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Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

Prepared for

Modesto Irrigation District

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Executive Summary

Introduction

Pursuant to the California Environmental Quality Act (CEQA), the Modesto Irrigation District (District or MID) is preparing this programmatic environmental impact report (PEIR) to disclose the anticipated environmental impacts associated with implementation of the Comprehensive Water Resources Management Plan (Proposed Program). The Proposed Program includes capital improvement projects and annual maintenance activities identified as the result of a comprehensive evaluation of the District's water resources, on-farm systems, land use patterns and projections, infrastructure, and finances.

Purpose of this Document

MID, as the lead agency under CEQA, determined preparation of a PEIR was the most appropriate approach to addressing potential impacts resulting from implementation of the Proposed Program. This determination was based on the nature of the Proposed Program, which includes capital improvement projects and annual maintenance activities, several of which are closely related but not necessarily fully defined. Implementation of the Proposed Program will require a significant investment and a long-term effort to implement all program components over the planning horizon through 2040. Many projects will involve construction activities that require coverage under applicable environmental plans and permits. MID intends to use this PEIR as the basis for CEQA compliance for future actions associated with implementation of the Proposed Program, including subsequent project-specific environmental review, as necessary.

Environmental Setting

MID is an independent, publicly owned utility that delivers irrigation water and electricity to municipal, agricultural, and residential customers in portions of Stanislaus County, California, and treated surface water to the city of Modesto, California. MID's primary source of water is surface water runoff from the Tuolumne River watershed. The 1,880-square-mile watershed extends to the high Sierra Nevada Mountains and terminates where the Tuolumne River flows into the San Joaquin River west of the city of Modesto. Groundwater within the MID irrigation service area is primarily used as a secondary source of water supply to supplement surface water from the Tuolumne River. MID currently delivers water serving approximately 66,000 acres of irrigated lands within its irrigation service area. The District's surface water resources are shown on Figure ES-1.

The Program Area includes the MID service area and proposed project locations outside the MID service area, which includes lands within unincorporated Stanislaus County and the cities of Modesto, Riverbank, and Waterford (Figure ES-2). The Study Area for each environmental resource area varies as applicable and is defined and described in the introduction to each resource/issue area in Section 3, Environmental Setting, Impacts, and Mitigation.

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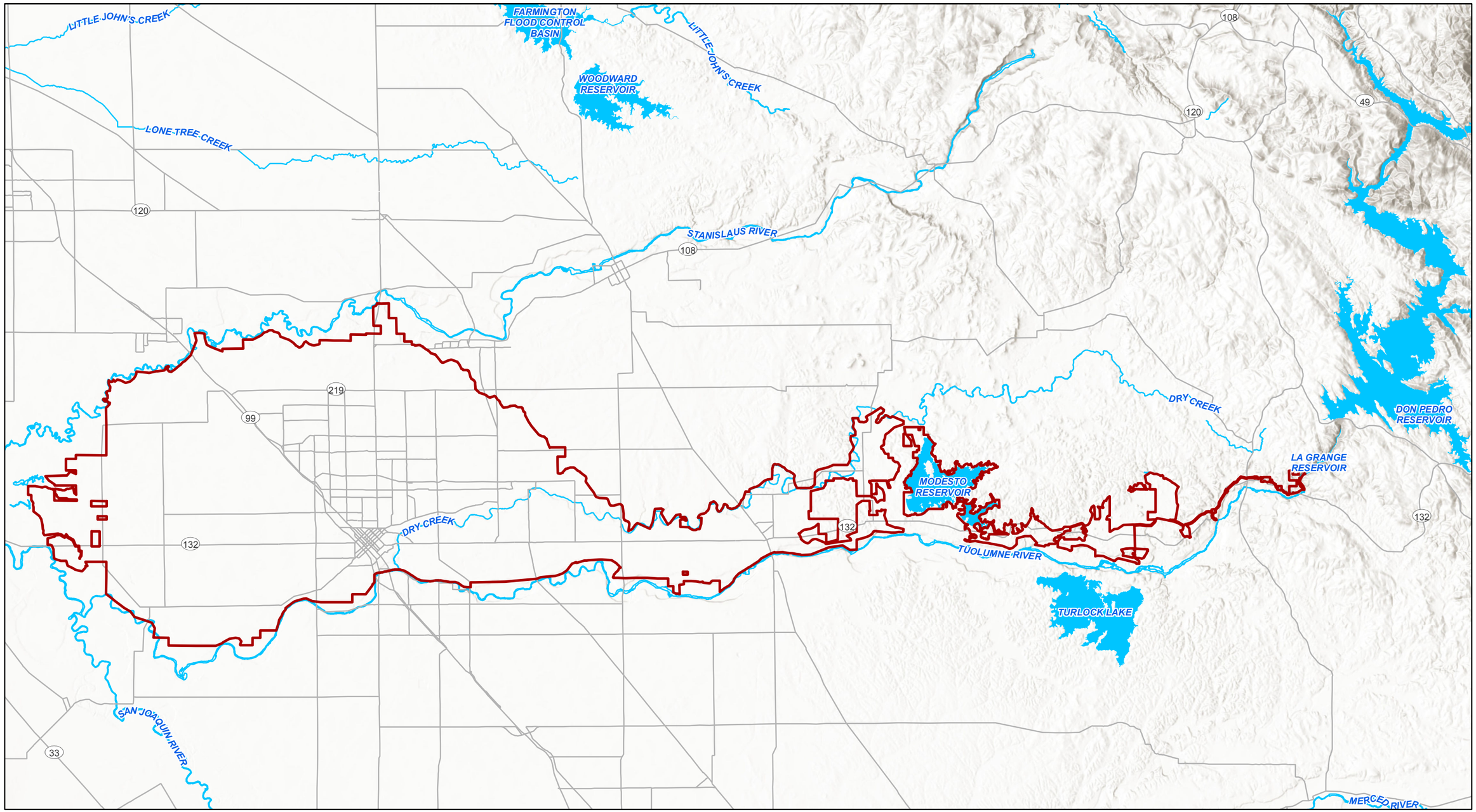

LEGEND

Modesto Irrigation District Service Area

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Service Layer Credits: Sources: Esri, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

FIGURE ES-1
Surface Water Resources within Modesto Irrigation District Service Area
Modesto Irrigation District
Stanislaus County, California

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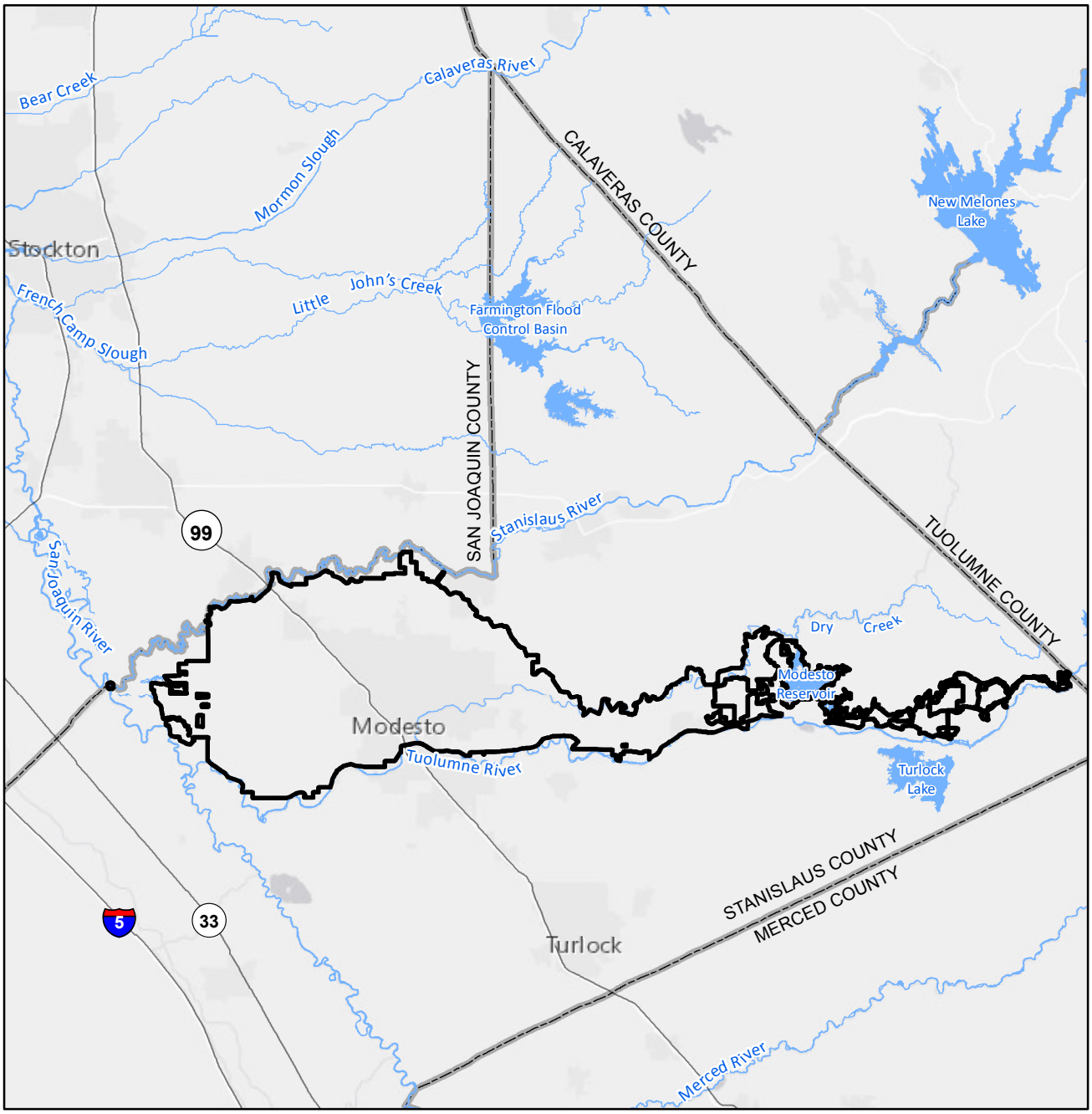

LEGEND

- Program Area
- County
- Water Body
- River, Creek, Canal

VICINITY MAP

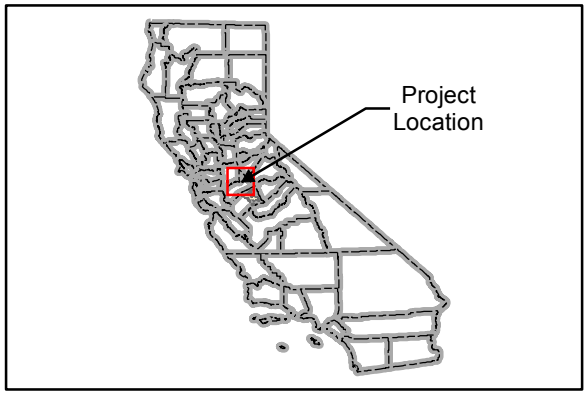

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FIGURE ES-2
Program Area
Modesto Irrigation District
Stanislaus County, California

Program Description

The Proposed Program includes approximately 70 projects grouped into the following 5 overall categories:

- Regulating Reservoirs – three regulating reservoirs proposed to meet future water delivery demands for customers and increase operational flexibility
- Canal, Lateral, and Tunnel Improvements – projects proposed to ensure canal, lateral, and tunnel operational reliability
- Flow Control – projects to provide operational reliability necessary to maintain a high level of customer service
- Groundwater Management – projects that include well testing, maintenance and rehabilitation, and replacing existing wells for conjunctive use
- Measurement and Automation – projects to minimize operational spills and service interruptions, replace aging supervisory control and data acquisition infrastructure, and achieve SB X7-7, Water Conservation Act of 2009, compliance

The Proposed Program includes several projects that are well defined and others that are currently more conceptual in nature. Conceptual projects are expected to be better defined as they progress through preliminary and final design. These projects have been evaluated to the extent possible and are anticipated to potentially require additional evaluation. As described in Section 2.1.1, Site-Specific Project Environmental Evaluation Checklist, prior to the start of construction, all proposed projects evaluated at the programmatic level in this PEIR (as well as projects evaluated at a project-level of detail, but delayed due to funding or changes in District priorities) would be subject to the Site-Specific Project Environmental Evaluation Checklist (Appendix A) process. This would ensure all potential impacts are identified and properly mitigated in accordance with the Mitigation Monitoring and Reporting Plan.

Program Objectives/Purpose and Need

CEQA requires that an EIR include a statement of project objectives. Similarly, the implementing regulations of the National Environmental Policy Act (NEPA) require that an environmental impact statement specify the purpose and need of the proposed action to frame the alternative methods of meeting the stated purpose of the action. Although this document is being prepared to satisfy CEQA requirements, MID has developed a purpose and need that can be used for subsequent documentation, as necessary, to complete future, potential NEPA requirements. The objectives and the purpose and need assisted MID in selecting the Proposed Program and determining how best to implement the Proposed Program.

As the lead agency under CEQA, MID's primary objectives in implementing the Proposed Program include the following:

- Provide a high level of customer services and meet customer's evolving water delivery needs
- Ensure compliance with Senate Bill (SB) X7-7, Water Conservation Act of 2009
- Implement irrigation infrastructure improvements for the stewardship of MID's water resources and increased operational reliability

The purpose of the Proposed Program is to implement the capital improvement projects identified by MID to address current system operations and limitations; land use, regulatory, resource, and customer-driven issues; and uphold MID's mission. Fulfilling these goals allows the District to balance reliability with reasonable water rates for MID customers and a high level of customer service, which in turn also allows MID to take a proactive role in supporting the agricultural economic base of the region. The need for the action stems from changing customer water needs and projected shifts in cropping patterns, land uses, water supply reliability, infrastructure needs, financial demands, and legislative actions.

Summary of Environmental Impacts and Mitigation Measures

Table ES-1 summarizes each of the potential environmental impacts evaluated in this PEIR, proposed mitigation measures to avoid or reduce impacts as necessary, and residual impacts given the implementation of mitigation.

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

PEIR Section and Impact	Level of Significance	Mitigation Measures
3.1 Aesthetics and Visual Resources		
Impact AES-1: Have a substantial effect on a scenic vista.	LTS	None required.
Impact AES-2: Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway.	No impact	None required.
Impact AES-3: Substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point) or, if in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.	LTS	None required.
Impact AES-4: Create a new source of substantial light or glare that will adversely affect day or nighttime views in the area.	LTS	None required.
3.2 Land Use and Agricultural Resources		
Impact AG/LU-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use.	LTS	None required.
Impact AG/LU-2: Conflict with existing zoning for agricultural use or a Williamson Act contract.	LTS	None required.
Impact AG/LU-3: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use.	LTS	None required.
Impact AG/LU-4: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	LTS	None required.

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3.3 Air Quality		
Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan.	LTS	None required.
Impact AQ-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.	LTS	None required.
Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations.	LTS	None required.
Impact AQ-4: Result in other emissions such as those leading to odors adversely affecting a substantial number of people.	LTS	None required.
3.4 Biological Resources		
Impact BR-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS. This includes potential reduction in the number, restricted range, increased mortality, or lowered reproductive success that jeopardizes the long-term persistence of local populations of an endangered or threatened native anadromous or resident fish species.	LTS with mitigation	MM-BR-1a: Nesting birds The following measures are recommended to avoid adverse effects on nesting birds (not including Swainson's hawk or other special-status raptor species) that nest within or immediately adjacent to the project site: • If construction occurs during the bird nesting season (generally February 1 through August 31), preconstruction nesting bird surveys (2 visits at least 1 week apart) will be conducted by a qualified biologist within the 14 days before construction to detect the presence of any nesting birds within or adjacent to the proposed project (within 400 feet for non-special-status raptors and within 100 feet for all other non-special-status birds). If construction occurs during the nonbreeding season for nesting birds (September 1 through January 31), preconstruction surveys are not required. • If the preconstruction nesting bird surveys detect actively nesting birds, the results of the surveys will be submitted to CDFW within 3 days of completing the surveys. If any active non-special-status bird nests are found on site, the applicant will avoid initiating any construction activities within the standard buffers described above (that is, 400 and 100 feet, as appropriate). The applicant will then develop and implement a plan for the protection and monitoring of these nests, to be approved by CDFW, in a timely manner. The results of any protective measures instituted as a part of the protection and monitoring plan will be provided to CDFW in electronic format within 1 week of implementation. The following measures are recommended to avoid adverse effects on nesting colonies of great blue heron (*Ardea herodias*) and great egret (*Ardea alba*): • Active nesting colonies of great blue heron or great egret will be avoided with a 400-foot buffer between the colony and active construction that uses heavy equipment or that involves tree removal.

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		• Minor modification activities may occur if they are short in duration (3 days or less), do not use heavy machinery, do not remove more than 900 square feet of vegetation, and avoid all activities within a 250-foot buffer between an active colony and construction activities. • If construction is initiated during the non-nesting season (September 1 through January 31), construction activities may occur within 100 feet of the nearest portion of the nest colony site. However, no woody vegetation (particularly large trees) within 200 feet of the nest colony site may be removed. MM-BR-1b: Burrowing owl Adverse effects on burrowing owls will be mitigated as follows: • The results of preconstruction surveys for burrowing owl, including negative findings, will be submitted to CDFW within 3 days of survey conclusion. If burrowing owls are found during the nesting season (February 15 through August 31), no ground disturbance will occur within 250 feet of occupied burrows until a qualified biologist determines that fledging has occurred (that is, the juveniles are no longer dependent upon the nest burrows). If burrowing owls are found during the non-nesting season (September 1 through February 14), no ground disturbance will occur within 160 feet of occupied burrows. • Alternatively, the applicant may retain a qualified biologist to conduct passive relocation of individuals from occupied burrows using 1-way doors for a minimum of 3 consecutive days (only during the non-nesting season). Once the occupied burrows have been cleared, the applicant may backfill the burrows. If passive relocation is used, the applicant will also provide alternate natural or artificial burrows that are more than 160 feet from the impact area and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair of relocated burrowing owls. One alternate natural or artificial burrow will be provided for each burrow that will be excavated within the project site. Artificial burrow creation, if used, will follow the guidelines in Trulio (1995) and the *Staff Report on Burrowing Owl Mitigation* (CDFG, 2012). The applicant will be responsible for reporting all observations of burrowing owl to the CNDDB within 10 days of the sighting. MM-BR-1c. Swainson's Hawk and White-tailed Kite Adverse effects on nesting Swainson's hawks and white-tailed kites will be mitigated as follows: • If active Swainson's hawk or white-tailed kite nests are detected during preconstruction surveys, a no-disturbance buffer zone of 500 feet will be implemented during the nesting season (March 1 through September 15) or until August 15 if management authorization is provided by CDFW (SHTAC, 2000). Furthermore, a nest monitoring plan will be developed and implemented for all active nests. If monitoring demonstrates that nesting individuals are being adversely affected, the no-disturbance zone will be increased in 100-foot increments until all adverse effects are eliminated. • Compensation for loss of suitable Swainson's hawk foraging habitat (mostly with reservoir construction) will be conducted as follows: habitat acquisition (through fee title or conservation easement) at a 1:1 ratio for nest sites within 1 mile, 0.75:1 ratio for nest sites within 5 miles,

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PEIR Section and Impact	Level of Significance	Mitigation Measures
		and 0.5:1 ratio for nest sites within 10 miles. Note that habitat acquisition can be "stacked" with mitigation for loss of agricultural land as long as the acquired land is planted in a suitable crop for Swainson's hawk foraging in 3 out of every 5 years. Compensation for loss of suitable white-tailed kite foraging habitat will be conducted concurrently with compensation for loss of suitable Swainson's hawk habitat. MM-BR-1d. Tricolored blackbird Adverse effects on nesting tricolored blackbird colonies will be mitigated as follows: • MID will prepare a habitat management plan and incidental take permit application for submittal to, and approval by, CDFW before any loss of suitable nesting habitat for tricolored blackbird on a project site. The habitat management plan will, at a minimum, include the following provisions: o To avoid and minimize impacts on nesting tricolored blackbird, MID will not initiate grubbing, grading, or other soil/vegetation disturbance within 250 feet of project boundaries during the nesting season (March 15 through July 30). All project soil/vegetation disturbance will occur between August 1 and March 14 to the extent feasible. o Alternatively, if MID initiates project soil/vegetation disturbance between March 15 and July 30, surveys will be conducted for prospecting or nesting tricolored blackbird colonies in all potentially suitable nesting habitats that are within and out to 250 feet from the project boundaries. The surveys will be conducted by a qualified biologist during the season immediately preceding initiation of the project. The surveys will be conducted according to the following schedule: a total of 2 visits during the early March 15 to July 30 time period with at least 1 month between survey visits. o If nesting colonies are found before initiation of project soil/vegetation disturbance in the year of the survey, a no-work exclusion zone will be established within 250 feet of each active nesting colony until a qualified biologist determines that the young-of-the-year are no longer reliant on the nest site. o Alternatively, MID may retain a qualified biologist to conduct daily monitoring of any active nesting colonies that are within 250 feet or less of project soil/vegetation disturbance to determine whether the individuals are exhibiting any behaviors that would suggest that nest failure could occur. If the qualified biologist determines that disturbance is sufficient to cause nest failure, all activities within 250 feet of the nesting colony will be terminated until the young-of-the-year are no longer reliant on the nest. o To compensate for the loss of known nesting habitat for tricolored blackbird on a project site, MID will plant Himalayan blackberry (*Rubus armeniacus*) or California blackberry at a minimum 2:1 compensation ratio. The compensation stands of blackberry will be sited on the nearest suitable land controlled by MID or on nearby alternative land on which MID has acquired a conservation easement acceptable to CDFW. Compensation sites will be chosen to avoid any loss of existing natural wetland communities. Annual monitoring of

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		the compensation stands will be conducted to determine whether tricolored blackbirds are using the compensation habitat. If no evidence of use has been found after 5 years of monitoring, MID will be required to plant additional blackberry at a minimum 1:1 compensation ratio on other lands under MID control within Stanislaus County where no active episodic human disturbance would preclude tricolored blackbirds from settling and nesting in the compensation habitat. MM-BR-1e. Western pond turtle Adverse effects on western pond turtle will be mitigated as follows: • During dewatering of any canal suitable for western pond turtle, the applicant will retain a qualified biologist to monitor the dewatering and salvage any stranded western pond turtles that are observed. Salvage will be conducted by net, and all individuals will be relocated to a portion of the associated canal at least 500 feet downstream of the nearest boundary of the project site that has at least 300 linear feet of continuous aquatic habitat. Any non-native turtles (for example, red-eared slider [*Trachemys scripta elegans*]) that are salvaged will not be released to the wild. The applicant will consult with CDFW in regard to the disposition of these latter individuals. • When removing the top 12 inches of soil from any relatively undisturbed edge habitat on or near the project site (ungraded road shoulders and field edges that could provide potential egg-laying sites), the applicant will use a qualified biologist as a spotter whose responsibility is to watch for western pond turtle eggs or neonates that are overturned during earthmoving. If eggs or neonates are found, all earthmoving activities within 30 feet of the eggs or neonates will be temporarily halted until the eggs or neonates can be salvaged. The eggs or neonates will then be delivered to a nearby qualified wildlife rescue and rehabilitation facility that has been approved by CDFW. The eggs or neonates will be held by the wildlife rescue and rehabilitation facility until they are ready for release into downstream portions of the associated canals (at least 500 feet downstream from the nearest project boundary). Once the top 12 inches of soil have been removed, no further monitoring for western pond turtle eggs or neonates is required given that western pond turtle nests are shallow (less than 6 inches deep). MM-BR-1f: California tiger salamander and western spadefoot Adverse effects on CTS will be mitigated as follows: • Concentrations of small mammal burrows and other suitable refugia that may support CTS will be avoided to the extent feasible. Prior to ground disturbance, linear routes will be mapped, marked in the field, and surveyed for burrows. Burrows within a vehicle access route that cannot be avoided and are susceptible to being crushed will be temporarily reinforced with polyvinyl chloride pipe or by other measures deemed effective by a qualified biologist before allowing vehicle access (dry season only). Any reinforcing materials will be removed immediately after access is completed. • Prior to any work within a project site with suitable CTS habitat or within 1 mile of suitable CTS habitat (or within 2 miles of known CTS occurrences where there is contiguous suitable habitat

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		between the project and occurrence), a one-way exclusion fence will be installed before winter (prior to October 15) of the planned year of construction. The exclusion fence around the project site will remain in place for the duration of the project. A qualified biologist will survey and delineate the fence route and be present during fence installation. Exit funnels or other appropriate exit structures for CTS will be provided no more than 60 feet apart along the entire fence alignment. The exclusion fence will be routinely inspected for repair for the duration of construction. Any damage, such as holes or gaps, will be repaired immediately. • CTS found within a project site will be captured by hand, contained in a 2-gallon plastic bucket with lid, and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, or under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation). • Prior to any disturbance of potentially suitable aquatic CTS breeding habitat, a qualified biologist will conduct presence/absence surveys within the habitat in accordance with the *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander October* (USFWS and CDFG, 2003). • Before the start of work each morning within the CTS exclusion fence, a qualified biologist will check for CTS under equipment and materials that are to be moved that day. The qualified biologist will also check all excavated steep-walled holes or trenches for CTS. CTS will be removed by the qualified biologists and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, or under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation). • A 10-mile-per-hour speed limit will be enforced at all project sites, except on roads with a posted speed limit. On roads with posted speed limits, construction traffic will be limited to the minimum safe speed. • If dead or injured CTS are found, the qualified biologist will consult with USFWS and CDFW to determine which, if any, additional protection measures will be implemented. These measures may include, but are not limited to, lower traffic threshold, more intensive monitoring, or controlled arrival and departures of construction traffic. Implementation of the above measures that address CTS also apply to western spadefoot and will also mitigate and compensate for potential adverse effects on this species within and adjacent to project sites. MM-BR-1g. Northern California Legless Lizard Adverse effects on northern California legless lizard will be mitigated as follows: • A preconstruction survey to identify suitable habitat for northern California legless lizard will be conducted no more than 30 days before initial ground-disturbing activities at a project site. • When removing the top 12 inches of soil from any construction activity area that has previously been identified as potentially suitable habitat for northern California legless lizard, the applicant will use a qualified biologist as a spotter whose responsibility is to watch for individuals of the

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PEIR Section and Impact	Level of Significance	Mitigation Measures
		species that are overturned during earthmoving. If neonates or adults are found, all earthmoving activities within 30 feet of the legless lizards will be temporarily halted until the individuals can be salvaged. The individuals will then be delivered to a nearby qualified wildlife rescue and rehabilitation facility that has been approved by CDFW. The individuals will be held by the wildlife rescue and rehabilitation facility until they are ready for release back to the project site (upon completion of remediation activities). Once the top 12 inches of soil have been removed, no further monitoring for northern California legless lizard individuals is required. Where suitable habitat for northern California legless lizards and egg-laying by western pond turtles overlaps, both surveys can be conducted concurrently. MM-BR-1h. Blainville's Horned Lizard Adverse effects on Blainville's horned lizard will be mitigated as follows: • Preconstruction visual surveys for horned lizards will be conducted weekly beginning 30 days before initial ground-disturbing activities at any project site where prior evidence of the species has been obtained. All horned lizards found within and out to 50 feet from the project footprint will be captured and released into designated relocation areas approved by a qualified biologist. • "Coverboards" will also be used to capture horned lizards. Coverboards will consist of untreated plywood at least 4 feet by 4 feet. Coverboards will be placed flat on the ground at least 30 days before construction and checked once a week. Captured horned lizards will be placed immediately into 5-gallon buckets containing sand and kept at a constant cool temperature. Horned lizards will be released in designated relocation areas no more than 1 hour after capture. • During all initial grading activities (first 12 inches of soil), a qualified biologist will be present as a spotter to salvage any horned lizard that may be excavated or unearthed with native material. If the individuals are in good health, they will be immediately relocated to the designated relocation area. If they are injured, the individuals will be held by a local wildlife rescue and rehabilitation facility until they are ready for release back to the project site (upon completion of all construction and related activities). MM-BR-1i. Vernal pool invertebrates Adverse effects on federally listed and other special-status vernal pool invertebrates will be mitigated through formal consultation with USFWS, with the likely consulting federal agency being the USACE. In the event of no federal nexus, the District will coordinate directly with USFWS through Section 10 of the FESA. USACE's guidelines for formal consultation and mitigation approach include the following (this approach will also be followed as appropriate as part of potential direct coordination with USFWS through the federal Section 10 process): • The precise location of the project site clearly delineated on either an original or high-quality copy of a USGS topographic map (exact scale, 7.5-minute, 1 inch = 24,000 inches). The map should include quad names; county name; project name; type of project by category (specify development or other); and townships, ranges, and sections in which the project is located. • Detailed maps of the proposed project site should include the following:

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		o Potential habitat of listed vernal pool plants and invertebrates (vernal pools, swales, and other areas in which water ponds in winter and spring) o On-site and adjacent properties where vernal pool complexes cross the property boundary o Other special-status species locations and habitats o Locations of any proposed on-site reserves o Locations of all proposed project features (buildings, roads, parking lots, bike trails, hiking paths, fences, irrigated and non-native landscaped areas, detention basins, recreation fields, parks, and any other open spaces) o Locations of existing infrastructure within proposed reserves, such as power lines, easements, pipelines, or any other underground structures for which access and maintenance privileges exist o Spatial buffers between the project features and avoided vernal pool resources o Watershed boundaries of wetlands, both avoided and affected, to assist in evaluation of indirect effects • Areas (in acres) directly and indirectly affected by the proposed project, including the following: o Total area of the project o Estimated area of listed vernal pool species habitat filled or destroyed, including effects of interrelated and interdependent actions o Estimated area of habitat of listed vernal pool invertebrates indirectly affected, and estimated size of buffer between the project features and adjacent avoided or preserved areas o Land use of properties adjacent to both affected areas and avoided or preserved areas o Map or discussion describing hydrological relationships of both affected and avoided wetlands with adjacent properties • Any conservation plan or conservation measures that the applicant proposes. To expedite consultation, such plans and measures should be developed during the informal consultation process with USFWS, before initiation of formal consultation, and should include the following: o Specific provisions for endowments for future management, maintenance, and ownership of any vernal pool reserves included in the conservation proposal o Specific locations and construction methods for any compensatory wetlands o Monitoring protocols, success criteria, and remediation protocols for any compensatory wetlands • A survey is required for any listed vernal pool plants if the proposed project is within the range of such species. If presence of listed invertebrates is not assumed, and the proposed project

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PEIR Section and Impact	Level of Significance	Mitigation Measures
		occurs in an area where USFWS does not assume presence of listed invertebrates in the watershed, protocol surveys are necessary. • In coordination with the requirements of any formal consultation regarding federally listed vernal pool invertebrates, MID will implement measures consistent with the formal consultation and Draft *Vernal Pool Mitigation and Monitoring Guidelines for U.S. Army Corps of Engineers South Pacific Division* (USACE, 2016) for compensatory mitigation projects involving vernal pool habitats as required for processing of Department of the Army permits under Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. MM-BR-1j. Valley Elderberry Longhorn Beetle Adverse effects on valley elderberry longhorn beetle will be mitigated consistent with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (*Desmocerus californicus dimorphus*) (USFWS, 2017). The framework provides specific detail and guidance for the implementation of mitigation. Mitigation measures in the framework include the following: • Avoidance and minimization measures • Transplanting of elderberries • Monitoring • Compensatory mitigation measures MM-BR-1k. Tree-Roosting Bats Adverse effects on tree-roosting bats (that is, western red bat [*Lasiurus blossevillii*] and hoary bat [*Lasiurus cinereus*]) will be mitigated as follows: • A qualified biologist will conduct a survey for tree-roosting bats at all suitable roosting habitat within 120 feet of the project boundaries. The survey will consist of the following: (1) daytime visual searches for individuals roosting in the foliage of on-site or adjacent large trees; and (2) evening Anabat or similar bioacoustic equipment surveys to show presence of foraging individuals. The surveys will be conducted on 2 consecutive days/nights during the 7 days before construction during months when these species may be present in the project area (that is, March 1 to October 15). • If the survey determines that individuals are present in on-site or adjacent roosting habitat (that is, riparian woodland, orchards, or other nearby mature trees), no construction activities that result in fugitive noise, vibration, light, or dust will occur within 120 feet of the roost site while it is occupied. • Ongoing evening surveys will be continued until 2 consecutive nights without any nearby detections have occurred (other than during the pupping season) and will then be terminated. Construction must then start within the next 2 days. • No additional evening surveys will be required at occupied sites and their 120-foot setback that are found during the pupping season (May 15 to July 15). Construction activities at such sites will be avoided until after mid-July. Construction must then start within the next 2 days.

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PEIR Section and Impact	Level of Significance	Mitigation Measures
		• All project night-lighting will be shielded and directed away from suitable roosting habitat. MM-BR-1l. Non-Tree-Roosting Bats Adverse effects on non-tree-roosting bats will be mitigated as follows: • A qualified biologist will conduct a survey for evidence of non-tree-roosting bats at constructed structures on site or within 100 feet of project boundaries (including bridges). • On-site day roosts will be avoided while the bat colony is present. A qualified biologist will assess when such roosts have been abandoned for the winter (typically early September to late March). Removal, demolition, or reconstruction of structures can then proceed once cleared by the biologist. • Work will not occur within 100 feet of an active roost. Airspace access to and from the occupied structure should remain unchanged. Combustion equipment, such as generators, pumps, and vehicles, will not to be parked or operated under or adjacent to the structure. Personnel will not be present near the colony, especially during the evening exodus. • Where work must occur in the area of a seasonal colony, bats will be excluded from directly affected work areas before April 15 of the construction year. Exclusion will be done selectively and only to the extent necessary to prevent morbidity or mortality to the colony. Expandable foam or other acceptable methods will be used for exclusion. Exclusionary devices will be removed between August 31 and April 15, once construction is complete. Airspace access to and from the bridge will not to be eliminated. Colony ventilation and protection will remain the same. Clearing and grubbing will be minimal, whenever possible. Combustion equipment, such as generators, pumps, and vehicles, will not be parked or operated under or adjacent to the structure unless they are required to be in contact with the structure. The presence of personnel directly adjacent to the colony will be minimized. • Where work must occur in the area of a seasonal colony, and the work requires either permanent demolition or substantial change of the structure, MID will consult with CDFW (for all bats) and USFWS (for federally listed species) with regard to construction, placement, and operation of temporary or permanent replacement habitat and monitoring. Such replacement habitat and monitoring will be consistent with the guidelines in California Department of Transportation's *California Bat Mitigation Techniques, Solutions, and Effectiveness* (2004). MM-BR-1m. American Badger Adverse effects on American badger will be mitigated as follows: • A preconstruction survey to identify suitable habitat for American badger will be conducted no more than 30 days before initial ground-disturbing activities at a project site. • If the preconstruction survey determines that the project site supports potentially suitable habitat for American badger, the applicant will conduct preconstruction surveys for dens, burrows, or other subterranean structures (potential dens) that could be occupied by the species. The preconstruction surveys will be conducted within no fewer than 14 days and no more than 30 days before the beginning of ground disturbance or construction activities.

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

PEIR Section and Impact	Level of Significance	Mitigation Measures
		Appropriate exclusion zones around potentially occupied subterranean habitat will then be observed where feasible as follows until there is evidence of no continued use: o Potential den – 50 feet o Atypical den – 50 feet o Known den – 100 feet o Natal/pupping den – 200 feet • Where infeasible to use an exclusion zone, limited destruction of potential dens will be conducted. Destruction of potential dens will be accomplished by careful excavation until it is certain that no American badgers are inside. The potential dens will be fully excavated, filled with dirt, and compacted to ensure that individuals cannot re-enter or use the den during the construction period. If at any point during excavation, an individual is discovered inside the den, the excavation activities will cease immediately, and the den will be monitored. Destruction of the den will be completed when, in the judgment of the biologist, the individual has escaped, without further disturbance, from the partially destroyed den. Destruction of any known or natal/pupping den requires authorization from CDFW. • Other applicable mitigation measures that address potential adverse effects on American badger include the following: o Project-related vehicles will observe a daytime speed limit of 20 miles per hour throughout the site in all project areas, except on county roads and state and federal highways. Nighttime construction will be minimized to the extent possible. However, if construction does occur during nighttime, the speed limit will be reduced to 10 miles per hour. Offroad traffic outside of designated project areas will be prohibited. o To prevent inadvertent entrapment of American badgers or other animals during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen fill or wooden planks will be installed. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If at any time a trapped or injured American badger is discovered, CDFW will be immediately contacted. o All food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in securely closed containers and removed at least once a week from the project site. o No firearms will be allowed on the project site. o No pets, such as dogs or cats, will be permitted on the project site to prevent the harassment or mortality of American badgers, or destruction of their dens. o Use of rodenticides and herbicides in project areas will be restricted. This restriction is necessary to prevent primary or secondary poisoning of individuals and the depletion of prey populations on which they depend. If uses of such compounds is necessary, workers

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
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PEIR Section and Impact	Level of Significance	Mitigation Measures
		will observe labels and other restrictions mandated by the Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation. Additional project-related restrictions deemed necessary by CDFW and USFWS will be observed. If rodent control must be conducted, zinc phosphide will be used because of its proven lower risk to American badger. o In the case of trapped animals, escape ramps or structures will be installed immediately to allow the animals to escape, or CDFW and USFWS will be contacted for guidance. MM-BR-1n. Sanford's Arrowhead Adverse effects on Sanford's arrowhead will be mitigated as follows: • No less than 25 percent of the potentially affected plugs (1 foot by 1 foot by 1 foot), with no fewer than three individual Sanford's arrowhead plants per plug, will be transplanted to an unlined portion of the occupied canals located immediately downstream from the project boundaries. The plug source locations will be selected randomly to ensure the greatest potential genetic diversity of the plants. • The transplantation program will not be bound by any survivorship monitoring standards given that it is expected that some of the source population will be unaffected by the project. However, the applicant will monitor the transplanted Sanford's arrowhead to evaluate the efficacy of such transplantation as it relates to future mitigation efforts for this species. Monitoring will occur for 3 consecutive years after transplantation, and a final report will be submitted to CDFW by October of the final year of monitoring. MM-BR-1o. Other Special-Status Plant Species Adverse effects on other special-status plants will be mitigated consistent with the *Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants* (CNPS, 1998) and will be accomplished through conference and coordination with CNPS. CNPS endorses the following measures: • Avoiding the impact altogether by not taking a certain action • Minimizing the impact by limiting the degree or magnitude of the action • Rectifying the impact by repairing, rehabilitating, or restoring the affected environment • Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the project • Compensating for the impact by replacing or providing substitute resources or environments elsewhere Multiple measures may be necessary to effectively mitigate adverse effects on a given plant species but will always be at the discretion of MID as long as the measures can be reasonably expected to avoid, minimize, or compensate for the anticipated effects.

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

PEIR Section and Impact	Level of Significance	Mitigation Measures
Impact BR-2: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, and coastal), riparian habitat, essential fish habitat (EFH), or other sensitive natural community identified in local or regional plans, policies, and regulations, or by CDFW and USFWS through direct removal, filling, hydrological interruption, or other means.	LTS with mitigation	MM-BR-2. Wetland and Riparian Habitats Wetlands identified as being potentially adversely affected by the construction of various project facilities under the Proposed Program would be field-delineated, and waters and wetland delineations would be verified by USACE. All jurisdictional determinations would be made as part of a formal delineation process, including information necessary to support a CWA 404(b)(1) analysis. Final determination of jurisdictional status and associated project impacts on such jurisdictional waters and wetlands would be determined by USACE, the Central Valley Regional Water Quality Control Board, and CDFW. Mitigation for unavoidable impacts on wetlands would be determined following USACE's 12501-SPD Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios (USACE, 2017) as well as USACE's Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines (USACE, 2015). Mitigation measures will include one or more of the following: • Obtaining credits from a mitigation bank • Making a payment to an in-lieu fee program that would conduct wetland restoration, creation, enhancement, or preservation activities. • Wetland restoration, establishment, enhancement, and/or preservation activities within the same watershed as the project impacts (off-site mitigation) where on-site mitigation would not be possible.
Impact BR-3: Substantially interfere with the movement of any native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.	LTS	None required.
Impact BR-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.	LTS	None required.
3.5 Cultural and Tribal Cultural Resources		
Impacts CUL-1 through CUL-4: Substantial adverse change in the significance of a historical resource, archaeological resource, or tribal cultural resources, or disturbance of human remains	LTS with mitigation	MM-CUL-1: Conduct cultural resources inventory. The Proposed Program could cause a substantial adverse change in the significance of a cultural resource as defined in CEQA Guidelines §15064.5. During the planning and design phase for individual projects and prior to ground-disturbing activities, MID will appoint a qualified CRS to conduct an inventory of the project locations and make evaluations for cultural resources. The archaeological and architectural resources surveys will consist of intensive pedestrian surveys to assess impacts on cultural resources when ground disturbance will occur within previously undisturbed areas. The CRS will meet the Secretary of the Interior's professional qualifications standards, as published in 36 CFR 61. MM-CUL-2: Monitoring Plan.

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

PEIR Section and Impact	Level of Significance	Mitigation Measures
		A qualified CRS will complete a construction monitoring program to be implemented according to recommendations. Monitoring and mitigation include required activities that may prescribe measures to ensure avoidance of resources, or compensate for the loss of significant cultural and tribal cultural resources because of unavoidable impacts resulting from the exigencies of a project's construction. The objectives of monitoring are to protect extant historical resources and unique archaeological resources, to identify at the time of discovery any archaeological materials exposed during ground disturbance, and to protect such resources from damage until recommendations of eligibility for the CRHR can be made. MM-CUL-3: Conduct cultural resources awareness training. A qualified CRS will prepare the cultural resources portion of the Worker Environmental Awareness Program, and worker environmental awareness training will be required for all personnel before working at construction sites. The training will emphasize and educate workers regarding sensitivity for cultural and tribal cultural resources on the site and procedures should such resources be encountered. MM-CUL-4: Protect resources upon discovery. If cultural resources are discovered during ground-disturbing activities, construction and maintenance work near the discovery would cease, and the area would be protected by a 50-foot buffer until the find could be evaluated by a qualified archaeologist. Mitigation measures recommended by the archaeologist will be implemented, and cultural resource mitigation measures will be consistent with guidance and standards in §15126.4 of the CEQA Guidelines. Protective measures may include avoidance and protection-in-place of the resource, as well as protecting the cultural character and integrity of the resource, protecting the traditional use of the resource, and protecting the confidentiality of the resource.
Impact CUL-5: Cause a substantial adverse change to the significance of a tribal cultural resource (defined in PRC §21074), determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC §5024.1(c). In applying the criteria set forth in PRC §5024.1(c), the lead agency shall consider the significance of a tribal cultural resource.		MM-CUL-5: Protect human remains upon discovery. If human remains are discovered, the discovery would be treated in accordance with the requirements of §7050.5(b) of the California Health and Safety Code. Pursuant to §7050.5(c) of the California Health and Safety Code. If the coroner determines that the human remains are of Native American origin, Stanislaus County would ensure that the discovery is treated in accordance with the provisions of PRC §5097.98(a) through (d).
3.6 Geology and Soils		
Impact GEO-1: Seismic-related ground failure, including liquefaction that would directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death.	LTS	None required.
Impact GEO-2: Substantial soil erosion or loss of topsoil.	LTS	None required.
Impact GEO-3: Unstable geologic unit, or a geologic unit that would become unstable as a result of the Proposed Program, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.	LTS	None required.

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

PEIR Section and Impact	Level of Significance	Mitigation Measures
Impact GEO-4: Substantial risks to life or property from expansive soil.	LTS	None required.
Impact GEO-5: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LTS	None required.
3.7 Greenhouse Gases		
Impact GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on environment.	LTS	None required.
Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.	LTS	None required.
3.8 Hydrology and Water Quality		
Impact HR-1: Violation of any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality.	LTS	None required.
Impact HR-2: Substantial decrease in groundwater supplies or interference with groundwater recharge such that sustainable groundwater management is impeded.	LTS	None required.
Impact HR-3: Substantial alteration to the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site.	LTS	None required.
Impact HR-4: Substantial alteration to the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site.	LTS	None required.
Impact HR-5: Substantial alteration to the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	LTS	None required.

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

PEIR Section and Impact	Level of Significance	Mitigation Measures
Impact HR-6: Risk release of pollutants due to project inundation in flood hazard, tsunami, or seiche zones; impede or redirect flows.	LTS	None required.
Impact HR-7: Conflict with or obstruction of the implementation of a water quality control plan or sustainable groundwater management plan.	No impact	None required.
3.9 Noise		
Impact NOI-1: Result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LTS	None required.
Impact NOI-2: Result in exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels.	LTS	None required.
Impact NOI-3: For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the Program Area to excessive noise levels.	LTS	None required.
3.10 Public Services and Utilities		
Impact Pub-1: A substantial adverse physical impact associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection, police protection, schools, parks, and/or other public facilities.	LTS	None required.
Impact Pub-2: Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	LTS	None required.
Impact Pub-3: Have insufficient water supplies available to serve the Proposed Program and reasonably foreseeable future development during normal, dry, and multiple dry years.	LTS	None required.

Table ES-1. Summary of Impacts and Mitigation Measures for Proposed Project
Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

PEIR Section and Impact	Level of Significance	Mitigation Measures
Impact Pub-4: Result in a determination by the wastewater treatment provider that serves or may serve the Proposed Program that it does not have adequate capacity to serve the projected demand in addition to the provider's existing commitments.	LTS	None required.
Impact Pub-5: Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LTS	None required.
Impact Pub-6: Compliance with federal, state, and local management and reduction statutes and regulations related to solid waste.	LTS	None required.
3.11 Transportation		
Impact TT-1: Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.	LTS	None required.
Impact TT-2: Conflict or be inconsistent with CEQA Guidelines §15064.3(b).	No impact	None required.
Impact TT-3: Substantially increase hazards due to a geometric design feature (such as sharp curves or dangerous intersections) or incompatible uses (such as farm equipment).	LTS	None required.
Impact TT-4: Result in inadequate emergency access.	LTS	None required.

Notes:

§ = section
CDFG = California Department of Fish and Game
CDFW = California Department of Fish and Wildlife
CEQA = California Environmental Quality Act
CFR = Code of Federal Regulations
CNDDB = California Natural Diversity Database
CNPS = California Native Plant Society
CRHR = California Register of Historic Resources
CRS = Cultural Resources Specialist
CTS = California tiger salamander
CWA = Clean Water Act
EFH = essential fish habitat
FESA = Federal Endangered Species Act
GHG = greenhouse gas
LTS = less than significant impact
MID = Modesto Irrigation District
MM = Mitigation Measure
NMFS = National Marine Fisheries Service
PRC = Public Resources Code
SHTAC = Swainson's Hawk Technical Advisory Committee
USACE = U.S. Army Corps of Engineers
USFWS = U.S. Fish and Wildlife Service

Contents

Appendices

Tables

Figures

Acronyms and Abbreviations

--	not applicable
>	greater than
<	less than
§	section
°F	Fahrenheit
µg/m^3	micrograms per cubic meter
AB	Assembly Bill
AADT	annual average daily traffic
ADT	average daily traffic
AF	acre-feet
ARB	California Air Resources Board
Assembly Bill 939	California Integrated Waste Management Act
BCC	Birds of Conservation Concern
BMP	best management practice
Board	Board of Directors
BPS	Best Performance Standard
CAA	Clean Water Act
CAAQS	California Ambient Air Quality Standards
Cal/OSHA	California OSHA
CalEEMod	California Emission Estimator Model
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CCIC	Central California Information Center
CCR	*California Code of Regulations*
CCV	California Central Valley
CDDS	California Division of Dam Safety
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDOC	California Department of Conservation
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFP	California Department of Fish and Wildlife-designated Fully Protected

CFR	*Code of Federal Regulations*
cfs	cubic feet per second
CGS	California Geologic Survey
CHRIS	California Historical Resource Information System
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPD	Comprehensive Planning District
CRHR	California Register of Historic Resources
CRS	Cultural Resources Specialist
CTS	California tiger salamander
CWA	Clean Water Act
CY	cubic yard(s)
dBA	decibels on the A-weighted scale
District	Modesto Irrigation District
DPS	distinct population segment
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EEC	Environmental Evaluation Checklist
EIR	environmental impact report
EIS	environmental impact statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EFH	essential fish habitat
FE	federally listed as Endangered
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FESA	federal Endangered Species Act
FMMP	Farmland Mapping and Monitoring Program
FR	*Federal Register*
FT	federally listed as Threatened
FTA	Federal Transit Administration

GAMAQI	*Guidance for Assessing and Mitigating Air Quality Impacts*
GHG	greenhouse gas
GSA	Groundwater Sustainability Agency
HP	horsepower
I-5	Interstate 5
ISR	Indirect Source Review
ITRC	Irrigation Training and Research Center
L_{eq}	equivalent noise level
L_{max}	maximum noise standard
LOS	level of service
LTS	less than significant
MBTA	Migratory Bird Treaty Act
MID	Modesto Irrigation District
MLM	Modesto Irrigation District Lower Main Canal
MM	mitigation measure
MMRP	Mitigation Monitoring and Reporting Plan
MMT	million metric ton(s)
$MMTCO_2e$	million metric tons carbon dioxide equivalent
MW	megawatt
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NOP	Notice of Preparation
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination Program
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places

NWPR	Navigable Waters Protection Rule
O&M	operations and maintenance
OID	Oakdale Irrigation District
OPR	Governor's Office of Planning and Research
OS	open space
OSHA	U.S. Occupational Safety and Health Administration
PCE	primary constituent element
PEIR	Programmatic Environmental Impact Report
PG&E	Pacific Gas and Electric Company
PM_{10}	particulate matter less than 10 micrometers in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in aerodynamic diameter
ppb	parts per billion
ppm	parts per million by volume
PRC	California Public Resources Code
Proposed Program	Comprehensive Water Resources Management Plan
RCNM User Guide	*Roadway Construction Noise Model User's Guide*
ROG	reactive organic gas
ROW	right of way
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
RWQCB	California Regional Water Quality Control Board
SB	Senate Bill
SB X7-7	Water Conservation Act of 2009
SCADA	supervisory control and data acquisition
SE	state listed as Endangered
SGMA	Sustainable Groundwater Management Act
SHTAC	Swainson's Hawk Technical Advisory Committee
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution District
SO_2	sulfur dioxide
SR	State Route
SRA	State Responsibility Area
ST	state listed as Threatened
StanCOG	Stanislaus Council of Governments

StanRTA	Stanislaus Regional Transit Authority
STRGBA	Stanislaus and Tuolumne Rivers Groundwater Basin Association Groundwater Sustainability Agency
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TID	Turlock Irrigation District
U.S.	United States
U.S.C.	United States Code
UBC	Uniform Building Code
UCMP	University of California, Museum of Paleontology
UD	urban design
USACE	U.S. Army Corps of Engineers
USD	U.S. dollar(s)
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	vibration decibels
VMT	vehicle miles traveled
vpd	vehicles per day
Williamson Act	California Land Conservation Act of 1965
WOTUS	Water of the U.S.

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SECTION 1

Introduction

Pursuant to the California Environmental Quality Act (CEQA), the Modesto Irrigation District (District or MID) is preparing this programmatic environmental impact report (PEIR) to disclose the anticipated environmental impacts associated with implementation of the Comprehensive Water Resources Management Plan (Proposed Program). The Proposed Program includes capital improvement projects and annual maintenance activities identified as the result of a comprehensive evaluation of the District's water resources, on-farm systems, land use patterns and projections, infrastructure, and finances.

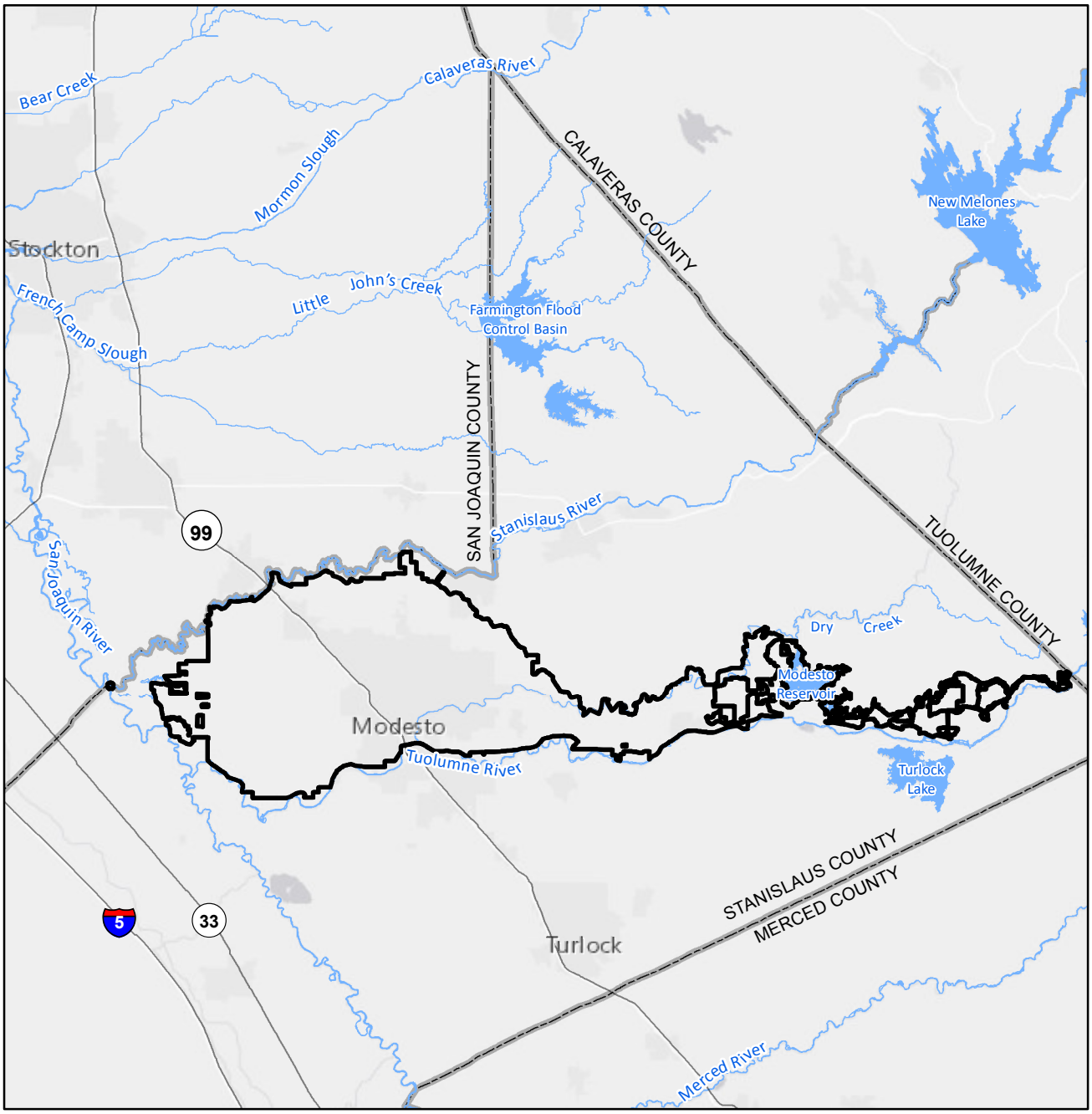
This introduction provides background on the District, summarizes the development of the Proposed Program, defines the Program Area and terminology used in this PEIR, and introduces other regulatory requirements associated with implementation of the Proposed Program. MID intends to use this PEIR as the basis for CEQA compliance for future actions associated with implementation of the Proposed Program, including subsequent project-specific environmental review, as necessary.

1.1 Background

MID is an independent, publicly owned utility that delivers irrigation water and electricity to municipal, agricultural, and residential customers in portions of Stanislaus County, California, and treated surface water to the city of Modesto, California. MID is located in the northern portion of the San Joaquin Valley, approximately 25 miles southeast of Stockton and 35 miles northwest of Merced (Figure 1-1). The District's system includes approximately 204 miles of canals, laterals, and pipelines; production wells; and drainage pumps. MID currently delivers water serving approximately 66,000 acres of irrigated lands within its irrigation service area.

MID's primary source of water is surface water runoff from the Tuolumne River watershed. The 1,880-square-mile watershed extends to the high Sierra Nevada Mountains and terminates where the Tuolumne River flows into the San Joaquin River west of the city of Modesto. Most water in the Tuolumne River comes from snowmelt, with peak runoff occurring from April through July. Groundwater within the MID irrigation service area is primarily used as a secondary source of water supply to supplement surface water from the Tuolumne River. The New Don Pedro Reservoir provides the primary surface water storage for MID and Turlock Irrigation District (TID). On the Tuolumne River downstream of New Don Pedro Reservoir is La Grange Diversion Dam, which is used as the primary diversion from the Tuolumne River for MID and TID. New Don Pedro Dam and La Grange Diversion Dam are operated jointly by MID and TID. The District's surface water resources are shown on Figure 1-2.

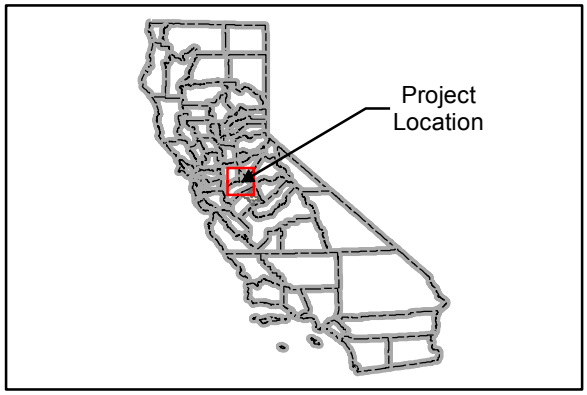
The MID mission is to provide electric, irrigation, and domestic water services for its customers, delivering the highest value at the lowest cost possible through teamwork, technology, innovation, and commitment. Over time, lands around the city of Modesto within the MID irrigation service area have been gradually converted from agricultural to urban uses, a trend that continues today. Cropping patterns and irrigation methods continue to evolve with technology and changing markets, which affects the water delivery needs of MID customers. To continue to achieve its mission, MID is implementing the Proposed Program to make irrigation infrastructure improvements to its water delivery system to better serve its customers, meet regulatory requirements, and be good stewards of water resources.



LEGEND

- Program Area
- County
- Water Body
- River, Creek, Canal

VICINITY MAP

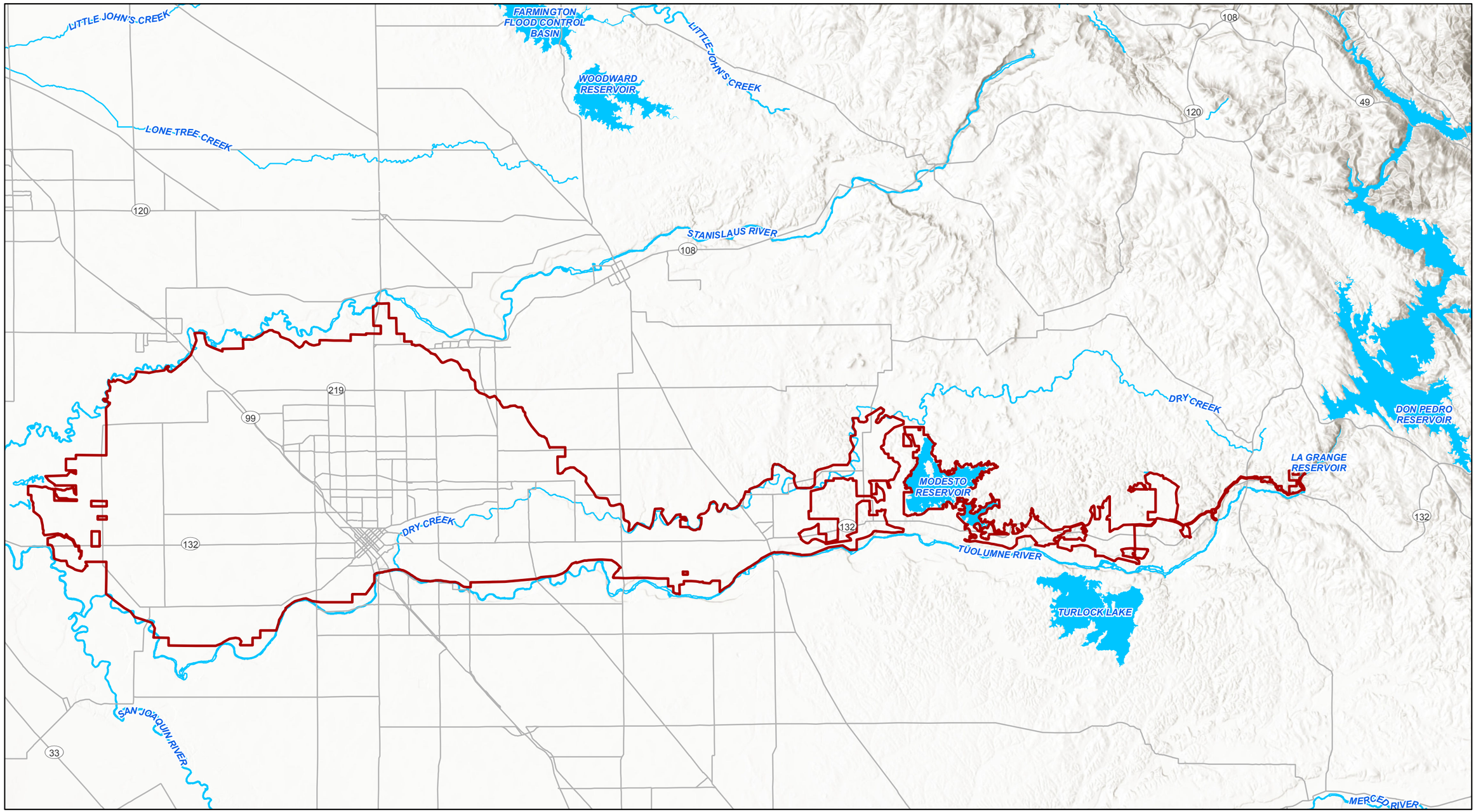


N

0 3.5 7 14

Miles

FIGURE 1-1
Program Area
Modesto Irrigation District
Stanislaus County, California



LEGEND

Modesto Irrigation District Service Area

N

0 1.5 3
Miles

Service Layer Credits: Sources: Esri, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

FIGURE 1-2
Surface Water Resources within Modesto Irrigation District Service Area
Modesto Irrigation District
Stanislaus County, California

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1.2 Proposed Program

The increasing complexity of water issues, locally and at the state and federal levels, led MID to initiate the Proposed Program, which includes a comprehensive evaluation of the District's on-farm systems, existing infrastructure, land use trends and forecasts, finances, and water resources. As part of the development of the Proposed Program, MID identified the following goals that reflect the District's long-term priorities and will guide decision-making over the planning horizon through 2040:

- Provide a high level of customer services and meet customers' evolving water delivery needs
- Ensure compliance with Senate Bill (SB) X7-7, the Water Conservation Act of 2009
- Implement irrigation infrastructure improvements for stewardship of MID's water resources and increased operational reliability

The Proposed Program was selected as the District's preferred approach given it best aligned with MID's goals and provides maximum flexibility for future decision-making. The Proposed Program identifies the capital improvement projects and annual maintenance activities necessary for MID to meet these goals. The Proposed Program includes approximately 70 projects grouped into the following five overall categories:

- Regulating Reservoirs – three regulating reservoirs proposed to meet future water delivery demands for customers and increase operational flexibility
- Canal, Lateral, and Tunnel Improvements – projects proposed to ensure canal, lateral, and tunnel operational reliability
- Flow Control – projects to provide operational reliability necessary to maintain a high level of customer service
- Groundwater Management – projects that include well testing, maintenance and rehabilitation, and replacing existing wells for conjunctive use
- Measurement and Automation – projects to minimize operational spills and service interruptions, replace aging supervisory control and data acquisition (SCADA) infrastructure, and achieve SB X7-7 compliance

Implementation of the Proposed Program will require a significant investment and a long-term effort to implement all program components over time. Many projects will involve construction activities that require coverage under applicable environmental plans and permits. To facilitate future environmental approvals, MID is developing this PEIR in accordance with CEQA.

1.3 Terminology Used within this Document

Several terms are unique to the Proposed Program and this document. Terms that are specific to this PEIR are defined as follows:

- Project(s) – Proposed capital improvements are referred to as "projects" under the Proposed Program.
- Project Categories – For the purposes of this PEIR, proposed projects have been grouped into categories based on anticipated similarity of impacts, including likely ground disturbance. The categories are listed in Section 1.2, Proposed Program, and described in more detail in Section 2, Program Description and Alternatives.
- Program Area – The Program Area includes the MID service area and proposed project locations outside the MID service area (Figure 1-1).
- Proposed Program – The Proposed Program includes approximately 70 projects as described in Section 2, Program Description and Alternatives.

- Study Area – The Study Area is the area that was considered in the impact analyses conducted for each environmental resource section. The Study Area for each environmental resource section varies as applicable and is defined and described in the introduction to each resource/issue area in Section 3, Environmental Setting, Impacts, and Mitigation.

1.4 Purpose and Use of this Programmatic Environmental Impact Report

MID determined the preparation of a PEIR was the most appropriate approach to address potential impacts resulting from implementation of the Proposed Program. This determination was based on the nature of the Proposed Program, which includes capital improvement projects and annual maintenance activities, several of which are closely related but not necessarily fully defined. As indicated in the CEQA Guidelines (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Section [§] 15168[a]), an agency should prepare a PEIR, rather than a project-level environmental impact report (EIR), when a number of related actions are proposed and are as follows:

- Linked geographically
- Logical parts in the chain of contemplated actions
- In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program
- Individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects that can be mitigated in similar ways

The Proposed Program includes projects that would require further definition to fully evaluate the potential impacts and are therefore described and assessed at a broad, programmatic level of analysis. Such projects are anticipated to require subsequent environmental documentation, as necessary. Other projects included in the Proposed Program are more defined and are evaluated at a project level.

The intended use of this PEIR is to (1) serve as a first-tier document for future implementation of the less-defined portions of the Proposed Program and (2) provide full compliance with CEQA requirements for the well-defined portions of the Proposed Program. Implementation of the Proposed Program would occur in several phases over the planning horizon through 2040.

During the planning and design phases for future projects, the District would evaluate the potential environmental impacts of constructing a particular project. This evaluation and siting process would be conducted for all projects to determine whether additional environmental documentation beyond this PEIR would be required and to potentially screen out locations (where feasible) that would result in the potential for significant impacts. A standardized approach would be used, including completion of a Site-Specific Project Environmental Evaluation Checklist (EEC; Appendix A) to determine whether additional site-specific resource evaluations are necessary for any given project. This standard approach would determine whether additional CEQA analysis is required and provide a consistent process for identifying potential impacts and implementing mitigation requirements identified in this PEIR, as well as other mitigation measures that may be identified in subsequent site-specific environmental documents.

As reflected in Appendix A, the less-defined projects of the Proposed Program would be evaluated in light of this PEIR to determine whether additional CEQA review is required as follows (CEQA Guidelines §15168[c]):

- If a later activity would have effects that were not examined in this PEIR, a new Initial Study would be prepared leading to either an EIR or a Negative Declaration.

- If the District found that, pursuant to CEQA Guidelines §15162, no subsequent EIR would be required, the District can approve the activity as being within the scope of the project covered by the PEIR, and no new environmental document would be required.
- The District would incorporate feasible mitigation measures and alternatives developed in the PEIR into subsequent actions in the Proposed Program.

If determined necessary through the EEC process, the additional CEQA analysis for future actions would be tiered from this PEIR.

This PEIR discloses relevant information to interested parties and invites such parties to play a role in both the decision-making process and the implementation of that decision. It also provides federal, state, and local decision-makers with detailed information concerning any potentially significant environmental impacts associated with the Proposed Program.

1.5 Project Objectives

CEQA requires that an EIR include a statement of project objectives. Similarly, the implementing regulations of the National Environmental Policy Act (NEPA) require that an environmental impact statement (EIS) specify the purpose and need of the proposed action to frame the alternative methods of meeting the stated purpose of the action. Although this document is being prepared to satisfy CEQA requirements, MID has developed a purpose and need that can be used for subsequent documentation, as necessary, to complete future, potential NEPA requirements. The objectives and the purpose and need assisted MID in selecting the Proposed Program and determining how best to implement the Proposed Program. MID is the lead agency under CEQA.

MID's primary objectives in implementing the Proposed Program, as presented in Section 1.2, Proposed Program, include the following:

- Provide a high level of customer services and meet customer's evolving water delivery needs
- Ensure compliance with SB X7-7, the Water Conservation Act of 2009
- Implement irrigation infrastructure improvements for the stewardship of MID's water resources and increased operational reliability

1.6 Purpose and Need

The purpose of the Proposed Program is to implement the capital improvement projects identified by MID to address current system operations and limitations; land use, regulatory, resource, and customer-driven issues; and uphold MID's mission. Fulfilling these goals allows the District to balance reliability with reasonable water rates for MID customers and a high level of customer service, which in turn also allows MID to take a proactive role in supporting the agricultural economic base of the region. Implementation of the Proposed Program would occur in several phases over the planning horizon to 2040.

The need for the action stems from changing customer water needs and projected shifts in cropping patterns, land uses, water supply reliability, infrastructure needs, financial demands, and legislative actions.

1.7 Consultation and Coordination

1.7.1 Notice of Preparation and Public Scoping

The District issued a CEQA Notice of Preparation (NOP) for this PEIR to the Governor's Office of Planning and Research State Clearinghouse on September 5, 2018 (Appendix B). In accordance with CEQA Guidelines, the NOP was subject to a 30-day comment period ending October 4, 2018. MID also held a public scoping meeting on October 2, 2018, to facilitate public and agency comments. The scoping process was designed to solicit input from the public, federal, state, and local agencies, and other interested parties on the scope of issues that should be addressed in this PEIR. Comments received on the NOP during the public scoping process are included in Appendix B.

The NOP indicated that impacts on various resource areas could occur as a result of implementation of the Proposed Program. Impacts on these resource areas are evaluated in Section 3, Environmental Setting, Impacts, and Mitigation. In addition, the environmental analysis contained in this PEIR is based on comments received on the NOP during the public scoping process, site reconnaissance visits, and available technical information. Technical reports and authorities consulted are listed in Section 7, References.

1.7.2 Circulation of this Programmatic Environmental Impact Report

This Draft PEIR will be circulated for a 45-day public comment and review period. Public comments on the Draft PEIR will be incorporated into a Final PEIR. MID will then consider whether to certify the Final PEIR. After MID certifies the Final PEIR, MID will also adopt findings of fact under CEQA Guidelines §15091. After considering the final PEIR and in conjunction with making findings under CEQA Guidelines §15091, the Lead Agency MID Board of Directors (Board) may decide whether or how to approve or carry out the Proposed Program. If the Board approves the Proposed Program, it must also approve a mitigation and monitoring program under CEQA Guidelines §15097. If the Final PEIR identifies significant and unavoidable impacts, the Board will need to issue a statement of overriding considerations outlining the reasons for proceeding given the identified impacts. A Final PEIR is expected to be completed by early 2023.

1.7.3 Areas of Potential Controversy

Although not anticipated to be major concerns, MID has identified the following areas of potential controversy with respect to the Proposed Program:

- Potential impacts on threatened, endangered, or rare species
- Potential impacts on air quality

This Draft PEIR addresses each of these areas of potential controversy within their respective resource sections included within Section 3, Environmental Setting, Impacts, and Mitigation.

1.8 Potentially Required Permits and Approvals

This PEIR discusses the Proposed Program and potential impacts at a level of detail appropriate for a long-term planning document. This PEIR generally evaluates the proposed capital improvement projects associated with the Proposed Program and identifies site-specific projects and actions that are currently known and proposed.

When implementing CEQA, several federal and state laws and policies must be considered, depending on the project type. At this stage of development, it is anticipated that the approvals presented below would potentially be required to implement the Proposed Program. As the components of the Proposed Program become more defined, the list below will become more defined. A summary of the potential

approvals required to implement some projects follows, and more detail is provided in Section 5, Consultation and Coordination:

- Federal Clean Water Act Section 404 Permit – United States (U.S.) Army Corps of Engineers (USACE)
- Federal Endangered Species Act (ESA) Section 7 consultation – U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS)
- Federal Fish and Wildlife Coordination Act Report – USFWS
- California Department of Fish and Wildlife 1600 Streambed Alteration Agreement – California Department of Fish and Wildlife (CDFW)
- California Endangered Species Act (CESA) consultation – CDFW
- Federal Clean Water Act Section 401 Water Quality Certification – California Regional Water Quality Control Board (RWQCB)
- Federal Clean Water Act (CWA) Section 402 General Construction Activity Stormwater Permit – RWQCB
- National Historic Preservation Act (NHPA) Section 106 authorization – California Department of Parks and Recreation, Office of Historic Preservation
- Approval of plans and specifications to construct or enlarge a dam or reservoir and certificate of approval to store water – California Department of Water Resources (DWR), California Division of Dam Safety (CDDS)
- Encroachment permits – Stanislaus County Public Works Department and California Department of Transportation (Caltrans)
- Landowner agreements

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SECTION 2

Program Description and Alternatives

The District developed and intends to implement an integrated and forward-looking Comprehensive Water Resources Management Plan (Proposed Program). The Proposed Program is based on a comprehensive evaluation of the District's water resources, on-farm systems, land use patterns and projections, infrastructure, and finances. The Proposed Program is developed around a set of the following goals and objectives:

- Providing a high level of customer services and meeting customer's evolving water delivery needs
- Ensuring compliance with SB X7-7, the Water Conservation Act of 2009
- Implementing irrigation infrastructure improvements for the stewardship of MID's water resources and increased operational reliability

The Proposed Program identifies the capital improvement projects and annual maintenance activities necessary for MID to meet these goals and objectives. The Proposed Program was selected as the District's preferred approach given it best aligned with MID's goals and provides maximum flexibility for future decision-making.

2.1 Proposed Program

The Proposed Program includes 72 projects grouped into the following 5 overall categories:

- Regulating Reservoirs – three regulating reservoirs proposed to meet future water delivery demands for customers and increase operational flexibility
- Canal, Lateral, and Tunnel Improvements – projects proposed to ensure canal, lateral, and tunnel operational reliability
- Flow Control – projects to provide operational reliability necessary to maintain a high level of customer service
- Groundwater Management – projects that include well testing, maintenance and rehabilitation, and replacing existing wells for conjunctive use
- Measurement and Automation – projects to minimize operational spills and service interruptions, replace aging SCADA infrastructure, and achieve SB X7-7 compliance

The Proposed Program identifies a number of projects that are well-defined and, therefore, able to be evaluated at a project-level, with conclusive impact analysis, as well as mitigation measures identified as determined to be necessary. Other projects included within the Proposed Program are currently more conceptual in nature and have not been developed to a level of detail to support project-level impact analysis. Such projects are expected to be better defined as they progress through preliminary and final design. These projects have been evaluated to the extent possible and are anticipated to potentially require additional evaluation.

As part of implementation of the Proposed Program, the District intends to use a Site-Specific Project Environmental Evaluation Checklist (EEC; Appendix A) to help identify and address potential impacts. Necessary mitigation would be implemented based on the Mitigation Monitoring and Reporting Plan (MMRP). Consistent use of the EEC and the MMRP would allow the District to accommodate most changes in priorities or funding availability by accounting for environmental resources and subsequent changes in conditions (for example, species or habitat presence). The EEC is further explained in Section 2.1.1, Site-Specific Project Environmental Evaluation Checklist.

Timing and phasing of projects are presented in the following sections to the extent they are currently known. Overall program implementation out to the 2040 planning horizon of the Proposed Program is shown on the draft schedule included in Appendix C. Implementation timing and phasing for any specific project depends on many factors, such as funding availability, year-to-year repair and rehabilitation priorities, and project-specific environmental review. Program implementation is anticipated to differ to some degree from what is outlined currently as requisite supporting activities are completed. Future factors including potential shifts in priorities as determined necessary by MID are expected to be key schedule and funding drivers.

2.1.1 Site-Specific Project Environmental Evaluation Checklist

This PEIR is intended to support future implementation of the Proposed Program. As the Proposed Program is implemented, individual projects would be evaluated in the light of this PEIR to determine whether additional environmental review is required. The District intends to use the following approach with respect to individual projects to be implemented as part of the overall Proposed Program, as specified in CEQA Guidelines §15168(c):

- If a later activity would have effects that were not examined in the PEIR, then a new Initial Study would need to be prepared leading to either an EIR or a Negative Declaration.
- If the District finds that, pursuant to §15162, no subsequent EIR would be required, the District can approve the activity as being within the scope of the project covered by the PEIR, and no new environmental document would be required.
- The District would incorporate feasible mitigation measures and alternatives developed in the PEIR into subsequent actions in the Proposed Program.
- Where the subsequent activities involve site-specific activities, the District has developed an EEC (Appendix A) to document site evaluation and activity and determine whether the environmental effects of the activity were covered in this PEIR.

During the planning and design phase for infrastructure improvements, the District would evaluate the potential environmental impacts of constructing a particular project, including locating a particular facility or group of facilities. This initial evaluation and siting would be conducted to determine whether additional environmental documentation is required beyond this PEIR, as well as to screen out potential locations (where feasible) that would result in the potential for significant but avoidable impacts. A standardized approach would be incorporated using the EEC described above (Appendix A) to guide site-specific resource evaluations for project locations that have been determined (that is, locations associated with existing facilities requiring maintenance or modification), as well as those projects that have not been sufficiently developed to support a site-specific analysis. This approach would facilitate consistent identification of impacts and implementation of mitigation requirements identified in this PEIR (as well as others that might be identified in subsequent site-specific environmental documents) to support the implementation of the Proposed Program.

The projects included as part of the Proposed Program are described in greater detail in the following sections, including implementation schedule, construction methods, and operational information where such information is available. Subsequent environmental review requirements would be evaluated within the context of the Proposed Program and this PEIR. Although the analysis and mitigation in this PEIR in anticipated to suffice for most proposed projects, additional documentation will likely be required in some cases.

2.1.2 System Improvements

The projects included in the Proposed Program have been grouped into the following project categories based on project types that have similar construction and operations and maintenance (O&M) details:

- Regulating Reservoirs – Projects in this category consist of three[1] planned regulating reservoirs that will be fundamental for MID to meet future water delivery demands for customers and increase operational flexibility by decreasing delivery response time to growers.
- Canal, Lateral, and Tunnel Improvements – These projects ensure canal, lateral, and tunnel operational reliability. Projects in this category are crucial to the entire irrigation system and must be addressed to prevent failure of the main canals and service liabilities. This category includes all projects on the Upper Main Canal, Lower Main Canal, Waterford Upper Main Canal, and the tunnels associated with these canals.
- Flow Control – Projects that would provide flow control and stormwater management, including check structures, such as weirs, headworks, headwalls, pump stations, and rehabilitate or replace aging and nonreinforced concrete pipelines (sections of which fail annually). These projects are instrumental in providing operational reliability, which is necessary to maintain a high level of customer service by minimizing pipeline failures and potential overflows.
- Groundwater Management – Projects include well testing, maintenance, and rehabilitation and constructing replacement wells for conjunctive use.
- Measurement and Automation – These projects are part of the ongoing modernization effort, including flow measurement upgrades and monitoring sites, additional SCADA infrastructure, and automatic trash cleaning racks. These projects minimize operational spills and service interruptions during the irrigation season, improve customer service, replace aging SCADA infrastructure, and achieve SB X7-7 compliance.

As identified earlier in this section, the proposed timing and phasing of all projects are presented in the following sections to the extent they are currently known, with proposed implementation greatly dependent on many factors, such as funding availability, year-to-year repair and rehabilitation priorities, project-specific environmental clearances, and securing agreements with cooperating partners, if necessary.

[1] The original Proposed Program included four regulating reservoirs; however, the Main Canal Reservoir was previously evaluated in the Main Canal Reservoir Initial Study and Mitigated Negative Declaration (MID, 2015) and therefore is not discussed further in this PEIR.

2.1.2.1 Regulating Reservoirs

The Proposed Program includes three regulating reservoirs that would provide increased flexibility for water deliveries to laterals and turnouts both upstream and downstream of each proposed facility. The new reservoirs would allow for improved management, which would include achieving downstream canal target flow rates, provide automated monitoring and control to reduce canal operational spills, and increase buffer storage capacity to better manage system outflows and improve customer service. Summary information for each proposed regulating reservoir project is presented in Table 2-1, and the approximate areas within which the proposed reservoirs could be located are shown on Figure 2-1.

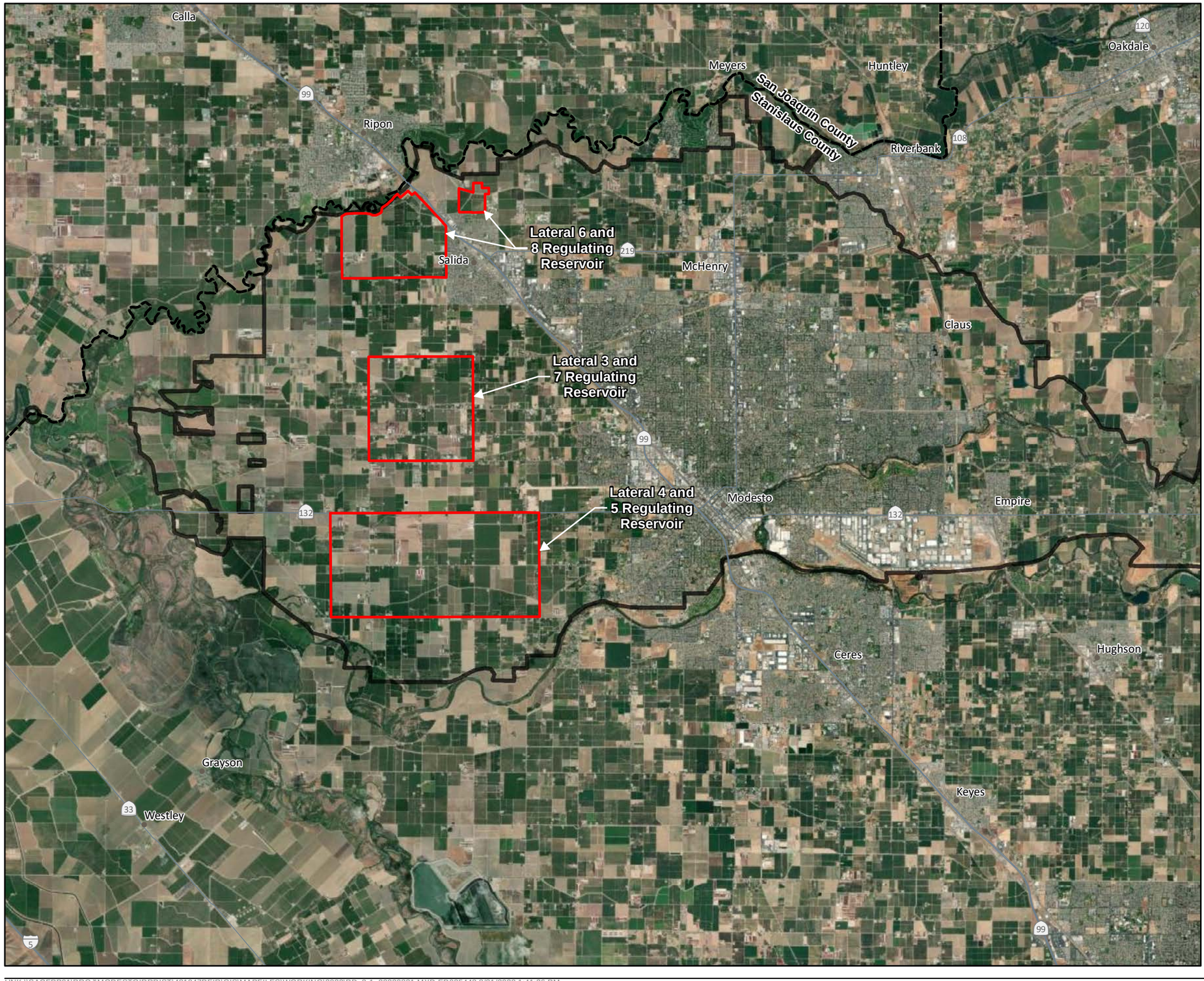
Table 2-1. Regulating Reservoir Projects
Modesto Irrigation District Programmatic Environmental Impact Report

Project Name	Footprint [a] and Capacity	Proposed Improvements	Proposed Schedule
Lateral 6 and 8 Regulating Reservoir	40 acres, 200 AF	Regulating reservoir; 80 cfs, 200 HP inlet; automated sluice gate inlet and outlet; pump station; interceptor pipeline; and SCADA for reservoir and pipeline operations	2025
Lateral 4 and 5 Regulating Reservoir	60 acres, 200 AF	Regulating reservoir; 90 cfs, 200 HP inlet flow; automated sluice gate inlet and outlet; pump station; interceptor pipeline; and SCADA for reservoir and pipeline operations	2030
Lateral 3 and 7 Regulating Reservoir	50 acres, 200 AF	Regulating reservoir; 60 cfs, 200 HP inlet flow; automated sluice gate inlet and outlet; pump station; interceptor pipeline; and SCADA for reservoir and pipeline operations	2035

[a] Footprint includes permanent and temporary impact areas and areas required for the interceptors (pipelines/open-cut channels).

Note:

AF = acre feet
cfs = cubic feet per second
HP = horsepower



LEGEND

- Program Area
- County
- Proposed Locations

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Figure 2-1
Proposed Locations of Regulating Reservoir Projects
Modesto Irrigation District
Stanislaus County, California

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Proposed Implementation

The three proposed regulating reservoirs would balance the demands of upstream and downstream irrigation delivery orders by diverting surplus flows from existing canals and laterals to the proposed reservoirs. The captured water would then be available for use to cover flow shortages. This balancing, or "buffering," of flows would allow for improved water delivery service at irrigation turnouts and improve overall water use efficiency by reducing unnecessary operational canal spills. The proposed reservoirs would not impound any natural surface water flows or other inflows. The approximate areas within which the proposed reservoirs could be located are shown on Figure 2-1.

Each proposed regulating reservoir project would span approximately 40 to 60 acres and could store and subsequently release up to 200 acre-feet (AF) with a maximum outlet flow of 60 to 90 cubic feet per second (cfs). Maximum pumping capacity to operate each reservoir would require up to 200 horsepower (HP). The reservoirs would be located between Lateral 3 and 7, Lateral 4 and 5, and Lateral 6 and 8, and would connect to the respective laterals via interceptor pipelines or open-cut channels. The reservoir footprints include permanent and temporary impact areas and areas required for the interceptors.

Proposed reservoirs likely would be constructed of unlined, compacted earth; however, reservoirs may be lined and may include riprap. Where feasible, the required reservoir basins would be located in proximity to existing canal and lateral facilities. In other cases, reservoirs may be located within approximately 1 mile of lateral facilities. Interceptor pipelines (approximately 42 inches in diameter) or open-cut channels would be used to connect the reservoir with the associated lateral.

The reservoir basin would be excavated and excavated soil from the interior of the reservoir would be used to construct embankments and berms surrounding the reservoirs. The berm would be approximately 6 to 10 feet above ground surface, with a top width of approximately 15 feet to also serve as an access road for maintenance purposes. The reservoirs would be constructed to a maximum depth of 8 feet. Water depth is anticipated to range from 0 to 6 feet, although typical depth is expected to range from 3 to 6 feet. If used, riprap lining may be installed on reservoir embankments to protect the embankments from erosion caused by reservoir drawdown, wind, and precipitation. Riprap material would be obtained from existing local sources, including Jackson Valley Rock Quarry in Ione, Table Mountain Quarry in Jamestown, and Carson Hill Rock and Concrete in Carson Hill.

Security fencing would be installed along the perimeter of the reservoir sites, as necessary. Permanent safety lighting may be incorporated for some reservoir facilities, such as at the outlet structures or otherwise wall-mounted on associated buildings. The safety lighting would be fully shielded, area-specific lighting that is directed downward to minimize glare and off-site light trespass. As required, to optimize earthwork and provide a means of draining the proposed reservoir, a drainage channel may be constructed within the reservoir inverts.

Other required features, including pumps and small ancillary facilities, would be constructed adjacent to the reservoir basin. Pump intake structures and canal outlet/inlet structures would be constructed at the tie-in locations of the canal and lateral facilities. Pump stations would be installed for most reservoir projects. SCADA systems would be installed to provide remote monitoring and control capabilities, and electrical and automation equipment would be housed in a control building.

Project Construction

Construction activities (including staging and laydown areas) for the proposed reservoirs would be contained within an approximate 4-acre construction footprint within and adjacent to the canal and existing facility footprints. No additional areas for staging and laydown outside of construction footprint would be needed. Construction of each reservoir is expected to last approximately 1 year in total and could occur any time of the year; however, tie-in work would occur outside of the irrigation season (between October 15 and March 15) to avoid affecting water deliveries. Work activities would also be

limited in winter months, as necessary, to times when access and work would not be constrained by weather. Activities requiring workers and truck traffic would include site excavation, backfill, and concrete pours, as well as vehicle trips for the delivery of concrete or hauling excavated material.

Each reservoir is anticipated to require approximately 370,000 cubic yards (CY) of soil excavation. Approximately 60 percent of this material is assumed to be suitable for reuse, and no additional soil would be imported. Approximately 80,000 CY would be used to construct the berms surrounding the new project facilities. Up to 10,000 CY may also be used along existing MID canal banks within a 5-mile radius of each project site to support ongoing bank maintenance for each reservoir. The remaining excess suitable and unsuitable material excavated for each project (up-to 280,000 CY) would either be sold to fill buyers or be permanently stored on District-owned property adjacent to project sites. As such, no excess excavation materials are anticipated to be diverted to landfills during facility construction.

Although each proposed reservoir would typically be unlined, up to approximately 630 CY of concrete would be trucked in for each reservoir to support associated necessary intake, discharge, and outlet facilities. Maximum excavation depths are expected to be approximately 10 feet deep at the inlet and outlet pumps and between 2 and 4 feet across each reservoir. Existing facilities would be demolished as necessary and potentially involve removing existing headgates from associated structures at the head of canal facilities for each proposed reservoir site and would generate approximately 50 CY of material per proposed reservoir, which would be disposed of at local recycling facilities, such as Modesto Sand and Gravel, located approximately 10 miles north of the city of Modesto. Table 2-2 summarizes anticipated construction activities (which would generally occur in sequence and only minimally overlap, with the exception of dust control), personnel, and equipment required for each of the proposed reservoir projects. As shown in Table 2-2, each project is anticipated to take approximately 1 year to complete.

Table 2-2. Individual Regulating Reservoir Projects Construction Work Days, Workforce, and Equipment [a]
Modesto Irrigation District Programmatic Environmental Impact Report

Activity	Work Days	Personnel Required	Equipment Required
Site Clearing	20 days	8 to 12	2 Bulldozers with brush attachments 1 Grader 1 Backhoe 1 Loader 3 Dump Trucks
Earthwork (topsoil stripping and removal)	20 days	5 to 14	2 Bulldozers 1 Loader 10 Dump Trucks
Earthwork (reservoir construction)	100 days	15 to 27	4 Scrapers 3 Bulldozers 1 Loader 1 Grader 2 Compactors 1 Water Truck 12 Dump Trucks
Structure/Equipment Installation	100 days	10 to 20	1 Excavator 1 Backhoe 1 Dump Truck 1 Concrete Truck/Pumping Equipment 1 Generator 1 Power screed 1 25-ton crane
Dust Control (overlaps construction activities)	200 days	2	2 Water Trucks

[a] This table lists anticipated average requirements for each of the regulating reservoir projects. Individual projects may vary in scale and complexity and, thus, will require more or fewer construction workers, work days, and equipment.

Construction Traffic

Construction traffic would access each proposed reservoir site via public roadways and existing District roads. Typical daily averages of construction vehicles entering and exiting the site during most of the construction period would range between 30 and 40 vehicles. Average daily construction activities would require up to 20 workers on site and 6 major pieces of equipment, with occasional increases to 27 workers and 8 to 12 pieces of major equipment. Activities requiring maximum workers and truck traffic would be limited to concrete pours, which could require approximately 80 vehicle trips for the delivery of concrete.

Operations and Maintenance

Each proposed regulating reservoir would be operated during the irrigation season to maintain a constant water surface elevation in the corresponding canals and laterals to achieve target flow rates, with flow discrepancies of up to 25 percent of canal flows absorbed by each proposed reservoir. To support improved water management capabilities, water would be conveyed in and out of the reservoirs via pumps or gravity flow.

A maximum of three maintenance personnel would perform most long-term O&M tasks. General reservoir maintenance would include weed control, levee/berm maintenance, and debris/sediment removal. When water is not present in the reservoir, silts would be removed from the bottom of the reservoir as required with heavy equipment, such as a grader and a tractor with a box scraper, and weeds may be disked. All mechanical and electrical equipment would be periodically inspected and maintained, as needed.

Normal operations would include visits by MID operations staff to monitor conditions and make manual changes to local irrigation services near the reservoirs, as needed. Operations of reservoir outlet gates would be managed using remote SCADA monitoring and control.

2.1.2.2 Canal, Lateral, and Tunnel Improvements

Improvements to tunnel, canal, and lateral infrastructure are proposed throughout the District as part of the Proposed Program. Existing tunnels are particularly critical facilities for conveying flow in the Upper Main Canal system. Failure of a tunnel would impact downstream irrigation operations, including the vast majority of the MID irrigation service area, and potentially affect the supply of municipal water to the city of Modesto. A total of 16 canal, lateral, and tunnel improvement projects are included in the Proposed Program. The approximate locations of the proposed canal, lateral, and tunnel improvement projects are presented in Figure 2-2. Table 2-3 summarizes information for the canal, lateral, and tunnel improvement projects.

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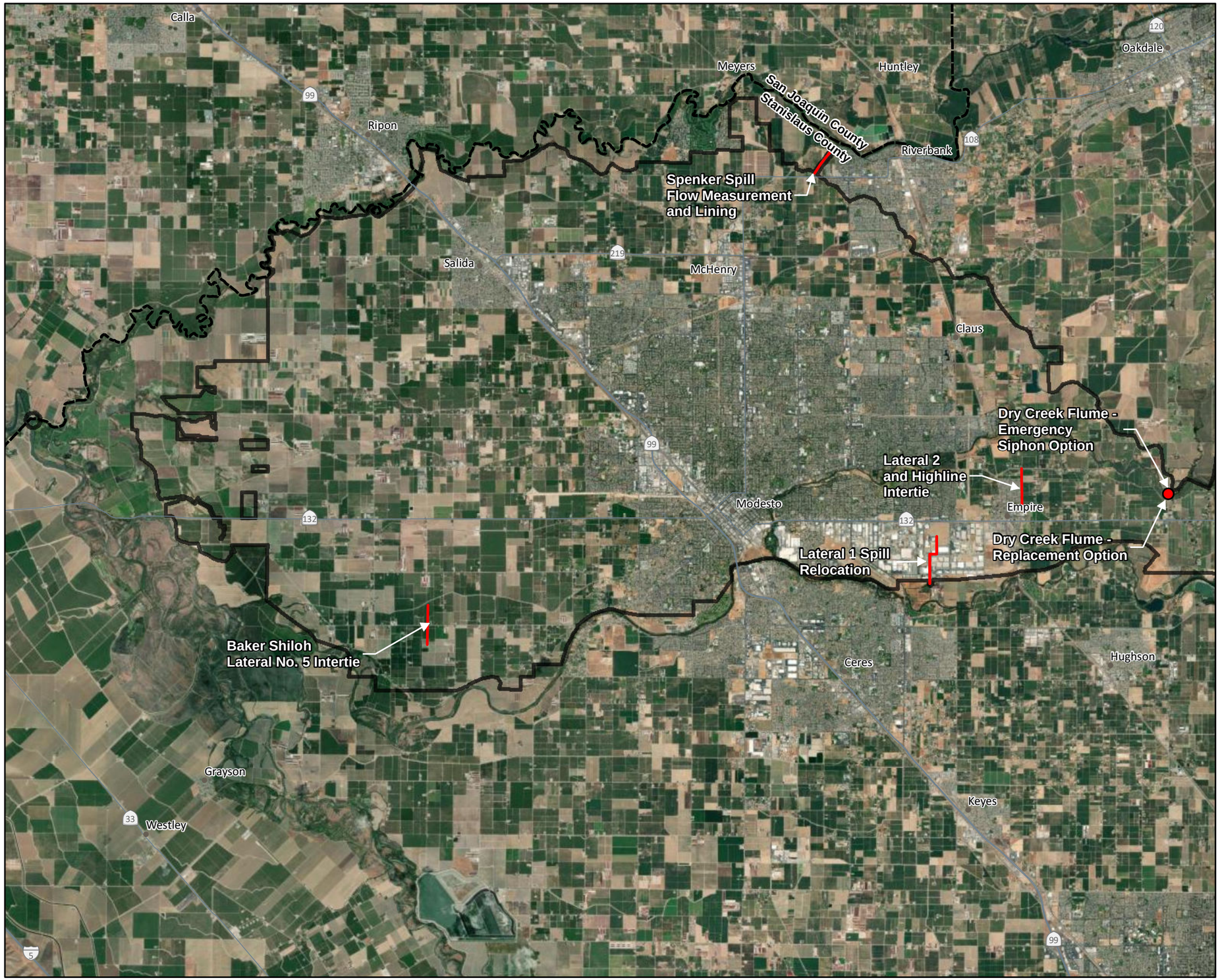

LEGEND

- Program Area
- County
- Project Location
- Project Location

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Figure 2-2 Sheet 1 of 2
Location of Canal, Lateral, and Tunnel Improvement Projects
Modesto Irrigation District
Stanislaus County, California

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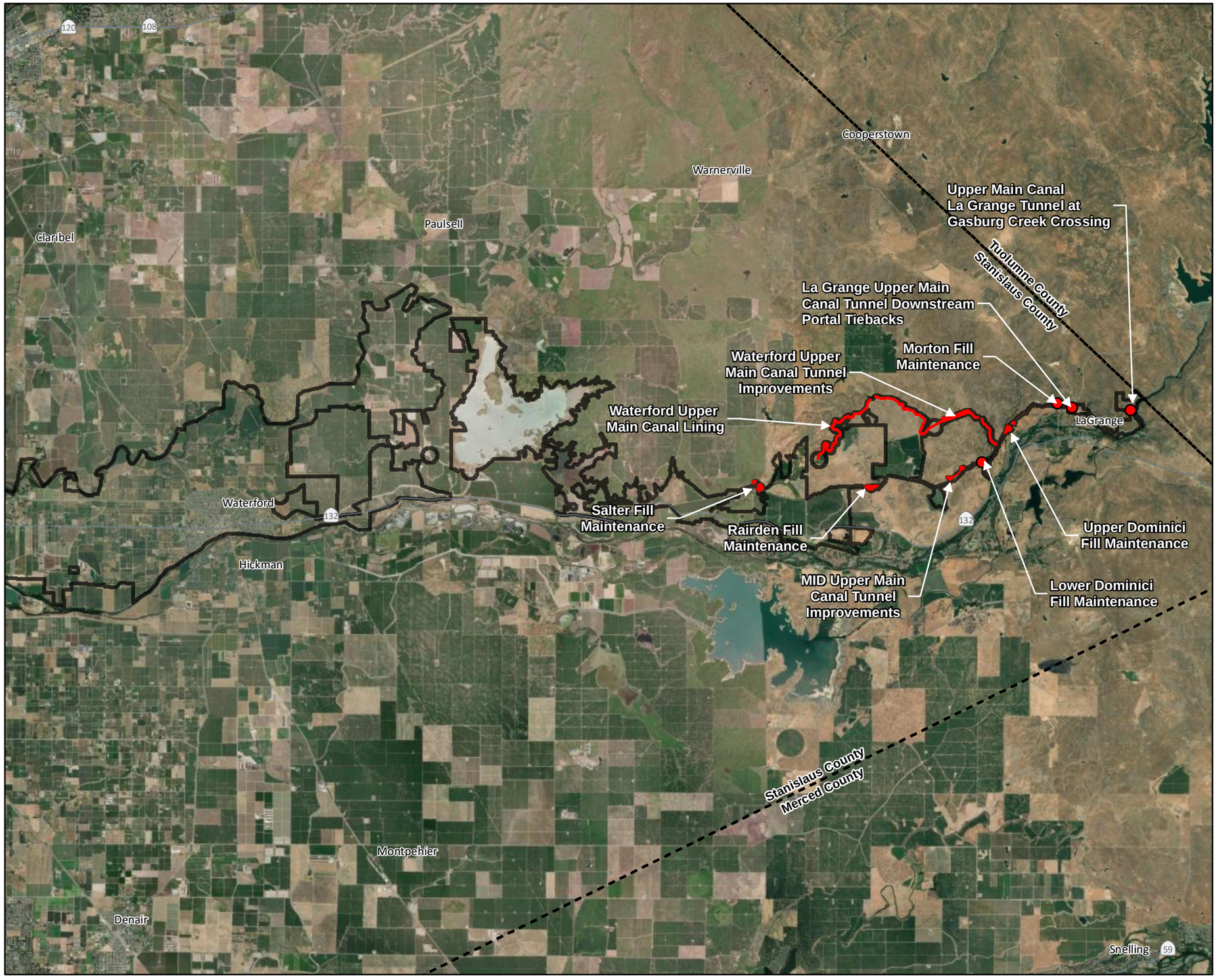

LEGEND

- Program Area
- County
- Project Location
- Project Location

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Figure 2-2 Sheet 2 of 2
Location of Canal, Lateral, and Tunnel Improvement Projects
Modesto Irrigation District
Stanislaus County, California

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Table 2-3. Canal, Lateral, and Tunnel Improvement Projects
Modesto Irrigation District Programmatic Environmental Impact Report

Project Name	Proposed Improvements	Proposed Schedule
Baker Shiloh Lateral 5 Intertie	Tie the Baker Shiloh Improvement District pipeline back into Lateral 5, essentially splitting up the existing improvement district into two separate areas of irrigation with flow coming back into the canal.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Dry Creek Flume - Emergency Siphon Option	Construct emergency siphon and associated inlet and outlet structures, instrumentation and control, and SCADA.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Dry Creek Flume - Replacement Option	Install permanent siphon replacement.	2033
La Grange Upper Main Canal Tunnel Downstream Portal Tiebacks	Install nine tiebacks to the shotcrete headwall above the downstream portal to address distress associated with shrink/swell of expansive retained soil.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Lateral 1 Spill Relocation	Abandon Lateral 1 downstream of new location.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Lateral 2 and Highline Intertie	Construct 42-inch reinforced concrete pipe intertie. Lateral to intertie Lateral 2 and Highline east of Town of Empire to eliminate Highline Lateral through Empire. Location proposed to be west of Root Road.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Lower Dominici Fill Maintenance	Remove vegetation from the upstream and downstream culvert headwalls, and repair of leaks in culvert, as needed.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
MID Upper Main Canal Tunnel Improvements	Perform land surveying to develop longitudinal profile of tunnel invert, crown, and ground surface above the tunnel and reevaluate tunnel stability based on longitudinal profile development; also install shotcrete and rock dowels at the upstream and downstream portal cuts to improve stability.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Morton Fill Maintenance	Remove debris, vegetation, and accumulated sediment at the concrete culvert inlet and outlet and patching of concrete cracks.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Rairden Fill Maintenance	Remove debris, vegetation, and accumulated sediment at the concrete culvert inlet and outlet; stabilize the upstream culvert headwall with tiebacks and a reinforced shotcrete facing or a buttress wall; and install cattle fencing around the shaft vents at ground surface.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Salter Fill Maintenance	Remove debris, vegetation, and accumulated sediment at the concrete culvert inlet and outlet; test spill pipe water; and overlay canal liner with shotcrete to reduce canal leaks and the associated fill settlement.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.

Table 2-3. Canal, Lateral, and Tunnel Improvement Projects
Modesto Irrigation District Programmatic Environmental Impact Report

Spenker Spill Flow Measurement and Lining	Install remote flow-monitoring and measurement equipment and 2,000 feet of lining.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Upper Dominici Fill Maintenance	Remove debris and accumulated sediment at the concrete culvert inlet and outlet; test water for leaks; conduct additional evaluation of upstream culvert headwall; and reduce ground loss and fill settlement.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Upper Main Canal La Grange Tunnel at Gasburg Creek Crossing	Install cover on tunnel/culverts for Gasburg Creek at top of La Grange Tunnel, and repair to address leak in the Tunnel near Gasburg Creek.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Waterford Upper Main Canal Lining	Line unlined sections of the Waterford Upper Main Canal.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.
Waterford Upper Main Canal Tunnel Improvements	Install cattle fencing around the shaft vents at ground surface, and develop additional projects to improve tunnel, downstream portal, and downstream canal sidewall stability that is compromised due to erosion and fallouts.	One Canal, Lateral, and Tunnel Improvement project would be constructed per year from 2024 to 2039.

Canals, laterals, and tunnels would be repaired, replaced, or rerouted as part of the Proposed Program. These improvements include lining and relining canals, rerouting laterals, installing new siphons, and in some cases, abandoning existing facilities. These improvements would reduce uncontrolled spills, improve operations at dead-end facilities, improve conveyance system efficiency and flexibility to meet the needs of local growers, and improve customer service as a result. One project within this category is anticipated to be completed each year from 2024 through 2039.

Proposed Implementation

Project Construction

Depending on the nature of the site, some tree removal and vegetation clearing would be necessary prior to canal rebuilding and relining. Construction at some facilities would be expected to occur outside of the irrigation season (between October 15 and March 15) to avoid impacting water deliveries. In some cases, construction would occur over multiple years for budget reasons, with specific sections of canal improved in phases each year. As identified above, total disturbance area including necessary temporary workspace would be less than 1 acre primarily within existing district right-of-way (ROW) and previously disturbed areas. Construction durations of the proposed canal, lateral, and tunnel improvement projects would range from approximately 2 months for the Lateral 2 and Highline Intertie to up to 12 months for the Dry Creek Flume – Replacement Option. Anticipated construction activities, personnel, and equipment required for each proposed canal, lateral, and tunnel improvement project is presented in Table 2-4 based on an approximately 6-month duration.

Table 2-4. Canal, Lateral, and Tunnel Improvements Construction Work Days, Workforce, and Equipment
Modesto Irrigation District Programmatic Environmental Impact Report

Activity	Work Days	Personnel Required	Equipment Required
Demolition or modification of existing facilities	40 days	6	1 Backhoe (with hydraulic hammer) 1 Excavator 1 Water Truck 1 Dump Truck 2 Concrete Trucks/Pumping Equipment
Construction	90 days	up to 10	2 Bulldozers 1 Backhoe (with hydraulic hammer) 1 Water Truck 1 Dump Trucks 2 Concrete Trucks/Pumping Equipment
Dust Control (overlaps construction activities)	130 days	1	1 Water Truck

Operations and Maintenance

Because these projects would generally repair and rehabilitate existing facilities, long-term O&M activities would not be expected to change based on the projects within this category. During the irrigation season, canals and laterals would be accessed on an as-needed basis by MID operations staff in field vehicles. MID operations staff would operate any manual flow control gates and conduct routine maintenance and inspections. During the winter shutdown, vegetation control, inspections, and repairs would be required. All of these activities are currently performed under existing O&M routines.

2.1.2.3 Flow Control

The Proposed Program includes implementing 13 projects that would increase the District's ability to control flow and manage stormwater. These projects would include installation of long-crested and sharp-crested weirs, control gates, headworks, pump stations, and check structures, which would generally be located within existing District ROW. Each proposed flow control project is summarized in Table 2-5, and the location of each proposed flow control project is presented on Figure 2-3.

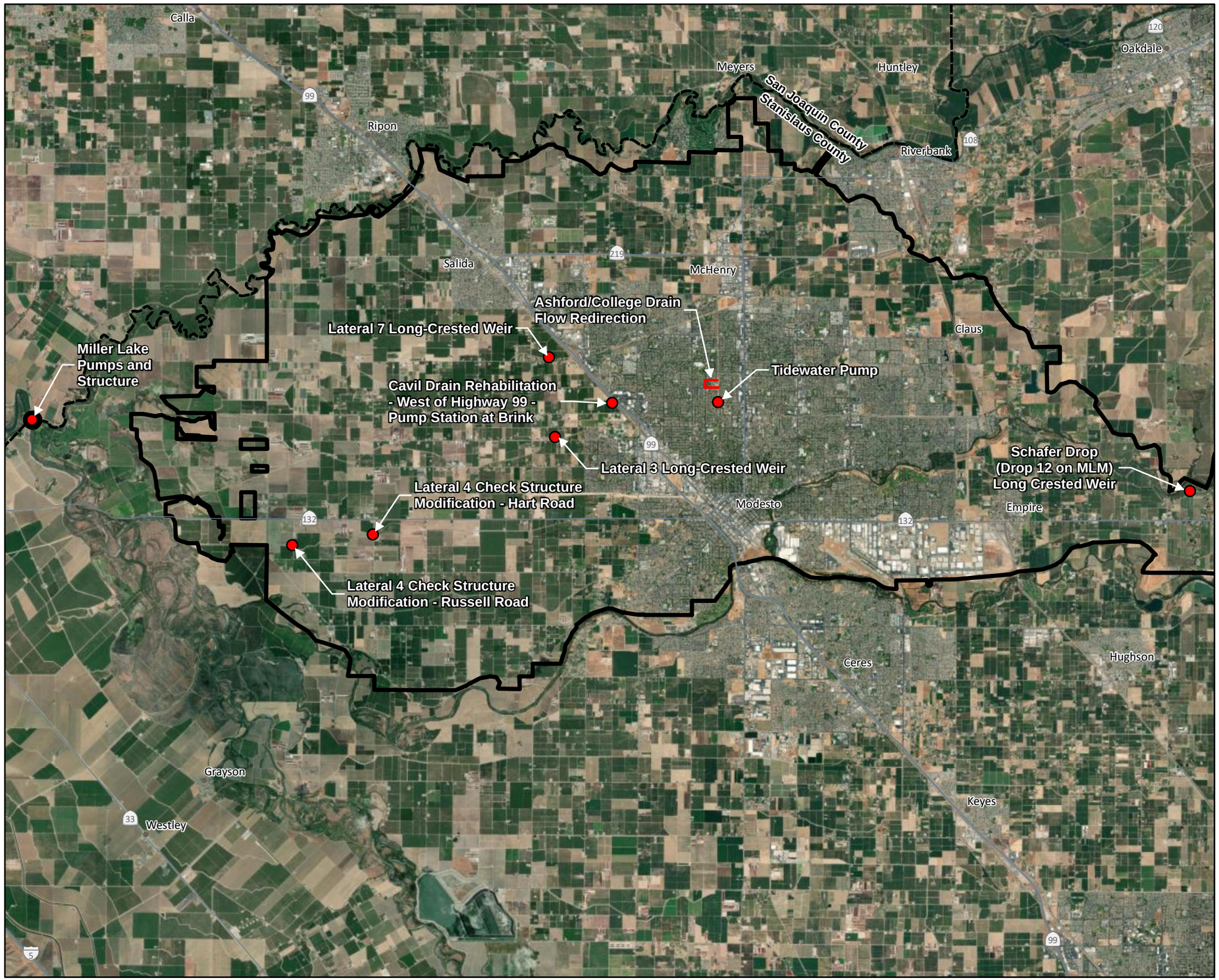
Table 2-5. Flow Control Projects
Modesto Irrigation District Programmatic Environmental Impact Report

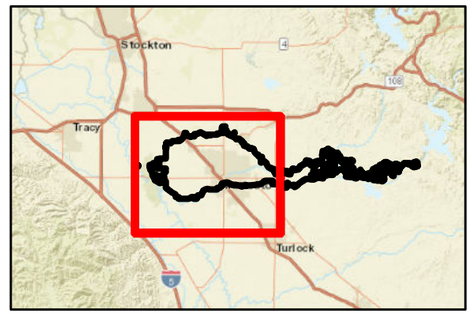
Project Name	Proposed Improvements	Proposed Schedule
Ashford/College Drain Flow Redirection	Re-direct flows from Ashford/College Drain inlet to Tidewater Drain by routing the stormwater from the Ashford/College drain inlet to the Tidewater line.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Cavil Drain Rehabilitation - East of Highway 99 - Pump Station at Brink	Install new pump station directly west of Highway 99 near Brink Avenue.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Lateral 4 Check Structure Modification	Modify Lateral 4 at Hart Road and Russell Road crossings. Alternatives include decreasing weir length or adding Irrigation Training and Research Center flap gate at Hart Road, and lowering weir	At least one Flow Control project would be constructed per year from 2023 to 2034.

Table 2-5. Flow Control Projects
Modesto Irrigation District Programmatic Environmental Impact Report

Project Name	Proposed Improvements	Proposed Schedule
	height or enlarging crossing at Russell Road.	
Lateral 3 Long-Crested Weir	Improve water delivery efficiency and water management with level control.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Lateral 7 Long-Crested Weir	Improve water delivery efficiency and water management with level control.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Lateral W-12 Long-Crested Weir at Missouri Road	Install long-crested weir upstream of Missouri Road.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Lateral W-3 Long-Crested Weir at W-3B Diversion	Install long-crested weir at W-3B Diversion.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Lateral W-A Headworks - SCADA	Replace existing headworks structure and Waterman manual C-10 gate.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Miller Lake Pumps and Structure	Rehabilitate 90-HP lift pump station and outlet for Miller Lake outflows and install automated trash rack cleaning system.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Schafer Drop (Drop 12 on MLM) Long-Crested Weir	Install 80-foot long-crested weir with eight 4.5-foot weir board bays.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Tidewater Pump	Upgrade 12 or 15-inch discharge to a 24-inch discharge by trenchless installation under Briggsmore Avenue and install additional pump(s) and backup generator.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Upper Main Canal - Emergency Spill at Upper Dominci Weir	Demolish existing structure; install new 70-CY headwall, high-capacity long-crested weir; install two 4-foot by 4-foot, electrically operated SCADA-controlled motor control slide gates; and make downstream land improvements, including riprap.	At least one Flow Control project would be constructed per year from 2023 to 2034.
Waterford Lower Main Canal - Boneyard Check Structure Drain	Install drain at existing check structure before siphon at Waterford Lower Main Canal.	At least one Flow Control project would be constructed per year from 2023 to 2034.

MLM = Modesto Irrigation District Lower Main Canal





LEGEND

- Program Area
- County
- Project Location
- Project Location

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Figure 2-3 Sheet 1 of 2
Location of Flow Control Projects
Modesto Irrigation District
Stanislaus County, California

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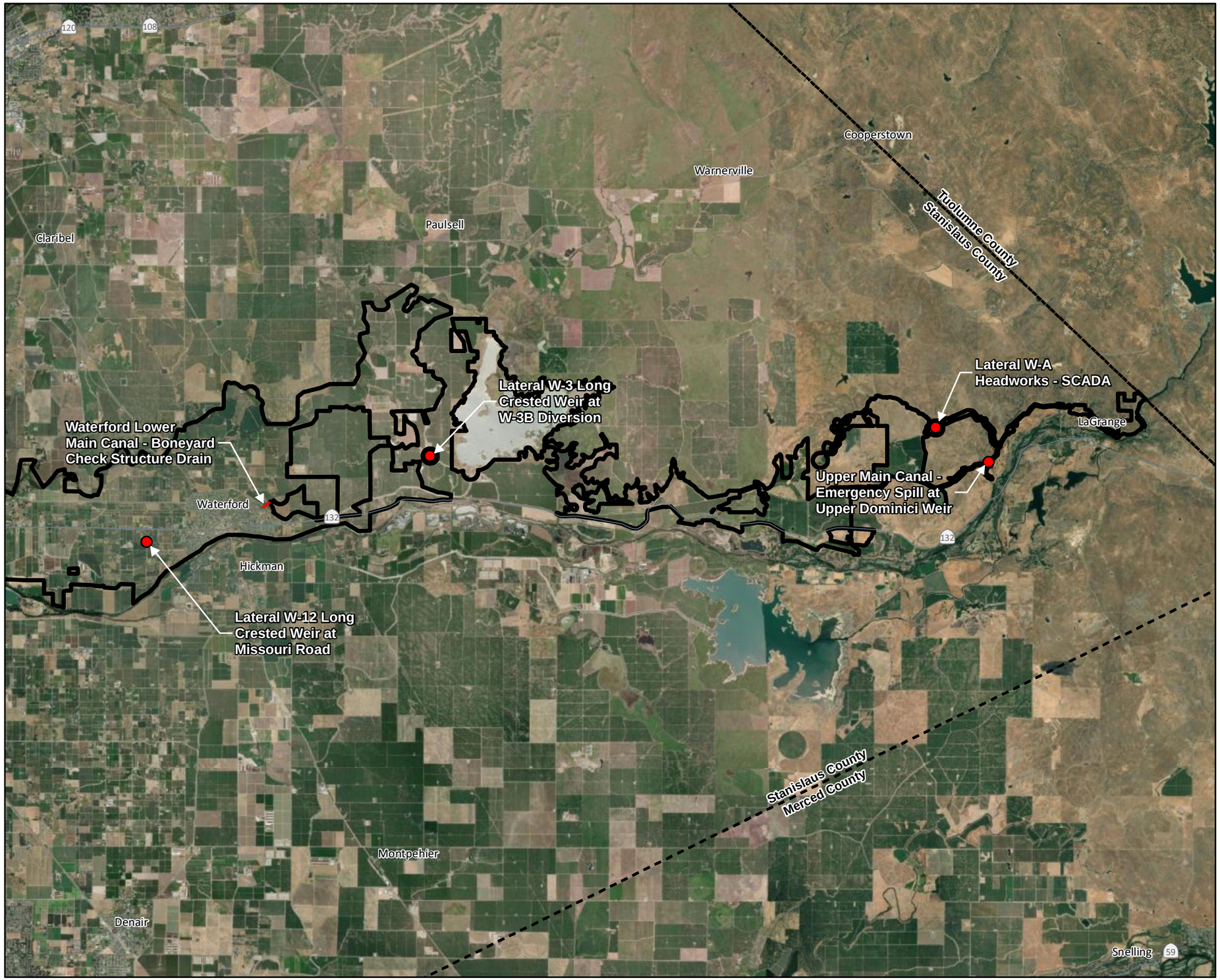

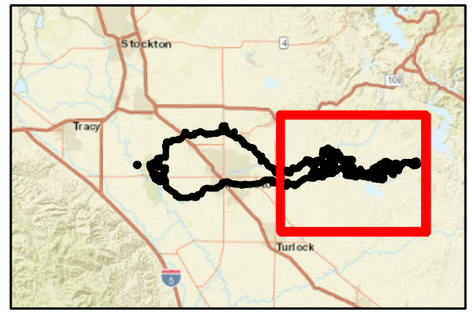

LEGEND

- Program Area
- County
- Project Location

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Figure 2-3 Sheet 2 of 2
Location of Flow Control Projects
Modesto Irrigation District
Stanislaus County, California

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Proposed Implementation

Construction activities, including staging and laydown areas, for the proposed flow control projects would typically be contained within temporary construction footprints spanning less than 1 acre within or adjacent to existing canal and existing facilities and/or District ROW. Due to the limited construction needs of demolition or rehabilitation of long-crested weirs and other flow control projects, these projects would not require additional areas for staging. Access to each facility would be via public roadways and existing District roads. With few exceptions, work would occur outside of the irrigation season (between October 15 and March 15) to avoid impacting water deliveries. It is anticipated that at least one project within this category would occur each year from 2023 to 2034. Activities requiring workers and truck traffic would include site excavation, backfill, and concrete pours, plus approximately 10 vehicle trips per project for the delivery of necessary materials and equipment and disposal of excess excavated material. Table 2-6 includes anticipated construction activities, personnel, and equipment required for each of the proposed flow control projects. As shown in the table, each project is anticipated to take approximately 6 to 8 weeks to complete.

Project Construction

Table 2-6. Flow Control Projects Construction Work Days, Workforce, and Equipment
Modesto Irrigation District Programmatic Environmental Impact Report

Activity	Work Days	Personnel Required	Equipment Required
Demolition/modification of existing facilities	20 days	6	1 Backhoe (with hydraulic hammer) 1 Excavator 1 Water Truck 1 Dump Truck 1 Concrete Truck/Pumping Equipment
Construction	20 days	up to 10	1 Backhoe (with hydraulic hammer) 1 Water Truck 1 Dump Truck 1 Concrete Truck/Pumping Equipment
Dust Control (overlaps construction activities)	40 days	1	1 Water Truck

Operations and Maintenance

O&M activities would generally include activities similar to those that currently occur within the service area, including regular access to the canals and control structures by MID operations staff to operate and maintain flow control gates, and routine maintenance and inspections of facilities. During the winter shutdown, vegetation control, inspections, and repairs would be required as is the case for current associated facilities.

2.1.2.4 Groundwater Management

MID uses groundwater to augment surface water supplies in the lower system. MID owns and operates 52 irrigation production wells and 43 drainage wells. Irrigation production wells are located throughout the District close to laterals to directly supply pumped water into the irrigation conveyance system. In three areas of the lower system, MID has automated wells to augment surface water deliveries based on the water level measurement in the canal. Drainage wells are used in the western lower system to prevent saturation of the root zone and protect crops from waterlogging.

The Proposed Program includes the implementation of seven groundwater management projects to repair, replace, or rehabilitate existing wells. The purpose of these projects is to maintain reliable existing sources of additional supply, as needed. These projects would not increase overall groundwater pumping levels or create new sources of additional supply. Summary information for each of the proposed groundwater management projects is presented in Table 2-7, and the location of each of the proposed groundwater management projects is presented on Figure 2-4.

Table 2-7. Groundwater Management Projects
Modesto Irrigation District Programmatic Environmental Impact Report

Project Name	Proposed Improvements	Proposed Schedule
Corson 66 Drainage Well	Rehabilitate the pump and motor. Install sounding tube	One Groundwater Management project would be constructed in 2023, 2024, 2026-2029, and 2032.
Edsel Pump Replacement Pipeline Project	Replace existing well and pump facilities with pipeline infrastructure.	One Groundwater Management project would be constructed in 2023, 2024, 2026-2029, and 2032.
Highline 197 Irrigation Well	Recommend additional testing and new pump panels.	One Groundwater Management project would be constructed in 2023, 2024, 2026-2029, and 2032.
Jackson 83 Drainage Well	Recommend additional testing and well replacement.	One Groundwater Management project would be constructed in 2023, 2024, 2026-2029, and 2032.
Langworth 240 Irrigation Well	Replace or reconfigure pump and motor.	One Groundwater Management project would be constructed in 2023, 2024, 2026-2029, and 2032.
Warnock 46 Drainage Well	Rehabilitate the pump and motor. Rehabilitate and clean well.	One Groundwater Management project would be constructed in 2023, 2024, 2026-2029, and 2032.
Wellsford 233 Irrigation Well	Install new pump panels.	One Groundwater Management project would be constructed in 2023, 2024, 2026-2029, and 2032.

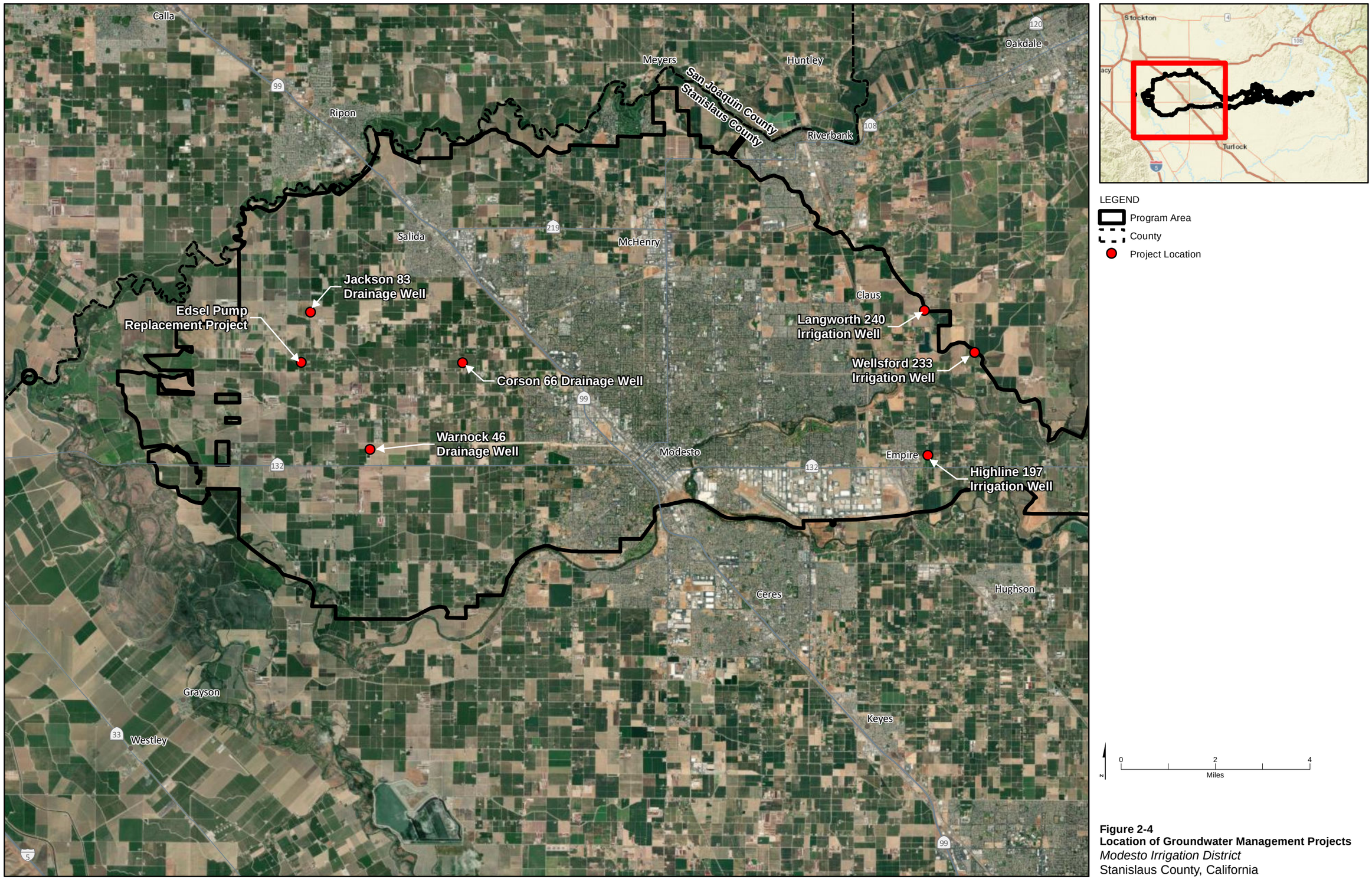

Figure 2-4
Location of Groundwater Management Projects
Modesto Irrigation District
Stanislaus County, California

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Proposed Implementation

Total construction footprint, including staging and laydown areas, would be approximately 0.5 acre for each well site. A 40-foot wide construction area or less would be required along the length of each discharge pipeline. Pipeline lengths would vary, ranging from 30 to 200 feet. Replacement wells would typically be located within 1,000 feet of the old well location. Soil excavation for the pipeline trenches and other structures would be to a depth that would provide a minimum cover of 3 feet above the pipe and 1 foot on either side. Excavation would be limited to the width of the easement and would vary by project.

Project Construction

Construction could occur any time of the year but would generally be completed during periods of dry conditions. It is anticipated that one well would be replaced in each of the designated years of the Proposed Program as shown in Table 2-7. Activities requiring workers and truck traffic would include site excavation, backfill, drilling, casing and gravel installation, and concrete pours, plus approximately one or two vehicle trips for the delivery of concrete or hauling excavated material. Upon completion of the well drilling, well development would occur by use of a truck, trailer mount pump, and 100 feet of drop hose. Construction traffic would access the sites via public roadways and existing District roads.
Table 2-8 includes anticipated construction activities, personnel, and equipment required for each of the proposed groundwater management projects. As shown in Table 2-8, each project is anticipated to take approximately 1 to 2 months.

Table 2-8. Groundwater Management Projects Construction Work Days, Workforce, and Equipment
Modesto Irrigation District Programmatic Environmental Impact Report

Activity	Work Days	Personnel Required	Equipment Required
Site Clearing, Earthwork	2 days	5	1 Excavator 1 Backhoe 1 Dump Truck 1 Concrete Truck/Pumping Equipment
Construction	26 days	5	1 Backhoe (with hydraulic hammer) 1 Drill Rig 1 Crane 1 Water Truck 1 Dump Truck 1 Concrete Truck/Pumping Equipment
Development	2 days		1 Truck 1 Pump Trailer
Dust Control (overlaps construction activities)	30	1	1 Water Truck

Operations and Maintenance

Irrigation groundwater wells are typically only utilized when surface water supply cannot meet irrigation demand and would continue to be operated in this manner after the proposed projects are complete. Drainage wells are used to help ensure that the agricultural root zone is not overly saturated, thus protecting crops. In addition, some drainage wells located in areas where the water table is below the root zone are pumped as a supplemental irrigation water supply in addition to surface water. O&M activities would generally include activities similar to those that currently occur within the service area, including routine maintenance and inspections of mechanical equipment, SCADA features, and local automated controls as necessary.

2.1.2.5 Measurement and Automation

The District implements a SCADA program that includes sites for electrical and irrigation facilities, and associated operation and control. In 2008, the SCADA system was split into two systems: electrical and irrigation. Since then, the District has further developed the irrigation SCADA system and has implemented new SCADA sites as well as upgraded existing sites. The Proposed Program includes 33 projects to increase the extent of automation and measurement devices across the District. These projects are summarized in Table 2-9, and the location of each of these measurement and automation projects is presented on Figure 2-5[2]. The Butler Communications Tower project is presented on Figure 2-6. Two projects within this category are anticipated to be completed each year from 2023 to 2037 and then one project per year from 2038 to 2040. The Butler Communications Tower would likely occur in 2031.

Table 2-9. Measurement and Automation Projects
Modesto Irrigation District Programmatic Environmental Impact Report

Project Name	Proposed Improvements	Proposed Schedule
Briggs Headgate Improvements	Install flow control and measurement device, and connect to SCADA system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Head of Butler Communications Tower/Butler Communications Tower	Install new tower and master radio site.	2031
Cities of Modesto, Riverbank, Empire, Salida Stormwater Pumping Measurement – SCADA	Measure flows from stormwater pumping into MID canals.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Goldsworthy Headgate Improvements	Install flow control and measurement device, and connect to SCADA system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Hinning Headgate Improvements	Install flow control and measurement device, and connect to SCADA system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Jacobson Drain – SCADA	Standard flow measurement SCADA site to be measured over a small rectangular weir	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Lateral 2/Highline Pipeline Headworks Flow Measurement	Install flow measurement device, connect to SCADA system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Lateral 3 Flow Measurement and SCADA at Gates Road	Install flow measurement device, connect to SCADA system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Lateral 4 Headworks Flow Measurement/Level Monitoring	Install flow measurement or high-water level monitoring device.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Lateral 7 Weir at Drop 8 – SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.

[2] The Cities of Modesto, Riverbank, Empire, Salida Stormwater Pumping Measurement - SCADA and SBx7-7: Flow Measurement Implementation Plan projects are not shown on Figure 2-5 because they include multiple locations throughout the Program Area.

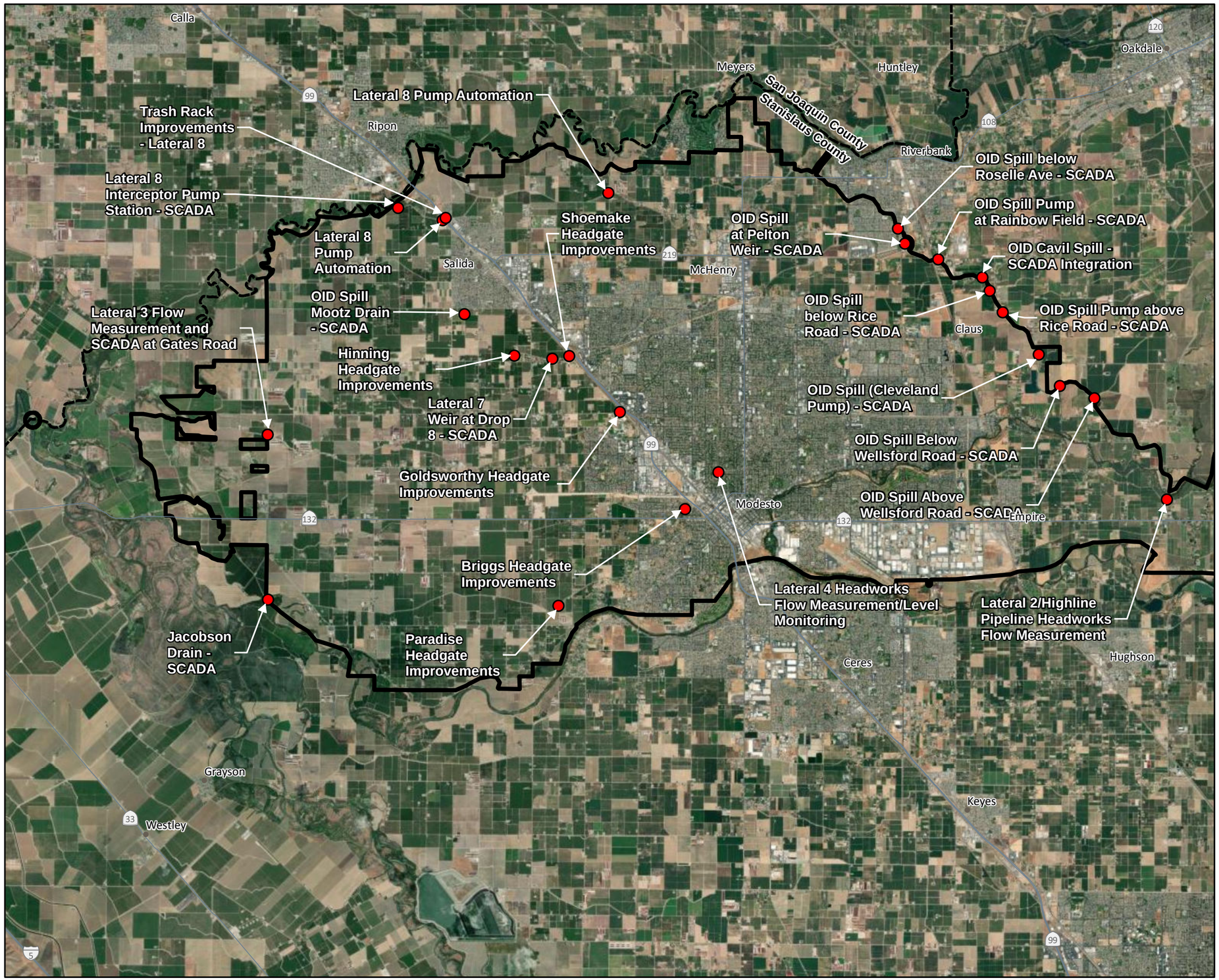
Table 2-9. Measurement and Automation Projects
Modesto Irrigation District Programmatic Environmental Impact Report

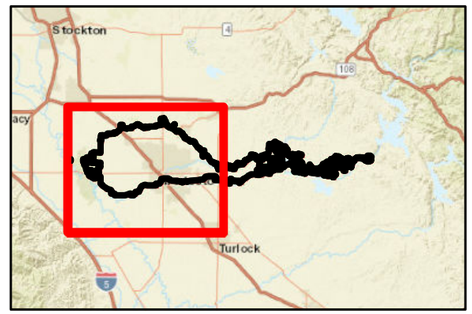
Project Name	Proposed Improvements	Proposed Schedule
Lateral 8 Interceptor Pump Station - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Lateral 8 Pump Automation	Automate Pump 208 and Pump 213.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Lateral W-10 Headworks - SCADA	Replace existing measurement system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Lower Waterford Canal at Lateral W-3 - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Cavil Spill - SCADA Integration	Incorporate OID Cavil Spill SCADA real-time data.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill (Cleveland Pump) - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill Above Wellsford Road - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill Below Wellsford Road - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill at Pelton Weir - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill Pump above Rice Road - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill below Rice Road - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill below Roselle Ave - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill Mootz Drain - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
OID Spill Pump at Rainbow Field - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Paradise Headgate Improvements	Install flow control and measurement device, connect to SCADA system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.

Table 2-9. Measurement and Automation Projects
Modesto Irrigation District Programmatic Environmental Impact Report

Project Name	Proposed Improvements	Proposed Schedule
Salter Gulch Spill (Laterals W-B and W-C) - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
SBx7-7: Flow Measurement Implementation Plan	Modify approximately 900 turnout locations to accept a measurement device for direct measurement or for re-calibration of the existing meter gate, with 60 devices being installed each year.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Scow Drop Measuring Weir	Inspect air vents, remove trash and install caps with a mesh of large holes, install new dataloggers and controllers.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Shoemake Headgate Improvements	Install flow control and measurement device, connect to SCADA system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Trash Rack Improvements - Lateral 8 - Other Hwy 99 crossings	Install automated trash rack cleaning systems.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Waterford Laterals Improvements: W-B, W-3B, W-5, W-8, W-9, W-10, W-11, W-12, Beard, Butcher, Tully	Install flow control and measurement device, connect to SCADA system.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Waterford Lower Main Canal at Lateral W-9 - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.
Waterford Lower Main Canal at Lateral W-10 - SCADA	Install standard flow measurement SCADA site.	Two Measurement and Automation projects would be constructed per year from 2023 to 2037 and one project per year from 2038 to 2040.

OID = Oakdale Irrigation District





LEGEND

- Program Area
- County
- Project Location

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Figure 2-5 Sheet 1 of 2
Location of Measurement and Automation Projects
Modesto Irrigation District
Stanislaus County, California

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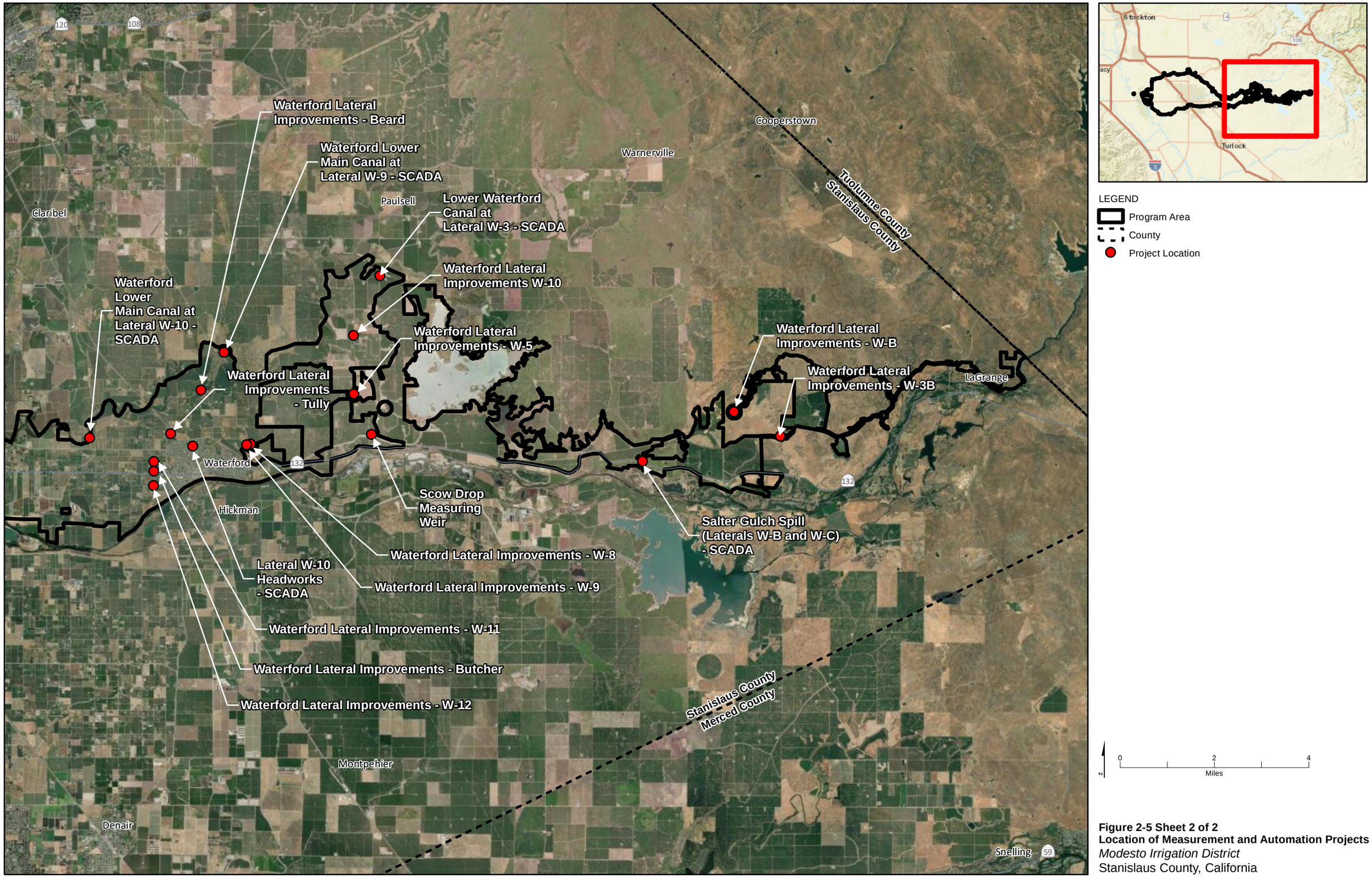

Figure 2-5 Sheet 2 of 2
Location of Measurement and Automation Projects
Modesto Irrigation District
Stanislaus County, California

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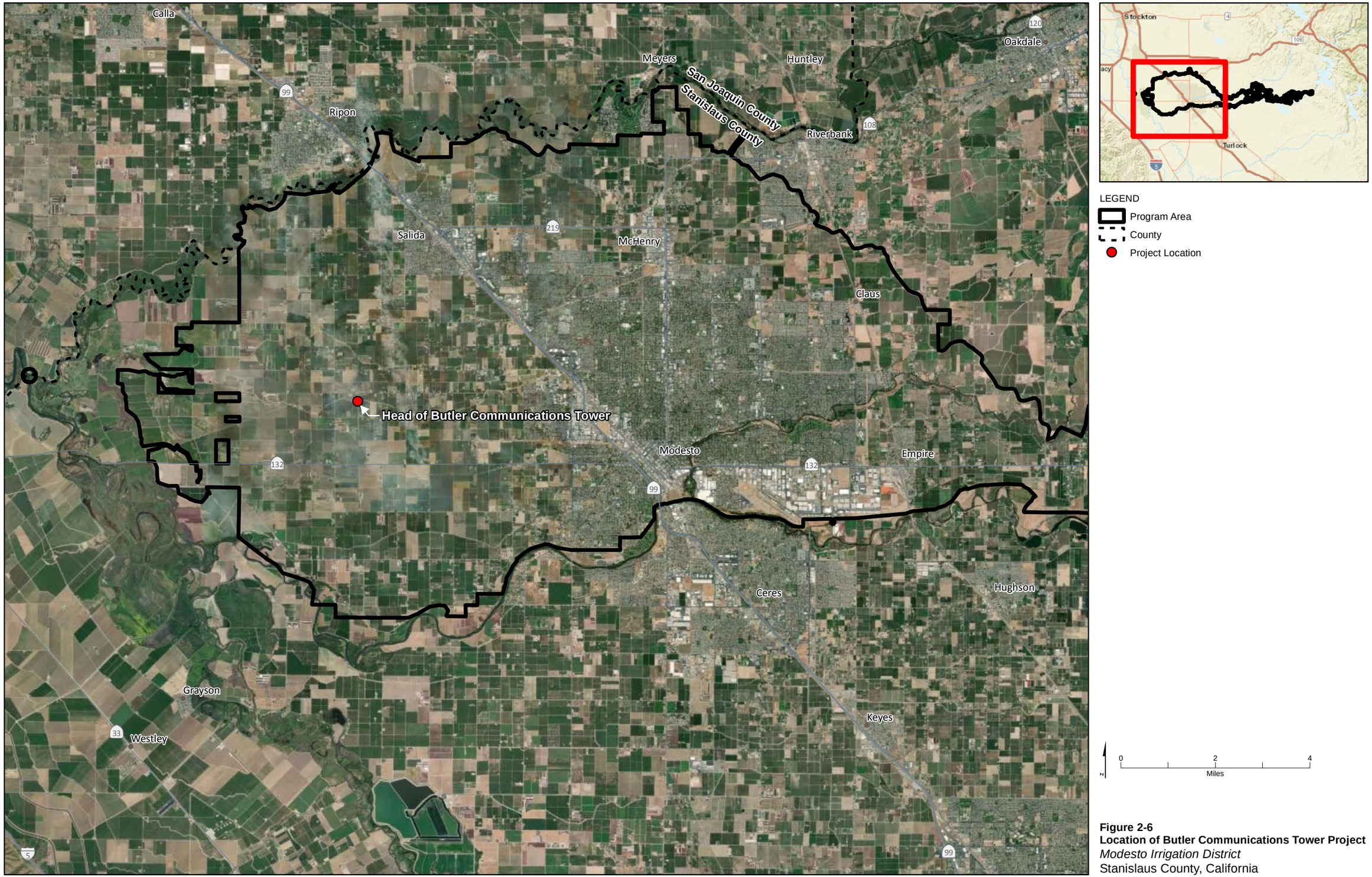

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- Program Area
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- Project Location

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Figure 2-6
Location of Butler Communications Tower Project
Modesto Irrigation District
Stanislaus County, California

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Proposed Implementation

With the exception of the Butler Communications Tower project, the total construction footprint, including staging and laydown areas, would be approximately 0.25 acre for each measurement and automation project. Table 2-10 includes anticipated construction activities, personnel, and equipment required for a typical automation and measurement project. As shown in Table 2-10, with the exception of the Butler Communications Tower, each project is anticipated to take approximately 1 to 2 months.

The Butler Communications Tower would be a lattice structure as shown on Figure 2-6 and located near the Butler headworks on the Lateral 3 & 7 Regulating reservoir site. The tower is anticipated to be approximately 120-160 feet high. The total anticipated disturbance area for the proposed Butler Communications Tower project would be up to 1 acre. The Butler Communications Tower project would require a 2-month construction period and additional equipment than a typical measurement and automation project, including an excavator, bulldozer, crane, and boom lift.

Project Construction

Table 2-10. Measurement and Automation Projects Construction Work Days, Workforce, and Equipment
Modesto Irrigation District Programmatic Environmental Impact Report

Activity	Work Days	Personnel Required	Equipment Required
Construction	20 days	up to 6	1 Backhoe (with hydraulic hammer) 1 Water Truck 1 Dump Trucks 1 Concrete Truck/Pumping Equipment
SCADA Equipment Installation	10 days	up to 5	1 Backhoe 1 Water Truck 1 Dump Truck 1 Concrete Truck/Pumping Equipment
Dust Control (overlaps construction activities)	30 days	1	1 Water Truck

Operations and Maintenance

Automating infrastructure and expanding remote monitoring control capabilities are anticipated to reduce the frequency with which MID operations staff would be required to visit project sites. Routine maintenance and inspections of facilities would continue to be required.

2.1.3 Annual Infrastructure Maintenance Programs

In addition to system improvements, a number of existing and recommended baseline maintenance programs have been included in the Proposed Program. These annual maintenance programs are intended to continue per current practices to maintain the current level of service by maintaining existing infrastructure, while the individual capital improvement projects are aimed at improving operations, level of service, and system modernization. As part of implementation of the Proposed Program, the District intends to use the Site-Specific Project EEC process in Appendix A to help identify and address potential impacts of the maintenance programs. The District would obtain all required permits prior to implementing activities identified under the maintenance programs.

2.1.3.1 Noninvasive Pipeline Repair Program

MID owns approximately 42 miles of pipeline comprised mostly of cast-in-place concrete pipe (about 70 percent). MID is completing a pilot study of a cured-in-place pipe rehabilitation method by lining two different sections of 36-inch-diameter pipe in the Highline Pipeline. As MID continues to evaluate potential pipe rehabilitation methods and identify sections of pipe for repair, having District staff evaluate the section(s) planned for repair to determine whether rehabilitation is the appropriate long-term solution or the specific reach identified should be replaced in its entirety will be important.

2.1.3.2 Canal Rehabilitation Program

MID currently rehabilitates canals via concrete lining repairs. In the lower system, canal lining rehabilitation occurs during the irrigation off-season (between November 1 and March 1). In the upper system, section repairs are scheduled in a 3-week period in late November and December.

2.1.3.3 Well Testing and Maintenance Program

The Stanislaus and Tuolumne Rivers Groundwater Basin Association Well Field Optimization Project conducted well assessments on the MID wells in 2007 (STRGBA, 2007). The well assessment findings include a list of the wells that need maintenance or additional testing and will be used to select wells for upcoming testing and maintenance. MID implements a maintenance plan for its groundwater wells, which consists of running each pump annually or semi-annually, oiling and greasing the pumps, performing other maintenance as noted during testing, and conducting flow and efficiency tests. This program is intended to maintain an understanding of pumping capabilities and capacity for times of future limited surface water availability, or as a response to meeting short-term, immediate surface water shortages within the canal system. All pumps have smart power meters that identify when more electricity is being used, which could indicate a pump or motor issue.

2.1.3.4 Road Crossing and Siphon Inspection and Cleaning Program

MID staff have identified the potential restriction of flow at several road crossings. There is a need for a systematic review and inspection of MID road crossings throughout the District. MID intends to implement a road crossing and siphon inspection program that inspects and cleans (if necessary) 10 to 15 crossings and/or siphons every year. Crossings and siphons most critical to water deliveries present the highest liability for damage if the canal upstream is overtopped and should be targeted first. This program will need to be coordinated with the roadway owners as they typically are responsible for the crossing.

2.1.3.5 Modesto Reservoir Dam and Fill Maintenance Program

This program is intended to maintain dams and fills for the Modesto Reservoir as part of DWR's Division of Safety of Dams (Dam No. 59) permit requirements, namely vegetation control and crown maintenance (DWR, 1963). Annual maintenance activities include rodent control, vegetation control, pipe penetration inspection, crown maintenance, and visual inspections for boils and erosion.

2.2 Existing Conditions

The CEQA baseline for assessing the significance of project impacts is existing conditions (Existing Conditions), which are documented for each resource area in the context of the environmental setting in Section 3.0, Environmental Setting, Impacts, and Mitigation. This baseline is identified to assess the significance of project impacts in relation to current conditions and the environment. The Existing Conditions baseline accounts for current conditions at the time of the release of the NOP (September 5, 2018), including applicable regulatory requirements.

2.3 No Program Alternative

CEQA also requires an analysis of an alternative under which the Proposed Program is not implemented. CEQA calls this scenario the "No Project Alternative." For this PEIR, this alternative is termed the "No Program Alternative." The No Program Alternative allows decision-makers to use the PEIR to compare the impacts of approving the Proposed Program with the future conditions of not approving the Proposed Program. CEQA Guidelines §15126.6(e)(2), indicates that the No Project (Program) Alternative should discuss Existing Conditions as well as what would be reasonably expected to occur in the foreseeable future if the project [Proposed Program] were not approved, based on current plans and consistent with available infrastructure and community services.

The capital improvements included in the Proposed Program will require a significant investment and long-term effort to implement. The future year associated with the No Program Alternative is 2040, because that is the planning horizon for the Proposed Program. The No Program Alternative represents a future in which the District would continue present practices in the absence of the Proposed Program. MID would maintain the existing level of service to its customers, only invest in projects to address major service liabilities, and only provide the minimum resources needed to comply with SB X7-7 and other regulatory requirements.

2.4 Project Commitments

As described in Section 2.1.1, Site-Specific Environmental Evaluation Checklist, before construction begins, all proposed projects evaluated at the programmatic level in this PEIR (as well as projects evaluated at a project-level of detail, but delayed due to funding or changes in District priorities) would be subject to the Site-Specific Project EEC process in Appendix A. This would ensure all potential impacts are identified and properly mitigated in accordance with the MMRP. Using the EEC will allow the District to accommodate minor changes in project details and conditions given the implementation of the Proposed Program over the 2040 planning horizon. Substantial changes in project design, footprint details, or conditions compared with those described in this PEIR, however, may result in the need for the District to conduct additional environmental review.

In addition to complying with the EEC and MMRP, the following project commitments and best management practices (BMPs) would be incorporated as part of the Proposed Program to avoid or minimize potential impacts:

2.4.1 Aesthetics and Visual Resources

- Proposed construction activity would generally occur during daytime hours on weekdays, unless otherwise approved by the applicable local agency and in coordination with affected landowners.
- Temporary and permanent safety lighting would be installed to minimize glare and off-site light trespass:
  - If nighttime construction activities that require lighting were to be approved, lighting would be limited to that needed for safety, and it would be aimed to minimize glare and light trespass. Lights would be turned off after completion of the work.
- Permanent safety lighting installed at Program facilities would be fully shielded, area-specific lighting that is directed downward to minimize glare and off-site light trespass.

2.4.2 Air Quality/Greenhouse Gases

- Compliance with applicable San Joaquin Valley Air Pollution Control District (SJVAPCD) Regulation VIII requirements for fugitive dust emissions. Emission control measures included as part of the Proposed Program would include the following:
  - Apply water to unpaved surfaces and areas.
  - Use nontoxic chemical or organic dust suppressants on unpaved roads and traffic areas.
  - Limit or reduce vehicle speed on unpaved roads and traffic areas.
  - Maintain areas in a stabilized condition by restricting vehicle access.
  - Install wind barriers, if necessary.
  - During high winds, cease outdoor activities that disturb the soil.
  - Keep bulk materials sufficiently saturated when handling.
  - When storing bulk materials, apply water to the surface or cover the storage pile with a tarp.
  - Do not overload haul trucks; overloaded trucks are likely to spill bulk materials.
  - Cover haul trucks with a tarp or other suitable cover, or wet the top of the load enough to limit visible dust emissions.
  - Clean the interior of cargo compartments on emptied haul trucks prior to leaving a site.
  - Prevent track-out by installing a track-out control device.
  - Clean up track-out at least once a day; if along a busy road or highway, then clean up track-out immediately.
  - Monitor dust-generating activities, and implement appropriate measures for maximum dust control.
  - Minimization of unnecessary construction vehicle trips and idling time to reduce greenhouse gas (GHG) emissions.
- Submit an Indirect Source Review (ISR) Rule 9510 application for emissions of oxides of nitrogen (NO_x) and particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}) and either mitigation of or offsetting the NO_x and PM_{10} construction emissions by 20 percent and 45 percent, respectively, as required by ISR Rule 9510. Emissions would be reduced through either on-site emission reductions, off-site emission offsets, or a combination of the two. On-site emission reduction measures would include using less polluting construction equipment, which would be achieved by using cleaner fuels or newer, lower-emitting equipment. Fugitive dust emissions would be controlled following SJVAPCD Regulation VIII, and with increased watering frequency to further reduce the emissions. For the required amount of emission reductions that are not achieved on site, payment of fees to the SJVAPCD would be required to offset the emissions.

2.4.3 Biological Resources

- Initial Siting Evaluation/Site-specific Resource Evaluation – MID and a qualified biologist (as necessary) will use a standardized approach/checklist (refer to Appendix A to this PEIR) to evaluate the potential for biological and other impacts and screen out or modify proposed facility locations to the extent possible.

- Conduct Appropriate Surveys – A qualified biologist will determine whether suitable habitat is present and warrants any species-specific focused surveys and, if necessary, conduct focused protocol surveys consistent with the protocols identified in Table 3.4-2, Recommended Special-status Species Surveys for Projects Associated with the Proposed Program, in Section 3.4 or with the most current agency-approved protocol for a given species.
- Avoid, Minimize, or Mitigate Impacts on Sensitive Habitat and Special-status Species – All proposed facilities and associated construction areas will be situated to avoid sensitive species and associated habitats to the extent possible. Current avoidance distances by habitat type are listed in Table 3.4-3, Avoidance Distances by Habitat Type, in Section 3.4. Such distances would be adjusted as appropriate given potential future agency guidance/requirements during the overall Proposed Program implementation period.
  - If avoidance (including buffer distances) of sensitive resources could not be achieved or maintained because of other constraints and/or necessary project purposes, the District would identify appropriate mitigation (such as mitigation replacement ratios and conservation easements) in consultation with federal and state resource agencies and obtain all permits and authorizations necessary.

2.4.4 Geology and Soils/Hydrology and Water Quality

- Implementation of BMPs to prevent soil erosion as prescribed in a stormwater pollution prevention plan (SWPPP), as required by the Construction General Permit Order issued by the California State Water Resources Control Board (SWRCB). BMPs would include the following:
  - Filter fences and catch basins would be placed below construction activities to intercept sediment before it reaches the waterway.
  - Sediment control measures would be in place before the onset of the rainy season and would be monitored and maintained in good working condition until disturbed areas have been stabilized.
  - When construction is complete, stabilizers, such as weed-free mulch, would be applied to disturbed areas.
  - Use, transport, and disposal of hazardous materials, such as fuels, lubricants, and solvents, would be in accordance with California Department of Toxic Substances Control (DTSC), U.S. Environmental Protection Agency (EPA), and U.S. Occupational Safety and Health Administration (OSHA), requirements.
- Site-specific geotechnical investigations would take place before completion of design and construction of load-bearing projects. The geotechnical investigations should include evaluation of the potential for native or fill material and underlying soils and bedrock to support the requirements of the structure designed for that location. Designs are expected to be updated to account for any potential shortfalls of the materials to fulfill project requirements.
- Management of unsuitable soils (including expansive soils) would be implemented as determined necessary through the design phase and ultimate construction as part of the Proposed Program. Soils determined to be unsuitable would be removed, replaced, or treated as necessary.
- Workers involved in earth-moving activities would be made aware of the potential (although unlikely) presence of paleontological resources and need to report any such encounters immediately.

2.4.5 Noise

- Proposed construction activity would be restricted to the hours set forth in the local noise regulations described in Section 3.9.1, unless otherwise approved by the applicable local agency and in coordination with affected landowners.
- Stationary noise-generating equipment would be located as far as possible from nearby sensitive receptors.
- Construction equipment powered by gasoline or diesel engines would have sound control devices at least as effective as those provided by the original equipment manufacturer. No equipment would be allowed to have unmuffled exhaust.
- Noise-generating mobile equipment and machinery would be turned off when not in use.

2.4.6 Public Services and Utilities

- Projects would be designed and constructed to avoid utility-provider facilities wherever possible. If avoidance is not possible, MID would coordinate with service providers to relocate facilities without interrupting service to customers.

2.4.7 Transportation

- MID will obtain appropriate encroachment permits and, if necessary, develop a traffic control plan (with Stanislaus County, as determined appropriate) to address emergency responder access and management of local traffic, including managing construction traffic routing and road use during construction activities associated with the Proposed Program. The plan will follow local and state requirements for traffic control, including use of flaggers and signage. Traffic control measures will help ensure that the effects on traffic will not create unsafe conditions. In addition, MID would inform residents of construction activities and potential delays, and coordinate with Caltrans and Stanislaus County to minimize construction impacts to the extent necessary.

SECTION 3

Environmental Setting, Impacts, and Mitigation

MID prepared this PEIR in accordance with CEQA regulations and requirements, which are discussed in Section 1, Introduction, and Section 2, Program Description and Alternatives.

3.1 Impact Analysis Organization

Sections 3.1 through 3.11 are organized by environmental resource area. Each section discusses the applicable regulatory setting, environmental setting, and environmental impacts specific to a given resource/issue area associated with implementation of the Proposed Program in comparison to Existing Conditions and the No Program Alternative. Assumptions considered, methodologies used, and references consulted during the preparation of the analyses are identified by resource/issue area section. Mitigation measures are proposed as applicable for those impacts considered to be potentially significant. In addition, Section 2.4, Project Commitments, identifies the measures that would be incorporated as part of the Proposed Program to avoid or minimize potential impacts.

Sections 3.1 through 3.11 are organized into the following environmental resource areas:

- Section 3.1, Aesthetics and Visual Resources
- Section 3.2, Land Use and Agricultural Resources
- Section 3.3, Air Quality
- Section 3.4, Biological Resources
- Section 3.5, Cultural and Tribal Cultural Resources
- Section 3.6, Geology and Soils
- Section 3.7, Greenhouse Gases
- Section 3.8, Hydrology and Water Quality
- Section 3.9, Noise
- Section 3.10, Public Services and Utilities
- Section 3.11, Transportation

Cumulative impacts are discussed in Section 4, Other CEQA Considerations. Appendixes are included at the end of this PEIR.

3.2 Resources Eliminated from Further Consideration

Appendix G of the CEQA Guidelines includes a general checklist of resources and impacts that may require consideration. In addition to the resource areas listed above, the following resources identified in the CEQA Guidelines Appendix G were also considered in the context of the Proposed Program. However, due to either an absence of the resource altogether or the lack of potential for impact, the following resources were determined to not have substantial enough potential to be affected to warrant impact analysis.

Energy

Construction activities associated with implementation of the Proposed Program would consume energy in the form of gasoline and diesel fuel through the operation of heavy off-road equipment, trucks, and worker traffic. Consumption of such resources would be temporary and would cease upon the completion of construction. Due to the limited scale of the individual capital improvement projects and compliance

with SJVAPCD requirements included in Section 2.4, Project Commitments, construction activities would not result in inefficient energy consumption during construction. Energy consumption during operation of the Proposed Program would be consistent with typical District operation and maintenance and, therefore, would be the same as under Existing Conditions and the No Program Alternative.

Hazards and Hazardous Materials

Although the potential for hazards and hazardous materials, including mosquitoes and other vectors, and contamination from mismanaged chemicals associated with agricultural production exists within the Program Area, the Proposed Program would not increase the likelihood of their presence or occurrence over Existing Conditions or the No Program Alternative. Construction associated with implementation of the Proposed Program would require the use of heavy equipment and vehicles. Most of this equipment requires petroleum products such as fuel, hydraulic fluids, and lubricants for effective operation. There is a risk of small fuel or oil spills as a result of fuel replenishment and other lubricant and hydraulic fluid changes and replenishments that may be required during equipment use; however, all hazardous materials would be stored, handled, and disposed of according to manufacturers' recommendations, and any spills would be cleaned up in accordance with existing regulations. As described in Section 2.4, Project Commitments, the use, transport, and disposal of hazardous materials, such as fuels, lubricants, and solvents, would be conducted in accordance with DTSC, EPA, and OSHA requirements.

Mineral Resources

Only one active claim on public lands managed by the Bureau of Land Management is recorded in Stanislaus County (The Diggings, 2019). As a result of the general lack of mineral extraction activities within the Program Area, the Proposed Program is not anticipated to have an impact on mineral resources.

Population and Housing

The Proposed Program includes capital improvement projects that would be constructed over the planning horizon until 2040; however, because these projects would be phased, construction would be temporary, and operational staffing needs minimal, most construction workers are anticipated to come from Stanislaus County. Therefore, the Proposed Program would have a negligible impact on the local population. Additionally, unincorporated Stanislaus County maintained an 8.5-percent vacancy rate across housing types in 2010 and 2014, according to the *Stanislaus County 2015 – 2023 Housing Element Update* (Stanislaus County, 2016a). Should there be a minor, temporary increase in localized population as a result of the larger proposed projects (such as, regulating reservoirs), sufficient housing would be expected to be available to ensure no additional housing is warranted.

Recreation

Although several recreational opportunities exist within the Program Area, the projects included in the Proposed Program would be located on private and District-owned lands and, thus, would not affect recreational resources nor access to them.

Wildfire

A small portion of the Program Area east of the Modesto Reservoir is located within a State Responsibility Area (SRA) and is classified as a moderate fire hazard severity zone (Stanislaus County, 2017). However, these eastern portions of Stanislaus County continue to see conversion of SRA land that historically contained grassland to irrigated land used for tree crops. The conversion of this SRA into irrigated land reduces the wildfire threat in the converted areas, and it is anticipated that irrigated crop land would be removed from the SRA in the future (Stanislaus County, 2017). Implementation of the Proposed Program would support continued agricultural uses in these areas and would not result in increased risk from wildfire as compared to Existing Conditions or the No Program Alternative.

3.3 General Assessment Methodology

3.3.1 Study Area

The Program Area includes the MID service area and proposed project locations outside the MID service area. The Study Area for each environmental resource area varies as applicable and is defined and described in the introduction to each resource/issue area in Section 3.

3.3.2 Project Categories

As described in Section 2, Program Description and Alternatives, the Proposed Program includes capital improvement projects that have been grouped into categories based on common features and functions. For example, although three different reservoir projects are proposed throughout the District, they are all located near canals and would require earthwork and connections similar to new or existing infrastructure. The similarity of projects under the various categories also would result in common potential effects. Therefore, impact analyses evaluate potential impacts by project category. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

3.3.3 Existing Conditions and No Program Alternative

The CEQA baseline for assessing the significance of project impacts is Existing Conditions, which are documented for each of the environmental resource areas in the context of the environmental setting in each resource/issue area of Section 3, Environmental Setting, Impacts, and Mitigation. This baseline is identified to assess the significance of project impacts in relation to current conditions and the environment. The Existing Conditions baseline accounts for current conditions at the time of the release of the NOP on September 5, 2018, including applicable regulatory requirements.

CEQA also requires an analysis of an alternative under which the proposed project is not implemented. For this PEIR, this alternative is termed the “No Program Alternative.” The No Program Alternative evaluated in this PEIR is based on the No Action Alternative in the Comprehensive Water Resources Management Plan. The No Program Alternative allows decision-makers to use this PEIR to compare the impacts of approving the Proposed Program with the future conditions of not approving the Proposed Program. CEQA Guidelines §15126.6(e)(2), indicates that the No Project (Program) Alternative should discuss Existing Conditions as well as what would be reasonably expected to occur in the foreseeable future if the project [Proposed Program] were not approved, based on current plans and consistent with available infrastructure and community services. Section 2.3, No Program Alternative, provides a detailed description of this scenario.

In the context of some environmental resource areas, the No Program Alternative would not differ substantially from Existing Conditions. For example, regarding aesthetics, the No Program Alternative is functionally the same as Existing Conditions because minimal additional future development is anticipated in the predominately rural and agricultural areas adjacent to Proposed Program facilities and both represent a condition in which the overall visual character of the Program Area is not expected to change substantially. The relationship between the Existing Conditions and No Program Alternative scenarios is specified in each resource/issue area of Section 3, Environmental Setting, Impacts, and Mitigation, under Impact Assessment Assumptions and Methodology. For resource/issue areas where the No Program Alternative was determined to be functionally the same as Existing Conditions, potential impacts are evaluated when compared to Existing Conditions and are identified as such.

3.4 Types of Impacts

Mechanisms that could cause impacts are discussed for each resource. General categories of impact mechanisms are construction and future operations and maintenance. Program-related impacts are categorized as follows, and as appropriate, to describe the intensity or duration of an impact:

- **A temporary or short-term impact** would generally occur only during construction of the proposed capital improvement projects. Construction impacts would occur during the defined construction period, which would vary by project, and include all activities required to construct each project. The construction disturbance area would include each facility footprint plus the land area around that footprint that would be used for materials laydown, soil stockpiling, equipment storage, construction vehicle parking, equipment/vehicle maintenance, spoil disposal, construction debris, materials delivery, access roads, actual construction activity disturbance, and any other activity conducted during the construction period that would cease after the proposed projects are built.
- **A long-term or permanent impact** would continue to occur after the completion of construction, including the permanent alteration of land to accommodate a given proposed project. Additionally, operations and maintenance impacts include any activities that must occur to operate and maintain each facility. These activities and their associated impacts are long term or permanent. Generally, operations activities include those related to the movement of water (such as, the intake or release of water through the facilities), and maintenance activities include vegetation management, minor repairs, and routine inspections.

3.1 Aesthetics and Visual Resources

This section describes the regulatory and environmental setting related to aesthetics, including visual resources, in the Program Area and evaluates potential impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

3.1.1 Regulatory Setting

This section describes guidelines and regulations for evaluating potential aesthetic and visual resources impacts and identifying mitigation. The aesthetics and visual resources standards within the Program Area are regulated by the local policies and regulations of Stanislaus County and the Cities of Modesto, Riverbank, and Waterford.

3.1.1.1 Federal and State

No federal or state regulations apply to aesthetics and visual resources.

3.1.1.2 Local

This section provides Stanislaus County and the Cities of Modesto, Riverbank, and Waterford policies related to aesthetic and visual resources that are relevant to the Proposed Program.

Stanislaus County

The Conservation/Open Space Element of the *Stanislaus County General Plan* provides the following goal and policies regarding aesthetic and visual resources that are relevant to the Proposed Program (Stanislaus County, 2016b):

Goal One: Encourage the protection and preservation of natural and scenic areas throughout the county.

- Policy One: Maintain the natural environment in areas dedicated as parks and open space.
- Policy Two: Assure compatibility between natural areas and development.
- Policy Three: Areas of sensitive wildlife habitat and plant life (e.g., vernal pools, riparian habitats, flyways and other waterfowl habitats, etc.) including those habitats and plant species listed by state or federal agencies shall be protected from development and/or disturbance.

City of Modesto

The *City of Modesto General Plan* provides the following policy regarding aesthetic and visual resources that is relevant to the Proposed Program (City of Modesto, 2019a):

Chapter VII: Environmental Resources, Open Space and Conservation.

- Policy 7a: Visual corridors of the river will be protected and enhanced.

City of Riverbank

The *2005-2025 General Plan* for the city of Riverbank provides the following goal regarding aesthetic and visual resources that is relevant to the Proposed Program (City of Riverbank, 2009):

Goal CONS-7: Maintain and increase public access to Riverbank's scenic resources.

City of Waterford

The *City of Waterford General Plan Vision 2025* provides the following policies regarding aesthetic and visual resources that are relevant to the Proposed Program (City of Waterford, 2007):

Goal Area A: Open Space (OS) for the Preservation of Natural Resources.

- Policy OS-A-2: Preserve and enhance the Tuolumne River and Dry Creek in their natural state throughout the planning area.
- Policy OS-A-3: Promote the protection and enhancement of designated scenic routes.

Goal Area Urban Design (UD): An Integrated Community-Well Connected.

- Policy UD-1: Promote Urban Continuity & Connection.
  - Implementing Action: UD-1b. Design street River Parkway and MID Canal corridor improvements in consideration of their hierarchical role and function within the larger system.
  - Implementing Action: UD-1f. Heighten the visual prominence of water corridors which help to establish a sense of orientation and identity within the City.
  - Implementing Action: UD-1h. Extend the amenity value of the waterways.

3.1.2 Environmental Setting

Situated in Stanislaus County, most of the Program Area is characterized by flat lands with open views of land used for agriculture and agriculture-related infrastructure (for example, canals, weirs, dams, and reservoirs). Eastern portions of the Program Area are near the base of the Sierra Nevada foothills. Views in these areas include undeveloped rolling hills, some agricultural lands, water features, and distant views of mountain ranges. Other portions of the Program Area that are closer to local communities in the region feature views of residential, commercial, and industrial uses.

For this analysis, a “sensitive” viewer is defined as one whose visual experience of the landscape might be adversely affected by construction or operations of the Proposed Program, either by physical features or activities. As a general rule, sensitive viewers in the Program Area are a largely mobile audience, as there are few stationary viewers (including residences) for whom projects associated with the Proposed Program would be visible. Proposed project locations are generally not near public roads where the project sites would be visible to the public. Within Stanislaus County, the only officially designated scenic highway is Interstate 5 (I-5), which is over 7 miles west of the nearest Program activity. In addition, the Program Area is not visible from any other local- or State-designated vista point, scenic route, or scenic highway (Caltrans, 2019a).

3.1.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on aesthetic and visual resources. The thresholds used to evaluate potential aesthetic and visual resources impacts, analysis methodology and assumptions, and impact analysis are presented in the following sections.

3.1.3.1 Thresholds of Significance

The thresholds used to evaluate the potential impacts are based on Appendix G of the CEQA Guidelines and are listed below. Impacts on aesthetics and visual resources are considered significant if the Proposed Program, except as provided in Public Resources Code (PRC) Section 21099,[1] would result in any of the following:

- Have a substantial effect on a scenic vista
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway
- Substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point) or, if in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality
- Create a new source of substantial light or glare that will adversely affect day or nighttime views in the area

3.1.3.2 Impact Assessment Assumptions and Methodology

"Aesthetic impact assessment" generally refers to the evaluation of potential effects on visual resources and the associated perception of contrast with an area's scenic character, resources, vistas, and sources of light and glare. In general, the degree of an aesthetic/visual impact is related to the perceived degree of contrast with existing views and visual character in relation with proposed project features, context, and view conditions (such as, distance, presence of existing features, and background).

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. The No Program Alternative is functionally the same as Existing Conditions as related to aesthetics because minimal additional future development is anticipated in the predominately rural and agricultural areas adjacent to Proposed Program facilities, and both represent a condition in which the overall visual character of the Program Area is not expected to change substantially. Therefore, this analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

The following assumptions were made regarding the Proposed Program-related construction, operations, and maintenance impacts related to aesthetic and visual resources:

- In the absence of the Proposed Program, MID would continue to operate and maintain its existing facilities; thus, existing aesthetic and visual resources conditions associated with agricultural use operations, including occasional views of construction activities and associated equipment, would be ongoing.

[1] Section 21009 of the PRC primarily discusses the development of significance criteria for transportation impacts of projects within transit priority areas (LegInfo, 2019). Section 21009 (d)(1) specifically discusses aesthetic impacts "on an infill site within a transit priority area"; however, since Program Area activities are not located on infill sites within a transit priority area, this does not apply.

- As discussed in Section 3.2, Land Use and Agricultural Resources, land use within and immediately adjacent to the Program Area would continue to be primarily agricultural. However, the population of urban areas within the Program Area, such as the cities of Modesto, Riverbank, and Waterford, as well as portions of several unincorporated communities, are expected to grow significantly by 2040 (CH2M, 2018). Additional urban development, primarily in terms of rural residential development, would increase the number of potential viewers within the Program Area. However, views would remain primarily agricultural, including daily operations and occasional MID maintenance activities, as necessary.
- The following project commitments would be incorporated as part of the Proposed Program to avoid or minimize potential aesthetic impacts:
  - Proposed construction activity would generally occur during daytime hours on weekdays, unless otherwise approved by the applicable local agency and in coordination with affected landowners.
  - Temporary and permanent safety lighting would be installed to minimize glare and off-site light trespass:
    - If nighttime construction activities that require lighting were to be approved, lighting would be limited to that needed for safety, and it would be aimed to minimize glare and light trespass. Lights would be turned off after completion of the work.
  - Permanent safety lighting installed at Program facilities would be fully shielded, area-specific lighting that is directed downward to minimize glare and off-site light trespass.

The evaluation of potential impacts on aesthetic and visual resources was completed by comparing existing visual resources, as described under Section 3.1.2, Environmental Setting (considered the Existing Conditions/No Program Alternative for this analysis), with anticipated construction, operations, and maintenance activities associated with the Proposed Program.

3.1.3.3 Impacts Associated with the Proposed Program

Impact AES-1: Have a substantial effect on a scenic vista.

Butler Communications Tower

As described in Section 2.1.2, the Butler Communications Tower project would include the construction of a lattice structure anticipated to be approximately 120 to 160 feet high and would take approximately 2 months to construct. Impacts on aesthetic and visual resources during construction of the Butler Communications Tower would include the removal of vegetation, construction dust raised by earthmoving, and the presence of construction equipment and vehicles. While there are residences in the vicinity, the proposed tower is in an area zoned for agricultural use (Stanislaus County, 2020). Residences near the construction area would be affected by short-term views of construction activities (Figure 2-6 shows the proposed location of the Butler Communication Tower). Construction impacts would be less than significant because of the limited duration of construction, typical construction equipment used, and limited number of viewers near the proposed project location.

Although no state- or county-designated scenic vista points, scenic corridors, or public viewpoints are located near the proposed location of the Butler Communication Tower, impacts on aesthetic and visual resources could potentially occur in the viewshed near the proposed project location because there are no existing structures similar in height to the proposed tower. However, the lattice design would allow much of the tower to be visually absorbed into the background, and the steel surface would be expected to dull over time. In addition, views from roads would be limited and of short duration. The full extent of the project's design and construction footprint are unknown at this time, and the District would use the EEC (Appendix A) to help identify potential impacts as this project is further developed. Long-term impacts on aesthetic and visual resources in the viewshed of the Butler Communications Tower would be expected to be less than significant.

All Other Project Types

The Proposed Program would not be implemented in or within view of any state- or county-designated scenic vista point, scenic corridor, or public view point. Impacts on aesthetic and visual resources during construction of the Proposed Program would include vegetation removal, construction dust raised by earthmoving, and the presence of construction equipment and vehicles. Individual projects would result in varying degrees of vegetation removal, earthwork, quantity of construction equipment and vehicles, and would vary as to number of and distance to sensitive viewers. Residences adjacent to construction areas within the Program Area would be affected by short-term views of construction activities; however, visual impacts would be temporary, with construction of most projects lasting up to approximately 3 months. Affected views would be limited to short-term views of construction vehicles and equipment common to general maintenance activities by the occasional motorist or residence. Although larger projects such as the proposed regulating reservoirs would take longer to construct (up to approximately 1 year), views would similarly be limited to brief views from motorists and scattered residences. Construction impacts would be less than significant because of the limited duration of construction, typical construction equipment used, and limited number of viewers near project sites in the Program Area.

The proposed facilities and improvements associated with the Proposed Program would be operated to support surrounding agricultural uses and would be consistent with the existing agricultural character in the Program Area. For example, water conveyance canals and facilities are common features in the Program Area; therefore, the Proposed Program would not substantially alter the existing agricultural landscape. Additionally, with the exception of the Butler Communication Tower, projects implemented as part of the Proposed Program would be primarily subgrade or at grade and, thus, would not be of sufficient height to substantially block views of the landscape or views of the Sierra Nevada foothills to the east of the Program Area. Therefore, the Proposed Program would not have a substantially adverse effect on views within and toward the Program Area.

As described in Section 3.1.1.2, Local, Stanislaus County and the Cities of Modesto, Riverbank, and Waterford identify general plan goals to enhance and protect scenic resources, including major river corridors and their tributaries, with public viewpoints. Although there are no designated public viewpoints of a major river in the vicinity of project sites associated with the Proposed Program, portions of the Tuolumne River, Dry Creek, and the Stanislaus River are visible within the Program Area. These views would not be adversely affected by the long-term operations of the Proposed Program because the proposed facilities and improvements would be located at or below grade and/or within existing infrastructure footprints and, therefore, would not permanently block views. Therefore, operations of the Proposed Program would result in a less than significant impact on scenic vistas.

Impact AES-2: Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway.

All Project Types

As described in Section 3.1.2, Environmental Setting, the only official state-designated scenic highway in the Program Area is I-5, which is over 7 miles west of the nearest Proposed Program project. None of the proposed facilities and improvements associated with implementation of the Proposed Program would be visible from or located on a state scenic highway. Therefore, the Proposed Program would not substantially damage scenic resources and no impact would occur.

Impact AES-3: Substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point) or, if in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.

The discussion above regarding construction impacts for Impact AES-1 also applies to Impact AES-3. Construction activities would be temporary and would not substantially degrade the existing visual character or quality of the Program Area. Potential impacts associated with operations of the Proposed Program are discussed below.

Regulating Reservoirs

As described in Section 3.1.2, Environmental Setting, the proposed locations for the regulating reservoir projects are characterized by flat lands with open views of land used for agriculture and agriculture-related infrastructure (for example, canals, weirs, dams, and reservoirs). Although some of the proposed location for the Lateral 6 and 8 Regulating Reservoir is in an area zoned for residential use (Stanislaus County, 2007), most of the area is characterized by active agricultural production and associated uses and includes few residences. The proposed locations for the remaining regulating reservoir projects are in areas designated for agricultural use. Overall, the regulating reservoir projects would be consistent with existing agricultural uses and would not degrade the visual character of the area. Therefore, impacts associated with operations of the proposed regulating reservoir projects would be less than significant.

Butler Communications Tower

As described in Impact AES-1, the Butler Communications Tower would be located in an area zoned for agricultural use. Although there are no existing structures similar in height to the proposed tower in the area, the lattice design would allow much of the tower to be visually absorbed into the background, and the steel surface would be expected to dull over time. In addition, views from roads would be limited and of short duration. The full extent of the project's design and construction footprint are unknown at this time, and the District would use the EEC (Appendix A) to help identify potential impacts as this project is further developed. Overall, operations of the Butler Communications Tower would affect the existing visual character or quality near the project; however, given the limited number of viewers and current and continued agricultural character of the area, aesthetic or visual resource impacts would be less than significant.

All Other Project Types

In general, most capital improvement projects associated with implementation of the Proposed Program would be constructed at or below grade or within existing canal or other existing facility footprints and are located in non-urbanized areas; thus, they would not be visible or result in changes in the visual character or quality of the Program Area. Some projects would result in visual changes such as vegetation removal along portions of canals and service laterals in preparation of canal relining efforts, pipeline installation, or new channel construction. These improvements would affect the existing visual character or quality of the Program Area; however, given the limited number of viewers and current and continued agricultural character of the area, aesthetic or visual resource impacts from operations of the Proposed Program would be less than significant.

Impact AES-4: Create a new source of substantial light or glare that will adversely affect day or nighttime views in the area.

Regulating Reservoirs

Permanent safety lighting may be incorporated for some of the facilities (for example, outlet structures or other buildings) associated with the regulating reservoirs. As described in Section 3.1.3.2, Impact Assessment Assumptions and Methodology, safety lighting would be fully shielded, area-specific lighting that is directed downward to minimize glare and off-site light trespass. In addition, the proposed regulating reservoirs could result in a new source of glare, where sunlight could reflect off the water surface. However, the proposed locations for the regulating reservoir projects are in primarily agricultural areas, with few potential viewers, and not in the immediate vicinity of any airports; thus, the potential to affect day or nighttime views would be minimal. No substantial new source of light or glare would occur during operations of the Proposed Program, and impacts would be less than significant.

All Other Project Types

Construction would generally occur during daytime hours on weekdays, unless otherwise approved by the applicable local agency and in coordination with affected landowners. Therefore, construction would typically not require night lighting. However, if nighttime construction activities that require lighting were to be approved, lighting would be limited to that needed for safety, and it would be aimed to minimize glare and light trespass as described in Section 3.1.3.2, Impact Assessment Assumptions and Methodology. Lights would be turned off after work is completed. No substantial new source of light would occur during construction of the Proposed Program, and impacts would be less than significant.

3.1.4 Mitigation Measures

Construction, operation, and maintenance of the Proposed Program would have less than significant impacts on aesthetics and visual resources; therefore, mitigation is not required or recommended. As included in Section 2, Program Description and Alternatives, the following project commitments would be implemented as part of the Proposed Program to avoid or minimize potential impacts:

- Proposed construction activity would generally occur during daytime hours on weekdays, unless otherwise approved by the applicable local agency and in coordination with affected landowners.
- Temporary and permanent safety lighting would be installed to minimize glare and off-site light trespass:
  - If nighttime construction activities that require lighting were to be approved, lighting would be limited to that needed for safety, and it would be aimed to minimize glare and light trespass. Lights would be turned off after completion of the work.
- Permanent safety lighting installed at Program facilities would be fully shielded, area-specific lighting that is directed downward to minimize glare and off-site light trespass.

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3.2 Land Use and Agricultural Resources

This section describes the regulatory and environmental settings related to land use and agricultural resources in the Program Area and evaluates potential impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area includes lands within the Program Area where projects under the Proposed Program are proposed.

3.2.1 Regulatory Setting

This section describes guidelines and regulations for evaluating potential land use and agricultural resources impacts and identifying mitigation. No federal regulations apply to land use and agricultural resources in the Program Area. Land use and agricultural resources within the Program Area are regulated by the State and local policies implemented by Stanislaus County and the Cities of Modesto, Riverbank, and Waterford.

3.2.1.1 State

California Land Conservation Act

The California Land Conservation Act of 1965 (Williamson Act) is the primary state regulation related to agricultural use in the Program Area. Preservation of farmland in California is encouraged by the Williamson Act (Government Code §51250 et seq.), which enables local governments to form contracts with private landowners to restrict specific parcels of land to agricultural or related open space use. A landowner may sign a contract with the county where the land is located, voluntarily restricting land to agricultural and open space uses.

Some open space, defined by Government Code §51201 as follows, is generally eligible to be included as a compatible (not primary) use:

- Wildlife habitat areas, designated by an agency or political subdivision of the federal or state government in consultation with CDFW
- Some managed wetland areas, tidal submerged areas, and salt evaporation ponds
- Land in its natural or agricultural state that is open to the public and supports recreational use
- Land in scenic highway corridors
- Land enrolled in the federal Conservation Reserve Program or Conservation Reserve Enhancement Program

In return, landowners receive substantially reduced property tax assessments. The tax assessments are based on generated income (such as farming and open space uses) rather than the potential market value of the property. Through 2009, local governments received a partial subsidy of foregone property tax revenues from the State under the Open Space Subvention Act of 1972 (Government Code §16140, et seq.).

3.2.1.2 Local

This section describes local regulations and requirements related to land use and agricultural resources that are relevant to the Proposed Program.

Stanislaus County

The *Stanislaus County General Plan* includes goals, policies, and implementation measures. The goals and policies regarding agricultural land, land use, and conservation and open spaces discussed in this section are relevant to the Proposed Program (Stanislaus County, 2016b).

Agricultural Element

Goal One: Strengthen the agricultural sector of our economy.

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

Goal Two: Conserve our agricultural lands for agricultural uses.

- Policy 2.3: The County shall ensure all lands enrolled in the Williamson Act are devoted to agricultural and compatible uses supportive of the long-term conservation of agricultural land.
- Policy 2.5: To the greatest extent possible, development shall be directed away from the County's most productive agricultural areas.
- Policy 2.14: When the County determines that the proposed conversion of agricultural land to nonagricultural uses could have a significant effect on the environment, the County shall fully evaluate on a project-specific basis the direct and indirect effects, as well as the cumulative effects of the conversion.

Conservation/Open Space Element

Goal Three: Provide for the long-term conservation and use of agricultural lands.

- Policy Eleven: In areas designated “Agriculture” on the Land Use Element, discourage land uses which are incompatible with agriculture.

Land Use Element

Goal One: Provide for diverse land use needs by designating patterns which are responsive to the physical characteristics of the land as well as to environmental, economic, and social concerns of the residents of Stanislaus County.

- Policy Two: Land designated Agriculture shall be restricted to uses that are compatible with agricultural practices, including natural resources management, open space, outdoor recreation, and enjoyment of scenic beauty.
- Policy Seven: Riparian habitat along the rivers and natural waterways of Stanislaus County shall, to the extent possible, be protected.

Goal Two: Ensure compatibility between land uses.

- Policy Fourteen: Uses shall not be permitted to intrude into or be located adjacent to an agricultural area if they are detrimental to continued agricultural usage of the surrounding area.

Goal Three: Foster stable economic growth through appropriate land use policies.

- Policy Seventeen: Agriculture, as the primary industry of the County, shall be promoted and protected.

Stanislaus County Code, Title 21 – Zoning

The Stanislaus County Zoning Ordinance assists in providing guidelines and restrictions for development in order to protect the character and the social and economic stability of agricultural, residential, commercial, industrial and other areas within the county (Stanislaus County, 1993).

City of Modesto

The *City of Modesto General Plan* provides the following policies regarding land use and agricultural resources that are relevant to the Proposed Program (City of Modesto, 2019a):

Chapter III: Community Development Policies

- Policy III.I.1: CPD Implementation. Specific Plans, as defined in Chapter VIII, should be used for the implementation of the Comprehensive Planning Districts (CPDs).
- Policy III.I.2: CPD Property Owners. Since each CPD contains a number of properties, unified direction from affected property owners should be encouraged, particularly for privately-initiated applications. In the case of disparate or unknown development intentions, the City may proactively seek consensus from affected property owners.

Chapter VII: Environmental Resources and Open Spaces

- Policy 2a: Minimize the loss of agricultural land by having future development be relatively compact and of reasonably high density.
- Policy 4b: Support the continuation of agricultural uses on lands designated for urban uses until urban development is imminent.
- Policy 4c: Encourage the County to retain agricultural uses on lands surrounding the General Plan area and on lands within the General Plan area pending their annexation to the City or development by mutual agreement with the County.

City of Riverbank

The *2005-2025 General Plan* for the city of Riverbank provides the following goals regarding land use and agricultural resources that are relevant to the Proposed Program (City of Riverbank, 2009):

Goal LAND-4: Commercial and Industrial Development Contributes to the Health, Welfare, and Vitality of the Community.

Goal CONS-3: Support the Practice of Agriculture and the Resources Associated with Farming in the Riverbank Planning Area and Beyond.

City of Waterford

The *City of Waterford General Plan Vision 2025* provides the following policies regarding land use and agricultural resources that are relevant to the Proposed Program (City of Waterford, 2007):

Goal Area OS-B: Maintain and improve regional agricultural productivity.

3.2.2 Environmental Setting

The Program Area is located in Stanislaus County. The Study Area includes lands within unincorporated Stanislaus County and the cities of Modesto, Riverbank, and Waterford. This section summarizes land use and agricultural resources in the Study Area.

3.2.2.1 Land Use in the Study Area

Stanislaus County

With an estimated 2020 population of 552,878, Stanislaus County is the 16th-most populous county in California (U.S. Census Bureau, 2020). The county has experienced population growth of approximately 7.5 percent since the 2010 Census (U.S. Census Bureau, 2020). The state's two primary transportation corridors, I-5 and State Route (SR) 99 run generally northwest-southeast through the county, and nearly all of the county's population reside east of I-5. Approximately two-thirds of the county's population

resides along the SR 99 corridor, including in the city of Modesto and unincorporated community of Salida; and another 10 percent live in unincorporated areas of the county (StanCOG, 2018).

The county is characterized by agriculture, which accounts for approximately 85 percent of land use, including important farmland and grazing land (CDOC, 2018). By contrast, urban land accounts for less than 7 percent of land use within the county (CDOC, 2018). The primary general plan designation within the Study Area is Agricultural, and these lands are zoned as General Agriculture (A-2).

Most lands across the Study Area are designated in the *Stanislaus County General Plan* as General Agriculture 40 Acre and are similarly zoned Agriculture 40 Acre (Stanislaus County, 2020). Table 3.2-1 provides Stanislaus County zoning designations for land potentially affected by implementation of the Proposed Program within each of the project categories (Figures 3.2-1 and 3.2-2).

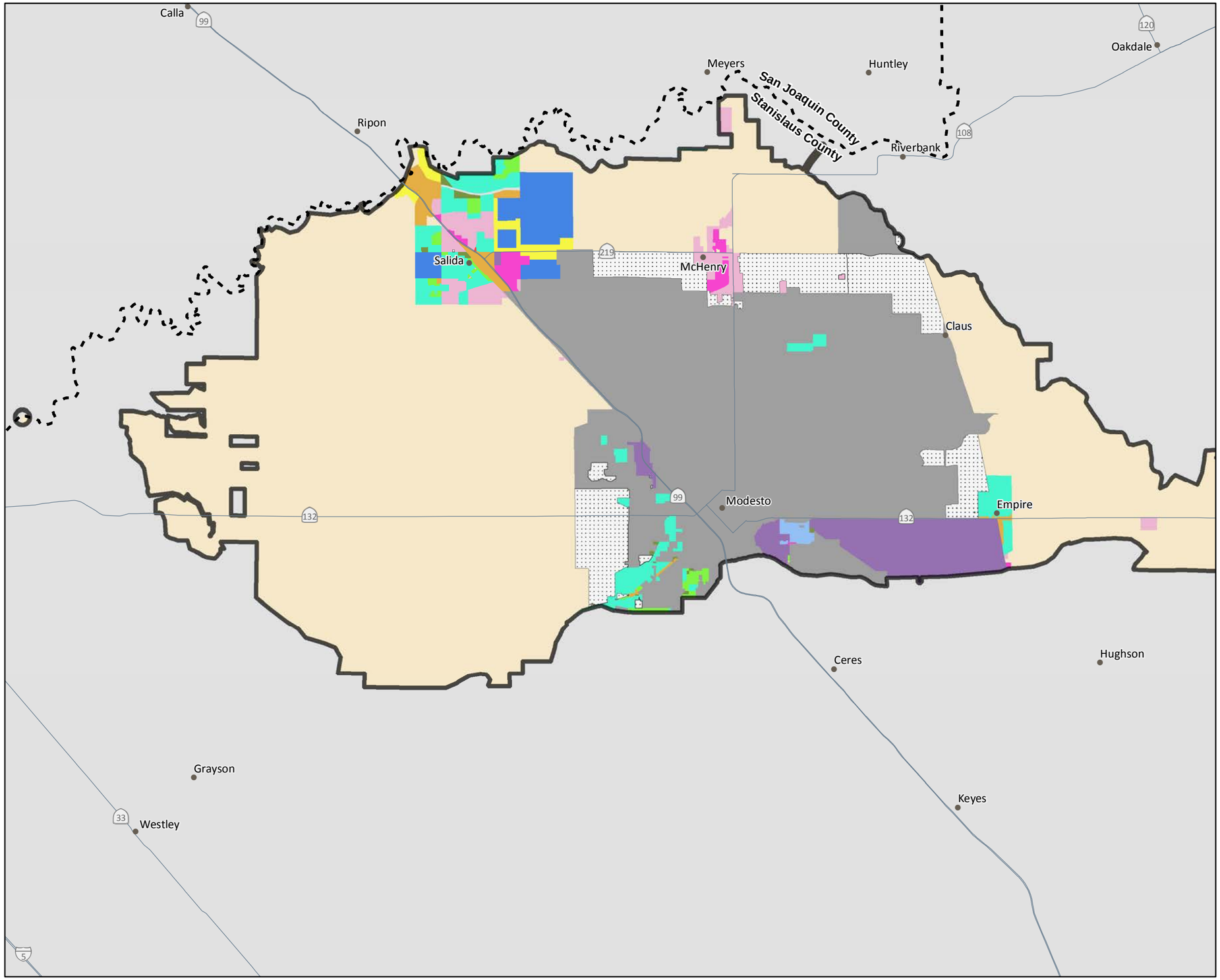
Table 3.2-1. Zoning Designations by Project Category
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Project Categories	Zoning [a]
Regulating Reservoirs	A-2-40
	SCP-R-1
	SCP-R-1-ST
	SCP-R-2
	SCP-R-3
	SCP-C-2
	SCP-IBP
	SCP-PI
Canal, Lateral, and Tunnel Improvements	A-2-40
	M
	R-A
Flow Control	A-2-40
	Modesto
Groundwater Management	A-2-40
Measurement and Automation	A-2-40
	Modesto
	Riverbank
	Waterford

Notes:

[a] Zoning designations:

A-2-40 = General Agriculture 40 Acres
M = Industrial
Modesto = City of Modesto
R-A = Rural Residential
Riverbank = City of Riverbank
SCP-R-1 = Salida Community Plan Low-Density Residential
SCP-R-2 = Salida Community Plan Medium-Density Residential
SCP-R-3 = Salida Community Plan Multiple Family
SCP-R-1-ST = Salida Community Plan Low-Density Residential-Special Treatment Area
SCP-C2 = Commercial
SCP-IBP = Business Park
SCP-PI = Planned Industrial
Waterford = City of Waterford



LEGEND

- Program Area
- County
- Agriculture
- Business Park
- City
- Commercial
- Highway Commercial / Planned Development
- Industrial
- Industrial Transition
- Planned Development
- Planned Industrial
- Residential - Low Density
- Residential - Medium Density
- Residential - Medium/High Density
- Salida Community Plan PI
- Urban Transition

N

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Source: General Plan, Stanislaus County, downloaded Jan 2019

Figure 3.2-1. Sheet 1 of 2
General Plan Land Use Designations
Modesto Irrigation District
Stanislaus County, California

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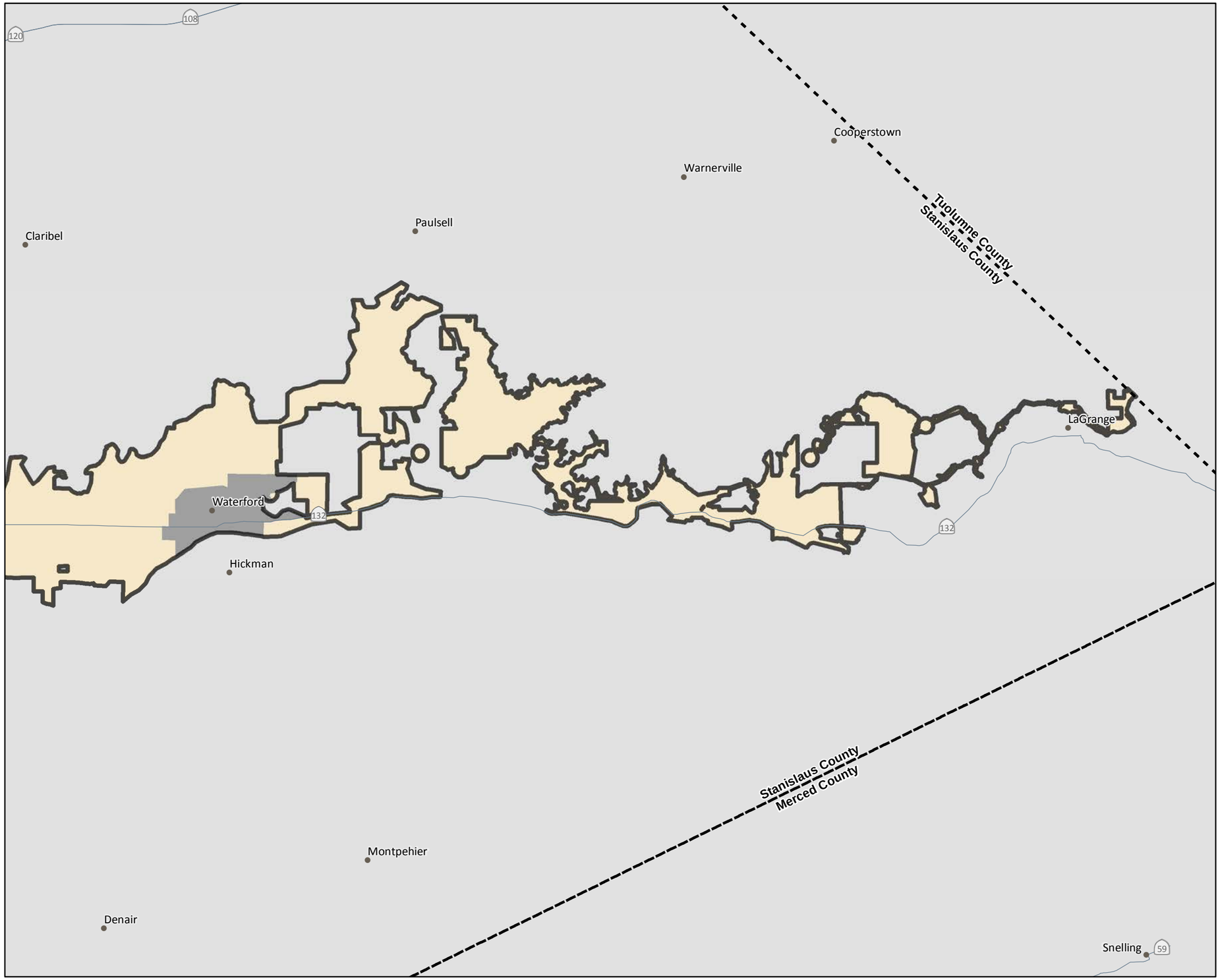

LEGEND

- Program Area
- County
- Agriculture
- City

N

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Source: General Plan, Stanislaus County, downloaded Jan 2019

Figure 3.2-1. Sheet 2 of 2
General Plan Land Use Designations
Modesto Irrigation District
Stanislaus County, California

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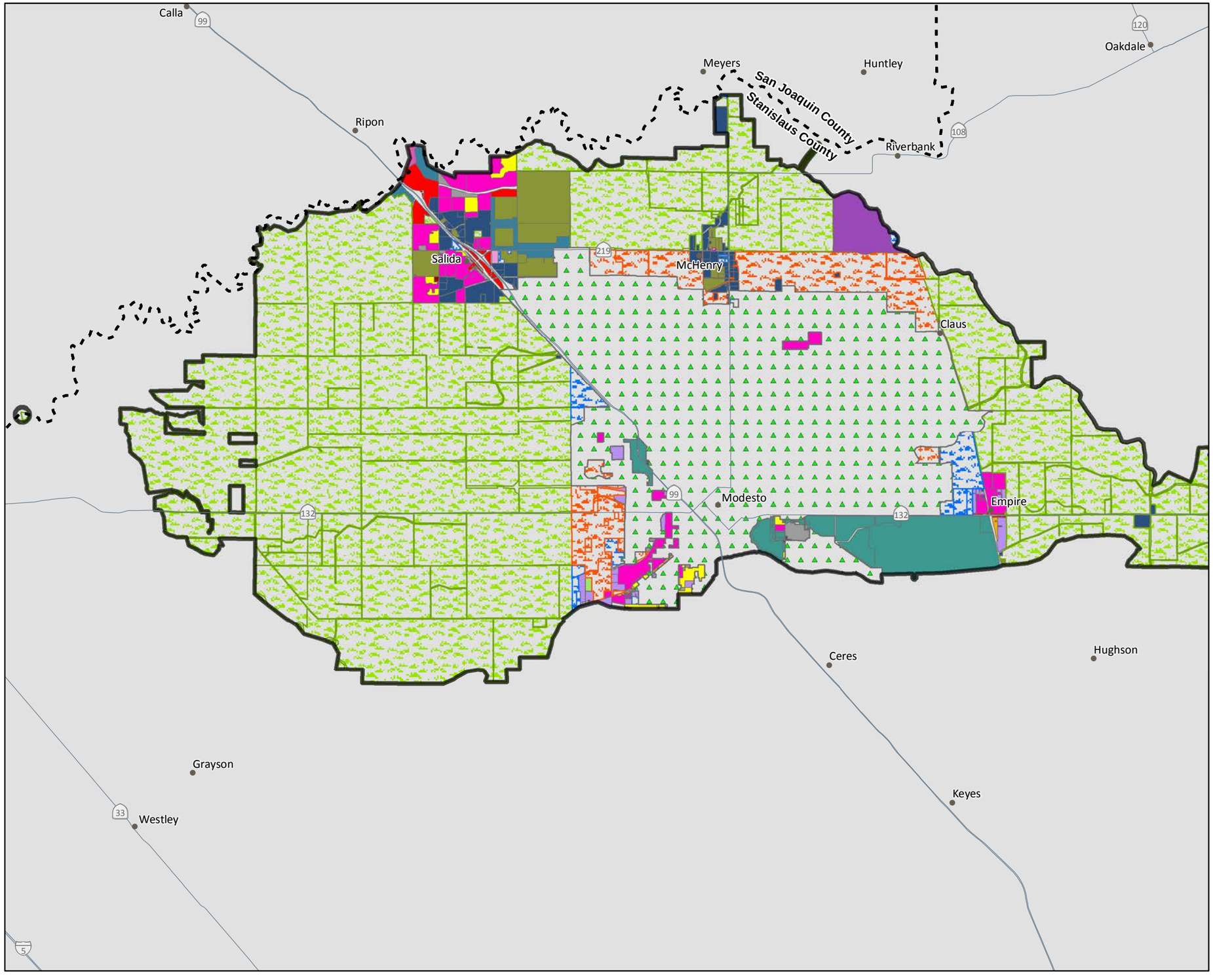

LEGEND

- Program Area
- County
- City of Modesto
- City of Riverbank
- General Agriculture 10 Acre
- General Agriculture 10 Acre Urban Transition
- General Agriculture 40 Acre
- General Agriculture 5 Acre
- General Agriculture
- General Commercial
- Highway Frontage
- Highway Frontage Urban Transition
- Industrial
- Limited Industrial
- Medium Density Residential
- Multiple Family
- Neighborhood Commercial
- Planned Development
- Planned Industrial
- Rural Residential
- Rural Residential Urban Transition
- Salida Community Plan IBP
- Single Family

N

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Source: General Plan, Stanislaus County, downloaded Jan 2019

Figure 3.2-2. Sheet 1 of 2
Zoning Designations
Modesto Irrigation District
Stanislaus County, California

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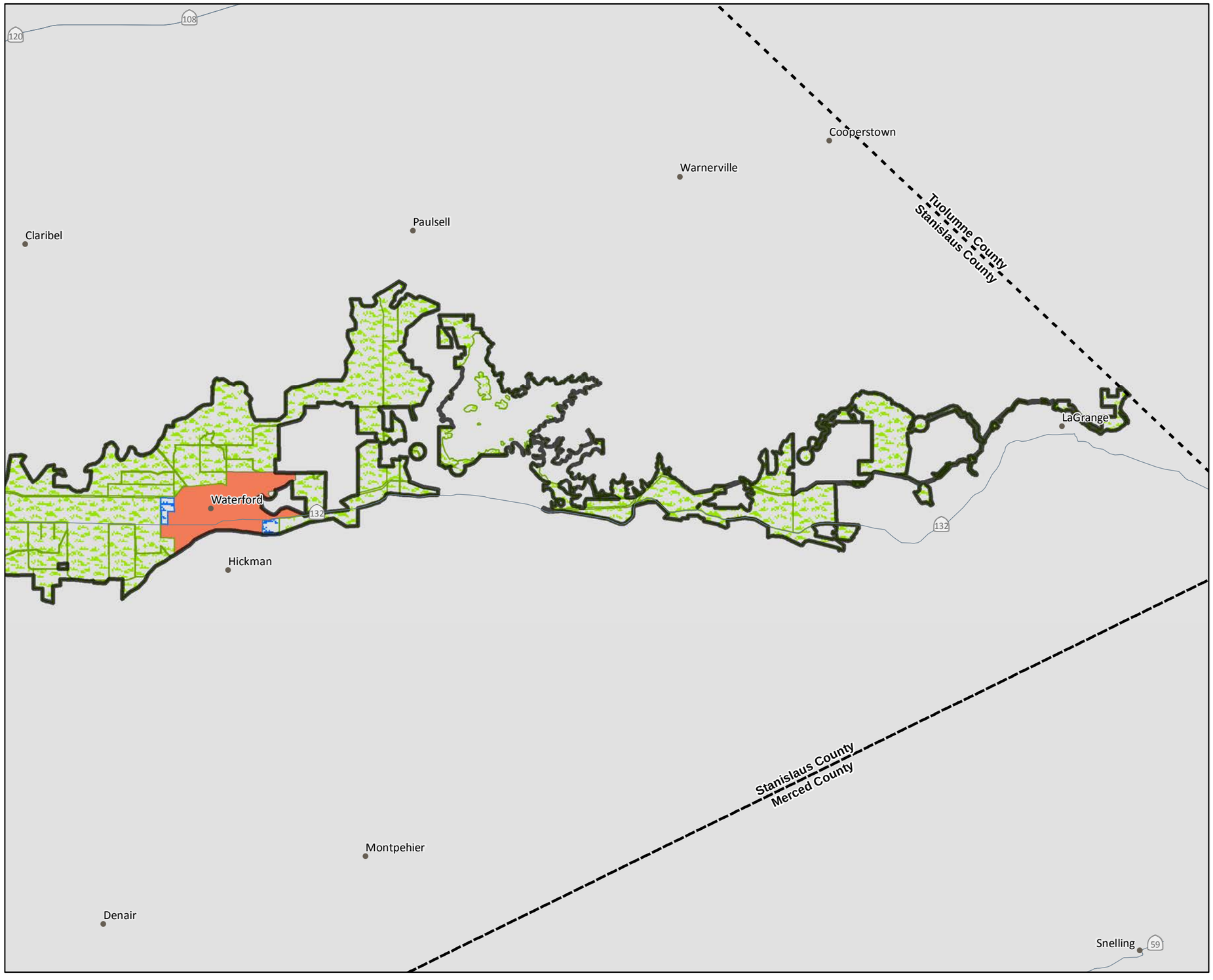

LEGEND

- Program Area
- County
- City of Waterford
- General Agriculture 10 Acre
- General Agriculture 40 Acre

N

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Miles

Source: General Plan, Stanislaus County, downloaded Jan 2019

Figure 3.2-2. Sheet 2 of 2
Zoning Designations
Modesto Irrigation District
Stanislaus County, California

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City of Modesto

The city of Modesto is the largest urban area in Stanislaus County and is located along the southern boundary of the Study Area. The city has a population of approximately 218,464, accounting for nearly 40 percent of Stanislaus County's estimated 2020 population (U.S. Census Bureau, 2020). The city of Modesto is characterized by residential land uses, with industrial, business park, and commercial land use designations comprising much of the area near the edge of the city's sphere of influence (City of Modesto, 2014).

City of Riverbank

With a population of 24,865, Riverbank has the fourth largest population in Stanislaus County (StanCOG, 2018; U.S. Census Bureau, 2020). The city is located north of Modesto, and the southwestern portion of the city falls within the Program Area (Figure 3.2-2). The city of Riverbank is largely designated for residential land uses, with a light industrial area within central Riverfront and the Riverfront Industrial Complex Park to the southeast (Stanislaus County, 2020).

City of Waterford

With a population of 9,120, the city of Waterford is the eighth largest city in Stanislaus County (StanCOG, 2018; U.S. Census Bureau, 2020). The city is located near the eastern boundary of the MID service area, west of Modesto. The city of Waterford is predominantly residential with commercial land use along SR 132 and a few public spaces (City of Waterford, 2013).

3.2.2.2 Farmland Designations and Agricultural Uses in Stanislaus County

Stanislaus County Important Farmland

The California Department of Conservation (CDOC), Office of Land Conservation, maintains a statewide inventory of farmlands. These lands are mapped by the CDOC, Division of Land Resource Protection as part of the Farmland Mapping and Monitoring Program (FMMP). Lands are classified using a system that combines technical soil ratings and current land use into the following categories (CDOC, 2015):

- Prime Farmland – must have been irrigated within the last 4 years and the soil must meet physical and chemical criteria determined by the Natural Resources Conservation Service
- Farmland of Statewide Importance – must have been irrigated within the last 4 years and must be of similar quality; however, these lands may possess minor shortcomings, including increased slope or decreased ability to store moisture in the soil
- Unique Farmland – must have been cropped within the last 4 years, and is typically irrigated, although some non-irrigated orchards or vineyards may qualify for the designation
- Farmland of Local Importance – generally of a quality that would otherwise qualify for Prime Farmland or Farmland of Statewide Importance if not for a lack of irrigation
- Grazing Land – existing vegetation of suitable quality for livestock grazing
- Urban and Built-up Land
- Other Land and Water

In 2018, more than 85 percent of the approximately 970,173 million acres inventoried in Stanislaus County under the FMMP were designated for agricultural purposes (CDOC, 2018) (Figure 3.2-3). Over half of these agricultural lands are designated as Important Farmland, the majority of which is Prime Farmland. Urban lands, such as incorporated cities, account for approximately 7 percent of the lands in the county (Table 3.2-2). As shown in Table 3.2-2, Important Farmland actually increased about 3,000 acres between 2016 and 2018, largely as a result of conversion from grazing land.

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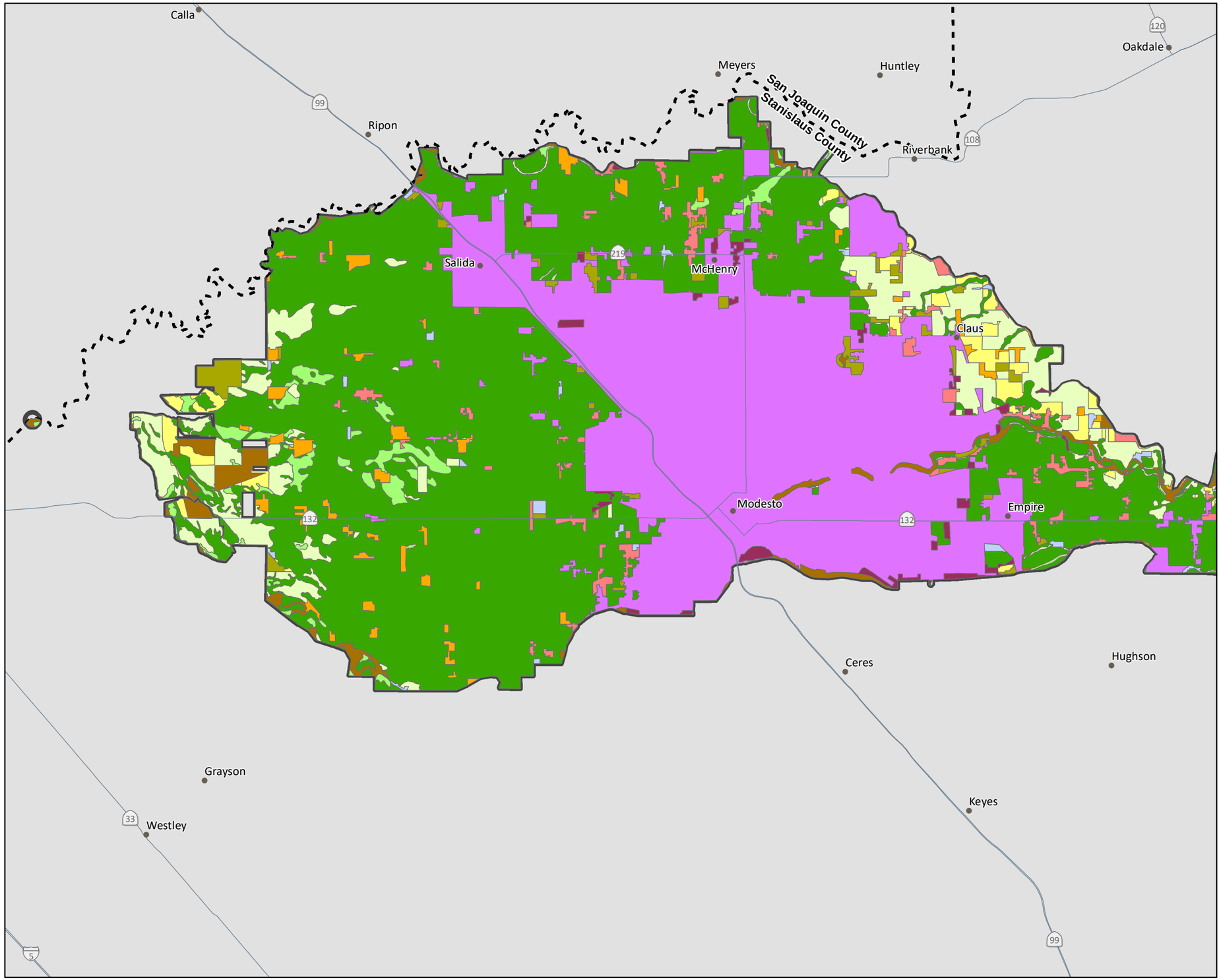

LEGEND

- Program Area
- County

Important Farmland Designation

- P - Prime Farmland
- S - Farmland of Statewide Importance
- U - Unique Farmland
- L - Farmland of Local Importance
- G - Grazing Land
- CI - Confined Animal Agriculture
- nv - Nonagricultural and Natural Vegetation
- V - Vacant or Disturbed Land
- R - Rural Residential Land
- D - Urban and Built-up Land
- W - Water
- sAC - Semi-Agricultural and Rural Commercial Land

N

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Miles

Source: 2018 FMMP, Stanislaus County, downloaded ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP March 2022

Figure 3.2-3. Sheet 1 of 2
Important Farmland
Modesto Irrigation District
Stanislaus County, California

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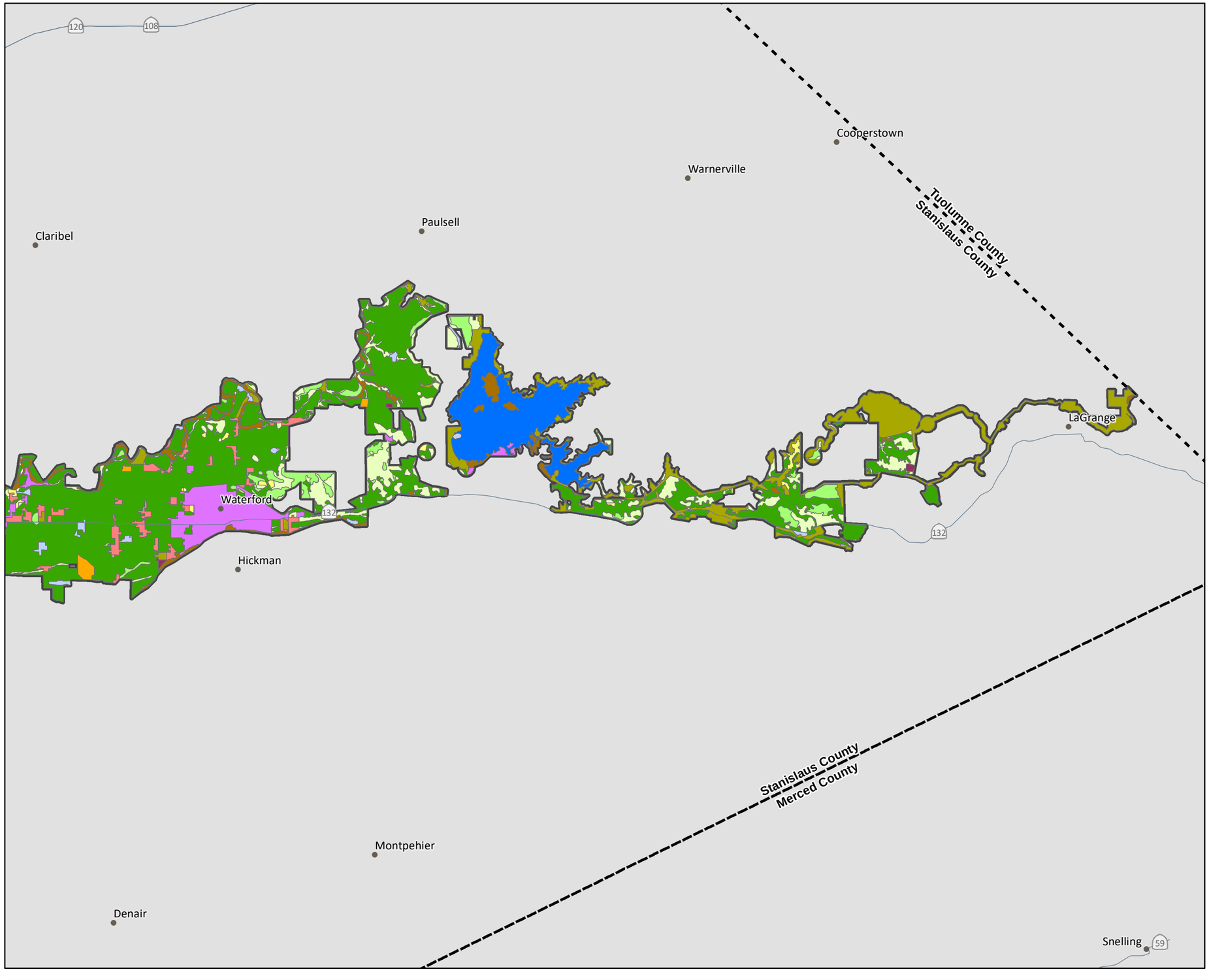

LEGEND

Program Area

County

Important Farmland Designation

- P - Prime Farmland
- S - Farmland of Statewide Importance
- U - Unique Farmland
- L - Farmland of Local Importance
- G - Grazing Land
- CI - Confined Animal Agriculture
- nv - Nonagricultural and Natural Vegetation
- V - Vacant or Disturbed Land
- R - Rural Residential Land
- D - Urban and Built-up Land
- W - Water
- sAC - Semi-Agricultural and Rural Commercial Land

N

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Miles

Source: 2018 FMMP, Stanislaus County, downloaded ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP March 2022

Figure 3.2-3. Sheet 2 of 2
Important Farmland
Modesto Irrigation District
Stanislaus County, California

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Table 3.2-2. Stanislaus County Summary and Change by Land Use Category 2016 through 2018
Modesto Irrigation District Proposed Program Programmatic Environmental Impact Report

	Total Acreage Inventoried		2016 through 2018 Acreage Changes		
Land Use Category	2016	2018	Acres Lost	Acres Gained	Net Change (acres)
Prime Farmland	249,964	250,420	1,328	1,784	456
Farmland of Statewide Importance	33,172	33,042	596	466	–130
Unique Farmland	116,212	121,930	166	5,884	5,718
Farmland of Local Importance	26,030	23,058	3,591	619	–2,972
Important Farmland Subtotal	425,378	428,450	5,681	8,753	3,072
Grazing Land	404,404	400,541	4,896	1,033	–3,863
Agricultural Land Subtotal	829,782	828,991	10,577	9,786	–791
Urban and Built-up Land	66,229	66,810	131	712	581
Other Land [a]	66,682	66,936	1,258	1,512	254
Water Area	7,480	7,436	44	0	–44
Total Area Inventoried	970,173	970,173	12,010	12,010	0

Source: CDOC, 2018.

[a] Land not included in any other mapping category. Common examples include low-density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry, or aquaculture facilities; strip mines; borrow pits; and water bodies smaller than 40 acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres are mapped as Other Land.

Implementation of the Proposed Program would include projects constructed on or adjacent to lands currently designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Confined Animal Agriculture, Rural Residential Land, and Urban and Built-up Land under the FMMP (CDOC, 2020).

Stanislaus County Agricultural Uses

Stanislaus County is regarded as one of the most agriculturally productive counties in the United States, with a gross revenue of $3.4 billion in 2020 (StanAg, 2021a). Nuts and other orchard crops and animals and animal products including dairy and meat account for a substantial amount of agricultural revenue generated in the county (StanAg, 2021a). Table 3.2-3 shows the leading agricultural commodities in Stanislaus County in 2020.

Modesto Irrigation District Service Area Agricultural Uses

The Program Area is characterized by agricultural uses. Table 3.2-4 summarizes the cropping areas within the Program Area.

3.2.2.3 Williamson Act Contract Status

Projects implemented as part of the Proposed Program could potentially occur on lands currently under Williamson Act contracts. Figure 3.2-4 shows lands currently enrolled in Williamson Act contracts within the Program Area (CDOC, 2006).

Table 3.2-3. Summary of Top Commodities within Stanislaus County 2020
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Rank	Crop	Value (USD)
1	Almonds	1,123,961,000
2	Milk	736,644,000
3	Chickens	342,099,000
4	Cattle and Calves	201,783,000
5	Nursery, Fruit and Nut Trees, and Vines	163,123,000
6	Walnuts	103,040,000
7	Silage	99,498,000
8	Almond Pollination	88,800,000
9	Turkeys	54,117,000
10	Tomatoes	37,991,000
Top 10 Total		2,951,056,000
All Other Commodities		525,037,000
Total All Commodities		3,476,093,000

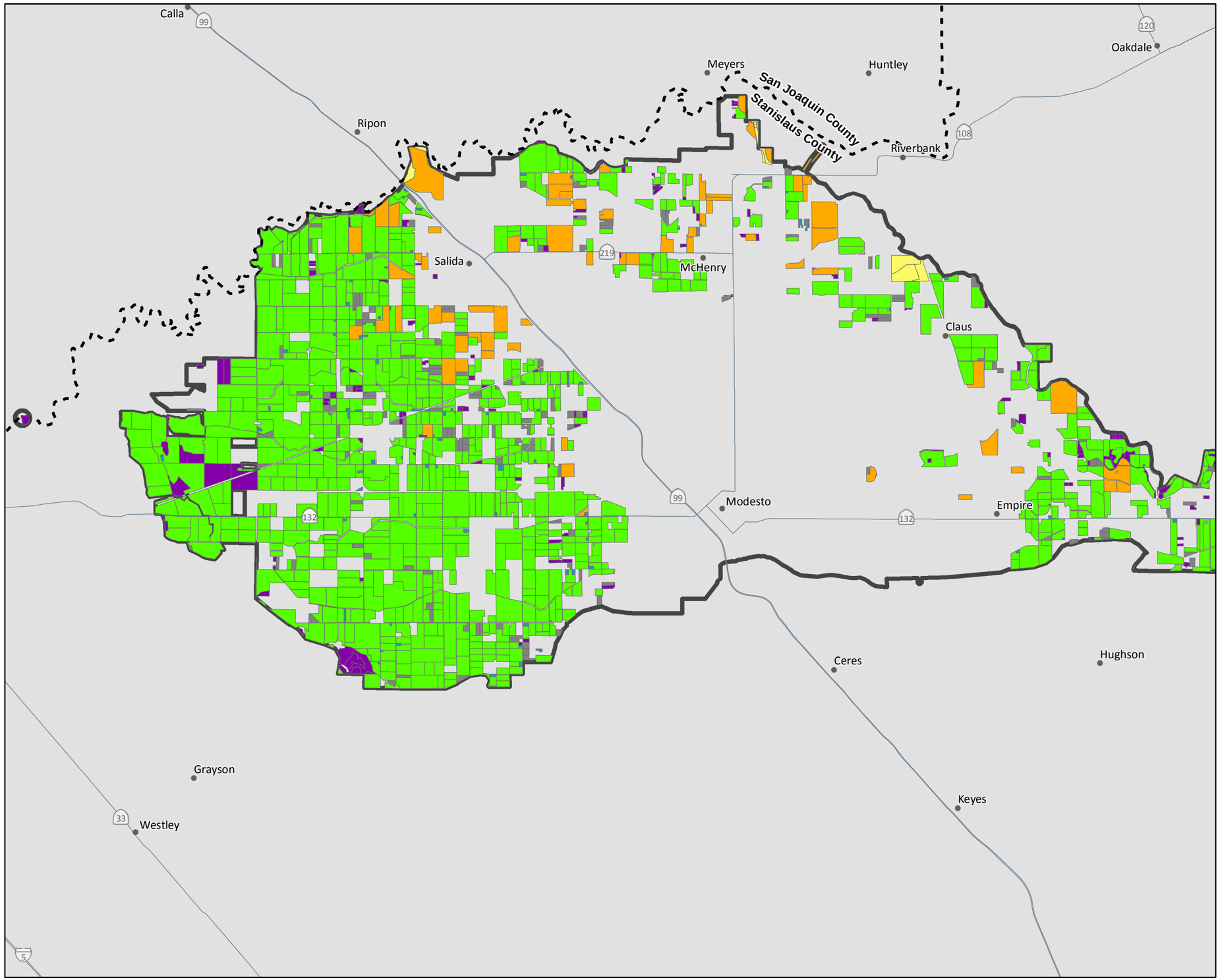
Source: StanAg, 2021
USD = U.S. dollars

Table 3.2-4. Summary of Cropping Areas within Modesto Irrigation District 2020
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Crop Type	2020 Distribution Acreage (percent of total)
Orchards	40,512 (61)
Field Crops	8,587 (13)
Pasture	6,600 (10)
Alfalfa	2,532 (4)
Idle	4,119 (6)
Truck Crops	1,628 (2)
Vineyards	1,020 (2)
Grain	1,191 (2)
Rice	263 (<1)
Total	66,452 (100)
Total Permanent Crops [a]	41,532 (62)
Total Nonpermanent Crops [b]	20,801 (31)
Total Irrigated Crops [c]	62,333 (94)
Total All Other Uses [d]	4,119 (6)

Source: MID, 2021

[a] Orchards and vineyards
[b] Field crops, pasture, alfalfa, truck crops, rice, and grains
[c] All permanent and nonpermanent crops
[d] Idle



LEGEND

- Program Area
- County

Williamson Act Designation

- HS - Home Site
- HS-NR - Home Site/Non-Renewal
- NP - Non-Prime
- NP-NR - Non-Prime/Non-Renewal
- P - Prime
- P-NR - Prime/Non-Renewal
- Undetermined

N

0 2 4

Miles

Source: Williamson Act, Stanislaus County, 2006

Figure 3.2-4. Sheet 1 of 2
Williamson Act Contracts
Modesto Irrigation District
Stanislaus County, California

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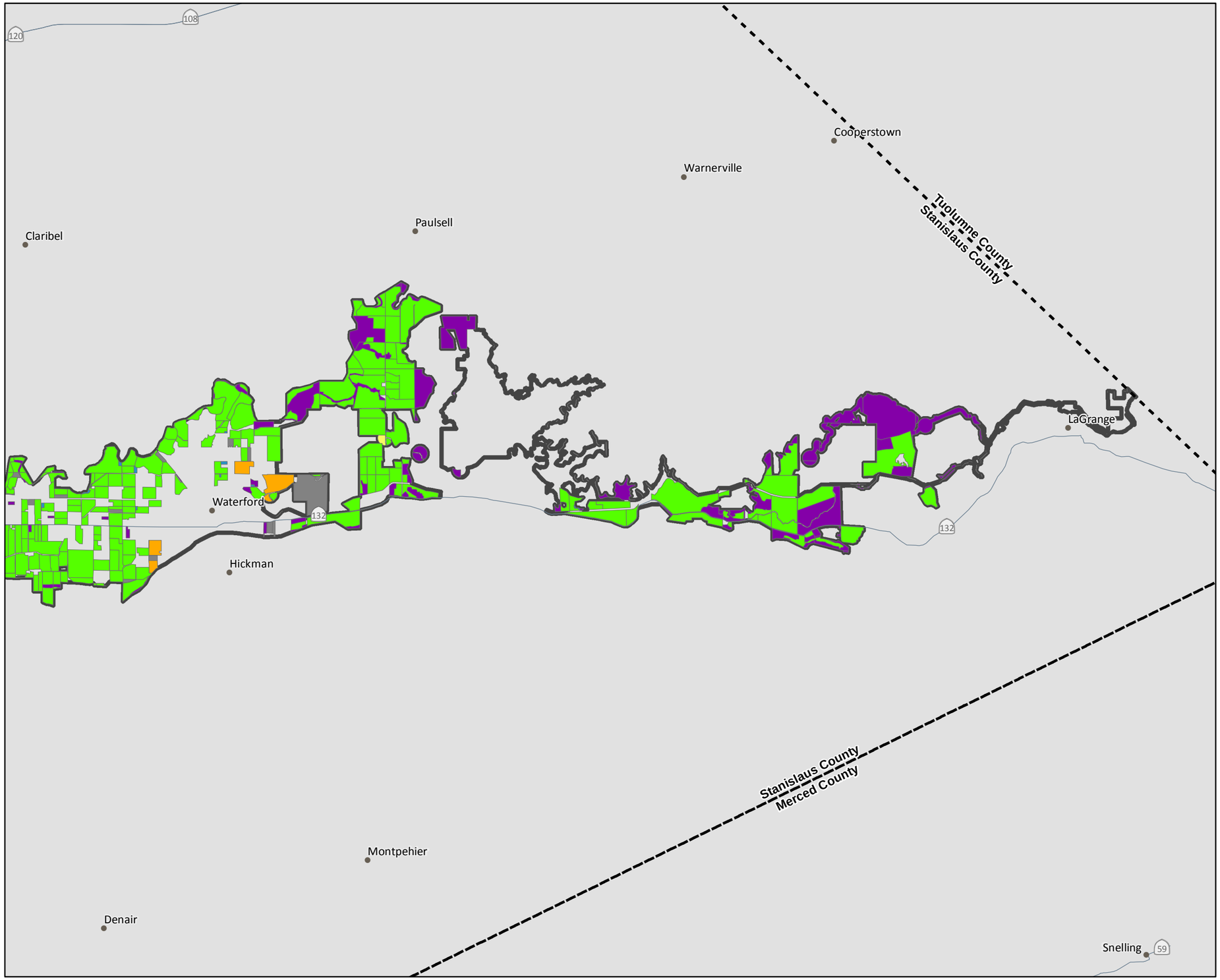

LEGEND

- Program Area
- County

Williamson Act Designation

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0 2 4

Miles

Source: Williamson Act, Stanislaus County, 2006

Figure 3.2-4. Sheet 2 of 2
Williamson Act Contracts
Modesto Irrigation District
Stanislaus County, California

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3.2.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on agriculture and land use. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

3.2.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and are listed below. Impacts on land use and agricultural resources are considered significant if the Proposed Program would result in any of the following:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use.
- Conflict with existing zoning for agricultural use, or a Williamson Act contract.
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code §12220[g]), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code § 51104[g]).
- Result in the loss of forest land or conversion of forest land to non-forest use.
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use.
- Physically divide an established community.
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

3.2.3.2 Topics Eliminated from Further Analytical Consideration

Because no forest land or timberland is located in the Program Area, impacts related to the thresholds listed in Section 3.2.3.1 regarding forest land and timberland are not evaluated in this analysis.

The Study Area is located in and around established communities; however, projects implemented as part of the Proposed Program include improvements to existing infrastructure. The Proposed Program would improve operational reliability and support the local agricultural economy and would not result in projects or actions that would physically divide an established community. Therefore, impacts related to the threshold above concerning division of communities are not evaluated in this analysis.

3.2.3.3 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is functionally the same as Existing Conditions as related to agriculture and land use because minimal additional future development is anticipated in the predominantly rural and agricultural areas adjacent to the Proposed Program facilities, and both represent a condition without the Proposed Program. Therefore, this analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into project categories based on common features of proposed improvements, as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

Impacts on land use were assessed using a combination of data review, published reports, and professional experience. Short-term impacts due to construction activities were assessed to the extent practicable; however, the analysis primarily focuses on long-term impacts from operation of the Proposed Program.

3.2.3.4 Impacts Associated with the Proposed Program

Impact AG/LU-1: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use.

Regulating Reservoirs

Implementation of the proposed regulating reservoir projects could potentially result in the loss of Important Farmland. Each proposed regulating reservoir project is anticipated to have a permanent footprint of 40 to 60 acres. The proposed locations within which the regulating reservoirs potentially could occur are shown on Figure 2-1. Table 3.2-5 provides the acres of Important Farmland within each of the proposed locations. Because the exact location of the regulating reservoir footprints will be confirmed based on availability of parcels and avoidance and minimization of conversion of Important Farmland, Table 3.2-5 includes the worst-case scenario for impacts on Important Farmland associated with each regulating reservoir. Impacts on Important Farmland may be reduced depending on the parcels ultimately selected for each project.

Table 3.2-5. Important Farmland Potentially Affected by Proposed Regulating Reservoir Projects
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Project Name	Prime Farmland (acres)	Farmland of Statewide Importance (acres)
Lateral 3 and 7 Regulating Reservoir	50	50
Lateral 4 and 5 Regulating Reservoir	60	6
Lateral 6 and 8 Regulating Reservoir	40	0

In addition to potential permanent impacts, construction of the proposed regulating reservoir projects may result in the short-term conversion of Important Farmland to accommodate construction activities, such as vehicle access and material and equipment staging. Construction of the proposed regulating reservoirs is anticipated to last approximately 1 year; however, agricultural uses would be restored once construction activities are complete and would not result in the permanent conversion of Important Farmland. Additionally, temporary impacts would be limited to the extent necessary to accommodate construction activity. Access routes and staging areas would be selected to limit impacts on adjacent agricultural properties, and proposed tie-ins at the new regulating reservoirs would be implemented outside of the irrigation season to avoid impacts on agricultural water deliveries. Therefore, impacts during construction would be less than significant.

As presented in Table 3.2-5 and described in preceding paragraphs and in Section 2, Program Description and Alternatives, permanent impacts of implementation of the Proposed Program as a result of the operation of proposed regulating reservoir projects would be limited to a maximum of approximately

150 acres for all three projects combined. When compared with the tens of thousands of acres of Important Farmland across the service area, the proposed regulating reservoir projects would represent a small fraction of agricultural land in the Study Area. Additionally, these projects would improve water supply delivery to agricultural land uses within the service area, thereby discouraging conversion of agricultural lands to other uses. The proposed regulating reservoir projects would not substantially change agricultural production or land use in the Study Area; therefore, impacts on Important farmland as a result of the proposed regulating reservoir projects would be less than significant.

All Other Project Types

Construction of individual projects under the Proposed Program could potentially occur on Important Farmland. However, this potential impact would be short term because agricultural uses would be restored once construction activities are complete. In addition, farmland adjacent to individual projects may be used to accommodate construction activities, such as vehicle access and material and equipment staging, resulting in a temporary impact. Depending on the project, construction duration would range from 1 month (for example, Measurement and Automation projects) to up to 1 year (for example, regulating reservoirs).

Temporary impacts would be limited to the extent necessary to accommodate construction activity. Access routes and staging areas would be selected to limit impacts on adjacent agricultural properties. Additionally, agricultural uses would be restored once construction activities are complete and would not result in the permanent conversion of farmlands. Therefore, short-term impacts during construction would be less than significant.

Similar to the proposed regulating reservoirs, implementation of all other projects under the Proposed Program could potentially result in the permanent loss of Important Farmland if they were located on lands designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. However, given that most projects would result in permanent impacts of 1 acre or less, the potential impact on Important Farmland would be expected to be minor in the context of the Program Area. In addition, implementation of the Proposed Program would result in irrigation infrastructure improvements that would support existing agricultural land use within the Program Area, thereby discouraging conversion of agricultural lands to other uses. Therefore, impacts on Important Farmland resulting from operation of the Proposed Program would be less than significant.

Impact AG/LU-2: Conflict with existing zoning for agricultural use or a Williamson Act contract.

Regulating Reservoirs

The proposed locations within which the regulating reservoirs potentially could occur are shown on Figure 2-1. The Lateral 6 and 8 Regulating Reservoir may be located in an area zoned for residential use in the *Salida Community Plan* (Stanislaus County, 2007). Although the area is characterized by agricultural production, because the parcels are not zoned for agriculture, the regulating reservoir would not conflict with zoning for agricultural use. Lateral 3 and 7 and Lateral 4 and 5 regulating reservoirs would be located on lands zoned Agricultural (Stanislaus County, 2020). However, because these proposed regulating reservoirs are consistent with and would support existing agricultural land use, the regulating reservoirs would not conflict with local zoning designations for agricultural use. As such, impacts associated with proposed regulating reservoir projects would be less than significant.

Table 3.2-6 provides the acres of land under Williamson Act contract within each of the potential regulating reservoir sites. Consistent with Table 3.2-5, Table 3.2-6 includes the worst-case scenario, but actual acreage impact may be reduced depending on final location selected for the proposed projects. Avoiding or minimizing conversion of lands under Williamson Act contracts would be considered in determining the locations of the regulating reservoirs. In addition, the proposed regulating reservoirs would support existing agricultural land use in the Program Area. Therefore, potential impacts on Williamson Act contract lands would be less than significant.

Table 3.2-6. Williamson Act Contract Lands Potentially Affected by Proposed Regulating Reservoir Projects
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Project Name	Williamson Act Contracts (acres)
Lateral 3 and 7 Regulating Reservoir	50
Lateral 4 and 5 Regulating Reservoir	60
Lateral 6 and 8 Regulating Reservoir	40

Source: CDOC, 2006

In addition to potential permanent impacts, construction of the proposed regulating reservoir projects may result in the short-term conversion of land zoned for agricultural use or land under Williamson Act contract to accommodate construction activities, such as vehicle access and material and equipment staging. Construction of the proposed regulating reservoirs is anticipated to last approximately 1 year; however, agricultural uses would be restored once construction activities are complete, and would not result in a permanent impact. Additionally, temporary impacts would be limited to the extent necessary to accommodate construction activity. Access routes and staging areas would be selected to limit impacts on adjacent agricultural properties, and proposed tie-ins at the new regulating reservoirs would be implemented outside of the irrigation season to avoid impacts on agricultural water deliveries. Therefore, impacts during construction would be less than significant.

All Other Project Types

As described in Section 3.2.2.1, Land Use in the Study Area, most of the Study Area is zoned by Stanislaus County as General Agricultural. As a result, individual projects under the Proposed Program could potentially be located on land zoned for agricultural use. However, implementation of these projects would result in irrigation infrastructure improvements that would be consistent with and support existing agricultural land use. As a result, the Proposed Program would not conflict with local zoning designations for agricultural use; and impacts resulting from operation of the Proposed Program would be less than significant.

As shown on Figure 3.2-4, there are lands under Williamson Act contract in the Study Area. As a result, individual projects under the Proposed Program could potentially be located on Williamson Act contract lands. However, where feasible, avoiding or minimizing conversion of land under Williamson Act contract would be considered in determining the locations of projects implemented as part of the Proposed Program. Given most projects would result in permanent impacts of 1 acre or less, the potential impact on Williamson Act contract lands would be expected to be minor in the context of the Program Area. In addition, implementation of the Proposed Program would result in irrigation infrastructure improvements that would support existing agricultural land use. As a result, impacts resulting from operation of the Proposed Program would be less than significant.

Construction of individual projects under the Proposed Program could potentially occur on land zoned for agricultural use or land under Williamson Act contract in the Study Area. However, this potential impact would be short term because agricultural uses would be restored once construction activities are complete. In addition, farmland adjacent to individual projects may be used to accommodate construction activities, such as vehicle access and material and equipment staging, resulting in a temporary impact. Depending on the project, construction duration would range from 1 month (for example, Measurement and Automation projects) to up to 1 year (for example, regulating reservoirs).

Temporary impacts would be limited to the extent necessary to accommodate construction activity. Access routes and staging areas would be selected to limit impacts on adjacent agricultural properties. Additionally, agricultural uses would be restored once construction activities are complete, and would not result in the permanent conversion of farmlands. Therefore, short-term impacts during construction would be less than significant.

Impact AG/LU-3: Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use.

All Project Types

Implementation of the Proposed Program would result in ground disturbance, such as grading and excavation, associated with construction of individual projects. The types of heavy equipment that would be used during construction are described in Section 2, Program Description and Alternatives. Depending on the project, construction duration would range from 1 month (for example, Measurement and Automation projects) to up to 1 year (for example, regulating reservoirs). Temporary impacts on neighboring agricultural fields could occur during construction; however, MID would coordinate construction activities with landowners to minimize impacts on agricultural production, including scheduling construction to avoid impacts on agricultural operations and associated production, as feasible, and financially compensating landowners for loss of production. Therefore, construction impacts would be less than significant.

The Proposed Program includes irrigation infrastructure improvements that would be consistent with and would support existing agricultural land use in the Program Area. Operations and maintenance activities associated with the Proposed Program would be consistent with existing activities that the District currently implements. Therefore, the Proposed Program would not result in a change in the existing environment that could result in the conversion of farmland to nonagricultural use. Impacts would be less than significant.

Impact AG/LU-4: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

All Project Types

The goals, objectives, and policies provided in Section 3.2.1.2, Local, emphasize the preservation of agricultural land use in the Program Area. The Proposed Program includes irrigation infrastructure improvements that would be consistent with and would support existing agricultural land use in the Program Area. In addition, as a "local agency," MID is exempt from City and County building and zoning ordinances during construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy pursuant to Government Code §53091(d)(e). Therefore, implementation of the Proposed Program would not conflict with local land use policies regarding agricultural uses.

The Study Area is located in Stanislaus County and also includes lands in the cities of Modesto, Riverbank, and Waterford. As shown in Table 3.2-1, some of the project sites would be located on land zoned as City (Modesto, Riverbank, and Waterford), Residential (Rural, Single Family, Medium Density, and Multiple Family), Commercial, Business Park, and Industrial. Although agricultural facilities would generally not be considered compatible with these zoning designations or with the existing or intended use of the land, these facilities would generally include improvements at existing facilities. Improvements to existing facilities would not preclude uses related to industrial facilities or residential housing at the sites, and existing or planned uses for these parcels would still be viable. MID would coordinate proposed improvements with the relevant local entity to ensure zoning requirements are properly addressed. Therefore, the Proposed Program would result in a less than significant impact.

3.2.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant impacts on land use and agricultural resources; therefore, mitigation is not required or recommended.

3.3 Air Quality

This section describes the regulatory and environmental setting with respect to air quality and evaluates potential air quality impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

3.3.1 Regulatory Setting

Air quality in California is regulated at the federal and state levels by the EPA and the California Air Resources Board (ARB). At the local level, regional air pollution control districts have been established to oversee the attainment of air quality standards within air basins throughout California. The districts have permitting authority over all stationary sources of air pollutants within their district boundaries and provide the primary review of environmental documents prepared for projects with air quality issues. The Proposed Program is located in the San Joaquin Valley Air Basin (SJVAB) under the jurisdiction of the SJVAPCD.

3.3.1.1 Federal

Clean Air Act and National Ambient Air Quality Standards

Federal air quality policies are regulated through the Federal Clean Air Act (CAA). The United States Congress adopted the CAA in 1970 and passed amendments to the CAA in 1977 and 1990. Pursuant to the CAA, EPA has established nationwide air quality standards to protect public health and welfare, with an adequate margin of safety. The National Ambient Air Quality Standards (NAAQS) developed in the Code of Federal Regulations (CFR) Title 40, Part 50 are the maximum allowable atmospheric concentrations for six criteria pollutants: ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), PM_{10}, particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead. The NAAQS contains primary standards that provide public health protection and secondary standards that protect public welfare. Table 3.3-1 summarizes the NAAQS.

Table 3.3-1. National and California Ambient Air Quality Standards
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

			NAAQS [a]	
Pollutant	Averaging Time	CAAQS [b]	Primary [c]	Secondary [d]
Ozone	8 hours	0.070 ppm	0.070 ppm	0.070 ppm
	1 hour	0.09 ppm	–	–
PM_{10}	Annual arithmetic mean	20 µg/m³	–	–
	24 hours	50 µg/m³	150 µg/m³	150 µg/m³
$PM_{2.5}$	Annual arithmetic mean	12 µg/m³	12 µg/m³	15 µg/m³
	24 hours	–	35 µg/m³	35 µg/m³
CO	8 hours	9.0 ppm	9 ppm	–
	1 hour	20 ppm	35 ppm	–
NO_2	Annual arithmetic mean	0.030 ppm	0.053 ppm	0.053 ppm
	1 hour	0.18 ppm	100 ppb	–
SO_2	24 hours	0.04 ppm	–	–
	3 hours	–	–	0.5 ppm
	1 hour	0.25 ppm	75 ppb[e]	–
Lead[f]	Calendar quarter	–	1.5 µg/m³ (certain areas)	1.5 µg/m³
	Rolling 3-month average	–	0.15 µg/m³	–
	30-day average	1.5 µg/m³	–	–
Visibility-reducing particles	8 hours	[g]	–	–

Table 3.3-1. National and California Ambient Air Quality Standards
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Pollutant	Averaging Time	CAAQS [b]	NAAQS [a]	
			Primary [c]	Secondary [d]
Sulfates	24 hours	25 µg/m^3	–	–
Hydrogen sulfide	1 hour	0.03 ppm	–	–
Vinyl chloride [f]	24 hours	0.01 ppm	–	–

Source: ARB, 2016a

[a] NAAQS other than ozone, particulate matter, and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The ozone standard is attained when the fourth-highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, is equal to or less than the standard.

[b] CAAQS for ozone, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO_2, and suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles) are not to be exceeded. All others are not to be equaled or exceeded.

[c] NAAQS Primary Standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d] NAAQS Secondary Standards are the levels of air quality necessary to protect the public welfare from known or anticipated adverse effects of a pollutant.

[e] Final rule was signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

[f] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. ARB made this determination following the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

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

Notes:

-- = not applicable
CAAQS = California Ambient Air Quality Standards
µg/m^3 = micrograms per cubic meter
ppb = parts per billion (by volume)
ppm = parts per million (by volume)

EPA classifies areas as being in attainment or nonattainment with the NAAQS for each criteria pollutant. A region that meets the NAAQS for a pollutant is designated as being in attainment for that pollutant. A region that does not meet the NAAQS for a pollutant is designated as being in nonattainment for that pollutant. An area that was previously designated as a nonattainment area but has met the standard and has been reclassified by EPA as attainment with a maintenance plan is a maintenance area.

The 1977 CAA amendment requires each state to develop and maintain a State Implementation Plan (SIP) for each nonattainment criteria pollutant. The SIP serves as a tool to help avoid and minimize emissions of nonattainment criteria pollutants and their precursor pollutants and achieve compliance with the NAAQS. In 1990, the CAA was amended to strengthen regulation of both stationary and mobile emission sources.

Toxic Air Contaminant and Odorous Emissions

In addition to the criteria pollutants, EPA also regulates emissions of hazardous air pollutants, or toxic air contaminants (TACs). TACs include airborne inorganic and organic compounds that can have both short-term (acute) and long-term (carcinogenic, chronic, and mutagenic) impacts on human health. Odorous compounds include those that can be detected by the human olfactory system, such as hydrogen sulfide and other sulfurous compounds.

Controlling air toxic emissions became a national priority with the passage of the CAA amendments in 1990, when Congress mandated that EPA regulate 188 air toxics. Prior to the 1990 CAA amendments, national emission standards were established for benzene, vinyl chloride, radionuclides, mercury, asbestos, beryllium, inorganic arsenic, radon 222, and coke oven emissions. The 1990 CAA amendments require EPA to set standards for categories and subcategories of sources that emit hazardous air pollutants, rather than for the pollutants themselves. EPA began issuing the new standards in November 1994. National emission standards set before 1991 remain applicable.

Odorous emissions are typically regulated by local air districts under nuisance prohibitory rules. Because odor is generally a subjective phenomenon that affects people differently, development of odor emissions standards has proven impractical. Therefore, regulators have relied on the nuisance standard to assist in enforcing control of odorous emissions. Determination of the presence of a nuisance emission is based on the number of odor complaints received by the air district during an odor episode.

3.3.1.2 State

California Clean Air Act and Air Quality Standards

ARB oversees California air quality policies and regulations. California Ambient Air Quality Standards (CAAQS) were first established in 1969 pursuant to the Mulford-Carrell Act. CAAQS are generally more stringent than the NAAQS and include the NAAQS pollutants and four additional pollutants: sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulates. Relevant CAAQS are listed in Table 3.3-1.

The California Clean Air Act, which was approved in 1988, requires each local air district, where ambient concentrations violate the CAAQS, to prepare an air quality management plan to achieve compliance with the CAAQS as a part of the SIP. ARB has ultimate responsibility for the SIP for nonattainment pollutants but relies on each local air district to adopt mandatory statewide programs and provide additional strategies for sources under their jurisdiction. The SIPs are a compilation of new and previously submitted plans, programs (that is, monitoring, modeling, and permitting), district rules, State regulations, and federal controls. Local air districts and other agencies prepare SIP elements and submit them to ARB for approval. ARB forwards SIP revisions to EPA for approval and publication in the *Federal Register*.

Air Toxics

California regulates TACs through its Air Toxics Program, which is mandated in Chapter 3.5 of the Health and Safety Code – Toxic Air Contaminants, and Part 6 – Air Toxics Hot Spots Information and Assessment (California Health and Safety Code, §§39660 et seq. and 44300 et seq., respectively).

The California EPA, Office of Environmental Health Hazard Assessment, completed a comprehensive health assessment of diesel exhaust in 1998. The assessment formed the basis for an ARB decision to formally identify particulate matter in diesel exhaust as a TAC that may pose a threat to human health.

ARB adopted the *Diesel Risk Reduction Plan* (ARB, 2016b) and a series of airborne toxic control measures for mobile and stationary sources, which are intended to reduce overall diesel exhaust emissions in California. ARB also adopted two airborne toxic control measures for controlling naturally occurring asbestos (NOA): (1) the Asbestos Airborne Toxic Control Measure for Surfacing Applications and (2) the Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations. ARB and local air districts have authority to enforce the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations for asbestos.

3.3.1.3 Local

San Joaquin Valley Air Pollution Control District

The Proposed Program is under the jurisdiction of SJVAPCD. SJVAPCD is responsible for (1) implementing air quality regulations, including developing plans and control measures for stationary sources of air pollution to meet the NAAQS and CAAQS; (2) implementing permit programs for the construction, modification, and operation of sources of air pollution; and (3) enforcing air pollution statutes and regulations governing stationary sources. SJVAPCD has specific air quality-related planning documents, rules, and regulations. Local planning documents and regulations that may be applicable to the Proposed Program as administered by SJVAPCD with ARB oversight are summarized below.

Fugitive Dust Control Measures

SJVAPCD Regulation VIII requires property owners, contractors, developers, equipment operators, farmers, and public agencies to control fugitive dust emissions from specified sources.

Indirect Source Review

In December 2005, SJVAPCD adopted the Indirect Source Review Rule (ISR; Rule 9510) to meet emission reduction commitments in the PM_{10} and ozone attainment plans. The ISR applies to development projects where construction exhaust emissions equal or exceed 2.0 tons per year of NO_x or 2.0 tons of PM_{10}. Unless exempt, projects are subject to the ISR and must submit an Air Impact Assessment Application to SJVAPCD, with commitments to reduce construction exhaust NO_x and PM_{10} emissions by 20 and 45 percent, respectively. If a project does not achieve the on-site reductions required by the ISR, then the project must pay off-site mitigation fees.

California Environmental Quality Act Guidelines

Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI; SJVAPCD, 2015a) assists lead agencies and project applicants in evaluating the potential air quality impacts of projects in the SJVAB. GAMAQI recommends procedures for evaluating potential air quality impacts for the CEQA environmental review process and provides guidance on evaluating short-term (construction) and long-term (operational) air emissions. The current GAMAQI (adopted March 2015) provides recommended air quality emission thresholds for CEQA purposes and was used to prepare this PEIR.

Stanislaus County

In addition to the SJVAPCD air quality plans, the Conservation/Open Space Element in the *Stanislaus County General Plan* (Stanislaus County, 2016b) has goals and policies to improve air quality in Stanislaus County. The plan includes the following goals and policies that apply to the Proposed Program:

Goal Six: Improve air quality.

- Policy Eighteen: The County will promote effective communication, cooperation, and coordination among agencies involved in developing and operating local and regional air quality programs.
- Policy Nineteen: The County will strive to accurately determine and fairly mitigate the local and regional air quality impacts of proposed projects.

City of Modesto

Chapter VII of the *City of Modesto General Plan* (City of Modesto,2019a) addresses Environmental Resources, Open Space and Conservation. Environmental resources addressed in the chapter include air quality and policies to reduce air quality impacts. A number of the policies are consistent with the SJVAPCD Air Quality Guidelines for General Plans and are intended to reduce emissions of PM_{10} and other particulates with local control potential. For example, the policies specify controls that are required to be implemented at all construction sites and specify measures that should be implemented at construction sites when required to mitigate significant PM_{10} impacts.

City of Riverbank

The *2005-2025 General Plan* (City of Riverbank, 2009) provides guidance for land use, development, and natural resource conservation in the city of Riverbank. The Air Quality Element of the General Plan addresses the City's goals, policies, and implementation strategies for maintaining and improving air quality during and after the buildout of the General Plan. The plan includes several goals, policies, and implementation strategies designed to achieve the overarching air quality goal to minimize Riverbank's contribution to existing and potential future air quality problems, whether experienced locally, regionally, or globally.

City of Waterford

The *City of Waterford General Plan Vision 2025* (City of Waterford, 2007) includes policies that guide decisions on future growth, development, and conservation of resources through 2025 in a manner consistent with the goals and quality of life desired by residents. The Sustainable Development Element contains policies that address the environmental, natural, and cultural resources of the city and proposes policies to minimize adverse effects resulting from growth and development. The following goals and policies that relate to air quality are applicable to the Proposed Program:

Goal Area SD-1: Air Quality

- Policy SD-1.1: Accurately determine and fairly mitigate the local and regional air quality impacts of projects proposed in the City of Waterford.
- Policy SD-1.2: Coordinate local air quality programs with regional programs and those of neighboring jurisdictions.
- Policy SD-1.6: Reduce emissions of PM_{10} and other particulates with local control potential.

3.3.2 Environmental Setting

3.3.2.1 Project Setting – San Joaquin Valley Air Basin

The primary pollutants of concern within the San Joaquin Valley are ozone and PM_{10} because concentrations of these pollutants have and currently exceed ambient air quality standards. The combination of heat and sunlight transform volatile organic compounds and NO_x from vehicle exhaust, industrial processes, and other operations into ground-level ozone. Additionally, small particles of manmade compounds, such as soot, ash, and dust, become suspended in air to create particulate matter. The topography of the basin exacerbates the problem by limiting dispersion and dissipation of the regional pollutants.

3.3.2.2 Topographic and Climate

Air quality is affected by the rate and location of pollutant emissions and by meteorological conditions that influence movement and dispersal of pollutants in the atmosphere. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients and local topography provide the link between air pollutant emissions and local air quality concentrations.

The Proposed Program is located in the SJVAB, in the southern half of California's Central Valley. The SJVAB encompasses an area approximately 250 miles long and 35 miles wide, shaped like a narrow bowl. The SJVAB is bordered by the Sierra Nevada Mountains to the east (8,000 to more than 14,000 feet in elevation), the Coast Ranges to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 8,000 feet in elevation). The elevation gradient is slightly downward from Bakersfield in the southeast end (elevation 408 feet) to sea level at the northwest end where the Central Valley opens to San Francisco Bay at Carquinez Straits (SJVAPCD, 2015b).

The SJVAB is in a Mediterranean climate zone. The SJVAB is typically arid in the summer; cool temperatures and tule fog (that is, a dense ground fog) are prevalent in the winter and fall. Average high

temperatures in the summer are in the mid-90 degrees Fahrenheit (°F) range; average low temperatures in winter are in the high 40°F range. January is typically the wettest month of the year, with an average of approximately 2 inches of rain. Wind direction is typically from the northwest with speeds around 30 miles per hour. The subtropical high-pressure cell is strongest during spring, summer, and fall, and produces subsiding air that can result in temperature inversions in the Central Valley. Wintertime high-pressure events often last many weeks, with surface temperatures in the 30°F range. During these events, fog can be present, and inversions can be strong. Winter inversions can inhibit vertical mixing of pollutants to a few hundred feet (SJVAPCD, 2015b).

3.3.2.3 Existing Air Quality and Attainment Status

ARB maintains ambient air monitoring stations for criteria pollutants throughout California. The air monitoring station within the Program Area is located at 14th Street in Modesto. The Modesto station monitors ambient concentrations of ozone, PM_{10}, and $PM_{2.5}$. NO_2 monitoring data were obtained from the South Minaret Street station in Turlock, approximately 10 miles south of the Program Area. Table 3.3-2 summarizes available data from the two stations during 2019 through 2021. As shown in the table, multiple exceedances of the NAAQS and CAAQS, primarily for ozone and particulate matter, have recently been recorded.

Table 3.3-2. Ambient Criteria Pollutants Concentration Data at Air Quality Monitoring Stations Closest to the Proposed Program Area
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Pollutant	Parameter	2019	2020	2021
Ozone	Maximum 1-hour concentration (ppm)	0.102	0.102	0.106
	Maximum 8-hour concentration (ppm)	0.083	0.082	0.088
	Number of days > NAAQS 8-hour standard of > 0.070 ppm	8	13	10
	Number of days > CAAQS 1-hour standard of > 0.090 ppm	1	3	3
	Number of days > CAAQS 8-hour standard of > 0.070 ppm	9	13	11
NO_2	Maximum 1-hour concentration (ppm)	0.0591	0.0520	0.0404
	Annual average (ppm)	0.008	0.009	0.006
	Number of days > NAAQS 1-hour standard of > 100 ppb	0	0	0
	Number of days > CAAQS 1-hour standard of > 0.18 ppm	0	0	0
PM_{10} (respirable particulate matter)	Maximum 24-hour concentration (µg/m³)	315.6	333.0	145.7
	Annual average (µg/m³)	27.8	39.2	36.1
	Number of days > NAAQS 24-hour standard of > 150 µg/m³	1	7	0
	Number of days > CAAQS 24-hour standard of > 50 µg/m³	41	80	59
$PM_{2.5}$ (fine particulate matter)	Maximum 24-hour concentration (µg/m³)	34.4	114.9	66.8
	Annual average (µg/m³)	7.7	14.5	15.0
	Number of days > NAAQS 24-hour standard of >35 µg/m³	0	25	20

Source: ARB, 2022a

Table 3.3-3 summarizes the attainment status for the Program Area. Under the NAAQS, the Program Area is currently designated as nonattainment for the ozone and $PM_{2.5}$ standards. The SJVAB is a maintenance area for the federal PM_{10} and CO standards. The Program Area is in attainment/unclassified for the federal NO_2, SO_2, and lead. Under the CAAQS, the Program Area is currently designated as nonattainment for ozone, PM_{10}, and $PM_{2.5}$, and as attainment or unclassified for other pollutants.

Table 3.3-3. Attainment Status for the Program Area
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Pollutant	NAAQS	CAAQS
Ozone	Nonattainment	Nonattainment
PM_{10}	Maintenance	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Maintenance	Attainment
NO_2	Attainment/Unclassified	Attainment
SO_2	Attainment/Unclassified	Attainment
Lead (particulate)	Attainment/Unclassified	Attainment
Hydrogen sulfide	No standard	Unclassified
Sulfates	No standard	Attainment
Visibility-reducing particles	No standard	Unclassified
Vinyl chloride	No standard	Attainment

Sources: ARB, 2019; EPA, 2022

Air quality planning documents for pollutants for which the Program Area is classified as a federal nonattainment or maintenance area are developed by SJVAPCD and ARB and approved by EPA. The following is a summary of the current SJVAPCD air quality plans:

- Ozone Plans:
  - *2007 Ozone Plan for the San Joaquin Valley Air Basin* (SJVAPCD, 2007a): The plan was adopted by SJVAPCD in April 2007 and approved by ARB in June 2007. The plan addresses the NAAQS 1997 8-hour ozone standard of 84 parts per billion (ppb). The plan was revised in June 2011, and EPA approved the revised plan on March 1, 2012.
  - 2013 Ozone Plan (SJVAPCD, 2013): The plan was prepared for EPA's revoked 1997 1-hour ozone standard. The plan was approved by ARB on November 21, 2013.
  - *2016 Plan for the 2008 8-Hour Ozone Standard* (SJVAPCD, 2016a): ARB approved the plan on July 21, 2016, and submitted it to EPA for approval. The plan sets out the strategy to reduce NO_x emissions by more than 60 percent between 2012 and 2031 and bring the San Joaquin Valley into attainment of the NAAQS 2008 8-hour ozone standard no later than December 31, 2031.
- PM_{10} Plan:
  - *2007 PM_{10} Maintenance Plan and Request for Redesignation* (SJVAPCD, 2007b): The plan provides verification of continued PM_{10} attainment, a contingency plan, an attainment emissions inventory, a maintenance demonstration, and a demonstration of California's monitoring network.
- $PM_{2.5}$ Plans:
  - *Proposed 2008 $PM_{2.5}$ Plan for the San Joaquin Valley Air Basin* (SJVAPCD, 2008a): ARB approved the plan on May 22, 2008. The plan sets out the strategy to attain the federal 1997 annual $PM_{2.5}$ standard by 2015. The plan was amended on April 28, 2011, and EPA approved the revised 2008 $PM_{2.5}$ Plan on November 9, 2011, except for the contingency measures.
  - *2012 $PM_{2.5}$ Plan* (SJVAPCD, 2012): ARB approved the plan January 24, 2013. The plan sets out the strategy to attain the federal 2006 24-hour $PM_{2.5}$ standard of 35 micrograms per cubic meter

($\mu g/m^3$) by 2019. SJVAPCD adopted a supplemental document to the *2012 $PM_{2.5}$ Plan* on September 18, 2014, which was approved by ARB on October 24, 2014.

- *2015 $PM_{2.5}$ State Implementation Plan* (SJVAPCD, 2015b): ARB approved the plan on May 21, 2015. The plan sets out the strategy to attain the federal 1997 24-hour $PM_{2.5}$ standard by 2018 and the 1997 annual $PM_{2.5}$ standard by 2020.
- *2016 Moderate Area Plan for the 2012 $PM_{2.5}$ Standard* (SJVAPCD, 2016b): SJVAPCD adopted the plan on September 15, 2016. The plan addresses the EPA federal annual $PM_{2.5}$ standard of 12 $\mu g/m^3$ established in 2012. The plan includes an attainment impracticability demonstration and request for reclassification of the Central Valley from moderate nonattainment to serious nonattainment.
- *2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards* (SJVAPCD, 2018): This is a single, comprehensive attainment plan that integrates the 1997, 2006, and 2012 NAAQS $PM_{2.5}$ standards. The plan was approved by EPA on June 30, 2020.

- Carbon Monoxide Maintenance Plan:
  - *Final Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Areas* (ARB, 1998): ARB approved the plan, which covers SJVAPCD as part of the SIP for CO. EPA approved the revision on June 1, 1998. On July 22, 2004, ARB approved an update to the SIP that (1) shows how the 10 areas will maintain the standard through 2018, (2) revises emission estimates, and (3) establishes new on-road motor vehicle emission budgets for transportation conformity purposes.

3.3.2.4 Sensitive Receptors

Sensitive receptors include hospitals, residences, libraries, schools, daycare facilities, elderly housing, and convalescent facilities. These are places where the occupants may be relatively more susceptible to the adverse effects of exposure to TAC emissions and other pollutants. Some projects under the Proposed Program are located near residential, commercial, and manufacturing land uses; however, most of the project sites are in areas where the primary land uses are agricultural. Sensitive receptors within 0.5 mile of projects that involve earth movement and larger-scale construction activities are identified in Table 3.9-2 in Section 3.9, Noise.

3.3.2.5 Naturally Occurring Asbestos

Asbestos minerals naturally occur in rock and soil as the result of natural geologic processes, often in veins near earthquake faults in the coastal ranges, the foothills of the Sierra Nevada Mountains, and other areas of California. NOA takes the form of long, thin, flexible, separable fibers. Natural weathering or human disturbance can break down NOA into microscopic fibers, which are easily suspended in air. Asbestos is a known human carcinogen. It causes cancers of the lung and the lining of internal organs, as well as asbestosis and pleural disease, which inhibit lung function.

The California Geological Survey identifies ultramafic rocks in California to be the source of NOA. *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos* (CDOC, 2000) indicates that the Program Area does not likely contain NOA.

3.3.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on air quality. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

3.3.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and are listed below. These thresholds also address the GAMAQI (SJVAPCD, 2015a) in evaluating the potential air quality impacts of projects in the SJVAB. GAMAQI numerical thresholds are discussed in more detail below. Impacts on air quality are considered significant if the Proposed Program would result in any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan
- Cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard
- Expose sensitive receptors to substantial pollutant concentrations
- Other emissions such as those leading to odors adversely affecting a substantial number of people

Air quality is evaluated in terms of emissions and impacts. SJVAPCD identifies thresholds that separate short-term (construction) and long-term (operational) emissions. Short-term emissions are typically associated with construction activities and are recognized to be short in duration. Long-term emissions are typically associated with project operations and occur over more than a year.

PM_{10} is generally the pollutant of primary concern for most construction projects. Construction-related emissions can increase localized concentrations of PM_{10}, as well as increased emissions of other pollutants such as ozone precursors of NO_x and reactive organic gases (ROGs) (SJVAPCD, 2015a).

CEQA Guidelines state that the significance criteria established by the air quality management or air pollution control district may be relied on to make impact determinations. The GAMAQI (SJVAPCD, 2015a) provides recommended air quality emission thresholds for CO, NO_x, ROG, SO_2, PM_{10}, and $PM_{2.5}$ for evaluating the significance of project emissions. If the emissions are below the significance thresholds, impacts would be considered less than significant. If the construction- or operations-phase emissions are greater than the significance thresholds, impacts during that phase would be considered significant.

Table 3.3-4 presents the SJVAPCD air quality significance thresholds applicable to the Proposed Program. Operations and maintenance activities and resulting emissions from the Proposed Program are expected to be similar to the Existing Conditions. Therefore, only construction emissions were quantified and compared to the CEQA thresholds:

Table 3.3-4. SJVAPCD Air Quality Thresholds of Significance – Criteria Pollutants
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

	Emissions (tons per year)					
Alternative	CO	NO_x	ROG	SO_2	PM_{10}	$PM_{2.5}$
SJVAPCD construction emission thresholds	100	10	10	27	15	15

Source: SJVAPCD, 2015a

3.3.3.1 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. The No Program Alternative is functionally the same as the Existing Conditions as related to air quality because both represent a condition without air pollutant emissions generated by proposed construction activities. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

Emission Estimates

Overall program implementation out to the 2040 planning horizon of the Proposed Program is shown on the draft implementation schedule included in Appendix C. As described in Section 2, Program Description and Alternatives, the timing and phasing for implementation of any specific project is dependent on many factors, such as funding availability, year-to-year repair and rehabilitation priorities, and project-specific environmental review. During any given year, multiple projects would be constructed simultaneously. Construction emissions resulting from implementation of the Proposed Program would primarily consist of vehicle and equipment exhaust emissions of CO, NO_x, PM_{10}, $PM_{2.5}$, SO_2, and ROG. In addition, site preparation and disturbance would result in fugitive dust emissions. Construction emissions from off-road construction equipment and fugitive dust were estimated using the methodologies and emission factors described in *California Emission Estimator Model (CalEEMod) User's Guide* (CAPCOA, 2021). On-road vehicle emission factors were obtained from EMFAC2017 (ARB, 2017a).

Projected construction emissions were estimated for different years during the planning horizon for the Proposed Program based on the potential overlapping of the projects in each year. Over the planning horizon to 2040, construction emissions of the following years were estimated because all other years would have lower construction emissions than at least one of these years based on the lower levels of proposed project construction activities:

- 2023
- 2024
- 2025
- 2030
- 2031
- 2033

After the emissions from the selected years were quantified (Table 3.3-5), 2025 and 2030 were identified as the worst-case annual emissions of pollutants and used as basis for the air quality impacts analysis. Because construction emissions of all other years would be lower, air quality impacts would be lower in other years than the worst-case year. Detailed assumptions regarding project schedule, construction equipment and vehicles, and construction emission calculated for the years listed above are provided in Appendix D.

As identified in Section 2, Program Description and Alternatives, the following project commitments would be incorporated as part of the Proposed Program to assist in avoiding or minimizing potential air quality impacts. As part of project construction within the SJVAB, compliance with SJVAPCD Regulation VIII for fugitive dust emissions is required. Emission control measures included as part of the Proposed Program would include the following:

- Apply water to unpaved surfaces and areas.
- Use nontoxic chemical or organic dust suppressants on unpaved roads and traffic areas.
- Limit or reduce vehicle speed on unpaved roads and traffic areas.

- Maintain areas in a stabilized condition by restricting vehicle access.
- Install wind barriers, if necessary.
- During high winds, cease outdoor activities that disturb the soil.
- Keep bulk materials sufficiently saturated when handling.
- When storing bulk materials, apply water to the surface or cover the storage pile with a tarp.
- Do not overload haul trucks; overloaded trucks are likely to spill bulk materials.
- Cover haul trucks with a tarp or other suitable cover, or wet the top of the load enough to limit visible dust emissions.
- Clean the interior of cargo compartments on emptied haul trucks prior to leaving a site.
- Prevent track-out by installing a track-out control device.
- Clean up track-out at least once a day; if along a busy road or highway, then clean up track-out immediately.
- Monitor dust-generating activities and implement appropriate measures for maximum dust control.
- Minimize unnecessary construction vehicle trips and idling time to reduce GHG emissions.

For projects in which construction-related activities would disturb equal to or greater than 1 acre of surface area, SJVAPCD recommends, as a condition of project approval, receipt of a District-approved Dust Control Plan or Construction Notification form, before issuance of the first grading permit.

In addition, as described in Section 3.3.1.3, construction projects that exceed the Rule 9510 threshold of 2 tons per year for NO_x and PM_{10} are subject to Rule 9510 requirements. To comply with Rule 9510, projects must reduce NO_x and PM_{10} emissions by 20 and 45 percent, respectively, through on-site emission reduction, off-site emission offset, or a combination of the two. Compliance with Rule 9510 requires that for the required amount of emission reductions not achieved on site by a given project, a project proponent must pay the required fees to SJVAPCD to offset the emissions.

3.3.3.2 Impacts Associated with the Proposed Program

Impact AQ-1: Conflict with or obstruct implementation of the applicable air quality plan.

All Project Types

Construction activities associated with the Proposed Program would cause temporary air pollutant emissions. The anticipated implementation schedule for projects associated with the Proposed Program is provided as Appendix C. For most projects, construction activities would last from 1 to 5 months. Construction of the proposed regulating reservoirs and the Dry Creek flume replacement project is expected to last up to 12 months.

Construction emissions were calculated for multiple years during the Proposed Program implementation period, and a summary of the emissions by construction year is provided in Table 3.3-5. Worst-case emissions of NO_x, CO, PM_{10} and $PM_{2.5}$ would occur in 2025, and the worst-case emissions of ROG and SO_2 would occur in 2030. As shown, the worst-case pollutant emissions would be lower than the SJVAPCD CEQA thresholds. Because construction emissions of all other years would be lower than the worst-case emissions presented in Table 3.3-5, construction emissions of all project years would be below the thresholds as well. Therefore, the project would not conflict with or obstruct implementation of the applicable air quality plan, and impacts would be less than significant.

Table 3.3-5. Total Emissions of Selected Construction Years
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

	Total Emissions with Multiple Projects (tons per year)					
Project	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
2023	0.19	1.48	1.57	0.01	0.74	0.13
2024	0.34	2.85	2.74	0.01	2.04	0.61
2025	1.16	9.68	8.82	0.03	11.07	3.41
2030	1.30	5.13	7.97	0.03	10.87	3.24
2031	0.32	1.26	2.35	0.01	2.01	0.56
2033	0.46	1.51	3.40	0.01	3.61	0.76
Worst-Case Annual Emissions	1.30	9.68	8.82	0.03	11.07	3.41
SJVAPCD Construction Emission Thresholds	100	10	10	27	15	15
Exceed Threshold?	No	No	No	No	No	No

Notes:

Emissions of project construction years not listed in the table would be lower than the identified worst-case emissions.
Worst-case emissions for each pollutant are shown in bold.

The Proposed Program does not involve construction of any new stationary source. In addition, operations and maintenance activities would include activities similar to those that currently occur within the Program Area and would not result in emission increases during project operation. Therefore, air quality impacts during project operation would be less than significant.

Impact AQ-2: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.

All Project Types

Under NAAQS, Stanislaus County is currently designated as nonattainment for ozone and $PM_{2.5}$ standards. The area is in maintenance for PM_{10}. Under CAAQS, the area is currently designated as nonattainment for ozone, PM_{10}, and $PM_{2.5}$ (refer to Table 3.3-3).

Pursuant to CEQA Guidelines §15064(h)(3), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project would comply with the requirements in a previously approved plan or mitigation program, including an air quality attainment or maintenance plan that provides specific requirements that would avoid or substantially lessen the cumulative problem within the geographic area in which the project is located. The Proposed Program would comply with SJVAPCD's mitigation program as established in the GAMAQI (SJVAPCD, 2015a) and would not conflict with the established emission reduction goals and measures and the attainment strategies.

As discussed under Impact AQ-1, the construction emissions of nonattainment pollutants of ozone precursors (NO_x), PM_{10}, and $PM_{2.5}$ would be below the SJVAPCD CEQA thresholds. Long-term operational air quality impacts are not anticipated because operations and maintenance activities would be similar to Existing Conditions. Therefore, the implementation of the Proposed Program would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard. Air quality impacts from project construction and operation would be less than significant.

Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations.

All Project Types

Although the Proposed Program would be implemented over the planning horizon to 2040, construction activities at a given project site would be short term, with the construction of most projects lasting approximately 1 to 5 months. Construction of the proposed regulating reservoirs and the Dry Creek flume replacement project would last up to 12 months. The majority of the projects planned as part of the Proposed Program are located in primarily agricultural areas with minimal sensitive receptors (refer to Table 3.9-2 in Section 3.9, Noise). In addition, construction emissions associated with the Proposed Program would be below the SJVAPCD CEQA thresholds; therefore, the Proposed Program would not be expected to expose sensitive receptors to substantial pollutant concentrations. As described in Section 2.4, Project Commitments, if necessary, a traffic control plan would be prepared and would ensure construction equipment and truck traffic would be routed away from local neighborhoods or sensitive receptor areas to the extent possible to minimize the impacts on nearby receptors. Therefore, construction of the Proposed Program would not expose sensitive receptors to substantial criteria pollutant concentrations, and construction impacts would be less than significant.

Operations and maintenance activities would generally include activities similar to those that currently occur within the Program Area s and would not result in new or a significant increase in vehicle emissions. Therefore, operation of the Proposed Program would not expose sensitive receptors to substantial criteria pollutant concentrations, and operational impacts would be less than significant.

Impact AQ-4: Result in other emissions such as those leading to odors adversely affecting a substantial number of people.

All Project Types

During construction, odor emissions could occur from diesel-powered construction equipment and vehicles. Such odors would be short term and limited to the immediate area of the activity. If necessary, as part of a traffic control plan, construction equipment and truck traffic would be located or routed away from local neighborhoods or sensitive receptor areas, as feasible. During operation of the Proposed Program, it is expected that future maintenance activities would be consistent with existing maintenance activities and would not result in increased odor emissions from diesel equipment. No other odor sources are expected from operation of the Proposed Program. Air quality impacts associated with odors during construction and operation of the Proposed Program would be less than significant.

3.3.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant air quality impacts; therefore, mitigation is not required or recommended. As included in Section 2, Program Description and Alternatives, the following project commitments would be implemented as part of the Proposed Program to minimize air quality impacts:

- Compliance with applicable SJVAPCD Regulation VIII requirements for fugitive dust emission. Emission control measures included as part of the Proposed Program would include the following:
  - Apply water to unpaved surfaces and areas.
  - Use nontoxic chemical or organic dust suppressants on unpaved roads and traffic areas.
  - Limit or reduce vehicle speed on unpaved roads and traffic areas.
  - Maintain areas in a stabilized condition by restricting vehicle access.
  - Install wind barriers, if necessary.
  - During high winds, cease outdoor activities that disturb the soil.

  - Keep bulk materials sufficiently saturated when handling.
  - When storing bulk materials, apply water to the surface or cover the storage pile with a tarp.
  - Do not overload haul trucks; overloaded trucks are likely to spill bulk materials.
  - Cover haul trucks with a tarp or other suitable cover, or wet the top of the load enough to limit visible dust emissions.
  - Clean the interior of cargo compartments on emptied haul trucks prior to leaving a site.
  - Prevent track-out by installing a track-out control device.
  - Clean up track-out at least once a day; if along a busy road or highway, clean up track-out immediately.
  - Monitor dust-generating activities, and implement appropriate measures for maximum dust control.
  - Minimize unnecessary construction vehicle trips and idling time to reduce GHG emissions.
- Submission of an ISR Rule 9510 application for emissions of NO_x and PM_{10} and either mitigation of or offsetting NO_x and PM_{10} construction emissions by 20 percent and 45 percent, respectively, as required by Rule 9510. Emissions would be reduced through either on-site emission reductions, off-site emission offsets, or a combination of the two. On-site emission reduction measures would include using less polluting construction equipment, which would be achieved by using cleaner fuels or newer, lower-emitting equipment. Fugitive dust emissions would be controlled following SJVAPCD Regulation VIII and increasing watering frequency to further reduce the emissions. For the required amount of emission reductions that are not achieved on site, payment of fees to SJVAPCD would be required to offset the emissions.

3.4 Biological Resources

This section describes the regulatory and environmental settings for biological resources and evaluates potential impacts that could result from implementation of the Proposed Program. The Study Area for the biological resources assessment includes the Program Area and adjacent area potentially affected by Proposed Program projects (a 5-mile buffer around the Program Area). The Study Area for biological resources is based on the habitat and species known or likely to occur in the area, the location of capital improvement projects included as part of the Proposed Program, and typical standards for biological resource assessments.

3.4.1 Regulatory Setting

This section describes federal, state, and local guidelines and regulations for evaluating potential biological impacts and mitigation.

3.4.1.1 Federal

Endangered Species Act of 1973, United States Code, Title 16, Sections 1531 through 1543

The federal Endangered Species Act (FESA) and its amendments protect plants and wildlife (and their habitats) listed as endangered or threatened by the USFWS and NMFS. Section 9 of FESA specifically prohibits the taking of FESA-protected wildlife and lists prohibited actions. FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50 CFR 17.3). FESA also governs the removal, possession, malicious damage, or destruction of endangered plants on federal land. Taking is allowed only when incidental to an otherwise legal activity through the FESA Section 7 process for federal agencies and through the FESA Section 10 Habitat Conservation Plan process for private entities.

Magnuson Stevens Fishery Conservation and Management Act of 1976 (as Amended)

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act (Public Law 104 to 297), requires that all federal agencies consult with NMFS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect essential fish habitat (EFH) for commercially managed marine and anadromous fish species. EFH includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growing to maturity. EFH also includes all habitats necessary to allow the production of commercially valuable aquatic species, to support a long-term sustainable fishery, and to contribute to a healthy ecosystem (16 United States Code [U.S.C.] Section 1802[10]). Riverine areas (including portions of the San Joaquin, Tuolumne, and Stanislaus Rivers) in or adjacent to the Program Area lie within designated EFH for Chinook salmon (*Oncorhynchus tshawytscha*) under the Pacific Coast Salmon Fishery Management Plan.

Migratory Bird Treaty Act, United States Code, Title 16, Sections 703 through 711

The Migratory Bird Treaty Act (MBTA) implements international treaties between the United States and other nations to protect migratory birds and their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized by regulation or permit. Examples of authorized activities include USFWS-issued permits to qualified applicants for falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. Regulations governing migratory bird permits are found in 50 CFR 13 – General Permit Procedures, and 50 CFR 21 – Migratory Bird Permits.

Invasive Species, Executive Order 13112 (February 3, 1999)

Executive Order (EO) 13112 directs federal agencies to prevent and control the spread of invasive plants and animals and avoid direct or indirect impacts whenever there is a practicable alternative. EO 13112 was intended to build on existing laws, such as NEPA, the Nonindigenous Aquatic Nuisance Prevention and Control Act, the Lacey Act, the Plant Pest Act, the Federal Noxious Weed Act, and FESA. EO 13112 established a national Invasive Species Council composed of federal agencies and departments and a supporting Invasive Species Advisory Committee composed of state, local, and private entities. The Invasive Species Council and Species Advisory Committee oversee and facilitate implementation of EO 13112, including preparation and revision of the National Invasive Species Management Plan.

3.4.1.2 State

California Endangered Species Act, Fish and Game Code, Section 2050 et seq.

CESA provides that certain species of fish, wildlife, and plants that are of ecological, educational, historical, recreational, aesthetic, economic, and scientific value to the people of California are of statewide concern and should be conserved, protected, and enhanced, along with their habitats. CESA establishes that state agencies should not approve projects as proposed that would jeopardize the continued existence of any state-listed endangered species or threatened species (or result in the destruction or adverse modification of essential habitat) if reasonable and prudent alternatives would conserve the species or its habitat. Furthermore, CESA provides that reasonable and prudent alternatives shall be developed by CDFW with the project proponent and the State lead agency that are consistent with conserving the species, while at the same time maintaining the project purpose to the greatest extent possible.

Native Plant Protection Act, Fish and Game Code, Sections 1900 through 1913

California's Native Plant Protection Act prohibits the taking of listed plants from the wild and requires that state agencies use their authority to conserve endangered and rare native plants. In compliance with the Native Plant Protection Act and CEQA, CDFW will notify project proponents if a rare or endangered native plant is growing within project boundaries and provide information to the project proponents concerning the protection of such plants as may be appropriate. CDFW must also be given 10-day advance notification of a land use change to provide CDFW an opportunity to salvage listed plant species that might be destroyed.

Fish and Game Code, Sections 1601 through 1603

Under Sections 1601 through 1603 of the Fish and Game Code, project proponents are required to notify CDFW before diverting, obstructing, or otherwise changing the natural flow, bed, channel, or bank of a river, stream, or lake. If CDFW determines that an existing fish or wildlife resource might be substantially adversely affected by project activities, it would issue a Streambed Alteration Agreement to project proponents that includes reasonable measures necessary to protect the resource. Project proponents must conduct project activities in accordance with the Streambed Alteration Agreement.

Section 1602 of the Fish and Game Code states that any entity proposing to substantially divert or obstruct the natural flow of, or alter streambed materials, channel, or bank in any river, stream, or lake must provide the following:

- A detailed description and map of the project location and name of and description of the river, stream, or lake affected by streamflow diversions
- Copies of applicable local, state, or federal permits and/or other documents already issued as part of a Streambed Alteration Agreement

The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and that supports wildlife, fish, or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A Streambed Alteration Agreement typically includes measures designed to protect the affected fish and wildlife and associated riparian resources.

Raptors, Fish and Game Code, Section 3503.5

Section 3503.5 of the Fish and Game Code states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Disturbance during the raptor breeding season could result in the incidental loss of fertile eggs or nestlings, or lead to nest abandonment. Although no permits are issued for species protected under this code, coordination with CDFW is required.

Non-game and Migratory Birds, Fish and Game Code, Sections 3513 and 3800

Sections 3513 and 3800 of the Fish and Game Code regulate unlawful take of non-game or migratory bird species. Disturbance during the breeding season could cause the incidental loss of fertile eggs or nestlings, or lead to nest abandonment. Although no permits are issued for species protected under these code sections, coordination with CDFW is required.

3.4.1.3 Local

Stanislaus County

The *Stanislaus County General Plan* (Stanislaus County, 2016b) provides guidance for land use, development, and natural resource conservation in Stanislaus County, which includes both incorporated and unincorporated areas. The plan includes the following goals and policies to protect, preserve, and enhance biological resources within the County that are applicable to the Proposed Program:

Conservation/Open Space Element

Goal One: Encourage the protection and preservation of natural and scenic areas throughout the County.

- Policy Three: Areas of sensitive wildlife habitat and plant life (for example, vernal pools, riparian habitats, flyways and other waterfowl habitats) including those habitats and plant species listed by state or federal agencies shall be protected from development and/or disturbance.
- Policy Four: Protect and enhance oak woodlands and other native hardwood habitat.

Goal Two: Conserve water resources and protect water quality in the County.

- Policy Six: Preserve natural vegetation to protect waterways from bank erosion and siltation.

Goal Ten: Protect fish and wildlife species of the County.

- Policy Twenty-Nine: Habitats of rare and endangered fish and wildlife species, including special status wildlife and plants, shall be protected.

City of Modesto

Chapter VII of the *City of Modesto General Plan* (City of Modesto, 2019a) addresses Environmental Resources, Open Space and Conservation. Environmental resources addressed in the chapter with relevance to the Program include the local open space plan and wildlife and other natural resources. Among the six broad categories to be designated in a local open space plan is open space for the preservation of natural resources. The Modesto Urban Area contains three such areas of preservation of natural resources: the Stanislaus River, Tuolumne River, and Dry Creek.

City of Riverbank

The *2005-2025 General Plan* (City of Riverbank, 2009) provides guidance for land use, development, and natural resource conservation in the city of Riverbank, and includes a Conservation and Open Space Element. The plan includes the following goals and policies to protect, preserve, and enhance biological resources within the city that are applicable to the Proposed Program:

Goal CONS-4: Preserve Habitat Associated with the Stanislaus River While Increasing Public Access.

- Policy CONS-4.1: Approved projects, plans, and subdivisions shall avoid conversion of habitat within the existing Stanislaus River riparian corridor, including Great Valley Mixed Riparian Forest, Great Valley Willow Scrub, and Riparian Scrub areas, and shall preserve an open space buffer along the Stanislaus River and associated riparian areas. The open space buffer shall be designed to avoid impacts to habitat and special status species in the riparian corridor.

Goal CONS-5: Preserve the Natural Diversity in the Riverbank Planning Area.

- Policy CONS-5.4: When the loss of important habitat is unavoidable, mitigation measures will be designed to reduce impacts to the maximum extent feasible. This mitigation may include, but is not limited to off-site mitigation banking with restoration and enhancement components. For projects that would affect the function and value of river, stream, lake, pond, or wetland features, each of these features shall be delineated. For wetlands, the delineation shall be conducted in accordance with the USACE Wetland Delineation Manual and verified by USACE. The project applicant shall determine the exact acreage of important habitat (including those protected by federal, state, regional, and/or local regulations) that would be impacted by project implementation. A mitigation plan to replace or rehabilitate affected habitats in a manner that ensures no net loss of habitat functions and values shall be prepared and implemented in accordance with applicable regulations. The plan shall be reviewed and approved by the appropriate regulatory agencies and all relevant permits and authorizations shall be obtained. Mitigation monitoring shall be conducted to ensure performance criteria are met.
- Policy CONS-5.5: Approved projects, plans, and subdivisions shall comply with applicable federal and state laws and regulations (for example, federal and state endangered species acts and California Fish and Game Code) that require the protection of special-status species.
- Policy CONS-5.7: A mitigation plan shall be prepared and reviewed and approved by the appropriate regulatory agencies for projects where avoidance of adverse effects on special-status species is not feasible, and authorization for take of listed species shall be obtained, if necessary. The mitigation plan shall include measures to minimize potential for effects during project construction (for example, pre-construction surveys and timing of construction) and measures to compensate for loss of special-status species habitat. Loss of Swainson's hawk foraging habitat shall be compensated for by preservation and management of foraging habitat of at least a similar quality at an appropriate location. Mitigation plans shall identify an appropriate mitigation site, compensation acreage, performance criteria, and monitoring and management requirements to ensure the site provides suitable habitat for the applicable species. Long-term protection of mitigation lands shall be ensured through fee title acquisition, conservation easement, or other suitable mechanisms. Long-term management of mitigation lands shall be ensured by establishing a management endowment or other suitable funding source. Alternatively, it may be appropriate to contribute funds to existing mitigation programs. Use of such a program shall be approved by the appropriate regulatory agencies.

City of Waterford

The broad purpose of the *City of Waterford General Plan Vision 2025* (City of Waterford, 2007) is to express policies that will guide decisions on future growth, development, and conservation of resources through 2025 in a manner consistent with the goals and quality of life desired by residents. The Open Space and Conservation Element contains policies for open space lands and for conservation of natural and human-made resources. The following goals, policies, and actions that relate to the preservation of open space and the conservation of resources are applicable to the Proposed Program:

Goal Area A: Open Space for the Preservation of Natural Resources.

- Policy OS-A-1: Identify and preserve wildlife habitats that support rare, endangered, or threatened species.
- Policy OS-A-2: Preserve and enhance Tuolumne River and Dry Creek in their natural state throughout the planning area.
- Policy OS-A-5: Preserve and enhance water quality.

3.4.2 Environmental Setting

The Proposed Program is located in eastern Stanislaus County in the northeastern part of the San Joaquin Valley. The Program Area is bounded on the north by the Stanislaus River, on the south by the Tuolumne River, on the west by the San Joaquin River, and on the east by the Sierra Nevada foothills. The Program Area includes portions of the U.S. Geological Survey (USGS) Avena, Escalon, Ripon, Salida, Riverbank, Waterford, Paulsell, Westley, Cooperstown, Brush Lake, La Grange, Ceres, and Denair 7.5-minute quadrangles.

The terrain within the Program Area is relatively flat and is composed primarily of alluvial fans sloping from east to west from the foothills to the San Joaquin River. Elevations range from more than 200 feet above sea level on the east to less than 40 feet above sea level on the west. Land within the Program Area consists mainly of sediments that have formed the broad alluvial plains of the Stanislaus and Tuolumne Rivers, which flow in a southwesterly direction and discharge into the San Joaquin River. The topography on the eastern one-third of the service area consists mostly of hilly to rolling land sloping in a westerly direction. The western two-thirds of the service area are relatively flat with a mild westerly slope.

Most of the Program Area consists of nonnative habitats. More than 70 percent of the land within the Program Area consists of irrigated croplands (including pastures) and orchards and vineyards. Urbanized lands associated with the cities of Modesto, Riverbank, Salida, and Waterford are concentrated on approximately 20 percent of the land. The central portion of the Program Area is dominated by the city of Modesto, which is surrounded by orchards, vineyards, irrigated pastures, row crops, and fields. Wetlands and vernal pools are found primarily toward the western boundary of the Program Area, interspersed with the irrigated cropland, with smaller areas of wetlands and vernal pools in the eastern portion of the Program Area (Figure 3.4-1). Open water and riparian habitats are restricted to areas adjacent to Modesto Reservoir and the Stanislaus and Tuolumne Rivers at the northern and southern boundaries, respectively, of the Program Area.

3.4.2.1 Habitat Presence Evaluation Methodology

A biological resources technical memorandum was prepared to evaluate habitat presence and likelihood of special-status species occurrence in the Study Area (Appendix E). The CDFW (2019) California Natural Diversity Database (CNDDB) and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants database (CNPS, 2019) were searched and reviewed to identify the potential for occurrence of special-status species and habitats within the Study Area. In addition, species lists were obtained from USFWS and NMFS (Appendix E). The searches were based on a 5-mile search radius of the individual projects included in the Proposed Program, or the USGS topographical quadrangles that are

within and adjacent to the Program Area. These include the Avena, Brush Lake, Ceres, Cooperstown, Denair, Escalon, La Grange, Paulsell, Ripon, Riverbank, Salida, Waterford, and Westley quadrangles.

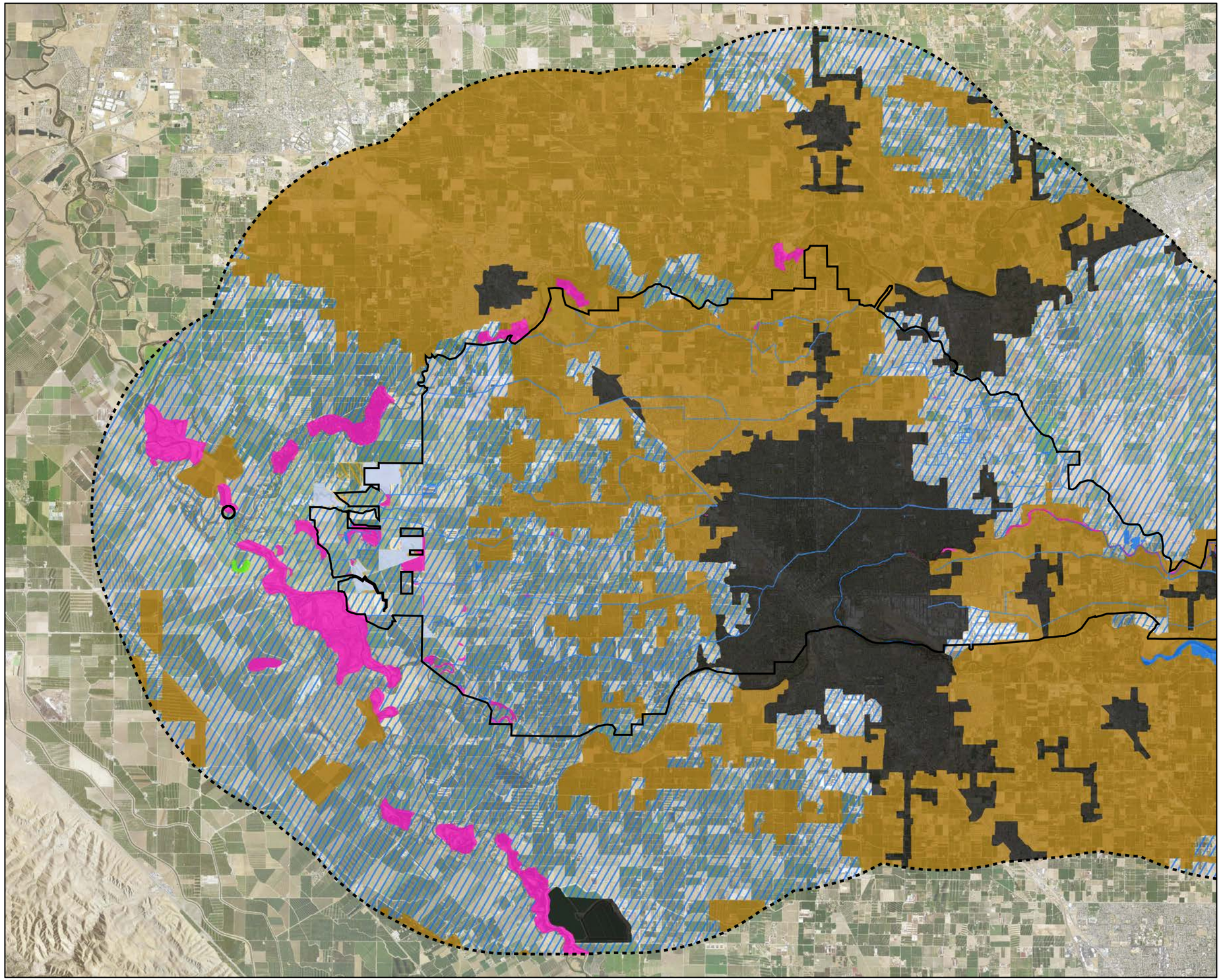
Other commercially available or resource agency-provided databases and software employed in the background/baseline research included the CDFW California Wildlife Habitat Relationships system; the University of California, Santa Barbara Biogeography Lab's California Gap Analysis Project: Regional Datasets (UCSB, 2012); and the USFWS's National Wetlands Inventory. In addition, environmental documents for other relevant projects in the region were consulted.

On May 30 and 31, 2018, biological reconnaissance-level surveys were conducted at 12 of the proposed project locations within the Program Area. Additional reconnaissance-level biological surveys were conducted on May 15, 2019, at 10 additional representative project sites within the Program Area. These surveys were used to identify habitat types, potential wetlands, environmentally sensitive areas, and potential special-status species issues associated with implementation of the Proposed Program. The sites selected for evaluation were those being proposed for upgrades to existing facilities or proposed new facilities and were considered characteristic of other Proposed Program facilities and associated potential habitat. Project locations were selected based on geographic coverage within the Program Area and representation of the project categories within the Proposed Program. In addition, existing MID pipelines, service canals, and groundwater wells were reviewed as a general point of reference for proposed facility improvements included as part of the Proposed Program. These surveys were conducted to identify potential habitat and the potential for special-status species within the Program Area. The sites visited are identified on Figure 3.4-2[1], and the general habitat characteristics are presented in the biological resources technical memorandum[2] (Appendix E).

In addition to the reconnaissance-level surveys, existing information was reviewed to further inform the evaluation of aquatic resources. The Program Area borders the Stanislaus River on the north, the Tuolumne River below the La Grange Diversion Dam on the south, and the San Joaquin River on the west. Special-status and managed anadromous fish (Chinook salmon) are present in the Stanislaus and Tuolumne Rivers. Habitat for California Central Valley (CCV) steelhead is also present in these rivers. Proposed projects located outside of the Stanislaus and Tuolumne Rivers but near other creeks or waterways were considered to potentially interact with native or introduced species of those related creeks but are not considered to potentially affect anadromous or special-status aquatic species.

[1] Figure 3.4-2 shows the representative locations that were surveyed for the regulating reservoirs; however, the exact locations of the regulating reservoirs could occur anywhere within the proposed locations shown on Figure 2-1.

[2] The biological resources technical memorandum in Appendix E includes three projects (Upper Main Canal La Grange Tunnel: Drainage Siphon Rehabilitation, Older Upper Main Canal Rehabilitation, and Lateral W-9 Long Crested Weir at Timbell Road Crossing) that were included in the biological reconnaissance-level surveys, but they are no longer a part of the Proposed Program and are therefore not discussed further in the PEIR. The size and locations of the proposed regulating reservoirs also continue to be evaluated and the current assumptions differ from those stated in Appendix E, but remain in the same general locations and associated habitats evaluated in the biological resources technical memorandum. In addition, the fill improvement projects identified in Appendix E are referred to as fill maintenance projects in the PEIR.



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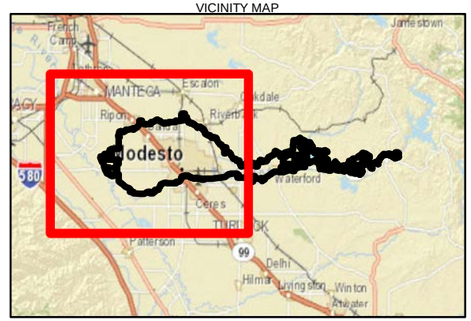

LEGEND

- Program Area
- 5-mile Buffer

Land Cover Type

- Annual Grassland
- Blue Oak Woodland
- Irrigated Pastures, Row Crops, and Field Crops
- Open-Water Aquatic Habitats
- Orchard and Vineyard
- Urban
- Valley Oak Woodland
- Vernal Pool Area
- Wetlands

-Open-Water Aquatic Habitat includes Freshwater Pond, Lacustrine, Lake and Riverine habitat types.
-Wetlands includes Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, and Wet Meadow habitat types.

Source: GAP, http://www.biogeog.ucsb.edu/projects/gap/gap_data_reg.html, Sept 2017; NWI, https://www.fws.gov, May 2017; Vernal Pool Area, vernalpools.org 2012

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FIGURE 3.4-1 Sheet 1 of 2
Land Cover Types in the Program Area
Modesto Irrigation District
Stanislaus County, California

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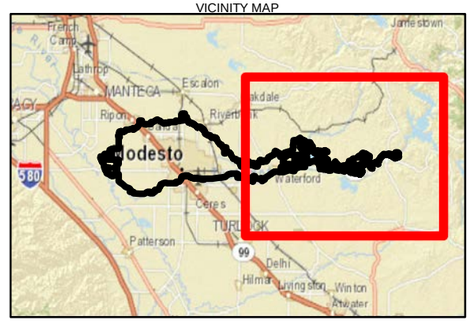
VICINITY MAP



LEGEND

- Program Area
- 5-mile Buffer

Land Cover Type

- Annual Grassland
- Blue Oak Woodland
- Irrigated Pastures, Row Crops, and Field Crops
- Open-Water Aquatic Habitats
- Orchard and Vineyard
- Urban
- Valley Oak Woodland
- Vernal Pool Area
- Wetlands

-Open-Water Aquatic Habitat includes Freshwater Pond, Lacustrine, Lake and Riverine habitat types.
-Wetlands includes Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, and Wet Meadow habitat types.

Source: GAP, http://www.biogeog.ucsb.edu/projects/gap/gap_data_reg.html, Sept 2017; NWI, https://www.fws.gov, May 2017; Vernal Pool Area, vernalpools.org 2012

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FIGURE 3.4-1 Sheet 2 of 2
Land Cover Types in the Program Area
Modesto Irrigation District
Stanislaus County, California

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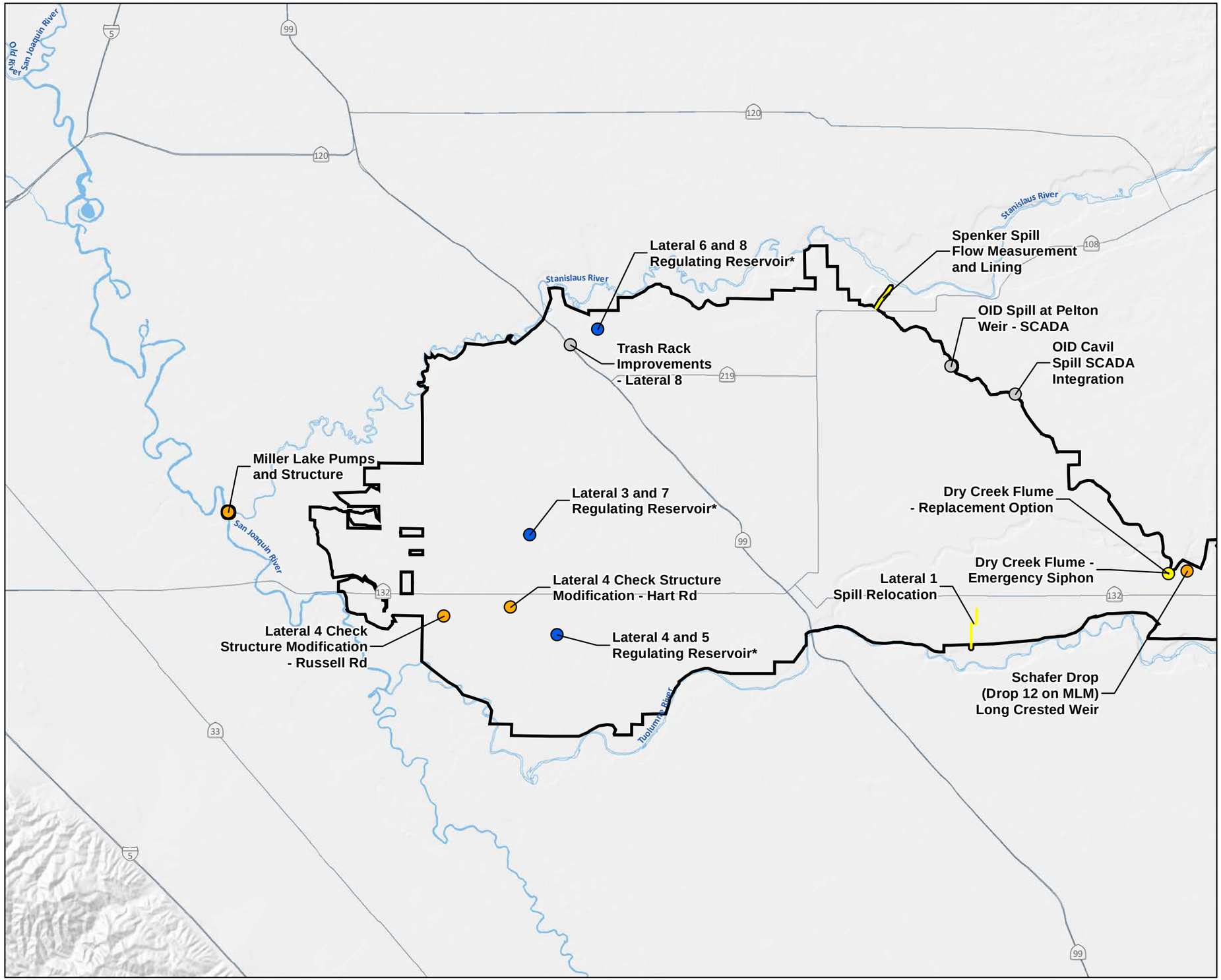

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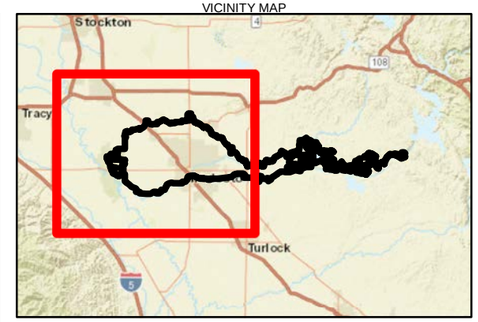

LEGEND

- Program Area
- Canal, Lateral, and Tunnel Improvements
- Flow Control
- Measurement and Automation Regulating
- Reservoirs*
- Canal, Lateral, and Tunnel Improvements

Note
*Representative locations only. Exact location of the regulating reservoirs could occur anywhere within the proposed locations shown on Figure 2-1.

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FIGURE 3.4-2 Sheet 1 of 2
Locations of Representative Projects Surveyed
Modesto Irrigation District
Stanislaus County, California

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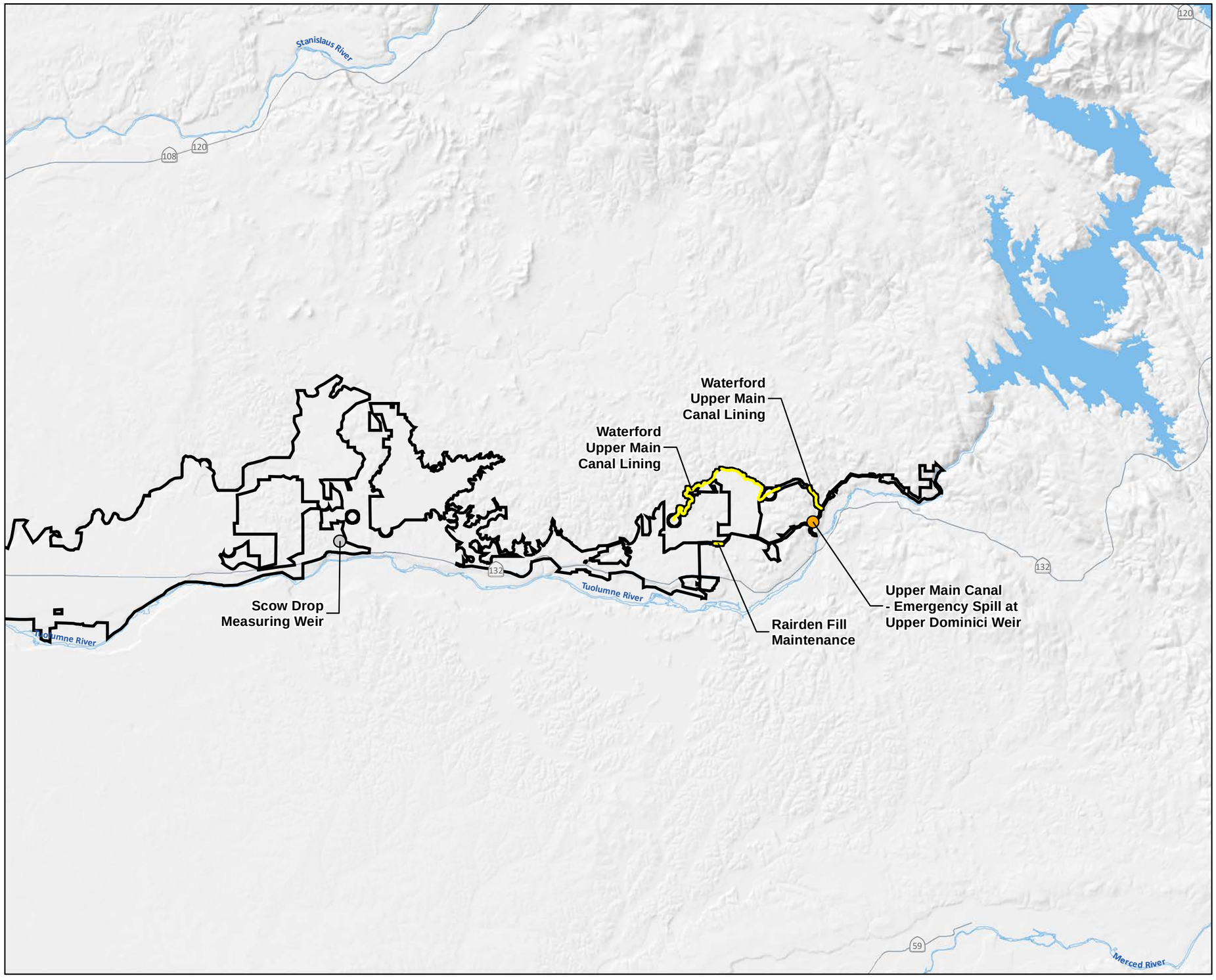

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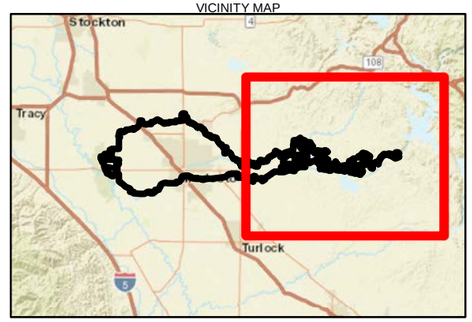

LEGEND

- Program Area
- Flow Control
- Measurement and Automation
- Canal, Lateral, and Tunnel Improvements

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FIGURE 3.4-2 Sheet 2 of 2
Locations of Representative Projects Surveyed
Modesto Irrigation District
Stanislaus County, California

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3.4.2.2 Land Cover Types and Associated Terrestrial and/or Aquatic Species

Historically, the Sacramento and San Joaquin Valleys, including the lands within the Program Area, contained a mosaic of riverine, wetland, and riparian habitats along rivers and streams, with surrounding terrestrial habitats consisting of perennial grassland and oak woodland. With settlement of the Sacramento and San Joaquin Valley, agricultural and urban development has resulted in the conversion of land from native habitats to cultivated fields, pastures, residences, water impoundments, flood control structures, and other developments. As a result, native habitats generally are restricted in their distribution and size and are highly fragmented, including in the Program Area.

The Study Area (including lands adjacent to the District boundary) contains the following major land cover types that support a diverse array of plant and animal species:

- Annual Grassland
- Blue Oak Woodland
- Valley Oak Woodland
- Irrigated Agriculture, including Orchards and Vineyards
- Open-Water Aquatic Habitats
- Urban
- Wetlands (including Vernal Pools) and Other Waters

The characteristics of each land cover type and associated wildlife occurring within these communities in the Program Area are described below and shown on Figure 3.4-1. The figure shows land cover within the Program Area. The general descriptions that follow are not specific to the Program Area, and individual species associated with each land cover type may not occur within the Program Area.

Annual Grassland

Annual grasslands in the Central Valley are open habitats composed primarily of non-native grass species. Introduced annual grass species include wild oat (*Avena* sp.), soft chess brome (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), wild barley (*Hordeum* sp.), and foxtail fescue (*Festuca myuros*). Common forbs include redstem filaree (*Erodium cicutarium*), turkey-mullein (*Croton setiger*), clovers (*Trifolium* sp.), and other non-native and native plant species (CDFG, 2005). These grassland habitats are found on fine-textured, usually clay, soils that are moist or even waterlogged during the winter rainy season and very dry during the summer and fall.

Annual grasslands are present primarily in the eastern portion of the Program Area, generally adjacent to actively cultivated lands, and make up around 2 percent of the acreage in the Program Area. Annual grassland provides important foraging areas and nesting areas for many birds, including white-tailed kite (*Elanus caeruleus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), prairie falcon (*Falco mexicanus*), burrowing owl (*Athene cunicularia*), yellow-billed magpie (*Pica nuttalli*), loggerhead shrike (*Lanius ludovicianus*), and many other avian species (CDFG, 2005). Mammals found in this habitat type generally include deer mouse (*Peromyscus maniculatus*), California vole (*Microtus californicus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), California ground squirrel (*Spermophilus beecheyi*), and Botta's pocket gopher (*Thomomys bottae*), all of which support larger predatory species such as mountain lion (*Felis concolor*), coyote (*Canis latrans*), and bobcat (*Lynx rufus*). Characteristic reptiles and amphibians include various toads, western fence lizard (*Sceloporus occidentalis*), common kingsnake (*Lampropeltis getula*), western rattlesnake (*Crotalus oreganus*), and gopher snake (*Pituophis catenifer*).

Blue Oak Woodland

Blue oak woodland can be dense, with a closed canopy, but typically is more open, forming a grassy understory savanna rather than a closed woodland (CDFG, 1988a). These woodlands are typically located on shallow, rocky, infertile, well-drained soils. Distribution of this community occurs along the western foothills of the Sierra Nevada-Cascade Ranges, the Tehachapi Mountains, and in the eastern foothills of the Coast Range. These woodlands form a nearly continuous belt around the Central Valley, between the foothill grassland and lower montane mixed conifer forest. Relatively small areas of blue oak woodlands are located on shallow, rocky, infertile, well-drained soils present in the eastern portion of the Program Area adjacent to the Tuolumne River. Blue oak woodlands make up less than 1 percent of the acreage in the Program Area.

Blue oak (*Quercus douglasii*) is the dominant species, with interior live oak (*Quercus wislizeni*) as the subdominant tree species in the Sierra Nevada region (CDFG, 1988a). Associated shrubs include poison-oak (*Toxicodendron diversilobum*), California coffeeberry (*Frangula californica*), buckbrush (*Ceanothus cuneatus*), California buckeye (*Aesculus californica*), and manzanita (*Arctostaphylos* spp.). The understory for these areas is usually dominated by various introduced annual herb and grass species.

Numerous wildlife species (about 29 species of amphibians and reptiles, 57 species of birds, and 10 species of mammals) are known to use blue oak woodland for breeding, assuming that other special habitat requirements are met (CDFG, 1988a).

Valley Oak Woodland

Valley oak woodland cover type varies from savanna-like to forest-like stands with partially closed canopies, comprising mostly winter-deciduous, broad-leaved species. Denser stands typically grow in valley soils along natural drainages (CDFG, 1988b). Tree density decreases with the transition from lowlands to the less fertile soils of drier uplands. Similarly, the shrub layer is best developed along natural drainages, becoming insignificant in the uplands with more open stands of oaks. Valley oak (*Quercus lobata*) stands with little or no grazing tend to develop a partial shrub layer of bird-disseminated species, such as poison-oak, toyon (*Heteromeles arbutifolia*), and California coffeeberry. Canopies of this land cover type are dominated almost exclusively by valley oaks. However, tree associates in the Central Valley include western sycamore (*Platanus racemosa*), Hinds black walnut (*Juglans hindsii*)), interior live oak, boxelder (*Acer negundo*), and blue oak. The shrub understory consists of poison-oak, blue elderberry (*Sambucus nigra* ssp. *caerulea*), California wild grape (*Vitis californica*), toyon, California coffeeberry, and California blackberry (*Rubus ursinus*). Various sorts of wild oats (*Avena* spp.), bromes (*Bromus* spp.), barleys (*Hordeum* spp.), blue wildrye (*Leymus triticoides*), and California needlegrass (*Nasella pulchra*) dominate the ground cover.

Where these woodlands extend to the foothills surrounding the valley, they intergrade with blue oak woodland or blue oak-foothill pine. Near major stream courses, this community intergrades with valley-foothill riparian. Valley oak woodlands are important to many wildlife species because of the foraging, cover, and nesting habitat they provide. For example, more resident breeding birds in the Central Valley use valley oak woodland than any other vegetation type. In many areas, there is little valley oak recruitment to replace mature tree losses because of natural and human causes. As such, most local jurisdictions have land use policies to protect this vegetation community whenever feasible.

A small area (15 acres) of valley oak woodland is identified in the eastern portion of the Program Area, adjacent to annual grassland.

Irrigated Agriculture (Irrigated Pastures, Row Crops, Field Crops, Orchards, and Vineyards)

Irrigated agriculture includes all methods of irrigation, such as flooding, drip, and spray applications. Seasonally flooded agricultural land includes agricultural and rangeland farmed for cattle, grain, rice, field, truck, and other crops and that require seasonal flooding for at least 1 week at a time as a management practice (for pest control and irrigation) or are purposely flooded seasonally to enhance habitat value for specific wildlife species (waterfowl). Typically, orchards and vineyards are open, tree- or vine-dominated habitats consisting of a single species. This habitat is planted in a uniform pattern and intensively managed. Understory vegetation is usually sparse; however, in some areas, grasses or forbs are allowed to grow between orchard rows to reduce erosion. (Agricultural ditches and drains, although often associated with maintaining seasonally flooded agricultural lands, are described in the Open-water Aquatic Habitats section below.)

As described in Section 3.2, Land Use and Agricultural Resources, in 2014, approximately 85 percent of Stanislaus County was designated for agricultural purposes, including important farmland and grazing land (CDOC, 2018). Therefore, this land cover type is the most abundant cover type in the Program Area (73 percent) and is located throughout the Program Area outside of urban areas. Approximately half of the agricultural land in the Program Area consists of irrigated pastures, row crops, and field crops; the remainder is orchards and vineyards.

Many wildlife species inhabit or use agricultural lands, both when active or fallow. In winter, flooded fields, such as rice fields, attract thousands of waterfowl and other wetland-dependent birds that winter in the Central Valley. In summer, these fields provide habitat for various wetland-associated species, such as the federally and state-listed threatened giant garter snake (*Thamnophis gigas*) and western pond turtle (*Emys marmorata*). Other crop types and grazing lands provide foraging habitat for raptors and a variety of other birds, as well as American badger (*Taxidea taxis*), coyote, and various species of snakes (Pacific gopher snake).

Wildlife use of orchards and vineyards is typically limited. In the Program Area, deer and rabbits (*Sylvalagus* spp.) might occasionally browse in the trees and vines, while other wildlife, such as squirrels and numerous birds, feed on fruits or nuts (CDFG, 1988c). Some wildlife species (mourning dove [*Zenaida macroura*] and California quail [*Callipepla californica*]) use the habitat for cover and nesting. Other species may occasionally nest in orchards; however, orchards in the Program Area do not experience significant wildlife use.

Open-water Aquatic Habitats

Reservoirs, rivers, creeks, and canals within the Program Area can provide open-water habitats for aquatic invertebrate and fish communities. The Central Valley Subprovince of the Sacramento-San Joaquin ichthyologic province contains 28 native and 40 non-native species of fish (Moyle, 2002). The Stanislaus and Tuolumne Rivers are major perennial watersheds within the Central Valley and provide habitats for both anadromous and resident fish and aquatic invertebrate species within and adjacent to the Program Area. Several native fish species are found within the Program Area. However, the aquatic communities within the open-water habitats are likely dominated by non-native fish species.

The Tuolumne and Stanislaus Rivers, which border the Program Area on the south and the north, respectively, are principal tributaries to the San Joaquin River. On the east, the Program Area is intersected by Dry Creek, which drains from the eastern foothills and runs in a westerly direction before merging with the Tuolumne River near the city of Modesto. Because none of the projects included in the Proposed Program would affect the Stanislaus or Tuolumne Rivers, these water bodies are not described in detail or evaluated further in this PEIR.

Dry Creek originates near the Modesto Reservoir and flows past Waterford through Modesto where it finally terminates at its confluence with the Tuolumne River. There are no flow control systems on Dry Creek, such that rainfall and runoff in the eastern portion of Stanislaus County directly affect this creek.

Dry Creek is the largest tributary of the Tuolumne River downstream of New Don Pedro Dam and Reservoir and contributes significant but short-duration flood flows to the Tuolumne River during large winter rainstorms. Dry Creek drains a largely agricultural and urban watershed and is a major contributor of fine sediment to the Tuolumne River because of large cattle grazing areas adjacent to the waterway.

The CalFish database (2018a, b, c, and d) lists native fish species found in the Dry Creek watershed, including rainbow trout (*Oncorhynchus mykiss*), inland threespine stickleback (*Gasterosteus aculeatus*), Central California roach (*Lavinia symmetricus symmetricus*), prickly sculpin (*Cottus asper*), riffle sculpin (*Cottus gulosus*), Sacramento blackfish (*Orthodon microlepidotus*), Sacramento perch (*Archoplites interruptus*), Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis*), hitch (*Lavinia exilicauda*), hardhead (*Mylopharodon conocephalus*), and thicktail chub (*Gila crassicauda*).

Non-native species found in the Dry Creek watershed include common carp (*Cyprinus carpio*), bullhead (*Ameiurus* sp.) and catfishes (*Ictalurus* sp.), bass (*Micropterus* sp.), bluegill (*Lepomis macrochirus*) and other sunfish (Centrarchidae), Mississippi silversides (*Menidia beryllina*), golden shiner (*Notemigonus crysoleucas*), threadfin shad (*Dorosoma petenense*), western mosquitofish (*Gambusia affinis*), and crappie (*Pomoxis* sp.). The fish species found in Modesto Reservoir and the other small creeks in the Program Area are likely similar to those found in the Dry Creek watershed (CalFish, 2018a, b, c, and d).

Urban

Urban land includes both incorporated and unincorporated areas that can be or have been developed free of hazards and without disruption or significant impacts on public safety, health hazards, and natural resources. Urban land involves a human-created change to improve unimproved land and includes subdividing land; construction and alteration of buildings, structures, roads, and utilities; mining; dredging; filling; grading; paving; excavating; and drilling. Urban lands, such as incorporated cities, account for less than 7 percent of the lands in Stanislaus County (CDOC, 2018). Urban lands within Stanislaus County include residential, commercial, public/quasi-public areas (such as airports, hospitals, cemeteries, landfills, and schools), and open space. The Program Area includes urban lands associated with the cities of Modesto, Riverbank, Salida, and Waterford. The city of Modesto is the largest urban area located within the Program Area. Almost 20 percent (19,981 acres) of the Program Area is urban land.

Various species are common in urban areas of Stanislaus County and in the surrounding counties within California. These species include native urban-tolerant species such as California towhee (*Melozone crissalis*), northern mockingbird (*Mimus polyglottos*), Anna's hummingbird (*Calypte anna*), house finch (*Haemorhous mexicanus*), and mourning dove. Non-native urban-tolerant species include European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and rock pigeon (*Columba livia*). Urban-tolerant mammals, other than a small number of rodent species, that occur in urban areas include raccoon (*Procyon lotor*) and California ground squirrel.

Wetlands (including Vernal Pools) and Other Waters

Vernal pools and vernal pool swale complexes are typically found in association with annual grassland habitat but constitute a unique habitat type. Vernal pools form in shallow depressions that are underlain by hardpan or volcanic rock. The hardpan or volcanic rock impedes drainage such that, in winter, the depressions fill with water and inundate or retain moist soil into late spring. The pools are then dry during summer and fall until rains commence the following winter. The soils and moist microhabitat of these pools provide a unique habitat within a general matrix of annual grassland habitat. Most of the vernal pool habitat is associated with the wetland areas in the extreme western portion of the Program Area, although there are vernal pools in the eastern portion of the Program Area adjacent to annual grassland and outside of the Program Area. Overall, wetland and vernal pool habitats are relatively uncommon in the Program Area and comprise approximately 2 percent of the land area in the Program Area.

Plant species of vernal pools differ from those of the surrounding annual grassland habitat, and many animals associated with annual grassland habitat depend on the occurrence of vernal pools to persist in the annual grassland landscape. Common plant species found in vernal pools include popcorn flower (*Plagiobothrys stipitata*), navarretia (*Navarretia leucocephala*), toad rush (*Juncus bufonius*), goldfields (*Lasthenia chrysostoma*), yellow carpet (*Blennosperma nanum*), coyote thistle (*Eryngium alismifolium*), tidy tips (*Layia* spp.), water buttercup (*Ranunculus* spp.), and annual hairgrass (*Deschampsia danthonioides*).

Listed species associated with vernal pools in the Program Area include Colusa grass (*Neostapfia colusana*), Hoover's spurge (*Euphorbia hooveri*), hairy Orcutt grass (*Orcuttia pilosa*), San Joaquin Orcutt grass (*Orcuttia inaequalis*), Greene's tuctoria (*Tuctoria greenei*), fleshy owl's-clover (*Castilleja campestris* ssp. succulenta), Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool fairy shrimp, and vernal pool tadpole shrimp. In addition to the above-listed species, the California tiger salamander (CTS) (*Ambystoma californiense*) breeds in vernal pools and is federally and state-listed as threatened.

Freshwater marshes and seasonal wetlands are characterized by specialized plant species that require moist soils and inundation but are tolerant of periodic drying. Species composition within and among marshes and other wetlands varies according to hydroperiod, soils, water chemistry, soil chemistry, and climate, among other factors. Freshwater marsh habitats are among the most productive wildlife habitats in California. They provide food, cover, and water for more than 160 species of birds and numerous mammal, amphibian, and reptile species (CDFG, 1988d). Wildlife species commonly found in this habitat include waterfowl, songbirds, and a variety of amphibians, reptiles, and mammals. Several species of raptors (northern harrier) often visit marshes while foraging.

The outermost margins of marshes are saturated and inundated only periodically. Moist-soil plant species such as big leaf sedge (*Carex amplifolia*), baltic rush (*Juncus balticus*), redroot (*Cyperus erythrorhizos*), and nutgrass (C*yperus esculentus*) inhabit these portions of wetlands. On wetter sites or in portions of marshes with deeper or more regular inundation, cattails (*Typha* spp.), bulrush (*Schoenoplectus* spp.), and arrowhead (*Sagittaria* spp.) dominate. Thus, the characteristics of freshwater marshes are intimately linked with the marsh's water regime. Within the Program Area, this habitat type is generally restricted to scattered locations along the area's streams and rivers, as well as isolated areas with suitable hydrology.

3.4.2.3 Special-Status Plants and Wildlife Species

FESA (50 CFR 17) provides legal protection and requires definition of critical habitat and development of recovery plans for plant and animal species in danger of extinction. California has a parallel mandate in CESA and the California Native Plant Protection Act of 1977. These laws regulate the process of determining which plant and animal species are endangered or threatened. Table 3.4-1 presents federal and state species with the highest levels of protections (listed as threatened, endangered, or state-listed fully protected species) known to occur or potentially occurring in the Study Area. Table A-1, located in the biological resources technical memorandum (Appendix E), presents a full list of sensitive and special-status species that are known to occur or potentially occur in the Program Area. Table A-1 also presents additional information on habitat and likelihood of occurrence, as indicated by searches of databases provided by USFWS, CDFW, CNPS, and on-site field reconnaissance surveys.

Table 3.4-1. Federal and State Threatened and Endangered Species and State Fully Protected Species Occurring or Potentially Occurring in the Study Area

Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Scientific Name	Common Name	Status (Federal/State/Other)
Plants		
Castilleja campestris ssp. *succulenta*	Succulent owl's-clover	FT/SE/CNPS list 1B.2
Clarkia rostrata	Beaked Clarkia	FT/None/CNPS list 1B.3
Eryngium racemosum	Delta button-celery	FE/None/CNPS list 1B.1
Euphorbia hooveri	Hoover's spurge	FT/None/CNPS list 1B.2
Gratiola heterosepala	Bogg's Lake hedge-hyssop	None/SE/CNPS list 1B.2
Neostapfia colusana	Colusa grass	FT/SE/CNPS list 1B.1
Pseudobahia bahiifolia	Hartweg's golden sunburst	FE/SE/CNPS list 1B.1
Invertebrates		
Branchinecta longiantenna	Longhorn fairy shrimp	FE/None/None
Branchinecta lynchii	Vernal pool fairy shrimp	FT/None/None
Lepidurus packardi	Vernal pool tadpole shrimp	FE/None/None
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FT/None/None
Fishes		
Oncorhynchus mykiss irideus	Steelhead – Central Valley DPS	FT/None/None
Amphibians		
Ambystoma californiense	California tiger salamander	FT/ST/None
Birds		
Buteo swainsoni	Swainson's hawk (nesting)	None/ST/None
Elanus leucurus	White-tailed kite (nesting)	None/CFP/None
Haliaeetus leucocephalus	Bald eagle	None/SE/BCC
Agelaius tricolor	Tricolored blackbird (nesting)	None/ST/None

Notes:

DPS = distinct population segment

Status:

Federal
FE = Federally listed as Endangered
FT = Federally listed as Threatened

State
SE = State listed as Endangered
ST = State listed as Threatened
CFP = CDFW-designated "Fully Protected"

Other
BCC = Birds of Conservation Concern
CNPS = California Native Plant Society

3.4.2.4 Designated Critical Habitat

As described in the biological resources technical memorandum (Appendix E), when a species is proposed for listing as endangered or threatened under FESA, USFWS and NMFS must consider whether there are areas of habitat believed to be essential to the species' conservation. Such areas may be proposed for designation as critical habitat. Activities that involve a federal permit, license, funding, or authorization (that is, federal nexus) and are likely to destroy or adversely modify an area of critical habitat can be affected by the designation. USFWS and NMFS typically work with the appropriate federal lead agency and (when appropriate) private or other landowners to amend their project to allow it to proceed without adversely affecting the critical habitat.

Critical habitat units for 11 federally listed species have been designated within the MID Study Area; critical habitat for 8 of these species overlaps with the Program Area. Nineteen of the proposed projects are within or may affect designated critical habitat for one or more species. Designated critical habitat for CCV steelhead and four vernal pool plant species overlap or may be affected by projects under the Proposed Program (Appendix E provides additional information and figures of designated critical habitat units). Critical habitat for hairy Orcutt grass, vernal pool fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp, CTS, and Delta smelt is present within the Study Area; however, proposed projects have not yet been identified within any of the designated units for these species. However, it should be noted that future currently undefined projects under the Proposed Program could result in impacts within these or other critical habitat units.

Steelhead Critical Habitat

On February 16, 2000 (65 Federal Register [FR] 7764), NMFS published a final rule designating critical habitat for CCV steelhead. This critical habitat included all river reaches accessible to CCV steelhead in the Sacramento and San Joaquin Rivers and their tributaries in California. NMFS proposed new critical habitat for CCV steelhead on December 10, 2004 (69 FR 71880), and published a final rule on September 2, 2005 (70 FR 52488). This critical habitat includes the Tuolumne River from the confluence with the lower San Joaquin River upstream to La Grange Diversion Dam, the Stanislaus River from its confluence with the lower San Joaquin River upstream to approximately Knights Landing, as well as the San Joaquin River downstream of the Merced River and the Delta. Because none of the projects included in the Proposed Program would affect the Stanislaus, Tuolumne, or San Joaquin Rivers, designated critical habitat for CCV steelhead would not be affected by the Proposed Program, and critical habitat is not discussed further in this PEIR.

Vernal Pool Plant Critical Habitat

A summary of the critical habitat units designated for federally listed vernal pool crustaceans and plants is provided in 71 FR 7118 (February 10, 2006). The summary provides the unit number, name, and boundaries/location; the "physical or biological features" (formerly called primary constituent elements [PCEs]) found within the unit; and special management considerations and protections that may be required for actions within the unit.

The physical or biological features of critical habitat for fleshy owl's-clover and other vernal pool plant species are the habitat components that provide the following:

- Topographic features characterized by isolated mound and intermound complex within a matrix of surrounding uplands that result in continuously, or intermittently, flowing surface water in the depressional features, including swales connecting the pools providing for dispersal and promoting hydroperiods of adequate length in the pools.
- Depressional features, including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a period long enough to promote germination, flowering, and seed production of

predominantly annual native wetland species. Depressional features typically exclude both native and non-native upland plant species in all but the driest years.

3.4.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential impacts on biological resources. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

3.4.3.1 Thresholds of Significance

The thresholds used to evaluate the potential impacts are based on Appendix G of the CEQA Guidelines and are listed below. Impacts on biological resources are considered significant if the Proposed Program would result in any of the following:

- A substantial adverse effect either directly or through habitat modifications on any species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by CDFW and USFWS. This includes a potential reduction in the number, restricted range, increased mortality, or lowered reproductive success that jeopardizes the long-term persistence of local populations of an endangered or threatened native anadromous or resident fish species.
- A substantial adverse effect on riparian habitat, EFH or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW and USFWS.
- A substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means.
- Substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- A conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or conflict with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan.

3.4.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is functionally the same as Existing Conditions as related to biological resources because minimal additional future development is anticipated in the predominantly rural and agricultural areas adjacent to the Proposed Program facilities, and both represent a condition without the Proposed Program. Therefore, this analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. Individual projects under each of the categories for the Proposed Program would be expected to have similar impacts on biological resources; therefore, each of the project categories is not specifically discussed in the impacts section. However, the category with the most potential for ground disturbance and loss of habitat, Regulating Reservoirs, has been broken out and analyzed separately.

Field reconnaissance-level surveys were conducted in May 2018 and 2019 to identify general habitat presence and the likelihood for species use and presence. Findings from the field surveys and literature reviews are provided in the biological resources technical memorandum (Appendix E). These findings were used to evaluate potential impacts on biological resources associated with the Proposed Program and No Program Alternative.

As identified in Section 2, Program Description and Alternatives, the following project commitments would be incorporated as part of the Proposed Program to assist in avoiding or minimizing potential impacts:

- Initial Siting Evaluation/Site-specific Resource Evaluation – MID and a qualified biologist (as necessary) will use a standardized approach/checklist (Appendix A) to evaluate the potential for biological and other impacts and screen out or modify proposed facility locations to the extent possible.
- Conduct Appropriate Surveys – A qualified biologist will determine whether suitable habitat is present and warrants any species-specific focused surveys and, if necessary, conduct focused protocol surveys consistent with the protocols identified in Table 3.4-2 or with the most current agency-approved protocol for a given species.
- Avoid, Minimize, or Mitigate Impacts on Sensitive Habitat and Special-Status Species – All proposed facilities and associated construction areas will be situated to avoid sensitive species and associated habitats to the extent possible. Current avoidance distances by habitat type are listed in Table 3.4-3. Such distances would be adjusted as appropriate given potential future agency guidance/requirements during the overall Proposed Program implementation period.
  - If avoidance (including buffer distances) of sensitive resources could not be achieved or maintained because of other constraints and/or necessary project purposes, the District would identify appropriate mitigation (such as mitigation replacement ratios and conservation easements) in consultation with federal and state resource agencies and obtain all permits and authorizations necessary.

Table 3.4-2 Recommended Special-Status Species Surveys for Projects Associated with the Proposed Program
Modesto Irrigation District Capital Improvements Program Programmatic Environmental Impact Report

Survey Type	Survey Notes
Focused survey for special-status plants	Survey conducted consistent with *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2018) within all project sites (and out to 100 feet) where potentially suitable habitat is present.
Focused survey for special-status vernal pool invertebrates (vernal pool fairy shrimp)	Survey conducted consistent with *Survey Guidelines for the Listed Large Branchiopods* (USFWS, 2015) where suitable habitat is present on site or within 250 feet of project.
Focused survey for valley elderberry longhorn beetle	Survey conducted consistent with *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (USFWS, 2017).
Focused survey for special-status vernal pool amphibians (CTS and western spadefoot)	Survey conducted consistent with *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* (USFWS and CDFG, 2003) where suitable habitat is present.
Focused survey for western pond turtle	Survey conducted during any dewatering or dredging of a water feature that is potentially suitable habitat for western pond turtle.
Focused survey for coast horned lizard	Survey conducted concurrently with surveys for special-status bumble bees, burrowing owl, and American badger given overlap in suitable habitat with the horned lizard and compatible survey strategies for each of these species – survey conducted during the activity period of the horned lizard (April 1 to October 15).

Table 3.4-2 Recommended Special-Status Species Surveys for Projects Associated with the Proposed Program
Modesto Irrigation District Capital Improvements Program Programmatic Environmental Impact Report

Survey Type	Survey Notes
Focused survey for nesting birds	Survey conducted as a minimum of 2 visits during 14 days before construction (at least 1 week between visits) if project commences between February 1 and August 15 (at and within 100 feet of project except for non-listed raptors where a threshold of 400 feet applies).
Focused survey for large wader colonial nest sites (great blue heron and great egret)	Survey conducted as a single visit before "leaf out" (that is, prior to March 1) to locate colonial nest sites followed by a second visit to confirm that previously found sites are active (April 1 to June 1).
Focused survey for nesting Swainson's hawk and white-tailed kite	Survey conducted consistent with *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks* (*Buteo swainsoni*) *in the Central Valley of California* (CDFG, 1994) along the Planada Canal within and up to 0.25 mile from project site.
Focused survey for burrowing owl	Survey conducted consistent with *Staff Report on Burrowing Owl Mitigation* (CDFG, 2012) along all roads and levees and within all other non-agricultural, low, sparse vegetation types within the project site (and out to 250 feet) where suitable habitat is present.
Focused survey for nesting tricolored blackbird colonies	Survey conducted as a minimum of 2 visits at and within 250 feet of project at least 14 days before construction (at least 30 days between visits) if project commences during breeding season (between February 15 and July 15).
Focused survey for non-tree roosting bats	Survey conducted to find roosting bats or evidence of roosting bats (for example, guano, urine stains) within structures proposed for demolition or refurbishing during the 14 days before construction.
Focused survey for tree-roosting bats (western red bat and hoary bat)	Survey conducted to find evidence of tree-roosting bats in trees proposed for removal or where other trees are within 120 feet of trees proposed for removal – detection will be conducted through the use of appropriate acoustic equipment to record calls of the target species and will be conducted for 2 consecutive nights during the 7 days before construction.

Table 3.4-3 Avoidance Distances by Habitat Type
Modesto Irrigation District Capital Improvements Program Programmatic Environmental Impact Report

Habitat	Potential Presence by Land Cover Category	Buffer Distance
Vernal Pools	Vernal Pool Areas, Annual Grassland	250 feet
Wetlands	Wetlands, Annual Grassland	250 feet
Riparian Vegetation	Valley-Foothill Riparian, Wetlands	100 feet from dripline
Native Grasslands	Annual Grassland, Vernal Pool Areas	250 feet
Oak Woodlands	Blue Oak Woodland, Blue Oak-Foothill Pine, Valley Oak Woodland	100 feet from dripline

3.4.3.3 Impacts Associated with the Proposed Program

Potential impacts on biological resources are identified in this section. Each project category and specific project as applicable is evaluated below by potential impact. Table 3.4-4 presents a summary of potential impacts and proposed mitigation to lessen potentially significant impacts.

Impact BR-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS. This includes potential reduction in the number, restricted range, increased mortality, or lowered reproductive success that jeopardizes the long-term persistence of local populations of an endangered or threatened native anadromous or resident fish species.

Regulating Reservoirs

The Proposed Program includes three new regulating reservoirs that would provide increased flexibility for water deliveries to laterals and turnouts both upstream and downstream of each proposed facility. As shown on Figure 2-1, the proposed regulating reservoirs are located in the western and southwestern portion of the Program Area. Locations, project type, and specific construction details may be adjusted to adequately address the needs of the District. Construction activities (including staging and laydown areas) for the proposed reservoirs would be contained within an approximate 40- to 60-acre construction footprint within and adjacent to the canal and existing facility footprints (approximately 4 acres would be temporary staging and laydown areas). No additional areas for staging and laydown outside of the construction footprint would be needed. Water within the reservoirs would come from existing canal or lateral flows. The reservoirs would not impound natural surface water flows or other inflows.

Construction

Construction of each of the proposed regulating reservoirs would last approximately 1 year. Standard construction equipment (for example, bulldozers, graders, and excavators) would be used during construction. A complete list of construction equipment required for the proposed regulating reservoirs is provided in Table 2-2 in Section 2, Program Description and Alternatives. Construction of the regulating reservoir projects would result in increased human activity and traffic during construction. This increased noise and activity could disturb wildlife and plants, including special-status species, either directly or adjacent to construction areas. Construction could displace or directly injure wildlife and plants, including the special-status terrestrial species known to occur or with the potential to occur in the areas of the proposed regulating reservoir projects.

As identified in Appendix E (Biological Resources Technical Memorandum) and described below, construction activities could potentially affect the following sensitive biological resources known to occur, or with the potential to occur, in the areas of the proposed regulating reservoir projects.

Special-Status Terrestrial Wildlife

Nesting Birds

Many nesting birds are protected under FESA, CESA, and the MBTA. Based on the conditions observed during the reconnaissance-level surveys, nesting birds may occur on or near all of the proposed regulating reservoir projects. If project activities occur during the nesting season (February 1 through August 31), nests with eggs or young could be lost (directly affected) during construction activities such as vegetation removal, topsoil stripping/stockpiling, and reservoir construction. Disturbance associated with construction activities could indirectly cause the abandonment of nests. The loss of a small number of nesting birds during construction would be a less than significant impact; however, the loss of a large number of birds would be a potentially significant impact. The loss of a special-status species nest would be a potentially significant impact.

Burrowing Owl

No individuals of this species were observed during the reconnaissance-level surveys. However, suitable habitat (that is, annual grassland, sparse or non-existent tree or shrub canopies) occurs near the potential project location of the Lateral 6 and 8 Regulating Reservoir. Within areas containing potential

habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment, as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on burrowing owls would be potentially significant compared with Existing Conditions and the No Program Alternative.

Tricolored Blackbird

Identified as a state candidate for listing as endangered, tricolored blackbirds have been recorded in the Program Area and may find suitable habitat (dense stands of blackberry, grasslands or rangelands, and winter wheat fields) for post-breeding flocks in mid-summer, within or near the proposed location of the Lateral 4 and 5 Regulating Reservoir project. Evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on tricolored blackbirds would be potentially significant compared to Existing Conditions and the No Program Alternative.

Swainson's Hawk

Swainson's hawks are state-listed as threatened because of population declines associated with reduction in riparian habitats and development of open foraging areas. Typical foraging habitat for Swainson's hawk (grasslands and pastures) and habitat for nesting (riparian forests or lone trees or groves of trees in agricultural fields) occurs near the potential project location of the Lateral 6 and 8 Regulating Reservoir. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on Swainson's hawk would be potentially significant compared to Existing Conditions and the No Program Alternative.

White-tailed Kite

Nesting white-tailed kite are designated as "Fully Protected" by CDFW. Typical nesting habitat for white-tailed kite (riparian forests or lone trees or groves of trees in agricultural fields) occurs near the potential project location of the Lateral 6 and 8 Regulating Reservoir. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on white-tailed kite would be potentially significant compared to Existing Conditions and the No Program Alternative.

Western Pond Turtle

The western pond turtle is a California species of special concern and is proposed for listing under FESA. Although not observed during reconnaissance-level survey, there have been documented occurrences in the Program Area, and this species may occur at the proposed locations of the Lateral 6 and 8 and Lateral 3 and 7 Regulating Reservoirs. Evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described under Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on western pond turtle would be potentially significant compared to Existing Conditions and the No Program Alternative.

Critical Habitat for Special-Status Terrestrial Wildlife

As currently proposed, the regulating reservoir projects included in the Proposed Program would not be located within or adjacent to designated critical habitat for special-status wildlife species (Appendix E provides additional information on critical habitat units). Future refinement of the projects included under the Proposed Program could result in currently unidentified impacts within critical habitat units. Therefore, depending on where projects are located and whether the physical or biological features (formerly called PCEs) used to designate the critical habitat are present, impacts on critical habitat may be potentially significant. As described in Section 3.4.3.2, a standardized approach/checklist (Appendix A) would be used to evaluate the potential for biological and other impacts, including potential impacts

on areas designated as critical habitat. Avoidance and minimization of impacts on critical habitat would be coordinated with regulatory agencies as necessary.

Special-Status Plant Species

Special-status plant species that have the potential to occur within the proposed regulating reservoir project areas include, but are not limited to, Sanford's arrowhead (*Sagittaria sanfordii*), Henderson's bent grass (*Agrostis hendersonii*), alkali milk vetch (*Astragalus tener* var. tener), heartscale (*Atriplex cordulata*), brittlescale (*Atriplex depressa*), lesser saltscale (*Atriplex minuscula*), subtle orache (*Atriplex subtilis*), round-leaved filaree (*California macrophylla*), Hoover's calycadenia (*Calycadenia hooveri*), Lemmon's jewelflower (*Caulanthus coulteri* var. lemmonii), Hoover's spurge, beaked clarkia (*Clarkia rostrate*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), and forked hare-leaf (*Lagophylla dichotoma*) (the Biological Resources Technical Memorandum in Appendix E has the full list). Evaluation and avoidance of potential impacts on sensitive plant species would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on special-status plant species would be potentially significant compared to Existing Conditions and the No Program Alternative.

Critical Habitat for Special-Status Plant Species

As currently proposed, the regulating reservoir projects included in the Proposed Program would not be located within or adjacent to designated critical habitat for special-status plant species. Future refinement of the projects included under the Proposed Program could result in currently unidentified impacts within critical habitat units. Therefore, depending on where projects are located and whether the physical or biological features (formerly called PCEs) used to designate the critical habitat are present, impacts on critical habitat may be potentially significant. As described in Section 3.4.3.2, a standardized approach/checklist (Appendix A) would be used to evaluate the potential for biological and other impacts, including potential impacts on areas designated as critical habitat. Avoidance and minimization of impacts on critical habitat would be coordinated with regulatory agencies as necessary.

Summary of Construction Impacts on Special-Status Terrestrial Wildlife and Plants

Most areas under consideration for regulating reservoir projects are actively used for agricultural purposes. Construction impacts in these previously disturbed areas adjacent to active District facilities within existing MID rights-of-way would be less than significant because of the lack of habitat or species presence. For construction activities within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on special-status terrestrial species would be potentially significant. If necessary, potentially significant impacts may be mitigated to a less-than-significant level with implementation of the mitigation measures specified in Section 3.4.3.4, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

Operations and Maintenance

Activities related to operation of the regulating reservoir projects would include visits by MID operations staff to monitor conditions and make manual changes to local irrigation services near the reservoirs, as needed. Operations of reservoir outlet gates would be managed using remote SCADA monitoring and control. This would result in vehicle traffic throughout the MID Program Area related to maintenance activities. However, operational activities are anticipated to be infrequent and consistent with existing activity in the Program Area. Therefore, impacts from operational activities associated with the regulating reservoir projects under the Proposed Program would be anticipated to be less than significant.

General maintenance of the regulating reservoirs would include weed control, levee and berm maintenance, and debris and sediment removal. When water is not present in the reservoir, silt would

be removed from the bottom of the reservoir as required with heavy equipment, such as a grader and a tractor with a box scraper, and weeds may be disked. Periodic inspection and maintenance would be performed on all mechanical and electrical equipment, as needed. Impacts from maintenance activities associated with the regulating reservoir projects under the Proposed Program would be anticipated to be less than significant.

All Other Project Types

Construction

Infrastructure improvements to tunnels, canals, and laterals are proposed throughout the Program Area. In general, the total disturbance area, including necessary temporary work space, would be less than 1 acre, primarily located within an existing District right-of-way and previously disturbed areas. Depending on the nature of the site, some tree removal and vegetation clearing would be necessary before canal rebuilding and relining.

The Proposed Program also includes the implementation of a number of flow control projects, including installation of long-crested and sharp-crested weirs, control gates, headworks, pump stations, and check structures. All new facilities would also be connected to SCADA. Construction activities, including staging and laydown areas, for the proposed flow control projects would typically be contained within temporary construction footprints spanning less than 1 acre per project within or adjacent to the canal and existing facility footprints. Because of the limited construction needs of demolition or rehabilitation of long-crested weirs, these projects would not require additional areas for staging.

Several existing wells are in need of repair, replacement, or rehabilitation. The total construction footprint, including staging and laydown areas, would be approximately 0.5 acre for each well site. A 40-foot-wide construction area or less would be required along the length of each pipeline. Pipeline lengths would vary, ranging from 30 to 200 feet. Replacement wells would typically be located within 1,000 feet of the old well locations.

The Proposed Program includes several projects that would increase the extent of automation and measurement devices across the District. With the exception of the Butler Communications Tower project, the total construction footprint, including staging and laydown areas, would be approximately 0.25 acre for each measurement and automation project. The total anticipated disturbance area for the proposed Butler Communications Tower project would be up to 1 acre.

Similar to the regulating reservoir projects, construction of the other project categories under the Proposed Program would require using heavy equipment, such as backhoes, excavators, dump trucks, and concrete trucks/equipment. A complete list of construction equipment required for the proposed projects is provided in Section 2, Program Description and Alternatives. Similar to the regulating reservoir projects, the other project categories would result in increased human activity during construction. This increased noise and activity could disturb wildlife and plants, including special-status species, either directly or adjacent to construction areas. Construction could displace or directly injure wildlife, including special-status species.

As identified in Appendix E (Biological Resources Technical Memorandum) and described below, construction activities could potentially affect the following sensitive biological resources known to occur, or with the potential to occur, in the areas of the proposed projects.

Special-Status Terrestrial Wildlife

Nesting Birds

Almost all project sites have some potential for nesting habitat for one or more species of birds that are regulated by FESA, CESA, and the MBTA. Active nests (cliff swallow, barn swallow, and black phoebe) were observed during the May 2018 and May 2019 reconnaissance-level surveys. As such, nesting birds are expected at or near all of the proposed projects that would be constructed between February 1 and

August 15. Disturbance associated with construction activities could indirectly cause the abandonment of nests. The loss of a small number of nesting birds through implementation would be a less than significant impact; however, the loss of a large number of birds would be a potentially significant impact. The loss of a special-status species nest would be a potentially significant impact.

Burrowing Owl

No individuals of this species were observed during the reconnaissance-level surveys. However, suitable habitat (that is, annual grassland, sparse or non-existent tree or shrub canopies) does occur at some of the proposed project locations and surrounding areas. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment, as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on burrowing owls would be potentially significant compared to Existing Conditions and the No Program Alternative.

Tricolored Blackbird

Identified as a state candidate for listing as endangered, tricolored blackbirds have been recorded in the area and may find suitable habitat within or near some of the proposed project sites. Potential habitat for tricolored blackbird occurs in the following project areas visited during reconnaissance-level surveys: Spenker Spill Flow Measurement and Lining and Oakdale Irrigation District Spill at Pelton Weir - SCADA. Tricolored blackbird habitat may occur at other proposed project sites as well. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on tricolored blackbird would be potentially significant compared to Existing Conditions and the No Program Alternative.

Western Pond Turtle

Although not observed during reconnaissance-level surveys, potential habitat for western pond turtle was observed at many of the project locations visited during the surveys. There have been documented occurrences of western pond turtle in the Program Area, and this species may occur at many of the proposed project locations. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on western pond turtle would be potentially significant compared to Existing Conditions and the No Program Alternative.

California Tiger Salamander

The vernal pool grasslands in the vicinity of several of the proposed canal, lateral, and tunnel improvement projects provide suitable habitat for this federally and state-listed species. More than 10 occurrences of this species have been documented within the Program Area. Potential habitat for CTS occurs in the following projects visited during the reconnaissance-level surveys: Rairden Fill Maintenance and Waterford Upper Main Canal Lining. CTS habitat could occur at other proposed project sites as well. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on CTS would be potentially significant compared to Existing Conditions and the No Program Alternative.

Vernal Pool Invertebrates

Suitable habitat (vernal pools and similar seasonal wetlands) for vernal pool invertebrates exists in the valley grassland areas of the Program Area. The following species are likely to occur in these areas: Longhorn fairy shrimp (federally endangered), vernal pool fairy shrimp (federally threatened), midvalley fairy shrimp (CDFW Special Animal), vernal pool tadpole shrimp (federally endangered), and California

fairy shrimp (CDFW Special Animal). Most of these taxa would not be expected to be directly affected by the proposed projects, with the exception of projects that flood or destroy vernal pool grasslands, playas, or similar seasonal wetlands. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on vernal pool invertebrates would be potentially significant compared to Existing Conditions and the No Program Alternative.

Swainson's Hawk

Swainson's hawks are state-listed as threatened because of population declines associated with reduction in riparian habitats and development of open foraging areas. Typical foraging habitat for Swainson's hawk (grasslands and pastures) and habitat for nesting (riparian forests or lone trees or groves of trees in agricultural fields) occur in the Program Area. Potential habitat for Swainson's hawk was observed at nearly all of the projects visited during the reconnaissance-level surveys. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on Swainson's hawk would be potentially significant compared to Existing Conditions and the No Program Alternative.

White-tailed Kite

Nesting white-tailed kite are designated as "Fully Protected" by CDFW. Typical nesting habitat for white-tailed kite (riparian forests or lone trees or groves of trees in agricultural fields) occur in the Program Area. Potential habitat for white-tailed kite was observed at nearly all of the projects visited during the reconnaissance-level surveys. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on white-tailed kite would be potentially significant compared to Existing Conditions and the No Program Alternative.

Bats

Several bat species may roost in trees or within artificial structures in the Program Area. Potential bat roosting habitat occurs in the following projects visited during the reconnaissance-level surveys: Dry Creek Flume, Lateral 1 Spill Relocation, Waterford Upper Main Canal Lining, Miller Lake Pumps and Structure, Schafer Drop (Drop 12 on MLM) Long Crested Weir, Upper Main Canal - Emergency Spill at Upper Dominici Weir, Oakdale Irrigation District Cavil Spill - SCADA Integration, and Scow Drop Measuring Weir. Bat roosting habitat may occur at other proposed project sites as well. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described under Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on bats would be potentially significant compared to Existing Conditions and the No Program Alternative.

American Badger

The American badger is a state-listed species of special concern. They are known to occur in open habitat, such as annual grasslands, woodlands, and chaparral areas. Badgers may use areas within the Program Area for foraging and as movement corridors. Badgers are burrowing animals, so the potential for denning is more likely in hilly areas rather than in areas close to water. The agricultural areas of the Program Area are also unsuitable for denning because of frequent human disturbances. Potential habitat for the American badger occurs in the following project visited during the reconnaissance-level surveys: Waterford Upper Main Canal Lining. Badger habitat may occur at other proposed project sites as well. Badgers would likely leave the area during construction of the projects because of increased noise and human disturbance. However, the projects could result in impacts on badgers through

reduction in foraging areas as a result of habitat disturbance. The most likely direct impacts would be mortality if dens in the proposed project locations are destroyed during construction. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on American badger would be potentially significant compared to Existing Conditions and the No Program Alternative.

Western Spadefoot

Western spadefoot is a California species of special concern that occurs primarily in grasslands in areas with temporary pools; however, they do occasionally occur in other habitat types. They are mainly terrestrial but breed in shallow pools. Suitable habitat exists in the vicinity of the following projects visited during the reconnaissance-level surveys: Rairden Fill Maintenance and Waterford Upper Main Canal Lining. Spadefoot habitat may occur at other proposed project sites as well. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on western spadefoot would be potentially significant compared to Existing Conditions and the No Program Alternative.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle is a federally listed threatened species that is dependent on the elderberry shrubs as a host plant. Elderberry shrubs were observed the vicinity of the following projects visited during the reconnaissance-level surveys: Miller Lake Pumps and Structure and the Upper Main Canal - Emergency Spill at Upper Dominici Weir. Longhorn beetle habitat may occur at other proposed project sites as well. Removal or direct or indirect destruction of the host plant could result in potentially significant impacts on valley elderberry longhorn beetle.

Northern California Legless Lizard

The northern California legless lizard is a California species of special concern that occurs as a fossorial species in sand, sandy loam, or leaf-mold substrates in the San Joaquin Valley and coastal California. Suitable habitat exists in the vicinity of the following projects visited during the reconnaissance-level surveys: Dry Creek Flume and Spenker Spill Flow Measurement and Lining. Legless lizard habitat may occur at other proposed project sites as well. However, no individuals of this species were observed during the reconnaissance-level surveys. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on legless lizard would be potentially significant compared to Existing Conditions and the No Program Alternative.

Blainville's Horned Lizard

Blainville's horned lizard is a California species of special concern that requires open natural vegetation communities for basking, loose soils for burial, and ants as a prey base. Suitable habitat may exist in the vicinity of proposed projects, but no suitable habitat or individuals of this species were observed during the reconnaissance-level surveys. Within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on coast horned lizard would be potentially significant compared to Existing Conditions and the No Program Alternative.

Critical Habitat for Special-Status Terrestrial Wildlife

As currently proposed, the projects included in the Proposed Program would not be located within or adjacent to designated critical habitat for special-status terrestrial wildlife species. Future refinement of

the projects included under the Proposed Program could result in currently unidentified impacts within critical habitat units. Therefore, depending on where projects are located and whether the physical or biological features (formerly called PCEs) used to designate the critical habitat are present, impacts on critical habitat may be potentially significant. As described in Section 3.4.3.2, a standardized approach/checklist (Appendix A) would be used to evaluate the potential for biological and other impacts, including potential impacts on areas designated as critical habitat. Avoidance and minimization of impacts on critical habitat would be coordinated with regulatory agencies as necessary.

Special-Status Plant Species

Special-status plant species that have the potential to occur within the Program Area are identified above for the regulating reservoir projects. Additional special-status plant species associated with the other project types include plant species associated with vernal pools, such as Bogg's Lake hedge hyssop (*Gratiola heterosepala*), Colusa grass, succulent owl's-clover, Greene's tuctoria, and Hoover's spurge. However, much of the area that will be affected by the proposed Canal, Lateral, and Tunnel Improvements; Flow Control; and Measurement and Automation Projects is in existing MID rights-of-way in previously disturbed areas adjacent to active District facilities. Evaluation and avoidance of potential impacts on sensitive plant species would be conducted as a project commitment as described in Section 3.4.3.2. However, for those facilities that cannot be located to avoid areas containing potential habitat, some impacts may be unavoidable; therefore, impacts on these special-status plant species would be potentially significant.

Critical Habitat for Special-Status Plant Species

Some of the proposed project locations are within the boundaries of designated critical habitat units for Colusa grass, succulent owl's-clover, Greene's tuctoria, and Hoover's spurge. The Biological Resources Technical Memorandum in Appendix E provides additional information on critical habitat units. Projects that occur within designated critical habitat would be evaluated and relocated if feasible in accordance with the project commitments described in Section 3.4.3.2. If other projects are within critical habitat and cannot be relocated, there is the potential that they may result in a direct or indirect alteration that appreciably diminishes the conservation value of critical habitat for one or more of these species.[3] Avoidance and minimization of impacts on critical habitat would be coordinated with regulatory agencies, as necessary. However, some impacts on critical habitat may be unavoidable. Therefore, depending on where projects are located and whether the physical or biological features (formerly called PCEs) used to designate the critical habitat are present, impacts on critical habitat may be potentially significant.

Special-Status Fish Species

Anadromous salmonids and lamprey migrating upstream from the ocean are prevented from traveling up the San Joaquin River beyond the confluence with the Merced River by the Hills Ferry Barrier. Because the barrier is upstream of the Program Area, it would not prevent anadromous salmonids or lamprey from reaching streams in the Program Area, such as the Tuolumne and Stanislaus Rivers. However, none of the projects included in the Proposed Program would affect aquatic habitats in the Stanislaus or Tuolumne Rivers. Anadromous species are not likely to occur in other creeks, and thus, not in the connecting network of irrigation canals in the Program Area, given that the priority for these water features is delivery of water for agricultural purposes. Therefore, no impacts on anadromous salmonids or lamprey would be anticipated from construction activities associated with the Proposed Program.

[3] Such alterations may include, but are not limited to, effects that preclude or significantly delay the development of the physical or biological features (formerly called PCEs) that support the life history needs of the species for recovery. (Note that one or more of the physical or biological features upon which the designations were based would have to be adversely affected to the magnitude that the effects preclude or delay the recovery of the species; it is not enough that the project is simply within the boundaries of a critical habitat unit. This narrative also applies to designated critical habitat units for wildlife that may occur within the boundaries of a project.)

Special-status native resident fish species potentially present in the creeks and canals include river lamprey and hardhead. Habitat within these creeks and canals is highly modified, including frequent flow fluctuations; therefore, it is unlikely that lamprey or hardhead species, preferring calm, stable environments, would be present within the Program Area. In addition, construction activities would largely occur on dry land within the existing MID rights-of-way, the exceptions being canal rebuilding/lining projects and canal automation and flow measurement improvements that would take place within the existing canals. Only the canal intertie projects would require a new permanent footprint. Therefore, impacts on special-status resident fish species would be less than significant.

Critical Habitat for Special-Status Fish Species

Several of the projects under the Proposed Program are adjacent to the boundary of critical habitat unit SJVF 5535 (San Joaquin Valley Floor Hydrologic Unit 5535) for CCV steelhead (CCV DPS). Given construction activities would be adjacent to, but not in, the Tuolumne or Stanislaus Rivers, and measures would be taken to avoid impacts on the river, including avoiding potential sedimentation, impacts on critical habitat for CCV steelhead would be less than significant.

Summary of Construction Impacts on Special-Status Terrestrial Wildlife and Plants

Impacts associated with construction in previously disturbed areas adjacent to active District facilities within existing MID rights-of-way would be less than significant given the lack of habitat or species presence. For construction activities within areas containing potential habitat, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on special-status species would be potentially significant. If necessary, potentially significant impacts may be mitigated to a less-than-significant level with implementation of the mitigation measures specified in Section 3.4.3.4, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

Operations and Maintenance

Because these projects are slated to repair and rehabilitate existing facilities, long-term O&M activities would not be expected to change. O&M activities would generally include activities similar to those that currently occur within the service area, including regular access to the canals and control structures by MID operations staff to operate and maintain flow control gates, and routine maintenance and inspections of facilities. During the irrigation season, canals and laterals would be accessed on an as-needed basis by MID operations staff in field vehicles. Operations staff would operate any manual flow control gates and conduct routine maintenance and inspections. During the winter shutdown, vegetation control, inspections, and repairs would be required. All of these activities are currently performed under existing O&M routines. Therefore, impacts from O&M activities associated with the Proposed Program would be anticipated to be less than significant.

Impact BR-2: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, and coastal), riparian habitat, essential fish habitat, or other sensitive natural community identified in local or regional plans, policies, and regulations, or by CDFW and USFWS through direct removal, filling, hydrological interruption, or other means.

Wetlands (including riparian habitats) represent a unique habitat type that is a subset of the habitat and associated species discussed under Impact BR-1. Accordingly, the following discussion references impacts discussed for Impact BR-1 as appropriate.

All Project Types

Construction

Similar to the impacts identified for Impact BR-1, construction associated with implementation of the Proposed Program projects could result in the temporary and permanent loss of riparian or wetland habitat (including vernal pools) as well as other sensitive natural communities, which would reduce habitat availability for riparian, wetland, and other associated wildlife. Many special-status species identified above use riparian and wetland habitats (Appendix E). Most existing MID canals and operational facilities are maintained so as to minimize vegetation, and riparian and wetland habitats; most other areas proposed for projects and improvements are in active agricultural use and do not include wetland (including vernal pool), riparian, or stream-related habitats. Therefore, impacts on these habitat types during the construction of most projects would either not occur or would be limited.

For construction activities within wetlands or other sensitive natural communities, evaluation and avoidance of potential impacts on sensitive biological resources would be conducted as a project commitment as described in Section 3.4.3.2. However, some impacts may be unavoidable; therefore, impacts on wetlands and other natural communities would be potentially significant. If necessary, potentially significant impacts may be mitigated to a less-than-significant level with implementation of the mitigation measures specified in Section 3.4.3.4, or developed and documented as appropriate (including additional environmental documentation as determined necessary).

Riverine areas (including portions of the San Joaquin, Tuolumne, and Stanislaus Rivers) in or adjacent to the Program Area lie within designated EFH for Chinook salmon under the Pacific Coast Salmon Fishery Management Plan. However, implementation of the Proposed Program projects would not affect the major components of freshwater EFH for Pacific salmon. Therefore, no impacts on EFH would occur.

Operations and Maintenance

O&M activities associated with implementation of the Proposed Program projects are described under Impact BR-1. Facilities within the Program Area would continue to be operated and maintained consistent with current practices. Future operations and flows would remain similar to current operations. Therefore, impacts on biological resources from O&M under the Proposed Program would be anticipated to be less than significant.

Impact BR-3: Substantially interfere with the movement of any native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.

All Project Types

Construction

Disruption of wildlife movement corridors could occur both directly and indirectly through establishment of a physical barrier, such as a developed use, road, or canal, or by changing the nature or function of a natural feature used in migration or dispersal, such as by dewatering a wetland. Establishment of physical barriers or developed uses within movement corridors could adversely affect breeding, foraging, and dispersal. The most significant movement corridors within the MID service area are the Tuolumne and Stanislaus Rivers. The riparian corridor associated with these rivers provides the most intact habitat along which wildlife can move without impediment and provides habitat connections to lands both upstream and downstream of the Program Area. Other smaller drainages in the Program Area (Dry Creek) may also provide corridors for habitat linkage. Because none of the proposed projects would affect drainages that provide corridors for habitat linkage, these activities would not substantially interfere with the movement of any resident or migratory fish species, and potential impacts would be less than significant.

As described under Impact BR-1, migratory fish (anadromous salmonids) are largely isolated in areas away from the proposed project locations where construction activities would occur. Native resident fish species may be present in the rivers, creeks, and canals adjacent to proposed project locations. Construction activities would largely occur on dry land, the exception being the tie-ins to existing or new channels or the placement of control and measurement facilities, which would occur outside of the irrigation season. Therefore, these activities would not substantially interfere with the movement of any resident or migratory fish species, and potential impacts would be less than significant.

Operations and Maintenance

O&M of the Proposed Program projects is described under Impact BR-1. Facilities within the Program Area would continue to be maintained consistent with current practices. Future operations and flows would remain similar to current operations. Therefore, impacts on biological resources from O&M of the Proposed Program projects would be anticipated to be less than significant.

Impact BR-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

All Project Types

Construction

Local policies, ordinances, plans, and provisions related to biological resources for the Proposed Program are described in Section 3.4.1.3. Potential construction-related impacts resulting in conflicts with local policies and protections are included in the analysis of Impacts BR-1, BR-2, and BR-3. As described in Section 3.4.3.2, project commitments and mitigation measures identified below would provide for continued compliance and mitigation where applicable. Therefore, these activities would not conflict with any local policies or ordinances protecting biological resources, and potential impacts would be less than significant.

Operations and Maintenance

O&M activities associated with the implementation of the Proposed Program projects are described under Impacts BR-1, BR-2, and BR-3. Facilities within the Program Area would continue to be maintained consistent with current practices. Future operations and flows would remain similar to current operations. Therefore, impacts on biological resources from O&M of the Proposed Program projects are anticipated to be less than significant.

3.4.4 Mitigation Measures

Project commitments (Section 2.4 and Section 3.4.3.2) are included as part of the Proposed Program and are designed to avoid and minimize impacts on regulated habitats, special-status species, and other biological resources to the extent feasible. Additional mitigation measures identified in Table 3.4-4 would need to be implemented to reduce impacts to a less-than-significant level as necessary if potentially significant impacts on habitat or species occur. The following mitigation measures would be implemented to avoid or substantially lessen potentially significant impacts on biological resources. Table 3.4-4 summarizes the mitigation measures identified for each project category and individual project as applicable.

As described in Section 3.4.2.1, the reconnaissance-level surveys conducted as part of the impact assessment conducted for this PEIR were intended to assist in impact evaluation. Additional appropriately timed, focused surveys for specific special-status species would need to be conducted for future projects implemented as part of the Proposed Program. Appendix E provides recommendations for surveys to determine whether species are likely to be adversely affected and provides mitigation measures for species that are considered to have some potential to occur within or adjacent to a proposed project location.

Table 3.4-4. Summary of Mitigation Measures for MID Project Impacts on Biological Resources
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Project	Loss of Significance before Mitigation	Mitigation Measure	Loss of Significance after Mitigation
Impact BR-1: Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW, USFWS, or NMFS. This includes potential reduction in the number, restricted range, increased mortality, or lowered reproductive success that jeopardizes the long-term persistence of local populations of an endangered or threatened native anadromous or resident fish species.			
All projects – Special-Status Terrestrial Wildlife	Potentially Significant	MM-BR-1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 1l, 1m	Less than Significant
All projects – Special-Status Plants	Potentially Significant	MM-BR-1n, 1o	Less than Significant
All projects – Special-Status Native Anadromous or Resident Fish Species	Less than Significant	NA	Less than Significant
Impact BR-2: Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, and coastal), riparian habitat, essential fish habitat, or other sensitive natural community identified in local or regional plans, policies, and regulations, or by CDFW and USFWS through direct removal, filling, hydrological interruption, or other means.			
All projects – Wetland and Riparian Habitats	Potentially Significant	MM-BR-2	Less than Significant
All projects – Essential Fish Habitat	Less than Significant	NA	Less than Significant
Impact BR-3: Substantially interfere with the movement of any native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites.			
All projects – Wildlife Nursery Sites or Corridors	Less than Significant	NA	Less than Significant
All projects – Native Resident/Migratory Fish Nursery Sites or Corridors	Less than Significant	NA	Less than Significant
Impact BR-4: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance or conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.			
All projects – Local Policies, Ordinances, or Plans	Less than significant	NA	Less than Significant
All projects – Conservation Easements	Less than significant	NA	Less than Significant

Notes:

Potential impacts on fish species would be less than significant and, therefore, do not require mitigation. However, project commitments would be applied as appropriate.

Information is based on findings presented in the biological resources technical memorandum (Appendix E).

NA = not applicable

MM-BR-1a. Nesting Birds

The following measures are recommended to avoid adverse effects on nesting birds (not including Swainson's hawk or other special-status raptor species) that nest within or immediately adjacent to the project site:

- If construction occurs during the bird nesting season (generally February 1 through August 31), preconstruction nesting bird surveys (2 visits at least 1 week apart) will be conducted by a qualified biologist within the 14 days before construction to detect the presence of any nesting birds within or adjacent to the proposed project (within 400 feet for non-special-status raptors and within 100 feet for all other non-special-status birds). If construction occurs during the nonbreeding season for nesting birds (September 1 through January 31), preconstruction surveys are not required.
- If the preconstruction nesting bird surveys detect actively nesting birds, the results of the surveys will be submitted to CDFW within 3 days of completing the surveys. If any active non-special-status bird nests are found on site, the applicant will avoid initiating any construction activities within the standard buffers described above (that is, 400 and 100 feet, as appropriate). The applicant will then develop and implement a plan for the protection and monitoring of these nests, to be approved by CDFW, in a timely manner. The results of any protective measures instituted as a part of the protection and monitoring plan will be provided to CDFW in electronic format within 1 week of implementation.

The following measures are recommended to avoid adverse effects on nesting colonies of great blue heron (*Ardea herodias*) and great egret (*Ardea alba*):

- Active nesting colonies of great blue heron or great egret will be avoided with a 400-foot buffer between the colony and active construction that uses heavy equipment or that involves tree removal.
- Minor modification activities may occur if they are short in duration (3 days or less), do not use heavy machinery, do not remove more than 900 square feet of vegetation, and avoid all activities within a 250-foot buffer between an active colony and construction activities.
- If construction is initiated during the non-nesting season (September 1 through January 31), construction activities may occur within 100 feet of the nearest portion of the nest colony site. However, no woody vegetation (particularly large trees) within 200 feet of the nest colony site may be removed.

MM-BR-1b. Burrowing Owl

Adverse effects on burrowing owls will be mitigated as follows:

- The results of preconstruction surveys for burrowing owl, including negative findings, will be submitted to CDFW within 3 days of survey conclusion. If burrowing owls are found during the nesting season (February 15 through August 31), no ground disturbance will occur within 250 feet of occupied burrows until a qualified biologist determines that fledging has occurred (that is, the juveniles are no longer dependent upon the nest burrows). If burrowing owls are found during the non-nesting season (September 1 through February 14), no ground disturbance will occur within 160 feet of occupied burrows.
- Alternatively, the applicant may retain a qualified biologist to conduct passive relocation of individuals from occupied burrows using 1-way doors for a minimum of 3 consecutive days (only during the non-nesting season). Once the occupied burrows have been cleared, the applicant may backfill the burrows. If passive relocation is used, the applicant will also provide alternate natural or artificial burrows that are more than 160 feet from the impact area and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair of relocated burrowing owls. One alternate natural or artificial burrow will be provided for each burrow that will be excavated

within the project site. Artificial burrow creation, if used, will follow the guidelines in Trulio (1995) and the *Staff Report on Burrowing Owl Mitigation* (CDFG, 2012). The applicant will be responsible for reporting all observations of burrowing owl to the CNDDB within 10 days of the sighting.

MM-BR-1c. Swainson's Hawk and White-Tailed Kite

Adverse effects on nesting Swainson's hawks and white-tailed kites will be mitigated as follows:

- If active Swainson's hawk or white-tailed kite nests are detected during preconstruction surveys, a no-disturbance buffer zone of 500 feet will be implemented during the nesting season (March 1 through September 15) or until August 15 if management authorization is provided by CDFW (SHTAC, 2000). Furthermore, a nest monitoring plan will be developed and implemented for all active nests. If monitoring demonstrates that nesting individuals are being adversely affected, the no-disturbance zone will be increased in 100-foot increments until all adverse effects are eliminated.
- Compensation for loss of suitable Swainson's hawk foraging habitat (mostly with reservoir construction) will be conducted as follows: habitat acquisition (through fee title or conservation easement) at a 1:1 ratio for nest sites within 1 mile, 0.75:1 ratio for nest sites within 5 miles, and 0.5:1 ratio for nest sites within 10 miles. Note that habitat acquisition can be "stacked" with mitigation for loss of agricultural land as long as the acquired land is planted in a suitable crop for Swainson's hawk foraging in 3 out of every 5 years. Compensation for loss of suitable white-tailed kite foraging habitat will be conducted concurrently with compensation for loss of suitable Swainson's hawk habitat.

MM-BR-1d. Tricolored Blackbird

Adverse effects on nesting tricolored blackbird colonies will be mitigated as follows:

- MID will prepare a habitat management plan and incidental take permit application for submittal to, and approval by, CDFW before any loss of suitable nesting habitat for tricolored blackbird on a project site. The habitat management plan will, at a minimum, include the following provisions:
  - To avoid and minimize impacts on nesting tricolored blackbird, MID will not initiate grubbing, grading, or other soil/vegetation disturbance within 250 feet of project boundaries during the nesting season (March 15 through July 30). All project soil/vegetation disturbance will occur between August 1 and March 14 to the extent feasible.
  - Alternatively, if MID initiates project soil/vegetation disturbance between March 15 and July 30, surveys will be conducted for prospecting or nesting tricolored blackbird colonies in all potentially suitable nesting habitats that are within and out to 250 feet from the project boundaries. The surveys will be conducted by a qualified biologist during the season immediately preceding initiation of the project. The surveys will be conducted according to the following schedule: a total of 2 visits during the early March 15 to July 30 time period with at least 1 month between survey visits.
  - If nesting colonies are found before initiation of project soil/vegetation disturbance in the year of the survey, a no-work exclusion zone will be established within 250 feet of each active nesting colony until a qualified biologist determines that the young-of-the-year are no longer reliant on the nest site.
  - Alternatively, MID may retain a qualified biologist to conduct daily monitoring of any active nesting colonies that are within 250 feet or less of project soil/vegetation disturbance to determine whether the individuals are exhibiting any behaviors that would suggest that nest failure could occur. If the qualified biologist determines that disturbance is sufficient to cause nest failure, all activities within 250 feet of the nesting colony will be terminated until the young-of-the-year are no longer reliant on the nest.

  - To compensate for the loss of known nesting habitat for tricolored blackbird on a project site, MID will plant Himalayan blackberry (*Rubus armeniacus*) or California blackberry at a minimum 2:1 compensation ratio. The compensation stands of blackberry will be sited on the nearest suitable land controlled by MID or on nearby alternative land on which MID has acquired a conservation easement acceptable to CDFW. Compensation sites will be chosen to avoid any loss of existing natural wetland communities. Annual monitoring of the compensation stands will be conducted to determine whether tricolored blackbirds are using the compensation habitat. If no evidence of use has been found after 5 years of monitoring, MID will be required to plant additional blackberry at a minimum 1:1 compensation ratio on other lands under MID control within Stanislaus County where no active episodic human disturbance would preclude tricolored blackbirds from settling and nesting in the compensation habitat.

MM-BR-1e. Western Pond Turtle

Adverse effects on western pond turtle will be mitigated as follows:

- During dewatering of any canal suitable for western pond turtle, the applicant will retain a qualified biologist to monitor the dewatering and salvage any stranded western pond turtles that are observed. Salvage will be conducted by net, and all individuals will be relocated to a portion of the associated canal at least 500 feet downstream of the nearest boundary of the project site that has at least 300 linear feet of continuous aquatic habitat. Any non-native turtles (for example, red-eared slider [*Trachemys scripta elegans*]) that are salvaged will not be released to the wild. The applicant will consult with CDFW in regard to the disposition of these latter individuals.
- When removing the top 12 inches of soil from any relatively undisturbed edge habitat on or near the project site (ungraded road shoulders and field edges that could provide potential egg-laying sites), the applicant will use a qualified biologist as a spotter whose responsibility is to watch for western pond turtle eggs or neonates that are overturned during earthmoving. If eggs or neonates are found, all earthmoving activities within 30 feet of the eggs or neonates will be temporarily halted until the eggs or neonates can be salvaged. The eggs or neonates will then be delivered to a nearby qualified wildlife rescue and rehabilitation facility that has been approved by CDFW. The eggs or neonates will be held by the wildlife rescue and rehabilitation facility until they are ready for release into downstream portions of the associated canals (at least 500 feet downstream from the nearest project boundary). Once the top 12 inches of soil have been removed, no further monitoring for western pond turtle eggs or neonates is required given that western pond turtle nests are shallow (less than 6 inches deep).

MM-BR-1f. California Tiger Salamander and Western Spadefoot

Adverse effects on CTS will be mitigated as follows:

- Concentrations of small mammal burrows and other suitable refugia that may support CTS will be avoided to the extent feasible. Prior to ground disturbance, linear routes will be mapped, marked in the field, and surveyed for burrows. Burrows within a vehicle access route that cannot be avoided and are susceptible to being crushed will be temporarily reinforced with polyvinyl chloride pipe or by other measures deemed effective by a qualified biologist before allowing vehicle access (dry season only). Any reinforcing materials will be removed immediately after access is completed.
- Prior to any work within a project site with suitable CTS habitat or within 1 mile of suitable CTS habitat (or within 2 miles of known CTS occurrences where there is contiguous suitable habitat between the project and occurrence), a one-way exclusion fence will be installed before winter (prior to October 15) of the planned year of construction. The exclusion fence around the project site will remain in place for the duration of the project. A qualified biologist will survey and delineate the fence route and be present during fence installation. Exit funnels or other appropriate exit structures for CTS will be provided no more than 60 feet apart along the entire fence alignment.

The exclusion fence will be routinely inspected for repair for the duration of construction. Any damage, such as holes or gaps, will be repaired immediately.

- CTS found within a project site will be captured by hand, contained in a 2-gallon plastic bucket with lid, and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, or under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation).
- Prior to any disturbance of potentially suitable aquatic CTS breeding habitat, a qualified biologist will conduct presence/absence surveys within the habitat in accordance with the *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander October* (USFWS and CDFG, 2003).
- Before the start of work each morning within the CTS exclusion fence, a qualified biologist will check for CTS under equipment and materials that are to be moved that day. The qualified biologist will also check all excavated steep-walled holes or trenches for CTS. CTS will be removed by the qualified biologists and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, or under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation).
- A 10-mile-per-hour speed limit will be enforced at all project sites, except on roads with a posted speed limit. On roads with posted speed limits, construction traffic will be limited to the minimum safe speed.
- If dead or injured CTS are found, the qualified biologist will consult with USFWS and CDFW to determine which, if any, additional protection measures will be implemented. These measures may include, but are not limited to, lower traffic threshold, more intensive monitoring, or controlled arrival and departures of construction traffic.

Implementation of the above measures that address CTS also apply to western spadefoot and will also mitigate and compensate for potential adverse effects on this species within and adjacent to project sites.

MM-BR-1g. Northern California Legless Lizard

Adverse effects on northern California legless lizard will be mitigated as follows:

- A preconstruction survey to identify suitable habitat for northern California legless lizard will be conducted no more than 30 days before initial ground-disturbing activities at a project site.
- When removing the top 12 inches of soil from any construction activity area that has previously been identified as potentially suitable habitat for northern California legless lizard, the applicant will use a qualified biologist as a spotter whose responsibility is to watch for individuals of the species that are overturned during earthmoving. If neonates or adults are found, all earthmoving activities within 30 feet of the legless lizards will be temporarily halted until the individuals can be salvaged. The individuals will then be delivered to a nearby qualified wildlife rescue and rehabilitation facility that has been approved by CDFW. The individuals will be held by the wildlife rescue and rehabilitation facility until they are ready for release back to the project site (upon completion of remediation activities). Once the top 12 inches of soil have been removed, no further monitoring for northern California legless lizard individuals is required. Where suitable habitat for northern California legless lizards and egg-laying by western pond turtles overlaps, both surveys can be conducted concurrently.

MM-BR-1h. Blainville's Horned Lizard

Adverse effects on Blainville's horned lizard will be mitigated as follows:

- Preconstruction visual surveys for horned lizards will be conducted weekly beginning 30 days before initial ground-disturbing activities at any project site where prior evidence of the species has been obtained. All horned lizards found within and out to 50 feet from the project footprint will be captured and released into designated relocation areas approved by a qualified biologist.
- "Coverboards" will also be used to capture horned lizards. Coverboards will consist of untreated plywood at least 4 feet by 4 feet. Coverboards will be placed flat on the ground at least 30 days before construction and checked once a week. Captured horned lizards will be placed immediately into 5-gallon buckets containing sand and kept at a constant cool temperature. Horned lizards will be released in designated relocation areas no more than 1 hour after capture.
- During all initial grading activities (first 12 inches of soil), a qualified biologist will be present as a spotter to salvage any horned lizard that may be excavated or unearthed with native material. If the individuals are in good health, they will be immediately relocated to the designated relocation area. If they are injured, the individuals will be held by a local wildlife rescue and rehabilitation facility until they are ready for release back to the project site (upon completion of all construction and related activities).

MM-BR-1i. Vernal Pool Invertebrates

Adverse effects on federally listed and other special-status vernal pool invertebrates will be mitigated through formal consultation with USFWS, with the likely consulting federal agency being the USACE. In the event of no federal nexus, the District will coordinate directly with USFWS through Section 10 of the FESA. USACE's guidelines for formal consultation and mitigation approach include the following (this approach will also be followed as appropriate as part of potential direct coordination with USFWS through the federal Section 10 process):

- The precise location of the project site clearly delineated on either an original or high-quality copy of a USGS topographic map (exact scale, 7.5-minute, 1 inch = 24,000 inches). The map should include quad names; county name; project name; type of project by category (specify development or other); and townships, ranges, and sections in which the project is located.
- Detailed maps of the proposed project site should include the following:
  - Potential habitat of listed vernal pool plants and invertebrates (vernal pools, swales, and other areas in which water ponds in winter and spring)
  - On-site and adjacent properties where vernal pool complexes cross the property boundary
  - Other special-status species locations and habitats
  - Locations of any proposed on-site reserves
  - Locations of all proposed project features (buildings, roads, parking lots, bike trails, hiking paths, fences, irrigated and non-native landscaped areas, detention basins, recreation fields, parks, and any other open spaces)
  - Locations of existing infrastructure within proposed reserves, such as power lines, easements, pipelines, or any other underground structures for which access and maintenance privileges exist
  - Spatial buffers between the project features and avoided vernal pool resources
  - Watershed boundaries of wetlands, both avoided and affected, to assist in evaluation of indirect effects
- Areas (in acres) directly and indirectly affected by the proposed project, including the following:

  - Total area of the project
  - Estimated area of listed vernal pool species habitat filled or destroyed, including effects of interrelated and interdependent actions
  - Estimated area of habitat of listed vernal pool invertebrates indirectly affected, and estimated size of buffer between the project features and adjacent avoided or preserved areas
  - Land use of properties adjacent to both affected areas and avoided or preserved areas
  - Map or discussion describing hydrological relationships of both affected and avoided wetlands with adjacent properties
- Any conservation plan or conservation measures that the applicant proposes. To expedite consultation, such plans and measures should be developed during the informal consultation process with USFWS, before initiation of formal consultation, and should include the following:
  - Specific provisions for endowments for future management, maintenance, and ownership of any vernal pool reserves included in the conservation proposal
  - Specific locations and construction methods for any compensatory wetlands
  - Monitoring protocols, success criteria, and remediation protocols for any compensatory wetlands
- A survey is required for any listed vernal pool plants if the proposed project is within the range of such species. If presence of listed invertebrates is not assumed, and the proposed project occurs in an area where USFWS does not assume presence of listed invertebrates in the watershed, protocol surveys are necessary.
- In coordination with the requirements of any formal consultation regarding federally listed vernal pool invertebrates, MID will implement measures consistent with the formal consultation and Draft *Vernal Pool Mitigation and Monitoring Guidelines for U.S. Army Corps of Engineers South Pacific Division* (USACE, 2016) for compensatory mitigation projects involving vernal pool habitats as required for processing of Department of the Army permits under Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act.

MM-BR-1j. Valley Elderberry Longhorn Beetle

Adverse effects on valley elderberry longhorn beetle will be mitigated consistent with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (Desmocerus californicus dimorphus) (USFWS, 2017). The framework provides specific detail and guidance for the implementation of mitigation. Mitigation measures in the framework include the following:

- Avoidance and minimization measures
- Transplanting of elderberries
- Monitoring
- Compensatory mitigation measures

MM-BR-1k. Tree-Roosting Bats

Adverse effects on tree-roosting bats (that is, western red bat [*Lasiurus blossevillii*] and hoary bat [*Lasiurus cinereus*]) will be mitigated as follows:

- A qualified biologist will conduct a survey for tree-roosting bats at all suitable roosting habitat within 120 feet of the project boundaries. The survey will consist of the following: (1) daytime visual searches for individuals roosting in the foliage of on-site or adjacent large trees; and (2) evening Anabat or similar bioacoustic equipment surveys to show presence of foraging individuals. The surveys will be conducted on 2 consecutive days/nights during the 7 days before construction during months when these species may be present in the project area (that is, March 1 to October 15).

- If the survey determines that individuals are present in on-site or adjacent roosting habitat (that is, riparian woodland, orchards, or other nearby mature trees), no construction activities that result in fugitive noise, vibration, light, or dust will occur within 120 feet of the roost site while it is occupied.
- Ongoing evening surveys will be continued until 2 consecutive nights without any nearby detections have occurred (other than during the pupping season) and will then be terminated. Construction must then start within the next 2 days.
- No additional evening surveys will be required at occupied sites and their 120-foot setback that are found during the pupping season (May 15 to July 15). Construction activities at such sites will be avoided until after mid-July. Construction must then start within the next 2 days.
- All project night-lighting will be shielded and directed away from suitable roosting habitat.

MM-BR-1l. Non-Tree-Roosting Bats

Adverse effects on non-tree-roosting bats will be mitigated as follows:

- A qualified biologist will conduct a survey for evidence of non-tree-roosting bats at constructed structures on site or within 100 feet of project boundaries (including bridges).
- On-site day roosts will be avoided while the bat colony is present. A qualified biologist will assess when such roosts have been abandoned for the winter (typically early September to late March). Removal, demolition, or reconstruction of structures can then proceed once cleared by the biologist.
- Work will not occur within 100 feet of an active roost. Airspace access to and from the occupied structure should remain unchanged. Combustion equipment, such as generators, pumps, and vehicles, will not to be parked or operated under or adjacent to the structure. Personnel will not be present near the colony, especially during the evening exodus.
- Where work must occur in the area of a seasonal colony, bats will be excluded from directly affected work areas before April 15 of the construction year. Exclusion will be done selectively and only to the extent necessary to prevent morbidity or mortality to the colony. Expandable foam or other acceptable methods will be used for exclusion. Exclusionary devices will be removed between August 31 and April 15, once construction is complete. Airspace access to and from the bridge will not to be eliminated. Colony ventilation and protection will remain the same. Clearing and grubbing will be minimal, whenever possible. Combustion equipment, such as generators, pumps, and vehicles, will not be parked or operated under or adjacent to the structure unless they are required to be in contact with the structure. The presence of personnel directly adjacent to the colony will be minimized.
- Where work must occur in the area of a seasonal colony, and the work requires either permanent demolition or substantial change of the structure, MID will consult with CDFW (for all bats) and USFWS (for federally listed species) with regard to construction, placement, and operation of temporary or permanent replacement habitat and monitoring. Such replacement habitat and monitoring will be consistent with the guidelines in California Department of Transportation's *California Bat Mitigation Techniques, Solutions, and Effectiveness* (2004).

MM-BR-1m. American Badger

Adverse effects on American badger will be mitigated as follows:

- A preconstruction survey to identify suitable habitat for American badger will be conducted no more than 30 days before initial ground-disturbing activities at a project site.
- If the preconstruction survey determines that the project site supports potentially suitable habitat for American badger, the applicant will conduct preconstruction surveys for dens, burrows, or other subterranean structures (potential dens) that could be occupied by the species. The preconstruction surveys will be conducted within no fewer than 14 days and no more than 30 days before the beginning of ground disturbance or construction activities. Appropriate exclusion zones around

potentially occupied subterranean habitat will then be observed where feasible as follows until there is evidence of no continued use:

  - Potential den – 50 feet
  - Atypical den – 50 feet
  - Known den – 100 feet
  - Natal/pupping den – 200 feet

- Where infeasible to use an exclusion zone, limited destruction of potential dens will be conducted. Destruction of potential dens will be accomplished by careful excavation until it is certain that no American badgers are inside. The potential dens will be fully excavated, filled with dirt, and compacted to ensure that individuals cannot re-enter or use the den during the construction period. If at any point during excavation, an individual is discovered inside the den, the excavation activities will cease immediately, and the den will be monitored. Destruction of the den will be completed when, in the judgment of the biologist, the individual has escaped, without further disturbance, from the partially destroyed den. Destruction of any known or natal/pupping den requires authorization from CDFW.
- Other applicable mitigation measures that address potential adverse effects on American badger include the following:
  - Project-related vehicles will observe a daytime speed limit of 20 miles per hour throughout the site in all project areas, except on county roads and state and federal highways. Nighttime construction will be minimized to the extent possible. However, if construction does occur during nighttime, the speed limit will be reduced to 10 miles per hour. Offroad traffic outside of designated project areas will be prohibited.
  - To prevent inadvertent entrapment of American badgers or other animals during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen fill or wooden planks will be installed. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If at any time a trapped or injured American badger is discovered, CDFW will be immediately contacted.
  - All food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in securely closed containers and removed at least once a week from the project site.
  - No firearms will be allowed on the project site.
  - No pets, such as dogs or cats, will be permitted on the project site to prevent the harassment or mortality of American badgers, or destruction of their dens.
  - Use of rodenticides and herbicides in project areas will be restricted. This restriction is necessary to prevent primary or secondary poisoning of individuals and the depletion of prey populations on which they depend. If uses of such compounds is necessary, workers will observe labels and other restrictions mandated by the Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation. Additional project-related restrictions deemed necessary by CDFW and USFWS will be observed. If rodent control must be conducted, zinc phosphide will be used because of its proven lower risk to American badger.
  - In the case of trapped animals, escape ramps or structures will be installed immediately to allow the animals to escape, or CDFW and USFWS will be contacted for guidance.

MM-BR-1n. Sanford's Arrowhead

Adverse effects on Sanford's arrowhead will be mitigated as follows:

- No less than 25 percent of the potentially affected plugs (1 foot by 1 foot by 1 foot), with no fewer than three individual Sanford's arrowhead plants per plug, will be transplanted to an unlined portion of the occupied canals located immediately downstream from the project boundaries. The plug source locations will be selected randomly to ensure the greatest potential genetic diversity of the plants.
- The transplantation program will not be bound by any survivorship monitoring standards given that it is expected that some of the source population will be unaffected by the project. However, the applicant will monitor the transplanted Sanford's arrowhead to evaluate the efficacy of such transplantation as it relates to future mitigation efforts for this species. Monitoring will occur for 3 consecutive years after transplantation, and a final report will be submitted to CDFW by October of the final year of monitoring.

MM-BR-1o. Other Special-Status Plant Species

Adverse effects on other special-status plants will be mitigated consistent with the *Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants* (CNPS, 1998) and will be accomplished through conference and coordination with CNPS. CNPS endorses the following measures:

- Avoiding the impact altogether by not taking a certain action
- Minimizing the impact by limiting the degree or magnitude of the action
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the project
- Compensating for the impact by replacing or providing substitute resources or environments elsewhere

Multiple measures may be necessary to effectively mitigate adverse effects on a given plant species but will always be at the discretion of MID as long as the measures can be reasonably expected to avoid, minimize, or compensate for the anticipated effects.

MM-BR-2. Wetland and Riparian Habitats

Wetlands identified as being potentially adversely affected by the construction of various project facilities under the Proposed Program would be field-delineated, and waters and wetland delineations would be verified by USACE. All jurisdictional determinations would be made as part of a formal delineation process, including information necessary to support a CWA 404(b)(1) analysis. Final determination of jurisdictional status and associated project impacts on such jurisdictional waters and wetlands would be determined by USACE, the Central Valley Regional Water Quality Control Board, and CDFW.

Mitigation for unavoidable impacts on wetlands would be determined following USACE's *12501-SPD Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios* (USACE, 2017) as well as USACE's Final *2015 Regional Compensatory Mitigation and Monitoring Guidelines* (USACE, 2015). Mitigation measures will include one or more of the following:

- Obtaining credits from a mitigation bank
- Making a payment to an in-lieu fee program that would conduct wetland restoration, creation, enhancement, or preservation activities
- Wetland restoration, establishment, enhancement, and/or preservation activities within the same watershed as the project impacts (off-site mitigation) where on-site mitigation would not be possible

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3.5 Cultural and Tribal Cultural Resources

This section describes the regulatory and environmental settings of cultural and tribal cultural resources in the Program Area, and evaluates potential impacts that could result from implementation of the Proposed Program.

3.5.1 Regulatory Setting

This section describes the applicable guidelines and regulations for evaluating potential cultural and tribal cultural resources impacts and mitigation.

3.5.1.1 Federal

The implementation of the Proposed Program is not considered a federal action and does not possess a federal nexus; therefore, federal regulations are not applicable to the Proposed Program. If the Proposed Program becomes a federal action (including the acquisition of required federal permits), the following federal guidelines and regulations would apply within the Program Area.

National Historic Preservation Act

The protection of historic properties is governed by several federal laws and regulations, including the National Historic Preservation Act (NHPA) (1966). Section 106 of the NHPA states that federal agencies must take into account the effect of the undertaking on a historic property, which includes any prehistoric or historic district, site, building, structure, or object that is included in, or eligible for, inclusion in the National Register of Historic Places (NRHP), as defined in 36 CFR 800.

Under Section 106 of the NHPA, there is an adverse effect when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects may also include reasonably foreseeable effects caused by the undertaking that may occur later, be further removed in distance, or are cumulative.

The preservation of historic properties became national policy first with the passage of the Antiquities Act of 1906. The Historic Sites Act of 1935 continued the goal of preserving historic properties, with the NHPA being passed in 1966. The NRHP was established as part of the NHPA.

Cultural resources include prehistoric and historic archaeological sites, districts, and objects; standing historic structures, buildings, districts, and objects; locations of important historic events; and sites of traditional or cultural importance to Native Americans (tribal cultural resources are described further below). The criteria used to evaluate cultural resources for the NRHP as historic properties are provided in 36 CFR 60 and in the following list. A resource must meet one or more of the following criteria to be considered for eligibility:

- Be associated with events that have made a significant contribution to the broad patterns of history (Criterion A)
- Be associated with the lives of persons significant to our past (Criterion B)
- Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic values; or represent a significant and distinguishable entity whose components might lack individual distinction (Criterion C)
- Have yielded, or have the potential to yield, information important to prehistory or history (Criterion D)

Generally, cultural resources must be 50 years old to be eligible for the NRHP, but those that have achieved significance within the past 50 years may be eligible under Criteria Consideration G if it is of exceptional importance.

In addition to meeting one or more of these criteria, a resource must retain integrity to be considered a historic property. Integrity is the authenticity of the physical identity, as evidenced by the survival of characteristics that existed during the resource's period of significance. Historic properties must retain enough of their historic character or appearance to be recognizable and to convey the reasons for their significance. The seven aspects of integrity presented in 36 CFR 60 are location, design, setting, materials, workmanship, feeling, and association.

Native American Grave Protection and Repatriation Act of 1990

The Native American Grave Protection and Repatriation Act of 1990 includes provisions for the return of Native American remains and associated funerary objects to Native American tribes or known lineal descendants that are discovered as part of a federal action.

3.5.1.2 State

California Environmental Quality Act Guidelines

A historical resource is a resource listed in, or determined to be eligible for listing in, the NRHP and California Register of Historical Resources (CRHR). Additionally, historical resources, as defined in §15064.5 of the CEQA Guidelines, and included as such in a local register or deemed significant pursuant to criteria set forth in PRC §5024.1(g), are presumed to be historically or culturally significant for purposes of this section, unless the preponderance of evidence demonstrates that the resource is not historically or culturally significant. The fact that a resource is not listed in or determined to be eligible for listing in the CRHR, not included in a local register, or not deemed significant pursuant to criteria set forth in PRC §5024.1(g) shall not preclude a lead agency from determining whether the resource may be a historical resource. A historical resource that has lost its historic character or appearance and is not eligible for the NRHP still might have sufficient integrity to qualify for listing in the CRHR if it maintains the potential to yield significant scientific or historical information or specific data.

Section 7052 of the Health and Safety Code

The Health and Safety Code establishes a felony penalty for mutilating, disinterring, or otherwise disturbing human remains, except by relatives. Penal Code §622.5 provides misdemeanor penalties for injuring or destroying objects of historical or archaeological interest located on public or private lands, but specifically excludes the landowner. PRC §5097.5 defines the unauthorized disturbance or removal of archaeological, historical, or paleontological resources located on public lands as a misdemeanor.

California Assembly Bill 52

With the introduction of California Assembly Bill (AB) 52 on September 27, 2016, CEQA adopted modifications to Appendix G of the CEQA Guidelines to address tribal cultural resources. According to AB 52, any project with an effect that may cause a substantial adverse change in the significance of tribal cultural resources, as defined below, is a project that may have a significant effect on the environment.

Tribal cultural resources are defined as follows:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either determined to be eligible for inclusion in the CRHR or are included in a local register of historical resources, as defined in PRC §5020.1(k) and PRC §21074.
- A resource determined by the lead agency, at its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC §5024.1(c). As an example, a cultural landscape that meets the criteria of subdivision is a tribal cultural resource to the extent that the landscape is

geographically defined in terms of the size and scope of the landscape, a historical resource, a unique archaeological resource, or a "non-unique" archaeological resource, as defined in PRC §21084.1 and §21083.2.

In addition, AB 52 provides specific guidelines regarding tribal consultation and states that the lead agencies shall do the following:

- Provide information to Tribal governments early in the project planning process, to identify and address potential adverse impacts on tribal cultural resources.
- Conduct consultation with any California Native American tribe that requests consultation and is culturally and traditionally affiliated with the geographic area of a proposed project. According to PRC §21080.3.1, this consultation shall occur prior to the determination of whether a negative declaration, mitigated negative declaration, or environmental impact report is required for a project.
- Recognize that Native American prehistory, history, archaeology, cultural, and sacred places are essential elements in tribal traditions, heritages, and identities.
- Establish mitigation measures for tribal cultural resources that adhere to mitigation measures for historical and archaeological resources of preservation in place, if feasible.
- Recognize that Native Americans may have expertise regarding their tribal history and practices that concern the tribal cultural resources with which they are traditionally and culturally affiliated.

California Register of Historical Resources

As provided in PRC §5020.4, the California Legislature established the CRHR in 1992. The CRHR is used as a guide by state and local agencies, private groups, and citizens to identify historical resources that warrant protection, to the extent prudent and feasible, from substantial adverse change. The CRHR, as instituted by the PRC, automatically includes all California properties already listed in the NRHP. The CRHR also includes the following: those properties formally determined to be eligible for listing in the NRHP (Categories 1 and 2 in the State Inventory of Historical Resources), specific listings of the State Historical Landmarks and State Inventory of Historical Resources, and specific listings of State Historical Landmarks and State Points of Historical Interest. The CRHR may also include various other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historical resources
- Resources that contribute to a historic district
- Resources identified as significant in historical resource surveys
- Resources with a significance rating of Category 3 through Category 5 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP; Category 5 indicates a property with local significance.)

A resource can be eligible for listing in the CRHR if it also meets one of the following criteria:

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

Similar to the NRHP, eligible resources must also retain a sufficient amount of their historic integrity to be considered a historical resource and eligible for listing in the CRHR.

The CRHR generally follows the lead of the NRHP in using a 50-year threshold. A resource is usually considered for its historical significance after it reaches the age of 50 years, unless it possesses exceptional significance. This threshold is not absolute but was selected as a reasonable period after which a professional evaluation of historical value and importance can be made.

3.5.1.3 Local

Stanislaus County

The Conservation/Open Space Element of the *Stanislaus County General Plan* recognizes the importance of cultural resources on lands over which it has jurisdiction and outlines goals, policies, and procedures for managing these resources (Stanislaus County, 2016b). The goal and associated policies included in the *Stanislaus County General Plan* regarding cultural and tribal cultural resources that are relevant to the Proposed Program are as follows:

Goal Eight: Preserve areas of national, state, regional, and local historical importance.

- Policy Twenty-Four: The County will support the preservation of Stanislaus County's cultural legacy of archeological, historical, and paleontological resources for future generations. Landmarks of historical consequence not only include old schoolhouses and covered bridges, but also such sites as Native American burial grounds, cemeteries, pottery, rock carvings, and rock paintings. Normally, "sensitive" areas are often located near natural watercourses, springs or ponds, or on elevated ground. However, due to the silt build-up in the valley and the meandering of rivers, archaeological and historical sites may be found in unsuspected areas.
  - Implementation Measures
    - The County shall work with the County Historical Society, and other organizations and interested individuals to study, identify, and inventory archeological resources and historical sites, structures, buildings, and objects.
    - The County will cooperate with the State Historical Preservation Officer to identify and nominate historical structures, objects, buildings, and sites for inclusion under the NHPA.
    - The County shall utilize the CEQA process to protect archaeological or historic resources. Most discretionary projects require review for compliance with CEQA. As part of this review, potential impacts must be identified and mitigated.
    - The County shall make referrals to the Office of Historic Preservation and the Central California Information Center as required to meet CEQA requirements.
    - The County will work with all interested individuals and organizations to protect and preserve the mining heritage of Stanislaus County.
- Policy Twenty-Five: "Qualified Historical Buildings" as defined by the State Building Code shall be preserved.
  - Implementation Measures
    - Whenever possible, the County Building Permits Division shall utilize the provisions of the State Building Code that allow historical buildings to be restored without damaging the historical character of the building.
    - The County shall continue to utilize the Historical Site zone in Knight's Ferry and La Grange to protect the historical character of the communities.

Stanislaus County Zoning Ordinance

Chapter 21.44 of the Stanislaus County Zoning Ordinance establishes a Historical Site District to "support and enhance the character of historical areas within the County" and recognize that historic structures are a finite resource produced in another time and worthy of special consideration (Stanislaus County, 1993).

City Ordinances and Policies

City ordinances and policies do not apply to unincorporated lands under Stanislaus County jurisdiction; however, some of the projects implemented as part of the Proposed Program would fall within the City jurisdictions of Modesto, Riverbank, and Waterford. The following summaries describe ordinances, policies, and methods for protecting and preserving historical resources that are implemented by the individual cities where projects may occur within the Program Area.

City of Modesto

The City of Modesto Municipal Code, Chapter 10.04, Designation of Modesto Landmark Preservation Site allows the designation of properties as historic landmarks (City of Modesto, 2020a). The City's Landmark Preservation Commission is responsible for finding that a proposed landmark has special historical, architectural, archaeological, engineering, or cultural significance to the community, and that its designation as a landmark conforms to the goals and policies of the General Plan. In making its findings, the Landmark Preservation Commission considers the following factors regarding a proposed landmark:

- That the location and setting is compatible with future preservation and use.
- That the physical condition is such that preservation, maintenance, or use is economically feasible.
- That the distinguishing characteristics of significance are, for the most part, original and intact or capable of restoration.
- That the existing or proposed use is compatible with the preservation and maintenance of the site.

City of Riverbank

The City of Riverbank's Conservation and Open Space Element in the *2005-2025 General Plan* includes goals to maintain historical resources and minimize negative impacts on archaeological resources, including the permanent protection of Native American cultural and archaeological sites from urban development (City of Riverbank, 2009).

City of Waterford

The *City of Waterford General Plan Vision 2025* Open Space and Conservation Chapter contains goals and policies for the development and maintenance of public and private open space areas in the city. The chapter also addresses the approaches for preserving the city's soil, water, wildlife, air, energy, and historic/cultural resources, and for conserving its other natural resources (City of Waterford, 2007).

3.5.2 Environmental Setting

Stanislaus County is a generally rural, agricultural county with a population density of 369.6 people per square mile; the state average is 253.7 people per square mile (U.S. Census Bureau, 2020). Most of the county is designated for agricultural uses.

The Program Area is in a predominantly agricultural setting with few residences, where natural habitats have been largely displaced by agricultural and associated activities, such as row crops and orchards. As depicted on historical maps, flood events have caused changes in the terrain and in the courses of streams, creeks, and other waterways. The Proposed Program is located within Stanislaus County, which spans three geomorphic provinces (Great Valley, the Coast Ranges, and the Sierra Nevada Geomorphic

Provinces) (Stanislaus County, 2016c). The largest area of the county is in the San Joaquin Valley portion of the Great Valley Geomorphic Province (commonly referred to as the Central Valley), which is bordered by the Sierra Nevada Mountains to the east and south, the Coast Ranges to the west, and the Klamath Mountains to the north (CGS, 2002). This province consists of a deep, sediment-filled, asymmetric structural trough that extends more than 400 miles from north to south and averages 50 to 80 miles wide. The trough has been filled with a thick sequence of predominantly alluvial sediments ranging in age from Jurassic to Recent (SACOG, 2012). The San Joaquin Valley makes up the southern part of the Central Valley, drained ultimately by the San Joaquin River flowing toward the Sacramento-San Joaquin Delta.

3.5.2.1 Cultural Context

In Central California, cultural resources minimally represent 12,000 years of prehistory. Archaeologists have reconstructed general trends of prehistory in the Central Valley of California (Rosenthal et al., 2007). Since the first inquiry regarding Native American cultural groups, numerous classifications and chronological models have been created for California. For Central California, the classification for three cultural horizons for this region was incorporated as part of the Central California Taxonomic System. Below is a summary of the cultural periods within the Program Area.

Prehistoric and Ethnographic Background

The earliest sites in Central California are Fluted Point Tradition and Western Pluvial Lakes Tradition sites at Tracy, Tulare, and Buena Vista Lakes. These sites are few in number and remain undated by scientific means, but the assemblage types indicate probable ages of 11,500 to 7,500 years (Moratto, 2004). For the entire Central Valley region, there exists to date only three known sites from the early Paleoindian Period (CEC, 2010). Overall, evidence for Paleoindian occupation in the Central Valley is currently limited and has many gaps. The archaeological record requires additional data to better ascertain this chronological sequence.

The Proposed Program is in the territory associated with the ethnographic Yokuts, who are unique among Native Californians in that they were divided into true tribes. Each tribe had a unique name, a distinctly different dialect, and a defined territory (Kroeber, 1925). The Yokuts' language is a member of the California Penutian stock that includes four other groups found in Central California: Miwok, Costanoan, Maiduan, and Wintuan. Yokuts were divided into three groups: Southern Valley Yokuts, Northern Valley Yokuts, and Foothill Yokuts. Specifically, the Proposed Program is situated within the traditional lands of the Northern Valley Yokuts, of whom the least is known. Once Europeans reached the area, the Northern Valley Yokuts rapidly disappeared as a result of disease, missionization, and, most significantly, the gold rush.

The Yokuts comprised some 60 or more tribal groups that lived throughout interior Central California and traded with each other and other groups west of the Coast Ranges and east of the Sierra Nevada crest. Economic subsistence was based on the acorn, with substantial dependency on gathering and processing wild seeds and other vegetable foods. The rivers, streams, and sloughs that formed a maze within the Valley provided abundant food resources such as fish, shellfish, and turtles. Large game, waterfowl, and small mammals were trapped and hunted to provide protein in the diet.

Historical Background

Recorded history in Central California can be divided into three periods: the Spanish Period (1769-1821), Mexican Period (1821-1848), and American Period (1848-present).

Spanish Period

The Spanish period spans 1769 to 1822, beginning with the founding of the first mission, the Mission San Diego de Alcala, in 1769. The first recorded exploration of the southern San Joaquin Valley was in 1772, by Pedro Fages, whose written record describes the valley as "a labyrinth of lakes and tulares in the middle of a great plain" (Wedel, 1941).

Population shifts, prompted by the eastward retreat of Indians closer to the missions, forced adjustments in territorial boundaries, with concomitant movement into the eastern foothills. By the early 1820s, mission expansion in California ended as a result of Mexico's independence from Spain. It was also during this time that fur trappers discovered the California interior and began their forays into the San Joaquin Valley. Jedediah Smith might have been the first to enter the Central Valley during a fur trapping expedition in 1827. Smith's adventures included friendly encounters with the Southern Yokuts near the Kings River, and trapping and camping along the San Joaquin River. No missions were founded in Stanislaus County during the Spanish period, and overall, there was little settlement and exploration of the area by the Spanish (Wedel, 1941).

Mexican Period

In 1821, Mexico achieved independence from Spain. The years following independence saw the privatization of mission lands in California with the passage of the Secularization Act of 1833, which enabled Mexican governors in California to distribute mission lands to individuals as land grants. During this period, five land grants were established in Stanislaus County: Orestimba, El Pescadera, Rancho del Puerto, Rancheria del Rio Estanislao, and Thompson's Rancho. These grants spanned in size from 13,000 to 48,000 acres and were mostly concentrated along the San Joaquin and Stanislaus Rivers (State Lands Commission, 1982). War between the United States and Mexico led to the transfer of Alta California to the United States with the signing of the Treaty of Guadalupe Hidalgo in 1848.

American Period

John Marshall's gold discovery in January 1848 triggered the migration boom of thousands of eastern United States and European settlers to California. During the 1850s, settlement increased in the Central Valley after settlers realized they could make a better living supplying mining camps with meat, horses, and other products than by mining.

The San Joaquin Valley developed into a significant farming and ranching region, and by 1850, it was a major agricultural producer within the new State of California. The Homestead Act was passed by Congress in 1862, and it involved the transfer of 160 acres of open public land to any American that filed for a land patent and satisfied the act's requirements. These requirements consisted of the applicant being head of household, over 21 years old, making land improvements, occupying the property for 5 consecutive years, and paying $1.25 per acre. This act further encouraged western expansion and settlement in the valley.

Stanislaus County was a part of Tuolumne County until 1854 when Tuolumne was divided into two counties, and in 1860, a triangular portion of San Joaquin County was annexed to Stanislaus County (Stanislaus County, 2019). Early settlement in the County was primarily concentrated in the foothills of the Sierra Nevada and the three rivers in the area. Some communities started as mining camps along the Tuolumne and Stanislaus Rivers, and in the 1860s, larger and more permanent settlements developed along the Stanislaus River (Stanislaus County, 2019). As controlled irrigation developed in the Central Valley, the former land grants were broken up into many small farms. Agriculture became increasingly efficient with the advent of improved farm equipment. By 1872, railroads provided access to distant markets. Intensive agriculture depended on flood control and irrigation; impounding Sierra Nevada snowpack-melt water behind dams was critical in this regard (Hohenthal, 1972). The move toward organized irrigation systems began in 1871.

Stanislaus County

Stanislaus County was formed on April 1, 1854, primarily from Tuolumne County, and had a population of fewer than 1,000 people. The county and Stanislaus River were named after the Native American Chief Estanislao (Historic Modesto, 2019). The first substantial explorations of the San Joaquin Valley and the Program Area were led by Gabriel Moraga in 1806. Additional explorations by Moraga occurred in 1808 and 1810, which failed to procure a suitable mission site (Cooke, 1960). The mining boom of the 1850s drove prospectors through the area as a travel corridor to the Sierra Nevada Mountains (Arrington, 2009). Although some settlers remained in the region with small communities springing up alongside waterways, constant floods punctuated with droughts prevented continued occupation. Because of flood damage and destruction, the Program Area does not appear to have maintained long periods of agricultural or farm use.

City of Modesto

The City of Modesto was founded as a railroad town in the San Joaquin Valley. In the late 1860s, the "Big Four" (Collis Huntington, Leland Stanford, Mark Hopkins, and Charles Crocker) announced plans to construct a railroad down the San Joaquin Valley to connect the northern and southern portions of the state (City of Modesto, 2020b). They decided to extend the Central Pacific Railroad but were unable to secure land grants to finance construction as they had for the recently completed Transcontinental Railroad. Instead, land was purchased, then subdivided, and sold. Modesto's original town layout is still visible today: downtown is an approximate 640-acre tract with numbered streets oriented parallel to what is now the Union Pacific Railroad intersected by perpendicular lettered streets (City of Modesto, 2019b).

Modesto Irrigation District

Located in California's Central Valley, the MID was established in July 1887 with the mission to provide electric, irrigation, and domestic water services for its customers. It is one of the oldest irrigation districts in the state still in existence (Caltrans, 2000). The area's reliance on wheat production depleted soil nutrients. In response to shrinking wheat crops and profits, Modesto farmers recognized the need for crop diversification, which led to a need for irrigation, dams, and a canal system.

In 1890, the Tuolumne River was selected as MID's water source, and the District purchased the Wheaton Dam and water rights from Milton A. Wheaton for $10,000 and $21,000, respectively, in bonds (LSA Associates, 2014). Wheaton was a prominent patent lawyer who, in the 1870s, began buying water rights and property for the purpose of starting a private water company to supply water to the farmlands of Modesto (LSA Associates, 2014). Wheaton was unsuccessful in his attempts despite investing a substantial amount of money and time constructing a small canal system and dam. He employed 1,500 people but was only able to bring water a couple of miles south of La Grange. His ultimate goal was to irrigate Modesto's farmlands, but his proposal was rejected by local farmers (LSA Associates, 2014). The Wheaton Dam ultimately served as a starting point for MID's proposed storage reservoir and canal system.

By 1896, the first 9,600 feet of the canal system were completed, taking approximately 5 years to finish. The canal system took lengthy periods to build because tools and earthmoving equipment were inefficient. The main canal was completed and delivering water in June 1903, and some laterals were completed in September 1903. The full system was functioning by 1904 and consisted of 208 miles of a main canal and laterals (LSA Associates, 2014).

Old Don Pedro Dam was built in 1921 to increase water storage capabilities, and the La Grange Dam was raised 18 inches in 1923 to gain better water flow into the canals. However, the earthen canal system in place was inefficient. Earthen canals were subject to erosion, seepage, and evaporation. Starting in 1921, MID began a canal improvement project and began either lining portions of the canal with concrete or converting canals, laterals, and ditches into underground pipelines.

Overall, the District's success was due in part to the establishment of storage reservoirs equipped with hydroelectrical generation facilities that sold power within the District or to local utilities. In 1923, MID delivered electricity to residential, business, and public buildings for the first time, as well as irrigation pumps along parts the canal system. Farmers were expected to be the largest clients for energy because of their use of irrigation pumps and large farming equipment. In 1978, MID merged with Waterford Irrigation District and, in 1994, constructed the Modesto Regional Water Treatment Plant.

3.5.2.2 Known Cultural Resources

Literature Search

A cultural resources records search was conducted by the Central California Information Center (CCIC) of the California Historical Resource Information System (CHRIS). The CCIC contains information related to previously recorded cultural resources within the Program Area, which includes the entirety of Stanislaus County.

A total of 283 previously recorded cultural resources was identified in the Program Area. Of these 283 previously recorded cultural resources, less than 10 percent of these sites are located within a 250-foot-radius search area of the project locations within the Program Area. Table 3.5-1 lists the 21 resources located within the 250-foot-radius search area of the project locations within the Program Area, as well as the eligibility recommendations and determinations completed by previous cultural resources investigators, where available.

Table 3.5-1. Cultural Sites within the Program Area
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Site Number	Site Type	Name/Site Description	Evaluation/Year
P-50-000063	Not available	Passalaqua Residence (Remains)	Not available
P-50-000074	Historic	San Joaquin Pipelines 1 and 2	Recommended Eligible/2007 Recommended Eligible/1996 Unevaluated/1993
P-50-000075	Historic	Lateral 6	Recommended Eligible/2014 Recommended Not Eligible/2007
P-50-000078	Historic	Lateral 4 (Section)	Unevaluated/2009
P-50-000080	Historic	Lateral 3 (Portion)	Recommended Not Eligible/2007
P-50-000505	Historic	Brichetto Lateral, Oakdale Irrigation District	Recommended Not Eligible/2014 Recommended Not Eligible/2007 Unevaluated/1999
P-50-000513	Historic	9th and Needham Street Commercial Area	Recommended Not Eligible/1991
P-50-000550	Historic	La Grange Diversion Dam and Spillway	Recommended Eligible/2016
P-50-001910	Historic	Ciccarelli Road	Not available
P-50-002002	Historic	Modesto Main Canal	Recommended NRHP and CRHR Eligible/2014 Recommended NRHP and CRHR Eligible/2011 Recommended Not Eligible/2004

Table 3.5-1. Cultural Sites within the Program Area
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Site Number	Site Type	Name/Site Description	Evaluation/Year
P-50-002007	Historic	Lateral 7	Recommended Not Eligible/2007
P-50-002008	Historic	Finney Electrical Substation	Not available
P-50-002048	Historic	Hammett Road	Not available
P-50-002058	Historic	Riverbank Lateral	Recommended NRHP and CRHR Eligible/2014 Recommended NRHP and CRHR Eligible/2007
P-50-002180	Historic	PG&E NW-SE Transmission Line Towers	Recommended Not Eligible/2014 Recommended Not Eligible/2014
P-50-002193	Prehistoric	Milling Station with Mortar Cups	Unevaluated/2016
P-50-002199	Historic	La Grange MID Old Canal Discharge Structure	Recommended Not Eligible/2016
P-50-002200	Historic	La Grange MID Old Canal Intake Structure	Recommended Not Eligible/2016
P-50-002206/P-55-009498	Historic	La Grange Reservoir	Recommended Not Eligible/2016
P-50-002290	Historic	Rural Property	Recommended Not Eligible/2014
P-50-002303	Historic	Oakdale Irrigation District Canals and Laterals	Recommended Not Eligible/2014

Source: CHRIS, 2018

Note:

PG&E = Pacific Gas and Electric Company

More than 170 previous cultural resource investigations have been conducted in the Program Area. Of these studies, 30 have been conducted within a 250-foot-radius search area of the project locations within the Program Area. Many of the studies did not include full intensive, systematic cultural resources surveys. Therefore, many additional unidentified cultural resources, including prehistoric and historic archaeological sites, buildings and structures, and other tribal cultural resources may be present within the Program Area. Other known cultural resources might not have been incorporated into the CCIC database.

The CCIC also noted that many canals, laterals, and other historic features shown on the CCIC site record maps have not yet been recorded or evaluated.

Historical Map Review

A General Land Office survey plat for 1854 of the Program Area was provided by CCIC. The plat depicts land surveys resulting in USGS sections; however, little to no land development had yet to be established (GLO, 1854). The significance of General Land Office plats to modern cultural resources management in California is that the plats, which often date to the earliest years of the Gold Rush, record many historic sites and features that were existent in those times. The plats often identify the owners of such sites and features. These sites and features might still be discernible by a professional archaeologist, which potentially enables archaeologists and historians to correlate archaeological features and structures to specific people, dates, and events in history.

Based on this review, it was surmised that prior to extensive development of the irrigation system, the general area included inundated wetlands and rivers, and maps indicate the presence and ubiquity of unnamed creeks throughout the Program Area and its vicinity (GLO, 1854; USGS, 1916a; USGS, 1916b). The 1916 historical Ceres and Waterford USGS maps are the first to show land use in the form of private property, state highways and roads, utilities, railroads, schools, canals, pipelines, and other elements of the county's major communities.

Reconnaissance Survey

A reconnaissance survey was conducted on May 15, 2019, by an architectural historian who meets the Secretary of the Interior's professional qualifications standards. The reconnaissance survey consisted primarily of a built environment "windshield" field review and was completed with the assistance of MID engineers. This reconnaissance visit was conducted to characterize the following:

- Range and distribution of MID-related built environment resources within the Program Area constructed more than 45 years ago
- General setting of the resources and environs
- Current conditions of several capital improvement project locations (to better ascertain the types of project changes that may occur)

The primary land use was observed to be agricultural throughout the Program Area, with suburban and urban development concentrated in the central portion of the Program Area along State Route 99. The western and eastern portions of the Program Area are dominated by large agricultural fields and orchards. The eastern boundary of the Program Area includes open spaces and mountainous terrain near the Don Pedro Reservoir. Additionally, railroad features are located within the Modesto area and along the present-day State Route 99 corridor. Evidence of homesteading and older ranching activities was observed throughout the immediate vicinity of the Program Area.

In addition, numerous historic-era irrigation and power-related resources were identified within the Program Area that are associated with MID. These resources included a variety of irrigation property types constructed throughout the early to mid-twentieth century categorized as "major" and "minor" features.

Major Features

- Concrete-lined and unlined canals, laterals, drains, and ditches (for example, Modesto Main Canal, La Grange Canal, MID Lateral)
- Reservoirs (for example, Modesto Reservoir)
- Dams and powerhouses (for example, La Grange Dam)
- Lakes and control towers (for example, Don Pedro)
- Flumes and viaducts (for example, Dry Creek Flume)
- Pipelines

Minor Features

- Flow control devices
- Trash gates, grates, or screens
- Pumping structures
- Gates and drops
- Weirs
- Headboxes and intake structures

Although much of the Program Area is within agricultural, residential, and other use areas, areas remain that have not been subject to development or disturbance. All of Stanislaus County contains a large network of artificial and natural waterways marking the region rich for natural resources and of specific importance to prehistoric land use for Native Americans.

Native American Consultation

The Native American Heritage Commission (NAHC) was contacted on December 18, 2018, to request a Sacred Land File Search identifying information about traditional cultural properties, such as cemeteries and sacred places, as applicable, in the Program Area. A request for Native American Tribal contacts was also included on this form. The NAHC responded on January 7, 2019, stating that a review of the Sacred Lands File Search was conducted, and no Native American cultural resources were reported. A list of Native American tribal contacts interested in consulting on development projects was also provided at this time. Additionally, MID contacted tribal representatives who reached out prior to notification of the Proposed Program and indicated that they wished to be informed of future projects. Each individual and group was contacted on March 13, 2019, with follow-up calls on April 4, 2019, in compliance with AB 52 (PRC §21080.3.1). One response letter was received on March 20, 2019, from the Tuolumne Me-Wuk Tribal Council requesting review of the PEIR and noting the expansiveness of the Program Area. The closing date for requesting participation to consult was April 30, 2019.

3.5.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to cultural and tribal cultural resources. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

3.5.3.1 Thresholds of Significance

The thresholds that were used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts on cultural or tribal cultural resources are considered significant if the Proposed Program would result in any of the following:

- A substantial adverse change in the significance of a historical resource pursuant to §15064.5.
- A substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.
- Disturbance of any human remains, including those interred outside of formal cemeteries.
- A substantial adverse change in the significance of a tribal cultural resource (defined in PRC §21074) listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC §5020.1(k).
- A substantial adverse change in the significance of a tribal cultural resource (defined in PRC §21074), determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC §5024.1(c). In applying the criteria set forth in PRC §5024.1(c), the lead agency shall consider the significance of a tribal cultural resource.

3.5.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is functionally the same as the Existing Conditions related to cultural resources because minimal additional future development is anticipated in the predominantly rural and agricultural areas adjacent to Proposed Program facilities, and no substantial changes to the cultural or tribal cultural resources that exist within the Program Area are anticipated to occur in the future. Therefore, the

following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3. To avoid repetitive text, where an impact analysis applies to more than one project category, the analysis is presented as a single discussion with the relevant components specified.

Cultural and tribal cultural resources include prehistoric and historic archaeological sites; districts and objects; standing historic structures, buildings, districts, and objects; locations of important historic events; sites of traditional and cultural importance to various groups; and sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe. The Program Area has not been subject to a cultural resources inventory as part of this Proposed Program.

A preliminary cultural resources assessment included a literature search with data obtained from the CCIC of the CHRIS at California State University, Stanislaus; a Sacred Land File Search with the NAHC and coordination with Native American tribes; and a reconnaissance survey to characterize the range and distribution of MID-related built environment resources within the Program Area.

It is recognized that additional studies may be required for individual projects included as part of the Proposed Program. During the planning and design phase for future projects and prior to ground-disturbing activities, MID would have a qualified archaeologist and architectural historian conduct a cultural resources inventory of the project locations of a particular facility or group of facilities if there is a potential for the following: ground disturbance in previously undisturbed areas, or alterations to historic-age built environment. In these cases, the qualified archaeologist and architectural historian would make evaluations for cultural resources as determined necessary. The archaeological and architectural resources surveys would include intensive pedestrian surveys to assess potential impacts on cultural resources as determined necessary.

For purposes of this impact assessment, potential impacts from the Proposed Program are organized by project type, analyzing first impacts from the regulating reservoir projects and then all other project types.

3.5.3.3 Impacts Associated with the Proposed Program

Impacts CUL-1 through CUL-4: Substantial adverse change in the significance of a historical resource, archaeological resource, or tribal cultural resources, or disturbance of human remains.

Regulating Reservoirs

Construction of each of the proposed regulating reservoir projects has the potential to modify or affect known cultural resources located in the vicinity of the proposed locations (shown on Figure 2-1). For example, the Modesto Main Canal (P-50-002002), a significant built environment resource determined eligible for listing in the NRHP and CRHR, may be modified as a result of Lateral 6 and 8 Regulating Reservoir. Additionally, review of archival materials and historical maps indicates a high potential for historic-period archaeological resources. Reviews of the records search results, previous work in the Program Area and vicinity, and a historical map check indicate that cultural resources likely to be encountered near the potential locations of the proposed regulating reservoirs are associated with railroad, farming, irrigation, agriculture, and residential activities.

Geological review indicates a moderate to high sensitivity for buried archaeological resources throughout the Program Area. The Sacred Land File Search completed by NAHC did not identify sacred sites within the Program Area; however, there is still a moderate potential to encounter tribal cultural resources because the entirety of the Program Area has not been surveyed. Therefore, implementation of the regulating reservoir projects has the potential to affect significant historic-period archaeological and built

environment resources, tribal cultural resources, or human remains. Impacts on historical, archaeological, and tribal cultural resources, as well as on human remains, would be potentially significant.

Overall, although impacts from construction associated with the proposed regulating reservoirs would have the potential to cause significant impacts on significant cultural resources, the full extent of the projects' design and construction footprints is unknown at this time. Therefore, as these projects are further developed, the District would use the EEC (Appendix A) to help identify potential impacts. If necessary, potentially significant impacts may be mitigated to a less-than-significant level with implementation of MM-CUL-1 through MM-CUL-5 (Section 3.5.4).

All Other Project Types

The individual project sites within the Program Area have not been subject to a cultural resources inventory as part of this Proposed Program. As discussed in Section 3.5.2.2, more than 170 previous cultural resources investigations have been conducted throughout the Program Area. Of these studies, 30 have been conducted within a 250-foot-radius search area of the project locations within the Program Area. However, many of the studies did not include full intensive, systematic cultural resources surveys. Therefore, many additional unidentified cultural resources, including prehistoric and historic archaeological sites, buildings and structures, and other tribal cultural resources may be present within the Program Area where all other project types would occur.

Review of additional background materials, including archival materials, maps, geological data, and NAHC materials, indicate a reasonable potential for additional resources to be present in the Program Area environs. Also, as described in Section 3.5.2.2, 283 previously recorded cultural resources were identified in the Program Area. Of these 283 previously recorded cultural resources, 21 are located within a 250-foot-radius search area of the project locations within the Program Area. As shown in Table 3.5-1, at least 5 of the 21 previously recorded cultural resources have been evaluated as significant and are considered historical resources for purposes of CEQA.

Therefore, construction associated with all other project types would have the potential to affect currently unknown significant historic-period archaeological and built environment resources, tribal cultural resources, and human remains. Impacts on historical, archaeological, and tribal cultural resources, as well as human remains, would be potentially significant.

Overall, although impacts from construction of all other project types would have the potential to cause significant impacts on significant cultural resources, the full extent of the projects' design and construction footprints is unknown at this time. Therefore, as the projects in the Program Area are further developed, the District would use the EEC (Appendix A) to help identify potential impacts. If necessary, potentially significant impacts may be mitigated to a less-than-significant level with implementation of MM-CUL-1 through MM-CUL-5 (Section 3.5.4).

Operations and Maintenance

Operations and maintenance activities associated with implementing the Proposed Program would not involve earthmoving activities, facility removals and upgrades, or other demolition. Regular maintenance activities would be completed as part of the operations of the Proposed Program and may include activities such as vegetation clearance or facility repairs. Such activities are expected to be limited to previously disturbed areas and consistent with ongoing operations and maintenance activities in the Program Area; therefore, operations of the Proposed Program is not expected to affect significant historic-period archaeological or built environment resources, tribal cultural resources, and/or human remains. Impacts from operations and maintenance would be less than significant.

Impact CUL-5: Cause a substantial adverse change to the significance of a tribal cultural resource (defined in PRC §21074), determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC §5024.1(c). In applying the criteria set forth in PRC §5024.1(c), the lead agency shall consider the significance of a tribal cultural resource.

All Project Types

AB 52 requires lead agencies to conduct formal consultations with California Native American tribes during the CEQA process to identify tribal cultural resources that may be subject to significant impacts by a project. Where a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document must discuss the impact and whether feasible alternatives or mitigation measures could avoid or substantially lessen the impact. This consultation requirement applies only if the tribes have sent written requests for notification of projects to the lead agency. Consultation requests were sent via mail to the NAHC- and MID-identified tribal contacts on March 13, 2019, with follow-up calls completed on April 4, 2019. One response letter was received from Tuolumne Me-Wuk Tribal Council.

Although no Native American tribe has presented evidence for the potential presence of a tribal cultural resource, and no tribal cultural resources were identified during the background research completed for the Program Area, such resources may be uncovered during construction activities associated with all project types. Overall, although impacts from construction have the potential to cause significant impacts on tribal cultural resources, the full extent of the projects' design and construction footprints is unknown at this time. Therefore, as the projects in the Program Area are further developed, the District would use the EEC (Appendix A) to help identify potential impacts. If necessary, potentially significant impacts may be mitigated to a less-than-significant level with implementation of MM-CUL-1 through MM-CUL-5.

Operations and Maintenance

Operations and maintenance activities under the Proposed Program would not involve earthmoving activities, facility removals and upgrades, or other demolition. Regular maintenance activities would be completed as part of the operations of the Proposed Program, as described above, and are expected to be limited to previously disturbed areas and consistent with ongoing operations and maintenance activities in the Program Area. Therefore, operations of the Proposed Program are not expected to affect significant tribal cultural resources. Impacts from operations and maintenance would be less than significant.

3.5.4 Mitigation Measures

The following mitigation measures would be implemented to lessen potentially significant impacts on cultural resources and human remains (Impacts CUL-1 through CUL-4) to a less-than-significant level.

MM-CUL-1: Conduct cultural resources inventory.

The Proposed Program could cause a substantial adverse change in the significance of a cultural resource as defined in CEQA Guidelines §15064.5. During the planning and design phase for individual projects and prior to ground-disturbing activities, MID will appoint a qualified Cultural Resources Specialist (CRS) to conduct an inventory of the project locations and make evaluations for cultural resources. The archaeological and architectural resources surveys will consist of intensive pedestrian surveys as necessary to assess impacts on cultural resources when ground disturbance will occur within previously undisturbed areas. The CRS will meet the Secretary of the Interior's professional qualifications standards, as published in 36 CFR 61.

MM-CUL-2: Monitoring Plan.

A qualified CRS will complete a construction monitoring program to be implemented according to recommendations. Monitoring and mitigation include required activities that may prescribe measures to ensure avoidance of resources, or compensate for the loss of significant cultural and tribal cultural resources because of unavoidable impacts resulting from the exigencies of a project's construction. The objectives of monitoring are to protect extant historical resources and unique archaeological resources, to identify at the time of discovery any archaeological materials exposed during ground disturbance, and to protect such resources from damage until recommendations of eligibility for the CRHR can be made.

MM-CUL-3: Conduct cultural resources awareness training.

A qualified CRS will prepare the cultural resources portion of the Worker Environmental Awareness Program, and worker environmental awareness training will be required for all personnel before working at construction sites. The training will emphasize and educate workers regarding sensitivity for cultural and tribal cultural resources on the site and procedures should such resources be encountered.

MM-CUL-4: Protect resources upon discovery.

If cultural resources are discovered during ground-disturbing activities, construction and maintenance work near the discovery would cease, and the area would be protected by a 50-foot buffer until the find could be evaluated by a qualified archaeologist. Mitigation measures recommended by the archaeologist will be implemented, and cultural resource mitigation measures will be consistent with guidance and standards in §15126.4 of the CEQA Guidelines. Protective measures may include avoidance and protection-in-place of the resource, as well as protecting the cultural character and integrity of the resource, protecting the traditional use of the resource, and protecting the confidentiality of the resource.

MM-CUL-5: Protect human remains upon discovery.

If human remains are discovered, the discovery would be treated in accordance with the requirements of §7050.5(b) of the California Health and Safety Code. Pursuant to §7050.5(c) of the California Health and Safety Code. If the coroner determines that the human remains are of Native American origin, Stanislaus County would ensure that the discovery is treated in accordance with the provisions of PRC §5097.98(a) through (d).

3.6 Geology and Soils

This section describes the regulatory and environmental setting related to topography, geology, paleontology, seismicity and other geologic hazards, soils, and geomorphology. This section also evaluates potential impacts on geologic resources and soils associated with implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

3.6.1 Regulatory Setting

This section identifies and describes guidelines and regulations relevant to the evaluation of potential geology and soils impacts. No specific federal regulations apply to the Proposed Program with respect to geology and soils associated with construction or operation activities in the Program Area.

3.6.1.1 State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act became law in 1972. The law prohibits structures for human occupancy from being located across the trace of an active fault and requires that the state geologist delineate earthquake fault zones along faults that are "sufficiently active" and "well defined." Development permits cannot be issued for sites located in an earthquake fault zone until geologic investigations demonstrate that the site is not at risk for surface displacement from future faulting.

Seismic Hazard Mapping Act

Seismic hazards occur as a result of effects of strong ground shaking, liquefaction, landslides, ground failure, or other earthquake-related hazards. Under the Seismic Hazard Mapping Act, these hazards are to be identified and mapped to assist local governments in land use planning.

3.6.1.2 Local

This section describes the goals, policies, standards, and provisions implemented by Stanislaus County and the Cities of Modesto, Riverbank, and Waterford for evaluating potential environmental impacts on geological and soil resources, and their mitigation.

Stanislaus County

The Safety Element of the *Stanislaus County General Plan* (Stanislaus County, 2016b) includes one goal pertaining to geologic and seismic hazards that may be relevant to the Proposed Program:

Goal One: Prevent loss of life and reduce property damage as a result of natural disasters.

- Policy Three: Development should not be allowed in areas that are particularly susceptible to seismic hazard.
  - The County shall enforce the Alquist-Priolo Earthquake Fault Zoning Act.
  - Development in areas of geologic hazard shall be considered for approval only where the development includes an acceptable evacuation route.
  - Development proposals adjacent to reservoirs shall include evaluations of the potential impacts from a seismically induced seiche.

The Conservation/Open Space Element of the *Stanislaus County General Plan* (Stanislaus County, 2016b) also includes a goal pertaining to geologic and seismic hazards that may be relevant to the Proposed Program:

Goal Five: Reserve, as open space, lands subject to natural disaster in order to minimize loss of life and property of residents of Stanislaus County.

- Policy Sixteen: Discourage development on lands that are subject to flooding, landslide, faulting, or any natural disaster to minimize loss of life and property.
  - The County shall enforce the provisions of the Alquist-Priolo Earthquake Fault Zoning Act.
  - Development proposals in an area identified as having unstable soils (bluff, landslide areas in the foothills, etc.) shall include measures for mitigating possible hazards.
  - The County shall enforce the subdivision ordinance requirement for soils reports, which may be required to include a geologic report. Development proposals adjacent to reservoirs shall include evaluations of the potential impacts from a seismically induced seiche.
  - Development proposals shall be reviewed for conformance with all applicable Hazard Mitigation Plans and consistency with policies of the Safety Element.

Stanislaus County Code

Section 14.14.120 of the Stanislaus County Code (Stanislaus County, 2018) requires development of an SWPPP for activities that may result in discharges of stormwater to waterways. In addition, any construction activities that involve soil disturbance must include BMPs for erosion and sediment control. For projects with less than 1 acre of soil disturbance, an erosion and sediment control plan must be submitted to the County.

City of Modesto

The Environmental Resources, Open Space and Conservation Chapter of the *City of Modesto General Plan* (City of Modesto, 2019a) includes policies that may be relevant to the Proposed Program, as follows:

Seismic and Geological Hazard Policies

- Policy a: Continue to use building codes as the primary tool for reducing seismic risk in structures.
- Policy b: Require all new buildings in the City to be built under the seismic requirements of the current adopted California Building Code.
- Policy d: Enforce provisions of the Alquist-Priolo Earthquake Fault Zoning Act.

"Miscellaneous Issues" Policies (including landslides and erosion)

- Policy a: Any construction must conform with the current Uniform Building Code (UBC) regulations, which address seismic safety of new structures and slope requirements.
- Policy b: Discourage development on lands that are subject to landslides.
- Policy e: Control construction-related fluvial erosion by a construction erosion control program filed with the City's Public Works Department and kept current throughout site development.
- Policy f: Include "best management practices" in the erosion control program, as appropriate, given the specific circumstances of the site and/or project. Table V-9-2 in the Master Environmental Impact Report (City of Modesto, 2019c) presents examples of best management practices.
- Policy g: Design sediment control basins to capture eroded sediments and contain them on the project sites consistent with the criteria outlined in Table V-9-3 of the City of Modesto Master Environmental Impact Report (City of Modesto, 2019c).

City of Riverbank

The Conservation and Safety Elements of the *2005-2025 General Plan* (City of Riverbank, 2009) includes goals and policies pertaining to geologic and seismic hazards that may be relevant to the Proposed Program, as follows:

Goal CONS-6: Maintain or increase surface and groundwater quality and supply.

- Policy CONS-6.7: The City will require mitigation measures, in coordination with the Regional Water Quality Control Board, as a part of approved projects, plans, and subdivisions to address the quality and quantity of urban runoff, including that attributable to soil erosion.

Goal SAFE-1: Minimize the loss of life and damage to property due to natural and human-caused hazards.

- Policy SAFE-1.11: Proposed developments located within river bluff areas and other areas prone to geologic and soil limitations require a detailed geotechnical study prepared by an independent qualified geologist approved by the City. Approved plans, projects, and subdivision requests shall incorporate measures to reduce risks identified in the geotechnical study, to the City's satisfaction.
- Policy SAFE-1.12: The City will not allow the location of water wells in areas where subsidence could occur as a result or where existing potential for subsidence could be increased as a result of operation of a domestic water well.

City of Waterford

The Open Space and Conservation Chapter of the *City of Waterford General Plan Vision 2025* (City of Waterford, 2007) includes goals and policies pertaining to geologic hazards that may be relevant to the Proposed Program, as follows:

Goal Area OS-E: Preserve and Protect Soil Resources.

- Policy OS-E-2: Protect soil resources from the erosive forces of wind and water.
  - Implementing Action OS-E-2a. Reduce soil erosion potential of new development.

Goal Area 2: Seismic Safety.

- Policy S-2.2: Encourage the improvement of all public facilities and infrastructure, such as natural gas, fuel, sewer, water, electrical lines and equipment with up-to-date seismic safety features.

3.6.2 Environmental Setting

The Proposed Program is located entirely within Stanislaus County. The Program Area is rural and predominantly composed of agricultural uses, with pockets of residential neighborhoods.

3.6.2.1 Topography

The Program Area is located on the southwestward-sloping San Joaquin Valley floor adjacent to the foothills of the Sierra Nevada Mountains. The ground surface ranges in elevation from approximately 35 feet above mean sea level at the western extent up to approximately 500 feet above mean sea level at the eastern extent. The region consists of agriculturally productive land on the valley floor, bounded by the gentle, rolling hills of the Sierra Nevada foothills to the east. The region and the Tuolumne River drain toward the southwest to the San Joaquin River.

3.6.2.2 Geology

The Program Area and most of Stanislaus County are located in the Great Valley Physiographic Province, a large northwest-trending valley encompassing California's Central Valley bordered by the Sierra Nevada Mountains to the east and south, the Coast Ranges to the west, and the Klamath Mountains to the north. The province consists of a deep, sediment-filled, asymmetric structural trough that extends more than 400 miles from north to south and averages 50 to 80 miles wide. The trough has been filled with a thick sequence of predominantly alluvial sediments ranging in age from Jurassic to Recent (Bailey, 1966). The San Joaquin Valley makes up the southern part of the Great Valley, drained ultimately by the San Joaquin River flowing toward the California Delta.

Geologic units in the Program Area include mainly unconsolidated and semi-consolidated continental deposits, with some indurated rocks along the eastern boundary. The unconsolidated continental deposits in the Program Area include recent alluvium (Holocene age), the Modesto Formation (Pleistocene age), and Riverbank Formation (Pleistocene age). The indurated rocks include the Valley Springs (Miocene age) and Mehrten (Pliocene age) Formations, with an area of Gopher Ridge Volcanics at the far eastern edge (Wagner et al., 1991). The mapped geologic formation boundaries in the Program Area and surrounding vicinity are shown on Figure 3.6-1.

Soil in the Program Area consists mainly of alluvial fan and terrace deposits of fine sand and silt, with a minor amount of gravel and clay. Near-surface sediments are primarily floodplain deposits from the rivers and creeks originating from the metamorphic, sedimentary, and volcanic rocks of the Sierra Nevada Mountains (NRCS, 1964).

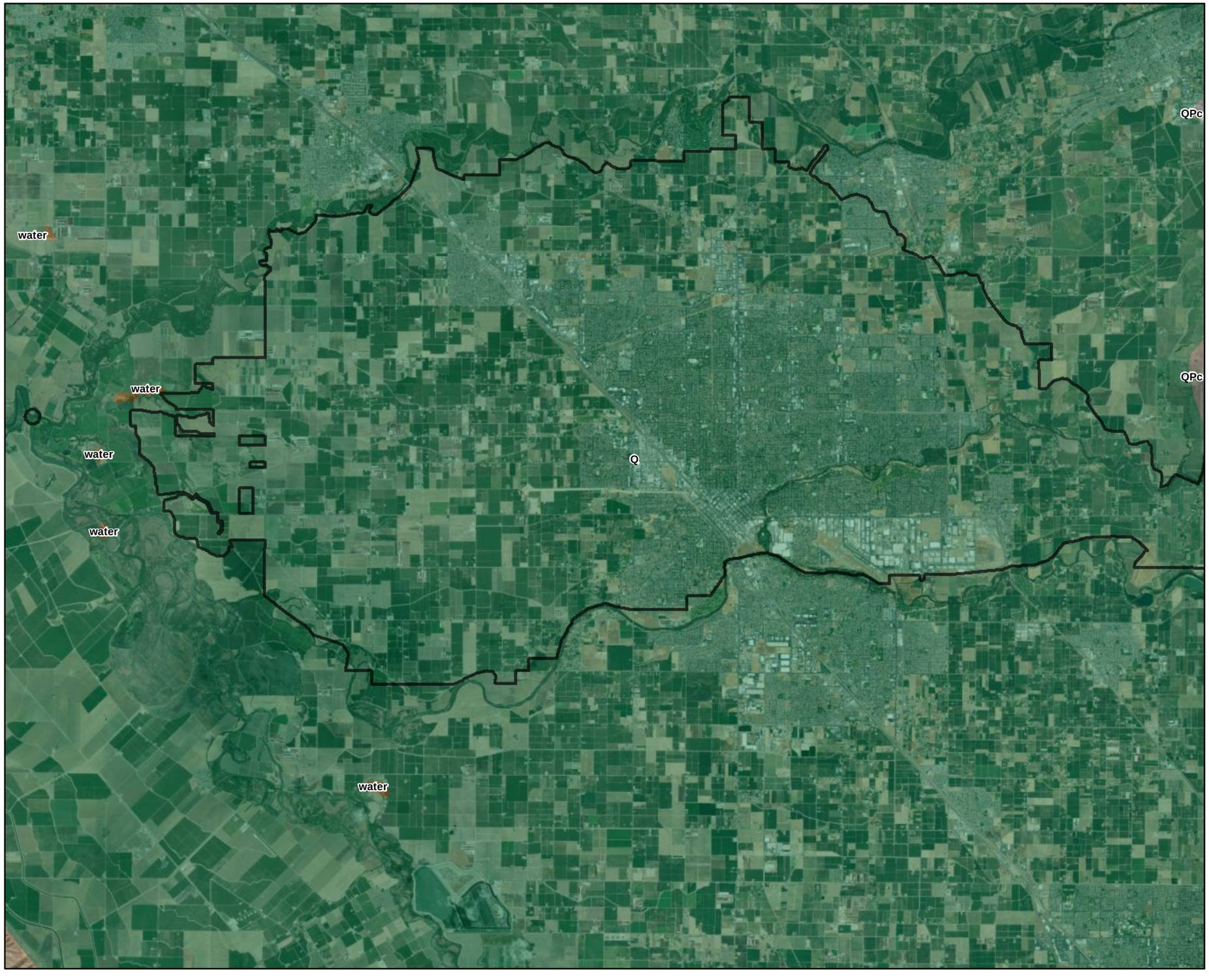
3.6.2.3 Paleontological Context

Stanislaus County is located on the southeastern side of the Great Valley Physiographic Province. The surficial geologic units within the Program Area, and their paleontological sensitivity, are discussed below. The evaluation determined that fossils from the Mesozoic Era (Jurassic Period and Cretaceous Period) and Cenozoic Era (Paleogene Period, Neogene Period, and Quaternary Period [Pleistocene Epoch]) are recorded in Stanislaus County (UCMP, 2019; Paleobiology Database, 2019).

Holocene Alluvium (Hal) – This sediment considered to be recent in geological terms, generally less than 10,000 years old. Holocene alluvium consists of sand, silt, and gravel associated with stream channel, floodplain, and low terrace deposits. The University of California, Museum of Paleontology (UCMP) and the Paleobiology Database (2019) have no record of fossils found in sediment labeled recent or Holocene in Stanislaus County (UCMP, 2019). Because no fossil records on recent or Holocene sediment are identified in Stanislaus County, Holocene alluvium in the Program Area is considered to have low paleontological sensitivity at shallow depths. Moderate to extreme depths may encounter underlying Pleistocene deposits, and fossils may be encountered in an ex situ context in Holocene deposits.

Modesto Formation (Qm) – This Pleistocene Epoch formation consists of arkosic (feldspar rich) alluvium that is divided into three subunits in the Program Area:

1. Upper Member Fine Alluvium: fine alluvium, alluvial sand, silt, clay of interdistributary areas, lower fans, and flood basins
2. Upper Member Coarse Alluvium: coarse alluvium, alluvial sand, silt, and gravel
3. Lower Member: alluvial sand, silt, and gravel of channels, terraces, and upper fans



Program Area

Geology Map Unit

QPc - Plio-Pleistocene and Pliocene loosely consolidated deposits

Q - Quaternary alluvium and marine deposits

water - water

N

0 1 2 4

Miles

Source: Geology Map Unit, https://mrdata.usgs.gov, Downloaded July 2017

Figure 3.6-1. Sheet 1 of 2
Geologic Map Units
Modesto Irrigation District
Stanislaus County, California

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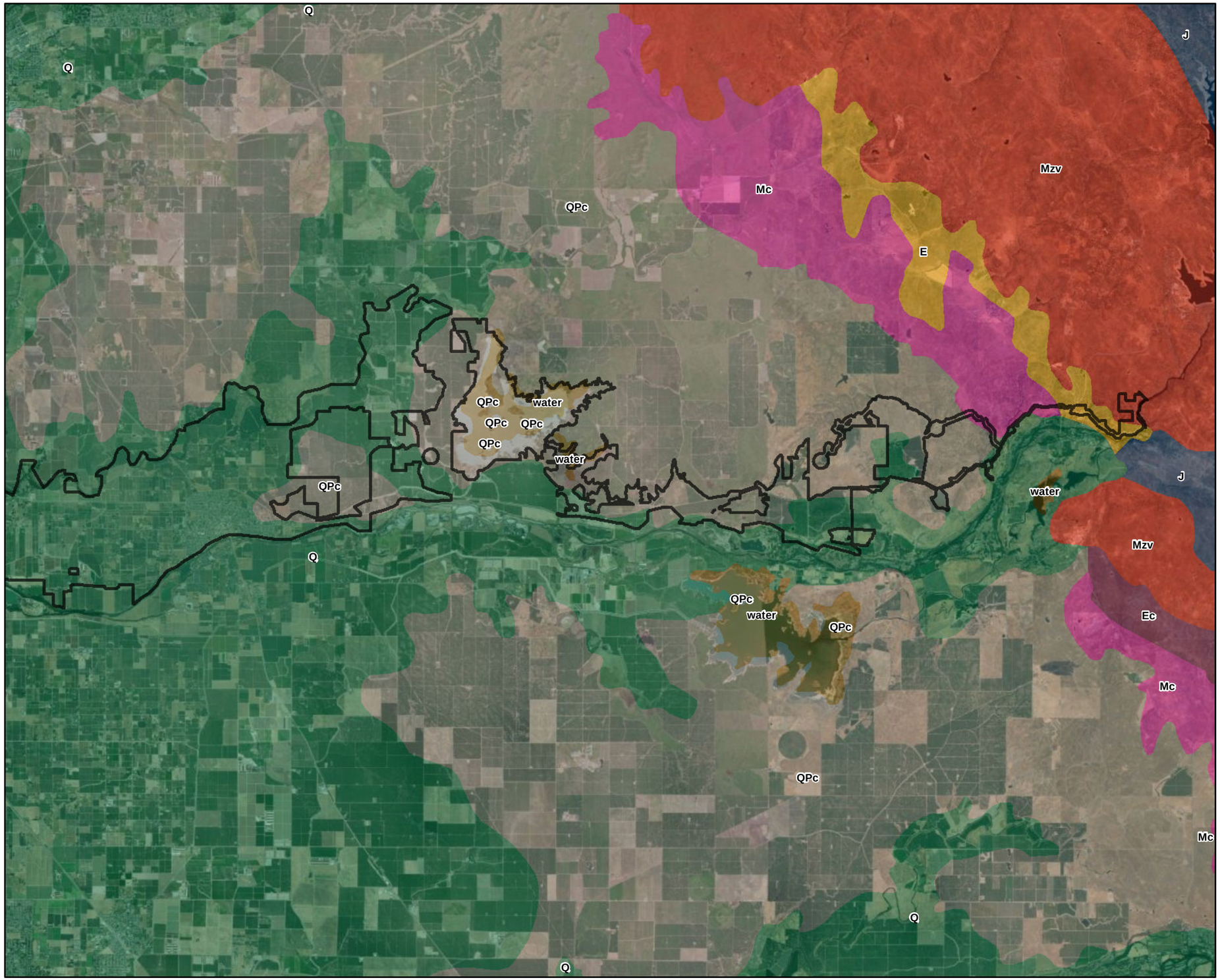

Program Area

Geology Map Unit

- E - Eocene marine rocks
- Ec - Eocene nonmarine rocks, unit 1 (Northern and Central California)
- J - Jurassic marine rocks, unit 1 (Western Sierra Nevada and Western Klamath Mountains)
- Mzv - Mesozoic volcanic rocks, unit 1 (Coast Ranges)
- Mc - Miocene nonmarine rocks
- QPc - Plio-Pleistocene and Pliocene loosely consolidated deposits
- Q - Quaternary alluvium and marine deposits
- water - water

N

0 1 2 4

Miles

Source: Geology Map Unit, https://mrdata.usgs.gov, Downloaded July 2017

Figure 3.6-1. Sheet 2 of 2
Geologic Map Units
Modesto Irrigation District
Stanislaus County, California

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The UCMP has a record of 11 vertebrate fossils in Stanislaus County. Vertebrate fossils from the Rancholabrean land mammal age that include camelops (camel), bison, megalonyx (ground sloth), and mammuthus (mammoth) were found in Modesto Formation sediment in Stanislaus County (UCMP, 2019; Paleobiology Database, 2019). Since additional significant paleontological resources could be found in sediments of the Modesto Formation, this stratigraphic unit has a high sensitivity for paleontological resources. The Modesto Formation is widespread in the Central Valley. Fossils in the Modesto Formation tend to occur more frequently close to major rivers and higher order streams, which tend to occur farther west in the Central Valley. When the Qm unit interdigitates or is undivided with the Riverbank Formation (Qr), it is labeled Qmr on geology maps (Wagner et al., 1991).

Riverbank Formation (Qr) – This Pleistocene Epoch formation is divided into two subunits in the Program Area:

1. Upper Unit, alluvium (r3): alluvial sand, silt, and gravel
2. Upper Unit, lag gravel deposits (Rg): gravel derived from reworking of older gravels

A single vertebrate fossil site is recorded in Riverbank Formation sediment in Stanislaus County; two sites are recorded in neighboring Fresno County (UCMP, 2019; Paleobiology Database, 2019). Most Riverbank Formation fossils have been found in the Sacramento area where five fossil sites are located around the city of Sacramento. Few significant fossil finds have been found in the Riverbank Formation near the Program Area; however, this may be related to a lack of research in this region more than to a paucity of fossils in the formation. Given the variability of the Riverbank Formation, it is considered to be of unknown paleontological sensitivity. Ancient alluvial fan deposits are considered to be of low paleontological sensitivity, and deposits of ancient rivers are considered to be of high paleontological sensitivity.

Turlock Lake Formation (Qtl) – A Pleistocene Epoch formation of nonmarine sand, silt, and gravel. The subunit of this formation in the Program Area consists of arkosic alluvium and granitic sand, with minor amounts of gravel. A major paleontological find occurred in this formation at Fairmead Landfill in the city of Chowchilla, south of the Program Area, in Madera County (Dundas et al., 1996). The Fairmead Landfill yielded more than 200 fossils from the Irvingtonian Period, which is a period that is not well represented in the fossil record. A museum was built adjacent to house the fossils. The UCMP records 293 Pleistocene fossils from the Turlock Lake Formation in Stanislaus County. This formation is considered to have high paleontological sensitivity in the Program Area.

North Merced Gravel (QTnm) – A Pliocene/Pleistocene Epoch unit of the Tulare Formation. The subunit of this formation in the Program Area consists of lag gravel deposits, which are a thin, locally derived pediment veneer of cobble gravel. No records were found of any fossils having been found in North Merced Gravel in the Program Area. This formation is considered to be of low paleontological sensitivity.

Laguna Formation (Tl) – A Pliocene Epoch formation composed of granitic alluvial sands, gravel, silts, and clays deposited between those of the Mehrten Formation and the North Merced Gravels (Clinkenbeard, 1999; Marchand and Allwardt, 1981). No records were found of any fossils having been found within this formation (UCMP, 2019; Paleobiology Database, 2019), with the exception of evidence of rodent burrows throughout portions of the formation (Marchand and Allwardt, 1981). This formation is considered to be of low paleontological sensitivity.

Mehrten Formation (Tm) – A Late Miocene and early Pliocene Epoch formation that consists of andesitic fluvial sand and silt with minor amounts of gravel and conglomerate. These deposits are presumably reworked volcanic mudflow deposits that are moderately indurated. Vertebrate fossils of Hemphillian land mammal age were found in the Mehrten Formation on Black Rascal Creek in adjacent Merced County. A new species of ground sloth, *Megalonyx mathisi*, was also discovered on Black Rascal Creek (Hirschfeld and Webb, 1968). Other fossils found in this formation include *Pliohippus coalingensis* (horse), *Camelidae* (camel), and *Sciuridae* (squirrel), although the exact locations are unknown (UCMP, 2019). More than 256 vertebrate and 125 plant fossil specimens have been recovered from

various locations in Stanislaus County (UCMP, 2019; Paleobiology Database 2019). The Mehrten Formation is considered to be of high paleontological sensitivity.

Valley Springs Formation (Tvs) – A Miocene to Pliocene age formation, consisting of andesitic conglomerates, sandstone, siltstone, and claystones (Clinkenbeard, 1999). This formation appears to have been deposited predominantly in paleotopographic lows within the underlying Ione Formation (Bartow, 1992), and it likely represents ephemeral stream and lake deposits within an alluvial plain (Bartow, 1992). No records were found of any fossils having been found within this formation (UCMP, 2019; Paleobiology Database, 2019); therefore, this unit has a low paleontological sensitivity.

Ione Formation (Ti) – The oldest member of the nonmarine Tertiary clastic deposits flanking the Sierra Nevada in the Great Valley. The Ione Formation is composed of primarily light-brown, tan, and gray to pinkish or yellowish quartz sandstones with interbedded clay (Marchand and Allwardt, 1981). Generally the formation is light in color, either white or near-white (Creely and Force, 2007). There is evidence that this formation underwent deep chemical decay as it was deposited; this is speculated as the cause for a paucity of fossils in this formation (Creely and Force, 2007). Marine fossils can rarely be found in the coarse upper portions of the sandstone (Marchand and Allwardt, 1981) and are exclusively marine invertebrates or trace fossils (Creely and Force, 2007). No fossil specimens are recorded in Stanislaus County by UCMP or the Paleobiology Database for this unit. This unit, therefore, has a low to moderate to (locally) high paleontological potential.

Kreyenhagen Formation (Ek) – An Eocene age formation, which is exposed in Stanislaus County (UCMP, 2019; Wagner et al., 1991). The unit is composed of deep marine sediments comprising white diatomaceous shale, porcelaneous mudstone, and brown argillaceous shale with subordinate interbeds of siltstone and limestone. Numerous invertebrate, microfossil, and vertebrate localities have been recovered from the Kreyenhagen Formation, which has yielded unspecified vertebrate remains, as well as echinoderm, gastropod, mollusk, foraminifera, and diatom fossils (UCMP, 2019). Given this, the unit is considered to have a high paleontological potential.

Moreno Formation (Km) – Consists of organic, rich marine shale. According to the UCMP database, 699 fossil specimens are recorded in Stanislaus County. They consist of 2 marine invertebrate fossils, 3 terrestrial vertebrate fossils, and 694 terrestrial plant fossils that were likely washed out into the sea by rivers. Marine vertebrate fossils have also been recorded within this unit, outside Stanislaus County (UCMP, 2019). Therefore, because highly significant terrestrial and marine vertebrate fossils have been found in the Moreno Formation, it is considered to have a high paleontological potential.

Panoche Formation (Kp) – Consists of marine sandstone and shale. According to the UCMP database, eight invertebrate fossil specimens are recorded in Stanislaus County (UCMP, 2019). Given this, the unit is considered to have a moderate to low paleontological potential.

Igneous and Metamorphic Basement Rocks (Jm) – Form the bedrock of the Program Area but generally do not preserve fossils given heat, pressure, and rock alteration; therefore, the igneous and metamorphic basement rocks are of low paleontological sensitivity. However, small-scale vugs, gas pockets, joints, and fractures within the bedrock may preserve much more recent (Holocene to Late Pleistocene) Neotoma (pack rat) middens, which are considered to be of high paleontological sensitivity because of the wealth of information these middens can provide about the ancient paleoclimate.

3.6.2.4 Seismicity

Earthquakes occur along faults, earth fractures, or zones of fracture along which the rocks on one side have been displaced in relation to those on the other side. The seismicity of a region is described by the distribution, recurrence, and intensity of ground shaking associated with earthquakes over a period of time. No Alquist-Priolo Fault Rupture Hazard Zones are within the Program Area (CDOC, 2019). Such zones highlight active earthquake faults that have a potential for ground-surface rupture.

The fault and fold database (USGS, 2018) indicates that no active faults, or faults that show evidence of rupture during the last 11,000 years, are known to pass within approximately 24 miles of the Program Area. The nearest active and significant faults are the Corral Hollow-Carnegie fault zone and the Greenville fault zone.

The Corral Hollow-Carnegie fault and the Greenville fault are located within San Joaquin and Alameda Counties, respectively. The faults are near each other, within the Burnt Hills area of the Coast Range Mountains, approximately 24 miles southwest of the Program Area. The Corral Hollow-Carnegie fault is small and is not identified by the Alquist-Priolo Earthquake Fault Zoning Act. The Greenville fault is the closest active fault to the Program Area identified by the Alquist-Priolo Earthquake Fault Zoning Act, and is a historically active strike-slip fault located in the Diablo Range area of the Coastal Range. The Greenville fault most recently experienced surface fault rupturing during the January 1980 Livermore Valley earthquakes (Bryant and Cluett, 2002).

During the last 100 years, the area within approximately 75 miles of the Program Area has had approximately 17 earthquakes greater than magnitude 5. The nearest earthquake larger than magnitude 5 occurred in 1986 approximately 40 miles west of the Program Area (USGS, 2019b).

3.6.2.5 Other Geologic Constraints and Hazards

Seismic hazard zone maps show areas of land that could be prone to landslides and liquefaction. Probabilistic seismic hazard maps show the hazards from earthquakes that geologists and seismologists agree could occur in California. The maps are typically expressed in terms of probability of exceeding a certain ground motion. Potential strong ground motion in the Program Area was estimated using probabilistic data from the national seismic hazard maps (USGS, 2019a). The maps indicate that the peak ground acceleration with a 10 percent probability of exceedance in 50 years varies between 0.16g (gravity) and 0.31g in the Program Area (USGS, 2019a).

The Program Area is gently sloped agricultural land and has a low potential for landslides. The Program Area has not been affected by subsidence from either peat loss or the extraction of oil or groundwater (USGS, 2019b).

3.6.2.6 Soils

The general groups of soils mapped by the Natural Resources Conservation Service (NRCS) within the Program Area are described below, grouped by the landform on which they can be found. This general mapping is appropriate for describing soils across a wide area; however, a review of more detailed NRCS mapping or a geotechnical investigation would be undertaken for areas where ground disturbance could occur. More detailed soils information is provided below for the proposed locations of the regulating reservoirs.

General Soils Information – Program Area

General soil groups within the Program Area include the following (NRCS, 1964):

- Recent alluvial floodplains
- Basin lands
- Young alluvial fans
- Low alluvial terraces and moderately old fans
- High alluvial terraces, partially eroded to rolling hills
- Upland soils of the Sierra Nevada foothills

The soil materials are derived from a mix of igneous, metavolcanic, and sedimentary rocks from the Sierra Nevada Mountains (NRCS, 1964). The following provides a summary of soils present within each of the five landforms within the Program Area.

Soils of the Recent Alluvial Floodplains

Recent alluvial floodplain soils include floodplains of the major rivers, including the San Joaquin, Tuolumne, and Stanislaus Rivers. Historically, these rivers were subject to flooding; however, dams and other impoundment structures have greatly reduced the frequency of flooding. Because of historical and less frequent recent flooding, along with the accompanying rise in the water table, soils of the floodplains are generally mottled and high in organic matter. They are nearly level and are used for producing numerous irrigated crops.

Soils of the Basin Lands

The basin lands are poorly drained soils that lie east of the San Joaquin River floodplain. Their texture ranges from fine sandy loam to clay loam. The distinctive feature of these soils is their saline-alkali condition that precludes their use for cultivated crops unless soil amendments such as gypsum, improved drainage, and large leaching fractions are employed.

Soils of the Young Alluvial Fans

Soils of the young alluvial fans are sandy and generally fertile and formed on broad, gently sloping alluvial fans consisting of granitic alluvium. They lie east of the San Joaquin River above the floodplain, and almost all of them are intensively cultivated to produce a wide range of irrigated crops. Some of these soils are among the most productive in California and produce high yields of orchard, vineyard, field, forage, and truck crops. These soils vary in their drainage from well drained to imperfectly drained.

Soils of the Low Alluvial Terraces and Moderately Old Fans

Soils of the low alluvial terraces and moderately old fans are made up of alluvium derived from granitic rocks. The alluvial fans have eroded into the gently undulating relief. Alluvial terraces are visible along the rivers in some areas. The soils on the fans have a distinct profile and a hardpan, making them difficult to manage for irrigated agriculture. Soils on the terraces lack a hardpan and have a sandy clay loam subsoil, making them suitable for a wide variety of irrigated crops.

Soils of the High Alluvial Terraces, Partially Eroded to Rolling Hills

Rolling or conical hills make up most of the high alluvial terraces landform, but some nearly level remnants of old alluvial terraces and fans are also scattered throughout. The older, level to gently undulating areas contain dense clay or a hardpan in the subsoil. The newer soils on the hillsides lack the increase in clay in the subsoil. The soil associations included in this group are moderately fertile and are subject to erosion.

Upland Soils of the Sierra Nevada Foothills

The eastern portion of the Program Area has upland soils. These foothill soils are generally shallow because of naturally occurring erosion. Rock outcrops and gravelly areas are common among a groundcover of grass and scattered blue oak. The relief of the foothills in the area ranges from rolling to steep. The parent materials of these soils include hard metamorphic rock, softer sedimentary rock, and volcanic lava. Most of these upland soils are used for range pasture.

Detailed Soils Information – Regulating Reservoirs

More detailed NRCS soil mapping is appropriate for determining potential soil units under the proposed locations of the regulating reservoirs. A determination of the soil map units within the proposed locations of the regulating reservoirs was developed using the online soil survey information for Eastern Stanislaus Area, California (USDA-NRCS, 2019), and is displayed on Figure 3.6-2.

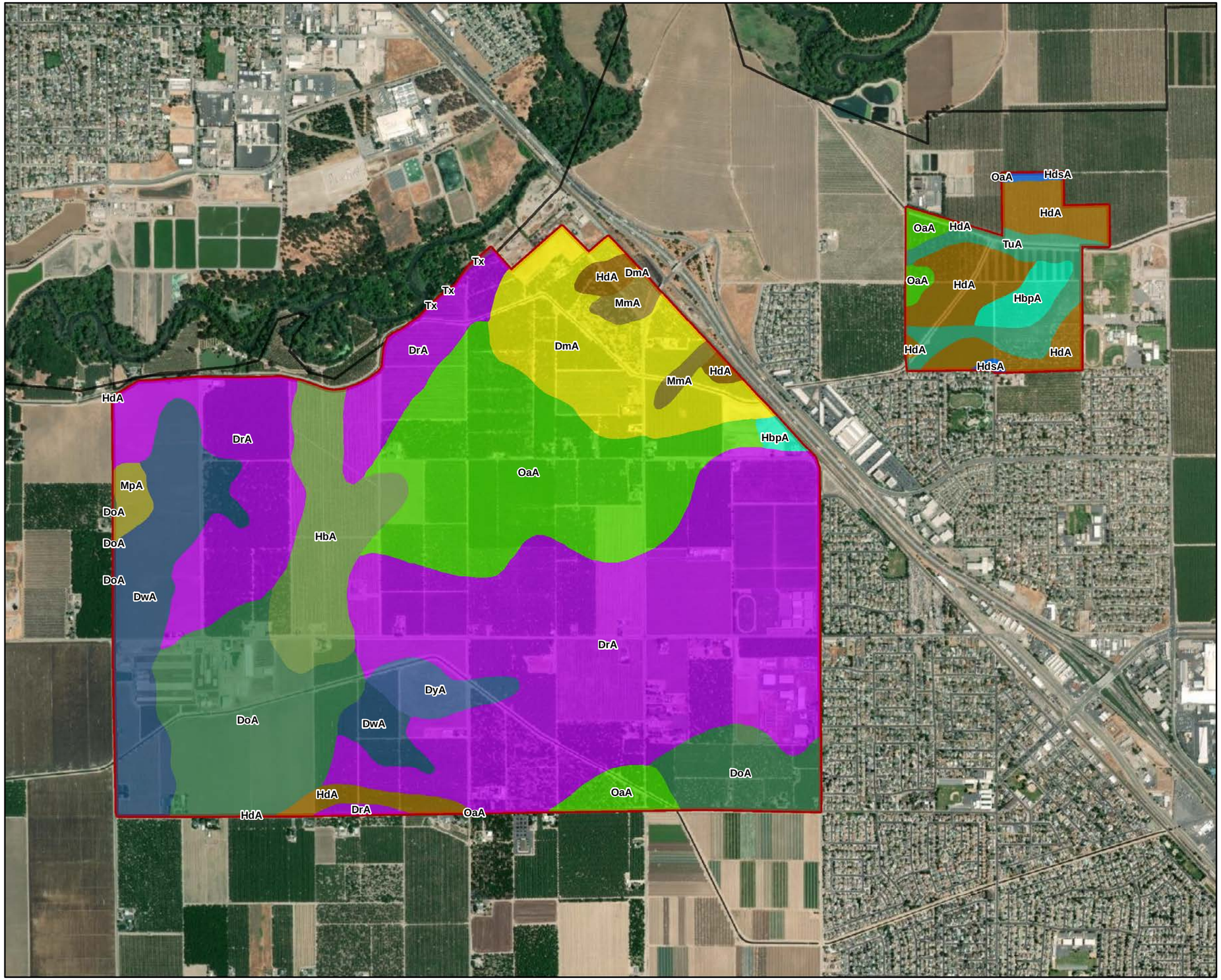

Figure 3.6-2
Sheet 1 of 3: Lateral 6 and 8 Regulating Reservoir
NRCS Soil Map Units within the Program Area
Modesto Irrigation District
Stanislaus County, California

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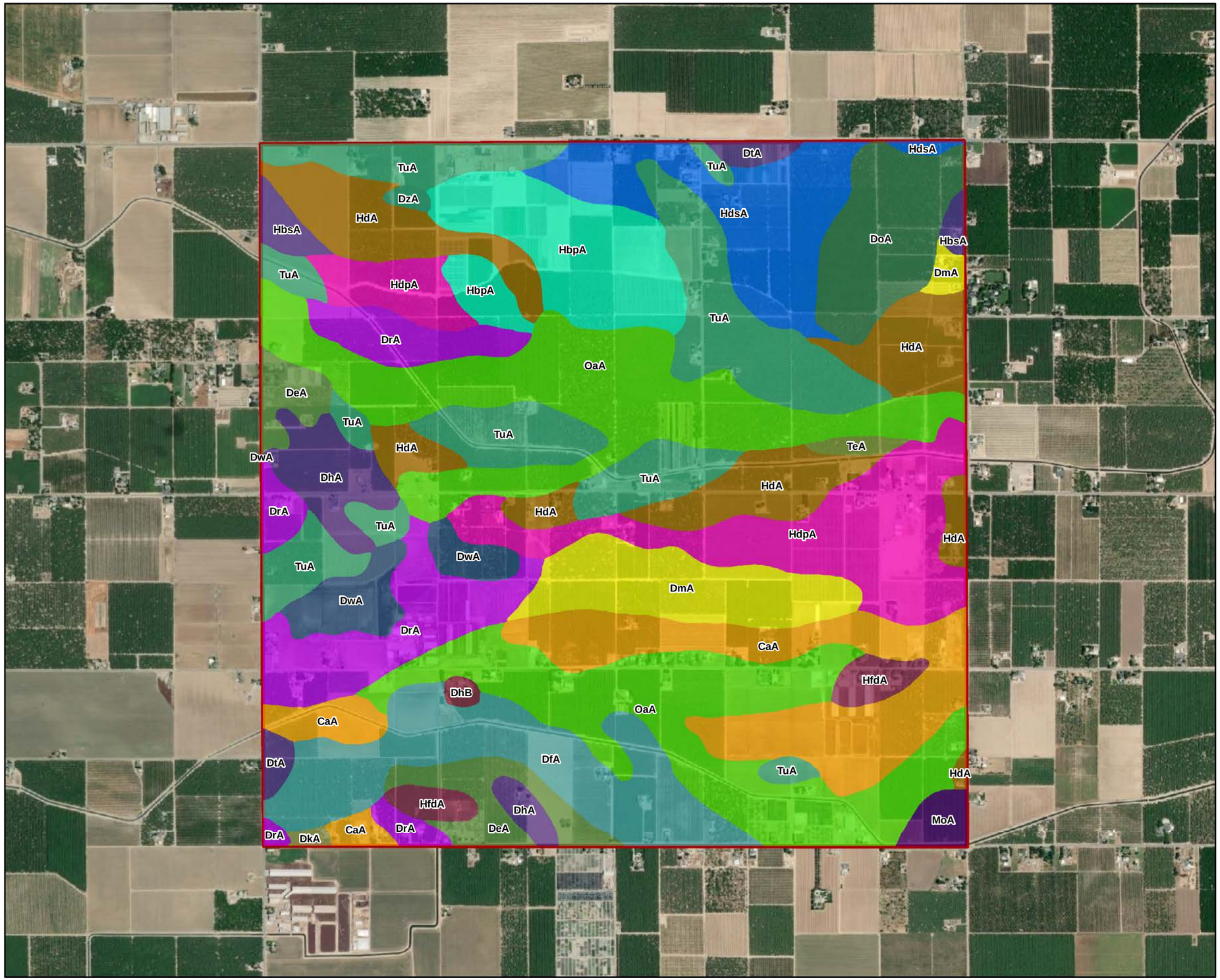

Program Area

Area of Interest

Soil Map Unit

- CaA: Chualar sandy loam, 0 to 3 percent slopes
- DeA: Delhi loamy sand, 0 to 3 percent slopes
- DfA: Delhi loamy sand, moderately deep over clay, 0 to 3 percent slopes
- DhA: Delhi sand, 0 to 3 percent slopes
- DhB: Delhi sand, 3 to 8 percent slopes, MLRA 17
- DkA: Dello loamy sand, 0 to 1 percent slopes
- DmA: Dinuba fine sandy loam, 0 to 1 percent slopes, MLRA 17
- DoA: Dinuba fine sandy loam, deep, 0 to 1 percent slopes
- DrA: Dinuba sandy loam, 0 to 1 percent slopes
- DtA: Dinuba sandy loam, deep, 0 to 1 percent slopes
- DwA: Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- DzA: Dinuba sandy loam, very poorly drained variant, slightly saline- alkali, 0 to 1 percent slopes
- HbpA: Hanford fine sandy loam, moderately deep over silt, 0 to 1 percent slopes
- HbsA: Hanford fine sandy loam, deep over silt, 0 to 1 percent slopes
- HdA: Hanford sandy loam, 0 to 3 percent slopes
- HdpA: Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes
- HdsA: Hanford sandy loam, deep over silt, 0 to 1 percent slopes
- HfdA: Hilmar loamy sand, deep, 0 to 1 percent slopes
- MoA: Modesto loam, 0 to 1 percent slopes
- OaA: Oakdale sandy loam, 0 to 3 percent slopes
- TeA: Temple silty clay, slightly saline, 0 to 1 percent slopes
- TuA: Tujunga loamy sand, 0 to 3 percent slopes

N

0 1,000 2,000

Feet

Figure 3.6-2
Sheet 2 of 3: Lateral 3 and 7 Regulating Reservoir NRCS Soil Map Units within the Program Area
Modesto Irrigation District
Stanislaus County, California

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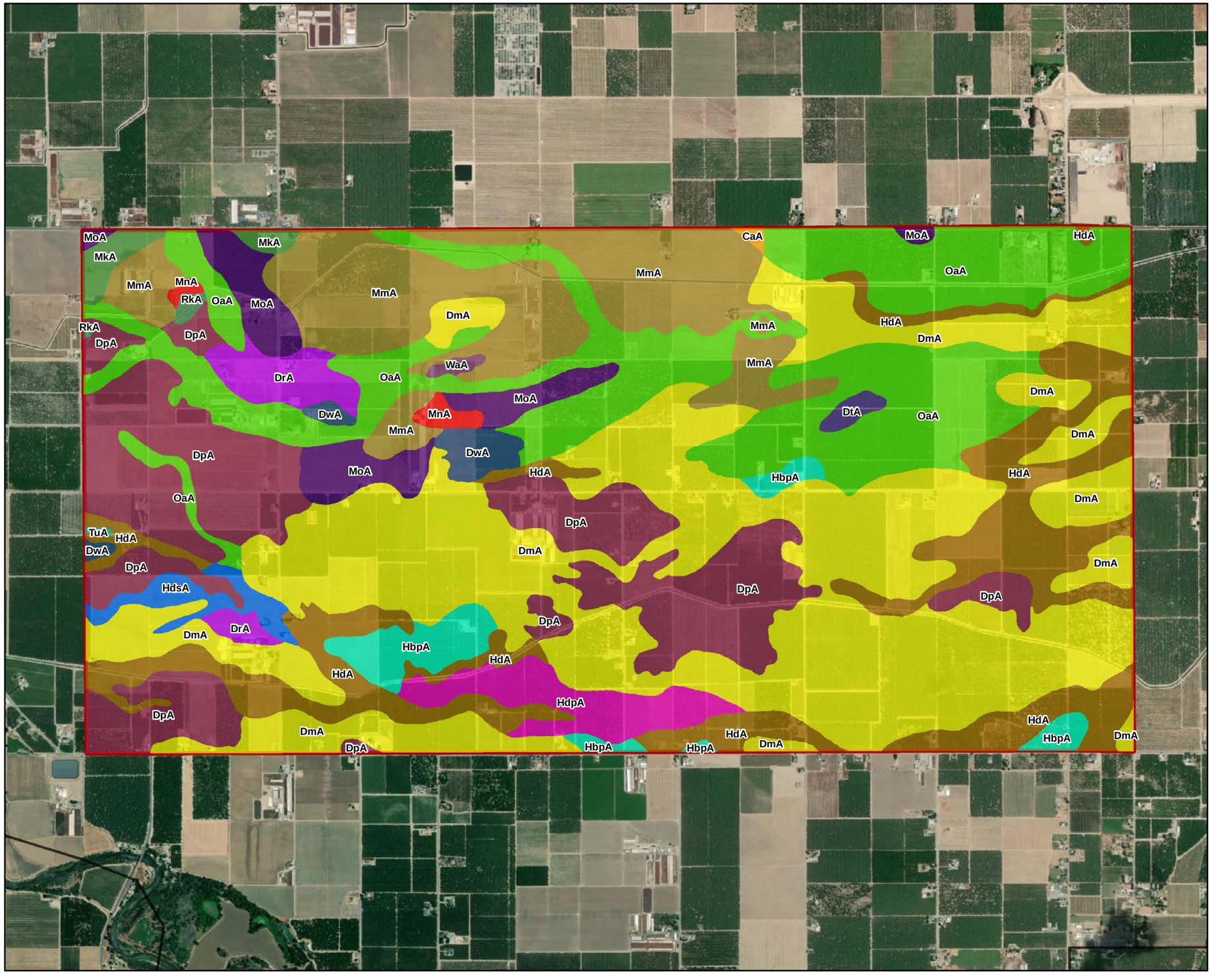

Program Area

Area of Interest

Soil Map Unit

- CaA: Chualar sandy loam, 0 to 3 percent slopes
- DmA: Dinuba fine sandy loam, 0 to 1 percent slopes, MLRA 17
- DpA: Dinuba fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- DrA: Dinuba sandy loam, 0 to 1 percent slopes
- DtA: Dinuba sandy loam, deep, 0 to 1 percent slopes
- DwA: Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes
- HbpA: Hanford fine sandy loam, moderately deep over silt, 0 to 1 percent slopes
- HdA: Hanford sandy loam, 0 to 3 percent slopes
- HdpA: Hanford sandy loam, moderately deep over silt, 0 to 1 percent slopes
- HdsA: Hanford sandy loam, deep over silt, 0 to 1 percent slopes
- MkA: Meikle clay, 0 to 1 percent slopes
- MmA: Modesto clay loam, 0 to 1 percent slopes
- MnA: Modesto clay loam, slightly saline-alkali, 0 to 1 percent slopes
- MoA: Modesto loam, 0 to 1 percent slopes
- OaA: Oakdale sandy loam, 0 to 3 percent slopes
- RkA: Rossi clay loam, moderately saline-alkali, 0 to 1 percent slopes
- TuA: Tujunga loamy sand, 0 to 3 percent slopes
- WaA: Waukena fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes

N

0 1,000 2,000

Feet

Figure 3.6-2
Sheet 3 of 3: Lateral 4 and 5 Regulating Reservoir
NRCS Soil Map Units within the Program Area
Modesto Irrigation District
Stanislaus County, California

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Soil map unit characteristics for the area that would be potentially affected by project construction are discussed below. Actual soil conditions could differ from what is described in the generalized soil descriptions because of the potential for previous grading or other earthmoving activities at the sites and natural soil variations.

Most soil units within the proposed locations for all three regulating reservoirs have a moderate potential for wind erosion. Small portions of the Lateral 6 and 8 Regulating Reservoir and the Lateral 3 and 7 Regulating Reservoir locations are made up of map units Tujunga loamy sand (TuA) and Delhi loamy sand,(DfA) (Figure 3.6-2) and are the most susceptible to wind erosion because of their loamy sand surface texture.

Most soil units within the proposed locations for all three regulating reservoirs have a moderate potential for sheet and rill erosion. The most susceptible map units are generally found in the Lateral 4 and 5 Regulating Reservoir location and include Dinuba fine sandy loam (DmA), Modesto clay loam (MmA), Modesto clay loam,(MnA), Modesto loam (MoA), and Waukena fine sandy loam (WaA). Small portions of the Lateral 6 and 8 Regulating Reservoir and the Lateral 3 and 7 Regulating Reservoir locations are made up of these susceptible map units. These soils generally have a finer surface texture, which is more susceptible to erosion by water.

Most soils within the proposed locations for all three regulating reservoirs have a low potential for linear extensibility, with the exception of the northwestern portion of the Lateral 4 and 5 Regulating Reservoir location. The soils in this area (including map units MmA, MnA, MoA, and Meikle clay [MkA]) have clay textures, or clay just below the surface, and are rated as moderate for linear extensibility.

3.6.3 Environmental Impacts

This section includes the approach to and results of the environmental impact analysis with respect to geology and soils. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following sections.

3.6.3.1 Thresholds of Significance

The thresholds that were used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and are listed below. Impacts on geology and soils are considered significant if the Proposed Program would result in any of the following:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving the following:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42 [CDOC, 1997])
  - Strong seismic ground shaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Substantial soil erosion or the loss of topsoil.
- Location on a geologic unit or soil that is unstable or that will become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Location on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial direct or indirect risks to life or property.

- Location on soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Because the Proposed Program does not include septic tanks or alternative wastewater disposal systems, impacts related to the corresponding threshold in the list above are not evaluated in the following analysis.

3.6.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. The No Program Alternative is functionally the same as the Existing Conditions as related to geology and soils because minimal additional future development is anticipated in the predominantly rural and agricultural areas adjacent to the Proposed Program facilities, and both represent a condition without the Proposed Program. Therefore, this analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

In the context of geology and soils, Proposed Program activities reviewed included the extent of earthwork and excavations (such as for excavation, cut, and fill associated with constructing the proposed regulating reservoirs), drilling wells, and digging trenches for conveyance pipelines and disturbance areas for construction. The potential for the Proposed Program to affect geology and soils resources is limited to the following categories, as outlined in Section 2.1 of the Program Description: regulating reservoirs; canal, lateral, and tunnel improvements; and groundwater management. Individual projects under the Proposed Program would be expected to have minimal impacts on soils and geological resources; therefore, each of the project categories is not specifically discussed in the impacts section. However, the category with the most potential ground disturbance (that is, regulating reservoirs) has been broken out and analyzed separately.

Management of unsuitable soils (including expansive soils) would be implemented as determined necessary through the design phase and ultimate construction as part of the Proposed Program. Geotechnical evaluations would be conducted as part of the design phase of the Proposed Program and unsuitable soils would be removed, replaced, and/or treated as necessary.

Implementation of BMPs to prevent soil erosion, as prescribed in a SWPPP, would be required and implemented as part of the Proposed Program. The SWPPP is required by the Construction General Permit Order issued by the SWRCB (Section 3.9, Hydrology and Water Quality) and would include the following requirements:

- Filter fences and catch basins would be placed below construction activities to intercept sediment before it reaches any waterway.
- Sediment control measures would be in place before the onset of the rainy season and would be monitored and maintained in good working condition until disturbed areas have been stabilized.
- When construction is complete, stabilizers, such as weed-free mulch, would be applied to disturbed areas.

Available data, published reports, and professional experience were used to evaluate the alternatives for potential impacts related to geology and soils. Data and publications (both printed and web-based) from the California Geologic Society, USGS , U.S. Department of Agriculture (USDA), NRCS, and other sources were used, as appropriate.

3.6.3.3 Impacts Associated with the Proposed Program

Impact GEO-1: Seismic-related ground failure, including liquefaction that would directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death.

Seismic hazard zones exist in the far southwestern portion of Stanislaus County; however, they are outside of the Program Area and not near any of the proposed projects (CDOC, 2019). Therefore, general ground motions in the Program Area are expected to be small because of the distance from active faults.

All Project Types

Given the distance from known active faults and unlikelihood that ground shaking would occur during construction of the various Proposed Program facilities, construction impacts from seismic-related ground failure would be less than significant.

Similar to much of the Central Valley, the Program Area has been and will continue to be subject to occasional ground shaking generated by activity on local and regional faults. Proposed Program features would not include habitable structures or bridges. Proposed Program facilities, such as the impoundment facilities associated with the proposed regulating reservoirs, would be designed and constructed to withstand the effects of anticipated earthquake loading for the Program Area, based on the site-specific detailed geotechnical analysis of each project site. Therefore, impacts from seismic-related ground failure during operation of the Proposed Program would be less than significant.

Impact GEO-2: Substantial soil erosion or loss of topsoil.

Construction activities associated with the Proposed Program would result in a range of ground disturbances and movements, and could result in localized soil erosion, sedimentation, and inadvertent permanent soil loss within the Program Area. During construction, BMPs would be implemented to prevent soil erosion as prescribed in a SWPPP, as required by the Construction General Permit Order issued by SWRCB.

Regulating Reservoirs

Construction of the proposed regulating reservoirs would involve earthmoving activities, including excavation and cut and fill. The factors that will have the largest effect on soil loss include steep slopes, lack of vegetation, and erodible soils composed of large proportions of silt and fine sands. The proposed locations of the regulating reservoirs are generally flat, with medium- to coarse-textured soils that have low runoff potential. Small areas of the Lateral 6 and 8 Regulating Reservoir and the Lateral 3 and 7 Regulating Reservoir proposed locations overlie small areas with soils that have higher water and wind erosion potential (for example, TuA and DfA); however, implementation of BMPs as prescribed in a SWPPP should reduce this potential to a less-than-significant level. Therefore, impacts from soil erosion or loss of topsoil during construction of the regulating reservoirs would be less than significant.

All Other Project Types

Construction will involve earth-moving activities, including excavation, cut, and fill associated with canal, lateral, and tunnel improvements, and groundwater management via well rehabilitation and relocation. Depending on the particular project and associated features, construction activities would result in a range of ground disturbances and movements, and could result in localized soil erosion, sedimentation, and inadvertent permanent soil loss within the Program Area. During construction, BMPs would be implemented to prevent soil erosion as prescribed in a SWPPP, as required by the Construction General Permit Order issued by SWRCB. Therefore, soil erosion-related impacts during construction would be less than significant.

During operation, most Proposed Program facilities would not be prone to soil erosion and, in general, would be operated and maintained in a manner that would not increase the potential for soil erosion. Soil erosion-related impacts during operation of the Proposed Program would be less than significant.

Impact GEO-3: Unstable geologic unit, or a geologic unit that would become unstable as a result of the Proposed Program, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

The Program Area is not in an area identified as unstable, and landslides are unlikely because of the relatively level topography. If necessary, site-specific geotechnical analysis would be performed for individual projects during site planning to verify that the facilities are designed to account for any hazards of liquefaction that may be identified.

All Project Types

During construction, implementation of the Proposed Program would involve earthmoving activities, including excavation, cut, and fill associated with constructing the proposed regulating reservoirs; canal, lateral, and tunnel improvements; and rehabilitation and relocation of wells. The Program Area generally does not contain unstable soils, and the potential for the Proposed Program to induce, or be affected by, landslides, lateral spreading, or subsidence is highly unlikely. Therefore, construction and operation impacts related to unstable geology would be less than significant.

Impact GEO-4: Substantial risks to life or property from expansive soil.

Construction activities associated with the Proposed Program would result in a range of ground disturbances and movements; however, the primary concern with expansive soil is its behavior during operation, and the suitability of the soil as a bearing surface because expansive clays have the potential to heave or collapse with changing moisture content. Site-specific geotechnical analysis of individual project sites would be performed as necessary to evaluate and determine design and construction criteria to limit the risk of adverse effects caused by expansive soils. Management of unsuitable soils (including expansive soils) would be implemented as determined necessary through the design phase and ultimate construction as part of the Proposed Program. Geotechnical evaluations would be conducted as part of the design phase of the Proposed Program, and unsuitable soils would be removed, replaced, or treated as necessary.

Regulating Reservoirs

The majority of the proposed locations of the regulating reservoirs are sited on soils with low linear extensibility (shrink-swell potential), so expansive soils would not be a concern at those sites. Soil units underlying a portion of the proposed location for the Lateral 4 and 5 Regulating Reservoir have a moderate shrink-swell potential; a design-level geotechnical soil investigation would be conducted to determine the site-specific presence or absence of expansive soils, and mitigation would be recommended, as appropriate. Removal and replacement of unsuitable soils would be implemented as determined necessary through the design phase and ultimate construction as part of the Proposed Program. Given that geotechnical evaluations would be conducted as part of the design phase of the Proposed Program, the potential presence of expansive soils would be addressed so as not to create a substantial risk to life or property, and this potentially adverse impact would be reduced to a less-than-significant level.

All Other Project Types

Soil materials within the Program Area generally have a low potential for shrink-swell behavior. If necessary, site-specific geotechnical analysis of individual project sites would be performed to evaluate and determine design and construction criteria to limit the risk of adverse effects caused by expansive soils, as identified above. If a hazard is identified, measures would be anticipated to include water infiltration management,

structural stiffening, an increase in foundation embedment, or over-excavation and replacement with suitable material; therefore, impacts related to expansive soil would be less than significant.

Impact GEO-5: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

As discussed in Section 3.6.2.3, although geologic units in the Program Area have high sensitivity for paleontological resources, no unique paleontological resources were identified during a review of relevant literature covering the Program Area. In addition, the geology of the Program Area is similar to the rest of the Central Valley. Although no paleontological resources are anticipated to occur, all personnel involved in earthmoving activities would be informed that fossils of scientific importance may be encountered during deeper excavations and must be reported immediately if encountered.

All Project Types

Reviewed references indicate a lack of unique paleontological resources and a geology that is consistent with the rest of the Central Valley. Nevertheless, workers involved in earthmoving activities would be made aware of the potential (although unlikely) presence of paleontological resources and the need to report any such encounters immediately; therefore, impacts related to unique paleontological resources or geological features would be less than significant.

3.6.4 Mitigation Measures

Construction, operation, and maintenance of the Proposed Program would have less-than-significant impacts on geology and soils; therefore, mitigation is not required or recommended. As described in Section 3.6.3.2 and included in Section 2, Program Description and Alternatives, the following project commitments would be implemented as part of the Proposed Program to minimize impacts on geology and soils:

- Implementation of BMPs to prevent soil erosion as prescribed in a SWPPP, as required by the Construction General Permit Order issued by SWRCB. BMPs would include the following:
  - Filter fences and catch basins would be placed below construction activities to intercept sediment before it reaches the waterway.
  - Sediment control measures would be in place before the onset of the rainy season and would be monitored and maintained in good working condition until disturbed areas have been stabilized.
  - When construction is complete, stabilizers, such as weed-free mulch, would be applied to disturbed areas.
  - Use, transport, and disposal of hazardous materials, such as fuels, lubricants, and solvents, would be in accordance with California Department of Toxic Substances Control, U.S. Environmental Protection Agency, and U.S. Occupational Safety and Health Administration requirements.
- Site-specific geotechnical investigations would take place before completion of design and construction of load-bearing projects. The geotechnical investigations should include evaluation of the potential for native or fill material and underlying soils and bedrock to support the requirements of the structure designed for that location. Designs are expected to be updated to account for any potential shortfalls of the materials to fulfill project requirements.
- Management of unsuitable soils (including expansive soils) would be implemented as determined necessary through the design phase and ultimate construction as part of the Proposed Program. Soils determined to be unsuitable would be removed, replaced, or treated as necessary.
- Workers involved in earthmoving activities would be made aware of the potential (although unlikely) presence of paleontological resources and need to report any such encounters immediately.

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3.7 Greenhouse Gases

This section describes the regulatory and environmental setting related to greenhouse gases (GHGs) and evaluates potential GHG and related climate change impacts associated with implementation of the Proposed Program.

3.7.1 Regulatory Setting

This section describes guidelines and regulations for evaluating potential impacts and identifying mitigation related to GHGs. GHGs include both naturally occurring and anthropogenic gases, such as carbon dioxide (CO_2), methane, nitrous oxide, hydro-chlorofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The accumulation of GHGs in the atmosphere influences the long-term range of average atmospheric temperatures. These gases trap the energy from the sun and help maintain the temperature of the earth's surface, creating a process known as the greenhouse effect (EPA, 2019). Relevant regulations and climate action plans at federal, state, and regional levels are discussed further in Sections 3.7.1.1 through 3.7.1.3.

3.7.1.1 Federal

Climate change and its associated effects are being addressed through various efforts at the federal level. These efforts include the attempt to reduce the output of emissions by improving fuel economy and energy efficiency. In 2009, EPA issued a science-based "endangerment finding," which indicated that the buildup of heat-trapping GHGs in the atmosphere endangers public health and welfare. Based on the endangerment finding, EPA and the National Highway Traffic Safety Administration (NHTSA) took coordinated steps to enable the production of a new generation of clean on-road vehicles and engines with reduced GHG emissions and improved fuel efficiency.

In April 2010, EPA, in conjunction with NHTSA, issued the first of a series of GHG emission standards for new cars and light-duty vehicles and significantly increased the fuel economy standards for all new passenger cars and light-duty trucks sold in the country. The standards required that these vehicles meet an average fuel economy of 34.1 miles per gallon by 2016. In August 2012, the federal government adopted the second rule that increases fuel economy for the fleet of passenger cars, light-duty trucks, and medium-duty passenger vehicles for model years 2017 and beyond to an average fuel economy of 54.5 miles per gallon by 2025. As part of the 2017 to 2025 standards rulemaking, EPA conducted a midterm evaluation of the longer-term standards for model years 2022 to 2025 and proposed, in 2018, to amend the corporate average fuel economy and GHG emissions standards for passenger cars and light-duty trucks and establish new standards, covering model years 2021 through 2026 (83 *Federal Register* 16077). The Safer Affordable Fuel-Efficient Vehicles Rule was adopted in March 2020, which sets fuel economy and CO_2 standards that increase 1.5 percent in stringency each year for passenger cars and light-duty trucks and cover model years 2021 through 2026 (NHTSA 2021).

In October 2016, NHTSA and EPA issued a Final Rule for "Phase 2" for medium- and heavy-duty vehicles to improve fuel efficiency and cut carbon pollution (that is, GHG emissions). The agencies estimate that the standards will save up to 2 billion barrels of oil and reduce CO_2 emissions by up to 1.1 billion metric tons over the lifetimes of model year 2018 to 2027 vehicles.

3.7.1.2 State

With the passage of legislation and EOs, California launched an innovative and proactive approach to addressing GHG emissions and potential climate change-related impacts, as follows:

- AB 1493, Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the California ARB to develop and implement regulations to reduce automobile and light-duty truck GHG emissions. These stricter emissions standards apply to automobiles and light-duty trucks beginning with the 2009 model year.
- EO S-3-05 (June 1, 2005): The goal of this EO is to reduce California's GHG emissions to (1) 2000 levels by 2010, (2) 1990 levels by 2020, and (3) 80 percent below 1990 levels by 2050. This goal was further reinforced with the passage of AB 32 in 2006 and SB 32 in 2016.
- AB 32, the Global Warming Solutions Act of 2006: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." In December 2008, ARB approved the initial scoping plan, which included measures to further reduce GHG emissions. Key elements of the initial scoping plan include the following:
  - Expand and strengthen energy efficiency programs, including building and appliance standards.
  - Increase electricity generation from renewable resources to at least 33 percent of the statewide electricity mix by 2020.
  - Establish targets for passenger vehicle-related GHG emissions in regions throughout California and pursue policies and incentives to achieve those targets. Included with this strategy is support for the development and implementation of a high-speed rail system to expand mobility choices and reduce GHG emissions.
  - Adopt and implement measures pursuant to existing state laws and policies, including California's clean car standards and the low carbon fuel standard.
  - Develop a cap-and-trade program so that the target is met while providing flexibility to California businesses to reduce emissions at low cost.

  In May 2014, ARB approved the *First Update to the Climate Change Scoping Plan* (ARB, 2014). The update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial scoping plan. It also evaluates how to align longer-term GHG reduction strategies with other state policy priorities for water, waste, natural resources, clean energy, transportation, and land use.

  In November 2017, ARB released the *2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target* (ARB, 2017b). The proposed framework includes the following elements:
  - 50 percent renewable energy
  - 50 percent reduction in statewide vehicular petroleum use
  - Doubling of energy efficiency in existing buildings
  - Carbon sequestration in California's land base
  - Aggressive reductions in short-lived climate pollutants, such as black carbon, fluorinated gases, and methane
  - Climate adaptation strategy

- EO S-20-06 (October 18, 2006): This EO establishes the responsibilities and roles of the Secretary of the California EPA and state agencies with regard to climate change.
- EO S-01-07 (January 18, 2007): This EO sets forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020. ARB re-adopted the low carbon fuel standard in September 2015, and the changes went into effect on January 1, 2016. The program promotes the low carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG reduction goals.
- SB 97, Chapter 185, 2007, Greenhouse Gas Emissions: SB 97 requires the Governor's Office of Planning and Research to develop recommended amendments to the CEQA Guidelines for addressing GHG emissions. The amendments became effective March 18, 2010.
- SB 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires ARB to set regional emissions reduction targets for passenger vehicles. The Metropolitan Planning Organization for each region must then develop a sustainable communities strategy that integrates transportation, land use, and housing policies to achieve the emissions target for its region.
- SB 391, Chapter 585, 2009 California Transportation Plan: This bill requires the State's long-range transportation plan to meet California's climate change goals under AB 32.
- Renewables Portfolio Standard (RPS): Established in 2002 under SB 1078, accelerated in 2006 under SB 107, and expanded in 2011 under SB 2, California's RPS is one of the most ambitious renewable energy standards in the United States. The RPS requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020.
- California EO B-30-15, 2015: California EO B-30-15, which was signed by Governor Brown in April 2015, requires a California GHG reduction target of 40 percent below 1990 levels by 2030. This is the most aggressive GHG emissions reduction goal in North America.
- SB 32 (California Global Warming Solutions Action of 2006: Emissions Limit) and AB 197 (State Air Resources Board: Greenhouse Gases: Regulations), 2016: SB 32 (Chapter 249, 2016) establishes a new target for GHG emissions reductions in the state at 40 percent of 1990 levels by 2030. This new target required ARB to reduce statewide GHG emissions to 1990 levels by 2020. Tied to SB 32, AB 197 (Chapter 250, 2016) increases legislative oversight of ARB, creating a Joint Legislative Committee on climate change policies to ascertain facts and make recommendations to the legislature concerning the state's programs, policies, and investments related to climate change. The bills became effective on January 1, 2017.

3.7.1.3 Local and Regional

The Proposed Program is within Stanislaus County, under the jurisdiction of SJVAPCD. SJVAPCD is taking initiatives to address GHG emissions and climate change. In August 2008, the SJVAPCD governing board adopted the *Climate Change Action Plan* (SJVAPCD, 2008). The *Climate Change Action Plan* directs the SJVAPCD Air Pollution Control Officer to develop guidance to assist lead agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project-specific GHG emissions on global climate change.

3.7.2 Environmental Setting

In the United States, the main source of GHG emissions is transportation, followed by electricity production (EPA, 2022). In California, transportation sources (passenger cars, light-duty trucks, other trucks, buses, and motorcycles) compose the largest category of GHG-emitting sources (ARB, 2019). In 2019, emissions from GHG-emitting activities statewide were 418.2 million metric tons (MMT) of carbon dioxide equivalent (CO_2e), which was 7.1 $MMTCO_2e$ lower than 2018 levels and almost 13 $MMTCO_2e$ below the 2020 GHG limit of 431 $MMTCO_2e$ (ARB, 2022b).

The transportation sector accounts for about 40 percent of the statewide GHG emissions inventory. Industrial and the electric power sectors account for 21 and 14 percent, respectively, of the total statewide GHG emissions inventory (ARB, 2022b). The dominant GHG emitted is CO_2, primarily from fossil fuel combustion.

In Stanislaus County, total GHG emissions in 2005 from the Stanislaus County region (combined emissions from the nine incorporated cities and the county) were 6.04 $MMTCO_2e$. Additional emissions arise from stationary sources and landfill sites (0.66 $MMTCO_2e$). The largest sources of GHG emissions in the region are building energy (electricity plus natural gas), on-road transportation, and agriculture (ICF, 2013).

3.7.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to GHG emissions and climate change. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following sections.

3.7.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts related to GHG are considered significant if the Proposed Program would result in any of the following:

- Generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG

Currently, no quantitative GHG emission thresholds apply to Stanislaus County in the context of CEQA. On December 17, 2009, SJVAPCD adopted the *Guidance for Valley Land-Use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* (SJVAPCD, 2009). According to the guidance, projects complying with an approved GHG emission reduction plan or GHG mitigation program would be determined to have a less-than-significant individual and cumulative impact with respect to GHG emissions and climate change. For other projects, the guidance relies on the use of performance-based standards, known as Best Performance Standards (BPSs), to assess the significance of project-specific GHG emissions on global climate change. Otherwise, a project needs to demonstrate a 29 percent reduction in GHG emissions from business-as-usual conditions to conclude that a project would have a less-than-significant impact. The determination is based on the principle that projects that have reduced or mitigated emissions consistent with AB 32 (the Global Warming Solutions Act of 2006) should be considered to have a less-than-significant impact.

Although SJVAPCD's guidance recommends approaches for evaluating the significance of GHG impacts, the guidance does not limit a lead agency's authority to establish its own process and guidance for determining significance (SJVAPCD, 2009). However, there is no applicable local GHG reduction plan. Therefore, the first criterion in SJVAPCD's GHG guidance does not apply. The SJVAPCD publishes a list of BPSs for land development projects, and each BPS has a corresponding GHG reduction percentage that can

be applied to emissions to meet the 29 percent emission reduction criterion. However, the current BPSs focus on measures to reduce GHG emissions from residential or commercial development projects with long-term GHG operational emissions. There are no applicable BPS for short-term construction activities.

Because most of the Proposed Program's emissions would occur over short-term construction periods and would have negligible increases of long-term operational GHG emissions, the criteria requiring use of BPSs, demonstration of 29 percent GHG emission reduction, or both, are not applicable. As the SJVAPCD-recommended guidance and significance criteria are not applicable to the Proposed Program, impacts of the GHG emissions that would result from the Proposed Program were evaluated based on whether the GHG emissions associated with proposed construction would hinder or delay California's ability to meet the statewide GHG reduction targets set in AB 32 and SB 32.

3.7.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. The No Program Alternative is functionally the same as the Existing Conditions as related to GHG emissions because both represent a condition without emissions generated by proposed construction activities. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

GHG would be emitted from vehicles and equipment during project construction. Construction emissions of GHG from off-road construction equipment were estimated using the methodologies and emission factors described in the California Emission Estimator Model User's Guide (CAPCOA, 2021). On-road vehicle emission factors of GHG were obtained from EMFAC2017 (ARB, 2017a).

Implementation of the Proposed Program over the 2040 planning horizon is shown on the draft implementation schedule included in Appendix C. As described in Section 2, Program Description and Alternatives, the timing and phasing for implementation of any specific project depends on many factors, such as funding availability, year-to-year repair and rehabilitation priorities, and project-specific environmental review.

Projected construction emissions of GHG were estimated for different years during the planning horizon for the Proposed Program based on the potential overlapping of the projects in each year. Over the planning horizon to 2040, GHG emissions of the following years were estimated because all other years would have lower construction emissions than at least one of these years, based on the lower levels of proposed project construction activities:

- 2023
- 2024
- 2025
- 2030
- 2031
- 2033

After the GHG emissions from the selected years were quantified (Table 3.7-1), 2030 was identified as the worst-case annual GHG emissions and used as the basis for the impact analysis. Because the GHG emissions of all other years would be lower, impacts would be lower in other years than the worst-case year. Detailed assumptions regarding project schedule, construction equipment and vehicles, and construction emissions calculated for the worst-case year (2030) are provided in Appendix D.

Table 3.7-1. Total Greenhouse Gas Emissions of Selected Construction Years
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Project Year [a]	CO_2e Emissions (metric tons per year)
2023	446.22
2024	785.89
2025	3034.97
2030	3395.79
2031	809.66
2033	1,212.48
Worst-Case GHG Emissions (2030)	3,395.79

[a] GHG emissions in the years not included in the table would be lower than the worst-case emissions.

As identified in Section 2, Program Description and Alternatives, project commitments would be incorporated as part of the Proposed Program to assist in avoiding or minimizing potential impacts, including minimization of unnecessary construction vehicle trips and idling time to reduce GHG emissions.

3.7.3.3 Impacts Associated with the Proposed Program

Impact GHG-1: Generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

Climate change is influenced by ongoing factors, including the construction and operation of projects at a global scale. A project may contribute to a potential impact through its incremental change in emissions when combined with the contributions of other sources of GHGs. In assessing such impacts, it must be determined whether a project's incremental effect is "cumulatively considerable" (CEQA Guidelines §§15064(h)(1) and 15130). To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of past, current, and future projects to make this determination is a difficult, if not impossible, task.

GHG emissions would occur during the Proposed Program construction and would include emissions from construction equipment, haul trucks, and worker commute vehicles. GHG emissions from the Proposed Program construction would vary each year because construction locations, times, and emissions would change over the planning horizon to 2040. As shown in Table 3.7-1, the worst-case annual CO_2e emissions during construction of the Proposed Program would be 3,396 metric tons of CO_2e in 2030. As described in Section 3.7.2, GHG emissions in 2005 in Stanislaus County were 6.04 $MMTCO_2e$. Therefore, Proposed Program emissions represent less than 0.1 percent of the County's total annual GHG emissions. The Proposed Program would implement best management practices during construction, such as minimizing unnecessary construction vehicle trips and idling time, which would reduce GHG emissions and make the overall construction emissions even lower. Therefore, the Proposed Program would not hinder or delay California's ability to meet the statewide GHG reduction targets set in AB 32 and SB 32. Impacts during construction of the Proposed Program would be less than significant.

Operations and maintenance of the Proposed Program would require similar equipment and vehicle trips as are required under current operations, and GHG emissions resulting from operation of the Proposed Program would not be expected to increase. As such, impacts during operation of the Proposed Program would be less than significant.

Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

EO S-3-05 and AB 32 set the goals of reducing GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and 80 percent below 1990 levels by 2050. To meet the GHG reduction goals, ARB prepared the AB 32 scoping plan and provided updates to the plan in 2017 to provide guidelines on statewide GHG reduction strategies.

The *2017 Climate Change Scoping Plan Update* (ARB, 2017b) is the primary plan for reducing GHG emissions throughout California. This plan is designed to reduce statewide GHG emissions in California by 40 percent as compared to the 1990 levels by 2030. The Proposed Program elements are consistent with the ARB policy of improving the resilience of infrastructure to climate change because the proposed capital improvements would replace aging infrastructure and modernize the water delivery system, allowing for greater operational flexibility. Therefore, implementation of the Proposed Program would not hinder or otherwise conflict with AB 32 or the AB 32 scoping plan or plan updates for reducing GHG emissions.

Although the scoping plan and updates identify a long-term vision and near-term activities to help California achieve its interim and 2050 emissions reduction goals, many factors influence California's ability to attain the goals, including changes in regulatory standards; fuel, transportation, and power generation technologies; growth in population; land use development patterns; and other factors that cannot currently be known. Because determining a conclusion about the Proposed Program's effect on compliance with the 2050 target identified in EO S-3-05 and AB 32 would require speculation, the potential impact of the Proposed Program with regard to this goal cannot be determined. In all other respects, the Proposed Program would not hinder or delay California's ability to meet the GHG reduction targets in AB 32 and the scoping plan and updates. Therefore, impacts from construction and operation of the Proposed Program would be less than significant.

3.7.4 Mitigation Measures

Construction, operation, and maintenance of the Proposed Program would have less-than-significant impacts with respect to GHG emissions and climate change; therefore, mitigation is not required or recommended. As described in Section 2, Program Description and Alternatives, the following project commitments would be implemented as part of the Proposed Program to minimize impacts on GHG emissions:

- Minimization of unnecessary construction vehicle trips and idling time to reduce GHG emissions.

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3.8 Hydrology and Water Quality

This section describes the regulatory and environmental setting related to hydrology and water quality in the Program Area, and evaluates potential impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

3.8.1 Regulatory Setting

This section describes relevant guidelines and regulations associated with the evaluation of potential impacts on hydrology and water quality in the Program Area.

3.8.1.1 Federal

Clean Water Act

The CWA (U.S.C., Title 33, Section 1251 et seq.) is the primary federal law governing surface water quality. The goal of the CWA is to restore and maintain the physical, chemical, and biological integrity of the waters of the United States. The CWA guides restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters.

CWA Sections 401, 402, and 404 requirements specifically apply to construction projects that might affect jurisdictional wetlands and waters of the United States. If a project discharges into waters of the United States, Section 401 specifies that a RWQCB certification must be obtained verifying that the project complies with the CWA and state water quality standards.

Section 402 established the National Pollutant Discharge Elimination System (NPDES), which regulates permits to discharge a pollutant (except dredge or fill material) into waters of the United States. Construction projects with disturbance areas greater than 1 acre that are implemented as part of the Proposed Program require coverage under the State's Construction General Permit (CAS0000001, Order 2009-0009-DWQ as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ). The permit requires development and implementation of a site-specific SWPPP, which must include BMPs to provide an effective combination of erosion and sediment controls. In Stanislaus County, the Central Valley RWQCB is the Section 401 and 402 permitting authority in the Program Area.

Section 404 of the CWA established the USACE permit program regulating the discharge of dredged or fill material into jurisdictional wetlands and waters of the United States. USACE's dredge and fill regulations are in 33 CFR Parts 320 through 330. Implementation of dredge and fill permitting follows the Section 404 (b)(1) Guidelines, which were jointly developed by EPA and USACE (40 CFR Part 230). The Section 404(b)(1) Guidelines allow the discharge of dredged or fill material into an aquatic system only if no practicable alternative with fewer adverse effects is available.

Section 303(c)(2)(B) of the CWA requires the state to develop and adopt numeric water quality standards for priority toxic pollutants identified according to EPA's Water Quality Management and Planning Regulation (40 CFR 130.7[b]), if those pollutants could be reasonably expected to interfere with the designated beneficial uses for a particular water body. EPA enacted the California Toxics Rule (40 CFR 13.138) to establish water quality criteria for water bodies not yet identified by the state and without numeric water quality criteria for priority toxic pollutants.

Section 303(d) of the CWA requires the state to identify and list water bodies not meeting water quality standards; these waters are deemed "impaired." The state then must develop a total maximum daily load, which is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources for the impaired water body.

3.8.1.2 State

Porter-Cologne Water Quality Control Act

The 1969 Porter-Cologne Water Quality Control Act gives statutory authority to regulate surface water and groundwater quality in the state to the SWRCB and the RWQCBs. This act is implemented by the SWRCB and nine RWQCBs, which regulate all pollutant or nuisance discharges that may affect surface water resources. The federal CWA authority under Section 402 was extended to the SWRCB and RWQCBs in 1972. The Porter-Cologne Water Quality Control Act protects the beneficial uses of surface water and groundwater in California, with a focus on water quality.

Each RWQCB is responsible for developing a Water Quality Control Plan for its region. The Proposed Program is located within the jurisdiction of the Central Valley RWQCB. The Water Quality Control Plan establishes water quality standards for all surface water and groundwater resources within the region, including designating the beneficial uses of waters, establishing numeric and narrative water quality objectives to ensure that beneficial uses are achieved, and incorporating the state's anti-degradation policy. In addition to administering the NPDES program through issuance of Waste Discharge Requirements, the SWRCB and RWQCBs also regulate discharges of waste to water or land that could affect surface water or groundwater.

California Fish and Game Code

Section 1602 of the California Fish and Game Code protects the natural flow, bed, channel, and bank of any perennial, intermittent, and ephemeral rivers, streams, and lakes in the state. These waterways are designated by the CDFW if there is, at any time, any existing fish or wildlife resources, or benefit for the resources. Any activity conducted by any person, state, or local governmental agency or public utility with the potential to substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake must notify CDFW; and a Section 1602 Lake and Streambed Alteration Agreement must be obtained.

California Water Code §10753.7

California Water Code §10753.7 requires local agencies seeking state funds for groundwater construction or groundwater quality projects to include considerations for responsible groundwater management. Specifically, it mandates local agencies to prepare or have the following:

- A developed and implemented groundwater management plan that includes basin management objectives and addresses the monitoring and management of groundwater levels, groundwater quality degradation, inelastic land surface subsidence, surface water/groundwater interaction, and a description of how recharge areas identified in the plan substantially contribute to the replenishment of the groundwater basin.
- A plan addressing cooperation and working relationships with other public entities.
- A map showing the groundwater basin the project is in, neighboring local agencies, and the area subject to the groundwater management plan.
- A map identifying the recharge areas for the groundwater basins.
- Monitoring protocols that are "designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater pumping in the basin."

- Groundwater management plans with the components listed above for local agencies outside the delineated Bulletin 118 groundwater basins.

California Water Code §13260

To avoid or minimize potential adverse impacts on waters of the state, California Water Code §13260 requires a waste discharge report submitted to the applicable RWQCB for any person discharging or proposing to discharge waste into any waters of the state other than into a community sewer system.

3.8.1.3 Local

This section provides Stanislaus County and the Cities of Modesto, Riverbank, and Waterford policies related to hydrology and water quality that are relevant to the Proposed Program.

Stanislaus County

The *Stanislaus County General Plan* includes goals, policies, and implementation measures. The goals and policies regarding hydrology and water quality discussed in this section are relevant to the Proposed Program (Stanislaus County, 2016b).

Land Use Element

Goal One: Provide for diverse land use needs by designating patterns which are responsive to the physical characteristics of the land as well as to environmental, economic, and social concerns of the residents of Stanislaus County.

- Policy Four: Urban development shall be discouraged in areas with growth-limiting factors such as high water table or poor soil percolation, and prohibited in geological fault and hazard areas, flood plains, riparian areas, and airport and private airstrip hazard areas, unless measures to mitigate the problems are included as part of the application.
- Policy Seven: Riparian habitat along the rivers and natural waterways of Stanislaus County shall, to the extent possible, be protected.
- Policy Eight: The County will continue to provide proper ordinances to ensure that flood insurance can be made available to qualified property owners through state and federal programs.

Goal Six: Promote and protect healthy living environments.

- Policy Twenty-Nine: Support the development of a built environment that is responsive to decreasing air and water pollution, reducing the consumption of natural resources and energy, increasing the reliability of local water supplies, and reduces vehicle miles traveled by facilitating alternative modes of transportation, and promoting active living (integration of physical activities, such as biking and walking, into everyday routines) opportunities.

Conservation/Open Space Element

Goal Two: Conserve water resources and protect water quality in the County.

- Policy Five: Protect groundwater aquifers and recharge areas, particularly those critical for the replenishment of reservoirs and aquifers.
- Policy Six: Preserve natural vegetation to protect waterways from bank erosion and siltation.
- Policy Seven: New development that does not derive domestic water from pre-existing domestic and public water supply systems shall be required to have a documented water supply that does not adversely impact Stanislaus County water resources.
- Policy Eight: The County shall support efforts to develop and implement water management strategies.

- Policy Nine: The County will investigate sources of water for domestic use.

Goal Five: Reserve, as open space, lands subject to natural disasters in order to minimize loss of life and property of residents of Stanislaus County.

- Policy Sixteen: Discourage development on lands that are subject to flooding, landslide, faulting, or any natural disaster to minimize loss of life and property.

City of Modesto

The Community Facilities and Services Chapter of the *City of Modesto General Plan* provides the following goals and policies regarding hydrology and water quality that is relevant to the Proposed Program (City of Modesto, 2019a):

Goal VI.A: Ensure a consistent, reliable, high-quality water supply for the City of Modesto's residents and businesses.

- Policy VI.A.2: Require water infrastructure master plans for public infrastructure and/or when otherwise pertinent to provision of water service at adopted service levels for the specific plan areas or other projects depending on site issues and location.

Goal VI.B: Pursue additional potential water supply alternatives available to the City to accommodate growth and meet future demand in both normal and dry years and continue to research and develop water reclamation as a water source.

- Policy VI.B.4: Strive to stabilize groundwater levels and minimize groundwater overdraft, as part of a conjunctive groundwater/surface water management program. View regional water resources, such as groundwater, surface water, and recycled wastewater, as an integrated hydrologic system when developing water management programs.

City of Riverbank

The *2005-2025 General Plan* provides guidance for land use, development, and natural resource conservation in the city of Riverbank, and includes Land Use, Conservation and Open Space, and Community and Character Design Elements (City of Riverbank, 2009). The plan includes the following goals and policies to protect, preserve, and enhance water resources within the city that are applicable to the Proposed Program:

Goal DESIGN-19: Water Quality is Protected Throughout the Development Process and Occupation of the Site.

- Policy DESIGN-19.1: The City will establish site design criteria for allowing natural hydrological systems to function with minimum or no modification.

Goal CONS-6: Maintain or Increase Surface and Groundwater Quality and Supply.

- Policy CONS-6.1: The City will require that waterways, floodplains, watersheds, and groundwater recharge areas are maintained in their natural condition, wherever feasible.
- Policy CONS-6.7: The City will require mitigation measures, in coordination with the Regional Water Quality Control Board, as a part of approved projects, plans, and subdivisions to address the quality and quantity of urban runoff, including that attributable to soil erosion.

Goal PUBLIC-2: Adequate Quality Water to Serve Existing and Future Projected Development Needs.

- Policy PUBLIC-2.1: The City will require that water supply, treatment, and delivery meet or exceed local, State, and federal standards.

City of Waterford

The broad purpose of the *City of Waterford General Plan Vision 2025*is to express policies that will guide decisions on future growth, development, and conservation of resources through 2025 in a manner consistent with the goals and quality of life desired by residents (City of Waterford, 2007). The Open Space & Conservation Element contains policies for open space lands and for conservation of natural and man-made resources. The following goals, policies, and actions that relate to the preservation of open space and the conservation of resources are applicable to the Proposed Program:

Goal Area A: Open Space (OS) for the Preservation of Natural Resources.

- Policy OS-A-2: Preserve and enhance Tuolumne River and Dry Creek in their natural state throughout the planning area.
- Policy OS-A-5: Preserve and enhance water quality.
- Policy OS-E-1: Promote water conservation throughout the planning area.

3.8.2 Environmental Setting

3.8.2.1 Hydrology

The Program Area is located in eastern Stanislaus County in the northeastern part of the San Joaquin Valley, entirely within the San Joaquin River Hydrologic Region (DWR, 2013). The Program Area is bounded on the north by the Stanislaus River, on the south by the Tuolumne River, on the west by the San Joaquin River, and on the east by the Sierra Nevada foothills. This area includes the local watersheds of the Stanislaus River, Tuolumne River, Dry Creek, and their tributaries, as well as the Modesto Reservoir. These collective watersheds drain into the San Joaquin River, located outside of the Program Area.

Figure 3.8-1 shows a map of the hydrologic resources within the Program Area. Both the Stanislaus and Tuolumne Rivers originate in the western Sierra Nevada Mountains before their respective confluences with the San Joaquin River, while Dry Creek originates within Stanislaus County and is a tributary to the Tuolumne River (Reclamation District 2092 and Stanislaus County, 2014). The Modesto Reservoir is also located within the Program Area. Completed in 1911, the reservoir acts as the primary regulating reservoir in the District system, with a maximum storage of 28,000 acre-feet. The reservoir is primarily used for balancing irrigation demands and deliveries, reducing flow rate fluctuation in District canals and laterals, and buffering flows from the hydroelectric power generation upstream.

Portions of the Program Area are designated by the Federal Emergency Management Agency (FEMA) as Special Flood Hazard Areas. FEMA produces and continuously updates flood hazard data in support of the National Flood Insurance Program (NFIP). Areas with a 1 percent probability of annual flooding are considered to be in a Special Flood Hazard Area, otherwise known as a 100-year floodplain. According to the FEMA NFIP Flood Rate Insurance Map for Stanislaus County, portions of the Program Area are located in Zone A within a Special Flood Hazard Area (FEMA, 2013), including along Dry Creek, on the southern boundary along the Tuolumne River, and on the western boundary of the District. Figure 3.8-2 identifies FEMA Special Flood Hazard Areas within the Program Area.

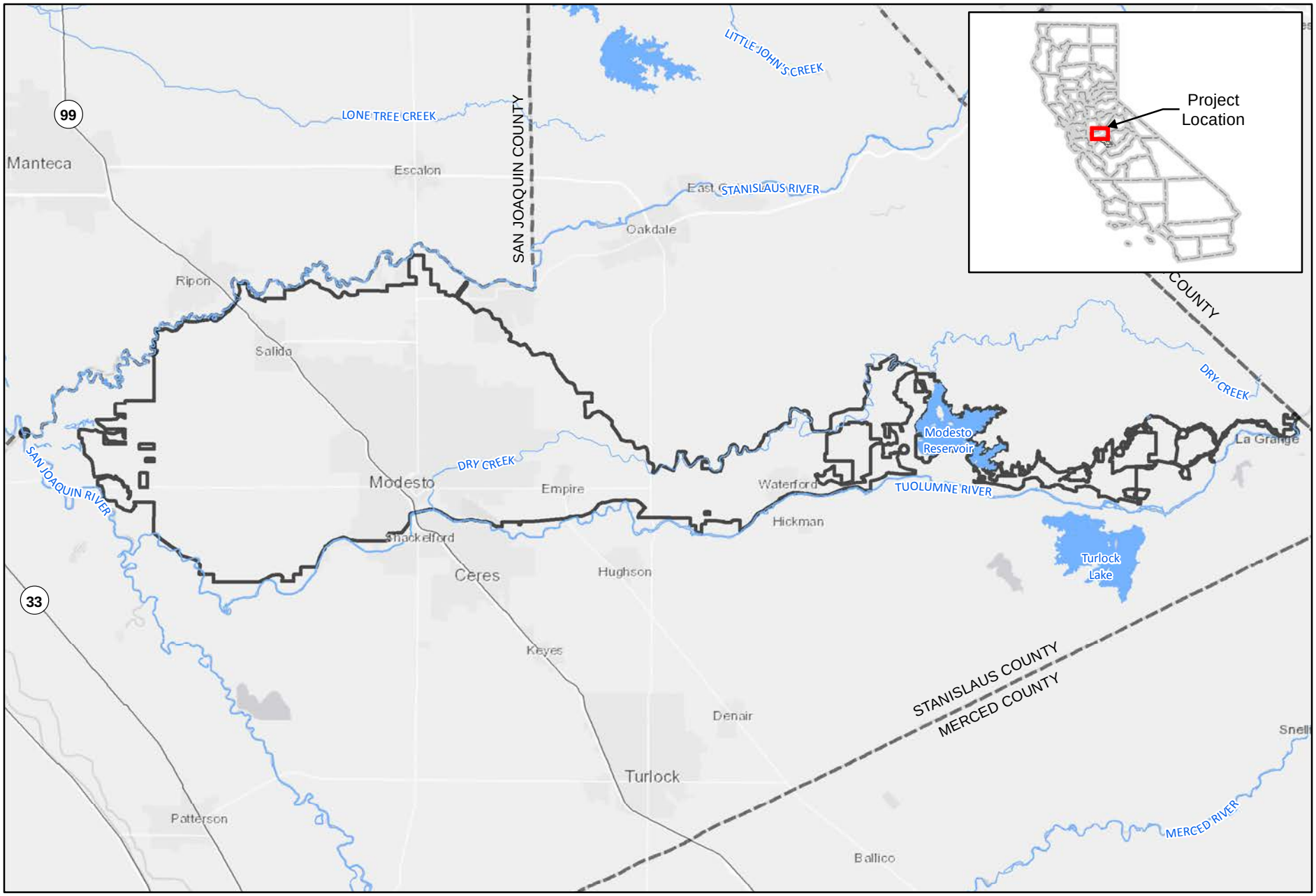
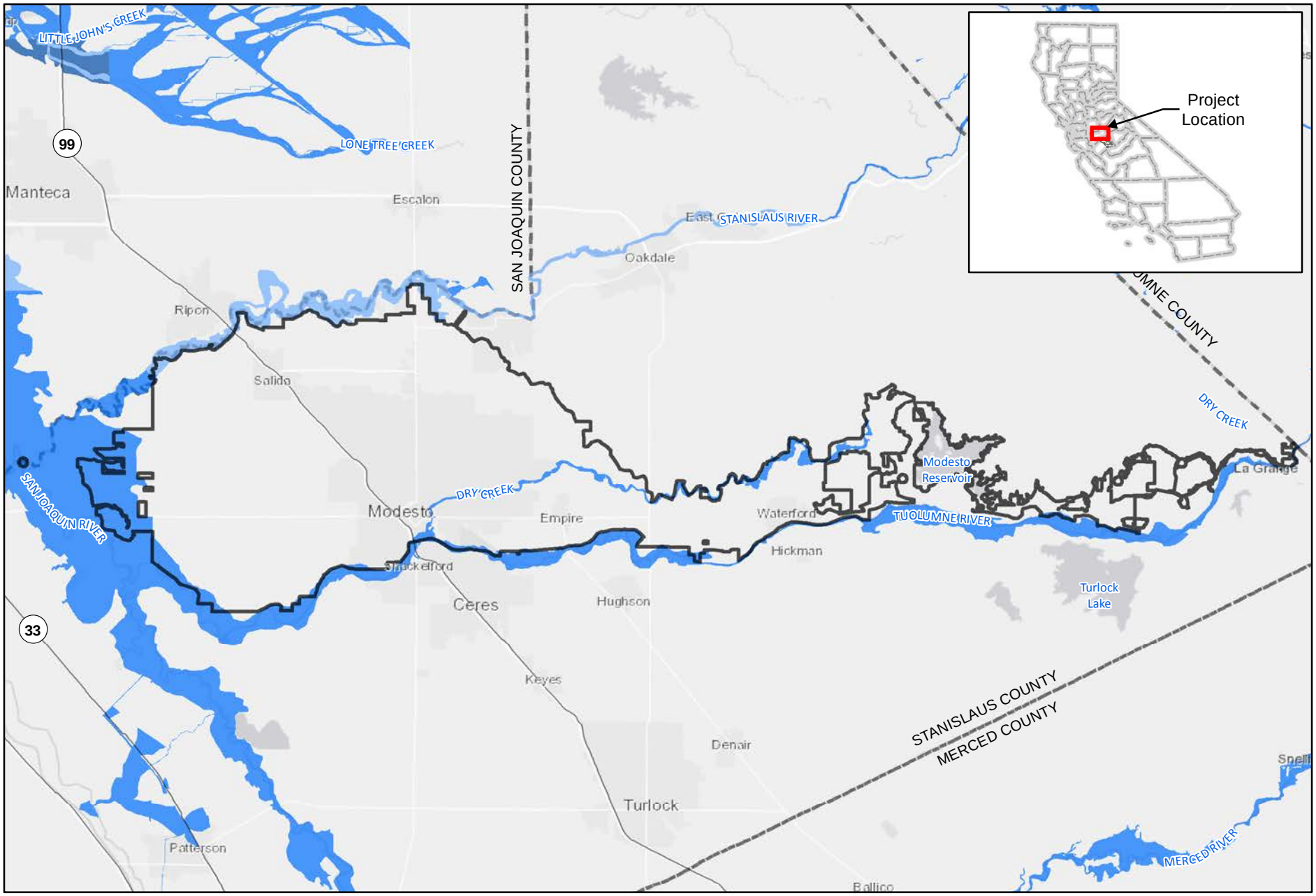


FIGURE 3.8-1
Hydrologic Resources within the Program Area
Modesto Irrigation District
Modesto, California



LEGEND

- Program Area
- Counties

FEMA Special Flood Hazard Area

- A - 1% annual chance flooding, for which no Base Flood Elevations have been determined
- AE - 1% annual chance flooding, for which Base Flood Elevations have been determined
- AO - 1% annual chance flooding (usually sheet flow on sloping terrain), for which average depths have been determined; flood depths range from 1 to 3 feet

N

0 2.5 5
Miles

FIGURE 3.8-2
FEMA Special Flood Hazard Areas in the Program Area
Modesto Irrigation District
Modesto, California

3.8.2.2 Water Quality

Impaired waterways and associated pollutant/stressors within the Program Area are provided in Table 3.8-1. Some of the contaminants of concern for these waters include diazinon, chlorpyrifos, Group A pesticides, and mercury.

Table 3.8-1. Impaired Waterways within the Program Area
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Waterway	Pollutant/Stressor	Source
Tuolumne River	Chlorpyrifos	Agriculture
	Group A pesticides [a]	Unknown non-point sources
	Mercury	Unknown non-point sources
	Diazinon	Agriculture
	Toxicity	Unknown non-point sources
Dry Creek	Chlorpyrifos	Agriculture
	Indicator bacteria	Unknown non-point sources
	Toxicity	Unknown non-point sources
	Oxygen, dissolved	Unknown non-point sources
	Diuron	Agriculture
Modesto Reservoir	Mercury	Unknown non-point sources

Source: SWRCB, 2018a.

[a]Organochlorine Group A pesticides, also referred to as "legacy pesticides," include toxaphene, chlordane, dieldrin, aldrin, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane (including lindane), endosulfan, dichlorodiphenyltrichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyldichloroethane.

The Central Valley RWQCB has established a variety of beneficial uses for surface waters in the Program Area. These include, but are not limited to, the following: agricultural water supply; cold and warm freshwater habitat; industrial process, service, and power supply; cold and warm fish migration habitat; municipal and domestic supply; water contact recreation; non-water contact recreation; cold and warm fish spawning habitat; and wildlife habitat (Central Valley RWQCB, 2018).

3.8.2.3 Climate

Like much of California, the Program Area is characterized by a Mediterranean climate with warm, dry summers and wet but mild winters. Average annual precipitation within the Program Area is approximately 13 inches, coming in the form of rainfall, primarily between the months of October and May (U.S. Climate Data, 2019). In most years, the rainfall is sufficient to meet the water demand for winter annuals, pasture, and winter cover crops in the orchards; as a result, the District does not typically provide irrigation deliveries during this period (MID, 2019a). However, during extended periods of drought, such as those years experienced between 2012 and 2016, demands generated may be more than those that can be supplied by precipitation, and off-season irrigation deliveries may be necessary.

As discussed in Section 3.9.2.1, most surface water flows within the Program Area originate in the high Sierra Nevada. Snowpack averages in the Sierra Nevada are based on a number of factors, including elevation, location, and weather conditions. The foothills of the Sierra Nevada may experience less than 10 inches of snowfall per year; however, peaks in the Sierra Nevada may experience hundreds of inches of snowfall and consequently, significant inches of snow water equivalent (DWR, 2019).

3.8.2.4 Groundwater

The Program Area is entirely located within the Modesto subbasin (MID, 2019b). The California Department of Water Resources Bulletin 118 identifies the Modesto subbasin as a subbasin of the San Joaquin Valley Groundwater Basin (DWR, 2004). Figure 3.8-3 shows the subbasins within the San Joaquin Valley Groundwater Basin.

The Modesto subbasin is bounded by the Stanislaus River to the north, the Tuolumne River to the south, the San Joaquin River to the west, and crystalline basement rock of the Sierra Nevada foothills to the east. Within the Modesto subbasin, natural groundwater flow is primarily in a southwestern direction, following the regional dip of basement rock and sedimentary units in the subbasin. Flows are unrestricted, with no faults being identified that affect the movement of fresh groundwater. MID production wells are often aligned closely with irrigation conveyance infrastructure to further convey groundwater throughout the Program Area. Production wells range in depth between 88 feet and 740 feet, with an average depth of 370 feet. Drainage wells are primarily located in the western portion of the Modesto subbasin because of the shallow groundwater table west of Highway 99 and are generally less than 100 feet deep (MID, 2012).

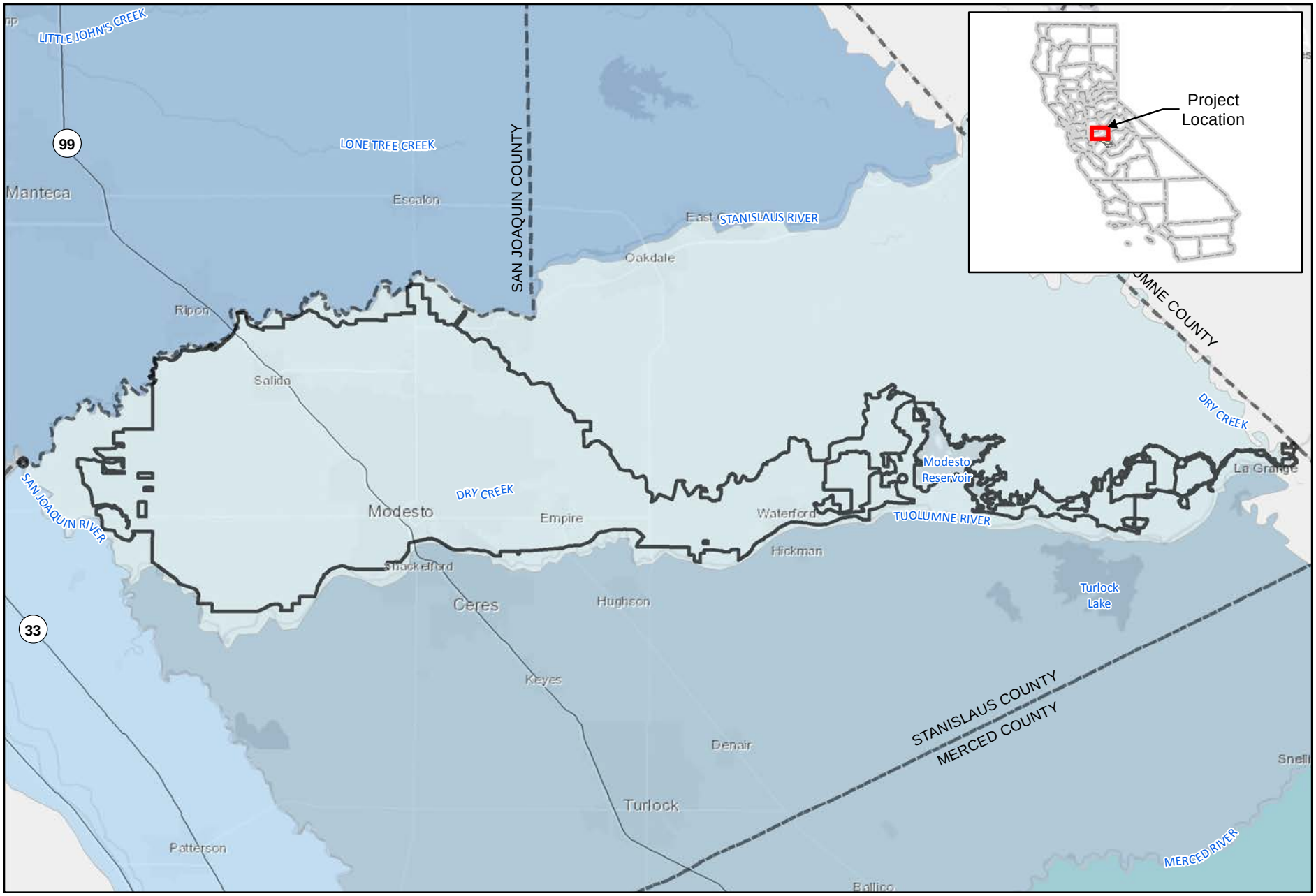
Across the Modesto subbasin, total dissolved solids values range from 60 to 8,300 milligrams per liter, with a typical range of 200 to 500 milligrams per liter. In the eastern subbasin, groundwater is characterized as a calcium bicarbonate type, whereas in the western portion, it is considered a calcium-magnesium bicarbonate or calcium-sodium bicarbonate type (DWR, 2004). As of May 2017, the Stanislaus and Tuolumne Rivers Groundwater Basin Association (STRGBA) Groundwater Sustainability Agency (GSA) became the exclusive GSA for the Modesto subbasin. The agency comprises the following seven participating members (STRGBA GSA, 2018):

- Modesto Irrigation District
- Oakdale Irrigation District
- City of Modesto
- City of Oakdale
- City of Riverbank
- City of Waterford
- Stanislaus County

To comply with the Sustainable Groundwater Management Act (SGMA), STRGBA prepared a Groundwater Sustainability Plan (STRGBA GSA & Tuolumne GSA, 2022). The Groundwater Sustainability Plan was adopted by the STRGBA GSA on January 31, 2022.

3.8.2.5 Modesto Irrigation District System

MID is an independent, publicly owned district that delivers irrigation water, electricity, and treated surface water to municipal, agricultural, and residential customers in portions of Stanislaus County and treated municipal water to the city of Modesto. MID's primary source of water is surface water runoff from the Tuolumne River watershed. The 1,880-square-mile watershed extends to the high Sierra Nevada Mountains and terminates where the Tuolumne River flows into the San Joaquin River west of the city of Modesto. Most water in the Tuolumne River comes from snowmelt, with peak runoff occurring from April through July. Groundwater within the MID irrigation service area is primarily used as a secondary source of water supply to supplement surface water from the Tuolumne River.



LEGEND

- Program Area
- Counties

Subbassins

- DELTA-MENDOTA
- EASTERN SAN JOAQUIN
- MERCED
- MODESTO
- TRACY
- TURLOCK

N

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Miles

FIGURE 3.8-3
San Joaquin Valley Groundwater Subbasins within the Program Area
Modesto Irrigation District
Modesto, California

The District's system includes approximately 204 miles of canals, laterals, and pipelines; production wells; and drainage pumps. MID currently delivers water serving approximately 66,000 acres of irrigated lands within its irrigation service area. The New Don Pedro Reservoir provides the primary surface water storage for MID and the TID. On the Tuolumne River downstream of New Don Pedro Reservoir is La Grange Diversion Dam, which is used as the primary diversion from the Tuolumne River for MID and TID. New Don Pedro Dam and La Grange Diversion Dam are operated jointly by MID and TID.

3.8.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to hydrology and water quality. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

3.8.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts on hydrology and water quality are to be considered significant if the Proposed Program would result in any of the following:

- Violation of any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality.
- Substantial decrease in groundwater supplies or interference with groundwater recharge such that sustainable groundwater management in the basin is impeded.
- Substantial alteration to the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:
  - Result in substantial erosion or siltation on or off site
  - Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site
  - Create or contribute to runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff
  - Impede or redirect flood flows
- Risk release of pollutants due to project inundation in flood hazard, tsunami, or seiche zones.
- Conflict with or obstruction of the implementation of a water quality control plan or sustainable groundwater management plan.

3.8.3.2 Impact Assessment Methods and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. The No Program Alternative is functionally the same as Existing Conditions as related to hydrology and water quality because minimal additional future development is anticipated in the predominantly rural and agricultural areas adjacent to Proposed Program facilities, and both represent a condition without the Proposed Program. However, under the No Program Alternative, the District's ability to manage water deliveries, system operations, and water measurement would comparatively degrade over time in the absence of the capital improvements included as part of the Proposed Program. The following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

Implementation of BMPs to prevent soil erosion from individual Proposed Program projects requiring construction would occur as prescribed in a SWPPP and would be implemented as part of the Proposed Program. A SWPPP would be required by the Construction General Permit Order issued by SWRCB. The SWPPP would emphasize proper hazardous materials storage and handling procedures; would outline spill containment, cleanup, and reporting procedures; and would limit refueling and other hazardous activities to designated areas. Signs prohibiting refueling would be posted in sensitive areas. Equipment would be inspected prior to use each day to ensure that hydraulic hoses are tight and in good condition. Appropriate BMPs would be used to prevent discharge of possible contaminants and chemicals associated with construction activities, such as the following: use of concrete washout basins, proper waste management, and securely locating and maintaining portable toilets.

Additionally, the contractor would employ BMPs to reduce runoff from the project sites or disposal areas to nearby surface water features. These may include, but are not limited to, temporary soil stabilization (such as proper grading and covering of soil stockpiles), temporary sediment control (such as silt fences, fiber rolls, or sandbag barriers), and permanent soil stabilization (such as installing sediment barriers, vegetative buffer strips, and reseeding disturbed areas).

3.8.3.3 Impacts Associated with the Proposed Program

Impact HR-1: Violation of any water quality standards or waste discharge requirements or otherwise substantially degrade surface water quality.

Regulating Reservoirs

As described in Section 2, Program Description and Alternatives, construction of the proposed regulating reservoirs requires the use of standard construction equipment. A complete list of construction equipment required for the proposed regulating reservoirs is provided in Table 2-2 in Section 2. It is possible that the O&M of construction equipment could result in hazardous materials spills if materials are misused or improperly handled and stored. Leaks and spills could enter the soil and potentially contaminate groundwater or runoff into nearby surface water features, causing an impact on water quality. Additionally, runoff from soil stockpiles in the disposal areas or temporary stockpiles, as well as runoff from disturbed areas, could affect nearby surface water features, causing an impact on water quality. During construction, BMPs would be implemented as prescribed in a SWPPP, as required by the Construction General Permit Order issued by SWRCB. With implementation of the SWPPP, construction of the regulating reservoirs would not violate water quality standards or waste discharge requirements, and impacts would be less than significant.

Implementation of the Proposed Program would increase the number of regulating reservoirs in the Program Area, and these additional reservoirs could provide temporary impoundment of surface water during storm events. Temporary impoundment of stormwater would allow for settling of suspended sediments, potentially improving water quality downstream. In addition, the regulation of surface water supplies during the irrigation season could potentially improve water quality in downstream waterways. The BMPs included in the SWPPP would be incorporated into routine maintenance activities, as applicable, to prevent the release of water and sediment during O&M of the proposed regulating reservoirs. Therefore, O&M of the regulating reservoirs under the Proposed Program would not result in the violation of any water quality standards or waste discharge requirements, and impacts on water quality would be less than significant.

All Other Project Types

Construction of other project types also would require the use of standard construction equipment, including bulldozers, graders, concrete pumps and trucks, and on-site generators (Section 2, Program Description and Alternatives, provides all anticipated required equipment by project category). As described above for the regulating reservoirs, it is possible that the O&M of construction equipment could result in hazardous materials spills if materials are misused or improperly handled and stored; however, a SWPPP would be implemented, as required by the Construction General Permit Order issued by SWRCB. With implementation of the SWPPP, construction would not violate water quality standards or waste discharge requirements, and impacts would less than significant.

O&M activities during operation of the Proposed Program would be consistent with existing O&M activities. The BMPs outlined in the SWPPP would be incorporated into routine maintenance activities, as applicable, to prevent the release of water and sediment during operation of the Proposed Program. As such, Program operation would not violate any water quality standards or waste discharge requirements, and impacts on water quality would be less than significant.

Impact HR-2: Substantial decrease in groundwater supplies or interference with groundwater recharge such that sustainable groundwater management is impeded.

All Project Types

As described in Section 2, Program Description and Alternatives, system improvement projects are proposed throughout the Program Area. The potential for the Proposed Program to affect groundwater resources is limited to groundwater management activities as described in Section 2.1.2.4 of the Program Description. None of the other system improvement projects would have any adverse effects on groundwater resources in the Program Area because construction of facilities would be limited to surface activity and excavation above current groundwater levels. It is possible that operation of the proposed regulating reservoirs could result in a minor degree of groundwater recharge and associated groundwater level improvement. Groundwater management projects include well testing, maintenance and rehabilitation, and constructing replacement wells for conjunctive use. The category also provides a placeholder for future regional activities and cooperative programs for groundwater management and water quality, as well as the projects that arise from the Well Testing and Maintenance Program. These projects would not increase overall groundwater pumping levels or create new sources of additional supply. No impacts on groundwater resources would occur.

Impact HR-3: Substantial alteration to the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site.

Regulating Reservoirs

As described in Section 2, Program Description and Alternatives, construction of the proposed regulating reservoirs would involve earth movement and soil stockpiling, and there is the potential for erosion or siltation on or off site. As described under Impact HR-1, the District would develop and implement a SWPPP to minimize the potential for on- and off-site erosion and siltation. With implementation of the SWPPP, construction of the proposed regulating reservoirs would not result in substantial erosion or siltation on or off site, and impacts would be less than significant.

Implementation of the proposed regulating reservoirs would increase operational flexibility in the context of the existing system and would not result in substantial modifications to drainage in the Program Area. Where site-specific modifications to drainage are necessary, the modifications would be designed to avoid substantial erosion and siltation during operation. The BMPs outlined in the SWPPP would be incorporated into routine maintenance activities, as applicable, to prevent substantial erosion and siltation. Therefore, O&M of the proposed regulating reservoirs would not result in substantial erosion or siltation on or off site, and impacts would be less than significant.

All Other Project Types

Similar to the proposed regulating reservoirs, construction of other project types also would involve earth movement and soil stockpiling, and there is the potential for erosion or siltation on or off site. As described under Impact HR-1, the District would develop and implement a SWPPP to minimize the potential for on- and off-site erosion and siltation. With implementation of the SWPPP, construction would not result in substantial erosion or siltation on or off site, and impacts would be less than significant.

Routine maintenance activities may involve occasional ground disturbance, and the applicable measures outlined in the SWPPP would be incorporated into those activities to prevent substantial erosion and siltation, as needed. Therefore, O&M would not result in substantial erosion or siltation on or off site, and impacts would be less than significant.

Impact HR-4: Substantial alteration to the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site.

Regulating Reservoirs

Construction of the proposed regulating reservoirs would result in site-specific modifications to local drainage at the project sites; however, construction activities would be managed so as not to cause on-site or off-site flooding, in keeping with standard practice. During construction, the existing drainage pattern at the proposed regulating reservoir sites would not be altered in a manner that would result in increased flooding, and impacts would be less than significant.

Implementation of the proposed regulating reservoirs would increase operational flexibility in the context of the existing system and would not result in substantial modifications to drainage in the overall Program Area. Where site-specific modifications to drainage are necessary, the modifications would be designed such that they would not result in flooding. Additionally, the implementation of the regulating reservoirs could increase the regional ability to impound flows during 100-year flood events through additional reservoir storage. Operation of the Proposed Program would not alter existing drainage patterns in a manner that would result in increased flooding, and impacts would be less than significant.

All Other Project Types

Construction of the other proposed system improvement projects would occur primarily within the existing water delivery systems and would not involve substantial alteration of the existing drainage pattern of the project sites. Construction activities would be managed so as not to cause on- or off-site flooding, in keeping with standard practice. During construction, the existing drainage pattern of proposed project sites would not be altered in a manner that would result in increased flooding, and impacts would be less than significant.

Impact HR-5: Substantial alteration to the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

All Project Types

As described under Impact HR-4, construction activities would be managed so as not to cause on- or off-site flooding. This includes the creation or contribution of runoff that would exceed the capacity of local drainage systems. As described under Impact HR-1, there is the potential for proposed construction activities to generate runoff. Through development and implementation of the SWPPP, the Proposed Program would not provide substantial additional sources of runoff during construction. Construction of the Proposed Program would not create or contribute runoff that would exceed the capacity of

stormwater drainage systems or provide substantial additional sources of polluted runoff, and impacts would be less than significant.

The Proposed Program would enhance the District's ability to deliver water, and the proposed system improvement projects would be designed to effectively convey and detain water throughout the District. The proposed projects would not introduce new impervious surfaces and would not result in increased local runoff. As described under Impact HR-1, operation of facilities under the Proposed Program would not result in new sources of surface water pollution. Operation of the Proposed Program would not create or contribute runoff that would exceed the capacity of stormwater drainage systems or provide substantial additional sources of polluted runoff, and impacts would be less than significant.

Impact HR-6: Risk release of pollutants due to project inundation in flood hazard, tsunami, or seiche zones; impede or redirect flood flows.

Regulating Reservoirs

The proposed locations for the regulating reservoirs are not within FEMA Special Flood Hazard Areas. The proposed regulating reservoirs would be designed and operated to neither impede nor redirect flood flows and would slightly expand the regional ability to impound flows during 100-year flood events. As described under Impact HR-1, water quality impacts during construction and operation would be less than significant, and the Proposed Program would not introduce new sources of pollutants that could be released as a result of flooding. Therefore, the Proposed Program would have a less-than-significant impact related to the risk of release of pollutants from project site inundation.

The proposed regulating reservoirs would have the extremely unlikely potential to increase the risk of release (including sediment) in the event of a failure. Each regulating reservoir would have a storage capacity of up to 200 acre-feet and would be constructed by excavating an area and using the excavated material to construct berms around the perimeter. The elevation of the bottom of the regulating reservoirs would be below the elevation of the surrounding area by around 6 feet. Under a failure scenario, water below that elevation would remain in the reservoir, and the water above the elevation of the surrounding land surface could inundate the area surrounding the reservoir. Because the Program Area is characterized by flat terrain, water would spread out laterally rather than being channeled toward a specific area. The regulating reservoirs are proposed in primarily agricultural areas where few structures exist in the immediate area. The regulating reservoirs would be designed to current engineering standards, which address potential failure modes. This includes the effects of anticipated earthquake loading for the Program Area, based on the site-specific detailed geotechnical analysis of each project site. As a result, the risk of releasing pollutants because of flooding would be less than significant.

All Other Project Types

The FEMA Special Flood Hazard Areas within the Program Area are shown on Figure 3.8-2. Although most of the proposed projects are located outside of the FEMA Special Flood Hazard Areas, a few of the proposed projects would be located within these areas. These facilities would be designed and operated to neither impede nor redirect flood flows. As described under Impact HR-1, water quality impacts during construction and operation would be less than significant, and the Proposed Program would not introduce new sources of pollutants that could be released as a result of flooding. Therefore, the Proposed Program would have a less-than-significant impact related to the risk of release of pollutants from project site inundation.

Impact HR-7: Conflict with or obstruction of the implementation of a water quality control plan or sustainable groundwater management plan.

As described under Impact HR-1, a SWPPP would be implemented, as required by the Construction General Permit Order issued by SWRCB, and with implementation of the SWPPP, the Proposed Program would result in a less-than-significant impact on water quality during construction and operation. The Proposed Program would not conflict with, or obstruct implementation of, the Water Quality Control

Plan for the Sacramento River and San Joaquin River Basins. As described under Impact HR-2, the Proposed Program would have no adverse impact on groundwater resources. The Proposed Program would not conflict with, or obstruct the implementation of, a water quality control plan or sustainable groundwater plan, and no impact would occur.

3.8.4 Mitigation Measures

Construction and O&M of the Proposed Program would have less-than-significant impacts on hydrology and water quality; therefore, mitigation is not required or recommended. As described in Section 2, Program Description and Alternatives, the following project commitments would be implemented as part of the Proposed Program to minimize impacts on hydrology and water quality:

- Implementation of BMPs to prevent soil erosion as prescribed in a SWPPP, as required by the Construction General Permit Order issued by SWRCB. BMPs would include the following:
  - Filter fences and catch basins would be placed below construction activities to intercept sediment before it reaches the waterway.
  - Sediment control measures would be in place before the onset of the rainy season and would be monitored and maintained in good working condition until disturbed areas have been stabilized.
  - When construction is complete, stabilizers, such as weed-free mulch, would be applied to disturbed areas.
  - Use, transport, and disposal of hazardous materials, such as fuels, lubricants, and solvents, would be in accordance with California Department of Toxic Substances Control, EPA, and U.S. Occupational Safety and Health Administration requirements.

3.9 Noise

This section describes the regulatory setting with respect to noise and vibrations, and existing noise and vibration conditions in the Program Area. This section evaluates potential noise- and vibration-related impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area.

3.9.1 Regulatory Setting

This section summarizes applicable noise guidelines and regulations related to the implementation of the Proposed Program. OSHA is the only relevant federal law that is applicable to potential worker facility or construction site noise exposure as a result of the Proposed Program. State regulations mandate that local jurisdictions implement noise policies and ordinances. Given that MID and the Proposed Program are located within Stanislaus County, noise and vibration standards within the area of analysis are regulated by the local policies and regulations of Stanislaus County and the Cities of Modesto, Riverbank, and Waterford.

3.9.1.1 Federal

OSHA (29 CFR 1910 et seq.) contains regulations that establish the maximum noise levels to which workers at a facility or construction site may be exposed. These OSHA noise regulations are designed to protect workers from the effects of noise exposure and list permissible noise-level exposure as a function of the amount of time during which the worker is exposed to the noise. OSHA regulations also dictate hearing conservation program requirements and workplace noise monitoring requirements.

No federal laws exist that govern off-site noise. However, EPA has identified a noise level of 55 decibels on the A-weighted scale (dBA) as adequate to protect persons engaging in outdoor activities from noise interference. This level does not represent an enforceable standard but is viewed as a level below which an increased health risk is unlikely.

3.9.1.2 State

Generally, state noise regulations consist of CEQA and California OSHA (Cal/OSHA) requirements. These are described below.

California Environmental Quality Act

CEQA requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. CEQA Guidelines define a significant effect on the environment as one that will "increase substantially the ambient noise levels for adjoining areas…" CEQA Guidelines further require that a project's impacts be considered cumulatively in conjunction with those of other projects planned for the area (14 CCR 15065[c]).

California Occupational Safety and Health Administration

The Occupational Noise Exposure Regulations promulgated by Cal/OSHA (8 CCR 5095 et seq.) set employee noise exposure limits and identify measures to be taken if limits are exceeded. These standards are equivalent to the federal OSHA standards described in Section 3.9.1.1. Additionally, vehicle noise limits are established by the California Vehicle Code §23130 and §23130.5.

No state regulations limit environmental noise levels. California Government Code §65302(f) mandates that the legislative body of each county adopt a comprehensive general plan policy document to address planning issues according to a variety of "elements," including noise.

3.9.1.3 Local

This section describes the goal, policies, standards, and provisions implemented by Stanislaus County and the Cities of Modesto, Riverbank, and Waterford for evaluating potential environmental noise impacts and mitigation.

Stanislaus County

The *Stanislaus County General Plan* (Stanislaus County, 2016b) includes a Noise Element that provides noise level standards by land use type. Major noise sources, as noted in the Stanislaus County Noise Element, include highways and freeways, arterials, railroad operations and ground rapid transit systems, aircraft operations, local industrial plants, and other ground stationary sources. Airports located within or near the Program Area include the Modesto City-County Airport, Mapes Ranch Airport, Peterson Airport, and Yandell Ranch Airport. As shown on Figure IV-2 of the general plan's Noise Element, noise levels up to 70 dBA are considered "normally acceptable" for most land use categories and "clearly unacceptable" at 75 dBA or greater (Stanislaus County, 2016b).

The following noise mitigation policy identified in the Noise Element is applicable and relevant to the Proposed Program (Stanislaus County, 2016b):

- Policy Two: It is the policy of Stanislaus County to develop and implement effective measures to abate and avoid excessive noise exposure in the unincorporated areas of the County by requiring that effective noise mitigation measures be incorporated into the design of new noise generating and new noise sensitive land uses.
- Policy Three: It is the objective of Stanislaus County to protect areas of the County where noise-sensitive land uses are located.

Stanislaus County Noise Ordinance

The Stanislaus County Code includes provisions to control the level and frequency of disturbing, excessive, offensive, or unusually loud noise in the county that may jeopardize the health, welfare, or safety of the citizens of the county (Stanislaus County, 2018a). Sound-level limitations relevant to the Proposed Program are provided under Chapter 10.46, Noise Control:

- Construction Equipment. No person shall operate any construction equipment so as to cause at or beyond the property line of any property upon which a dwelling unit is located an average sound level greater than seventy-five decibels between the hours of 7:00 p.m. and 7:00 a.m.

City of Modesto

The Environmental Resources, Open Space and Conservation chapter of the *City of Modesto General Plan* (City of Modesto, 2019a) includes a Noise Element that provides noise level standards by land use type. The ambient noise environment in the city is influenced primarily by roadway traffic, intermittent railroad operations, and aircraft operations (City of Modesto, 2019a). The Noise Element applies to the city as a whole and identifies policies to minimize exposure to excessive noise sources. As shown in Table VII-2, Noise and Compatibility Matrix, in the City's Noise Element, noise levels of 75 dBA or below are considered "normally acceptable" for most land use categories and "clearly unacceptable" at 75 dBA or greater (City of Modesto, 2019a).

The following policies identified in the Noise Element are relevant to the Proposed Program (City of Modesto, 2019a):

- The City of Modesto shall require construction activities to comply with the City's noise ordinance (Title 4, Chapter 9) and implement noise-reducing construction practices as conditions of approval for development projects where substantial construction-related noise impacts would be likely to occur (where construction would include extended periods of pile driving, where construction would

occur over an unusually long period, or where noise-sensitive uses like homes and schools would be in the immediate vicinity, etc.). Potential measures, include, but are not limited to, the following:

- Construction equipment and vehicles should be equipped with properly operating mufflers according to the manufacturers' recommendations. Air compressors and pneumatic equipment should be equipped with mufflers, and impact tools should be equipped with shrouds or shields.
- Quietest equipment available should be utilized.
- Haul routes that affect the fewest number of people should be selected.

City of Modesto Noise Ordinance

Title 4, Public Welfare, Safety, and Health of the Modesto Code of Ordinance (City of Modesto, 1991) includes provisions to control the level and frequency of disturbing, excessive, offensive, or unusually loud noise that may jeopardize the health, welfare, or safety of citizens in the city. Sound-level limitations relevant to the Proposed Program are provided under Chapter Nine Noise Regulations, Section 4-9.103, and prohibit the following:

(A) The loud and raucous discharge into the open air of the steam of any steam equipment or exhaust from any stationary internal-combustion engine.

(B) The loud and raucous operation or use of any of the following before 7:00 a.m. or after 9:00 p.m. daily (except Saturday and Sunday and State or federal holidays, when the prohibited time shall be before 9:00 a.m. and after 9:00 p.m.):

(1) A hammer, or any other device or implement used to pound or strike an object.

(2) An impact wrench, or other tool or equipment powered by compressed air.

(3) A hand-powered saw.

(4) Any tool or piece of equipment powered by an internal-combustion engine such as, but not limited to, chain saw, backpack blower, and lawn mower. Except as included in subsection (a)(6)of the Modesto Code of Ordinance, motor vehicles, powered by an internal-combustion engine and subject to the California Vehicle Code, are excluded from this prohibition.

(5) Any electrically powered (whether by alternating current electricity or by direct current electricity) tool or piece of equipment used for cutting, drilling, or shaping wood, plastic, metal, or other materials or objects, such as, but not limited to, a saw, drill, lathe, or router.

(6) Any of the following: heavy equipment (such as, but not limited to, bulldozer, steam shovel, road grader, back hoe), ground drilling and boring equipment (such as, but not limited to, derrick or dredge), hydraulic crane and boom equipment, portable power generator or pump, pavement equipment (such as, but not limited to, pneumatic hammer, pavement breaker, tamper, compacting equipment), pile-driving equipment, vibrating roller, sand blaster, gunite machine, trencher, concrete truck, and hot kettle pump.

(7) Any construction, demolition, excavation, erection, alteration, or repair activity.

City of Riverbank

The *2005-2025 General Plan* (City of Riverbank, 2009) included a Noise Element to provide a basis for comprehensive local policies to control and abate environmental noise and to protect the citizens of Riverbank from excessive noise exposure. Major noise sources, as mentioned in the Noise Element, include highways and freeways, primary arterials and major local streets, railroad operations, aircraft operations, and local industrial facilities.

The following noise goals, policies, and actions identified in the Noise Element of the *2005-2025 General Plan* are relevant to the Proposed Program (City of Riverbank, 2009):

- Policy NOISE-2.3: The City shall require all feasible noise mitigation to reduce construction and other short-term noise and vibration impacts as a condition of approval for development projects by applying the performance standards outlined in Table 3.9-1 [below]. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table 3.9-1, as measured at outdoor activity areas of any affected noise sensitive land use except:
  - If the ambient noise level exceeds the standard in Table 3.9-1, the standard becomes the ambient level plus 5 dBA.
  - Reduce the applicable standards in Table 3.9-1 by 5 decibels if they exceed the ambient level by 10 or more decibels.

City of Waterford

The *City of Waterford General Plan Vision 2025* (City of Waterford, 2007) includes a Noise Element to identify noisy areas and to provide measures for protecting residents from the harmful effects of excessive noise. Major noise sources identified in the Waterford Noise Element include vehicular noise, aircraft operations, and railroad operations. As shown on Figure 11.4, Feasibility of Developments with Respect to Noise, accessible in Chapter 11 of the City's general plan, noise levels 70 dBA or below are considered "feasible" or "probably feasible" for most land use categories and "usually not feasible" at 75 dBA or greater (City of Waterford, 2007).

The following policies identified in the Noise Element of the *City of Waterford General Plan Vision 2025* are relevant to the Proposed Program (City of Waterford, 2007):

- Policy N-1.2: Reduce equipment noise levels.
- Policy N-1.3: Reduce noise levels at the receiver where noise reduction at the source is not possible.
- Policy N-1.4: Coordinate planning efforts so that noise-sensitive land uses are not located near major noise sources.
- Policy N-1.5: Mitigate all significant noise impacts as a condition of project approval for sensitive land uses.

Table 3.9-1. City of Riverbank Maximum Allowable Noise Exposure
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Noise Level Performance Standards for Non-transportation Noise Sources		
	Maximum Exterior Noise Level Standards [b]	
Cumulative Duration of Noise Event (Minutes) [a]	Daytime [c,d]	Nighttime [d,e]
30–60	50	45
15–30	55	50
5–15	60	55
1–5	65	60
0–1	70	65

Source: City of Riverbank, 2007.

[a] Cumulative duration refers to time within any 1-hour period.

[b] Noise level standards measured in decibels.

[c] Daytime = Hours between 7:00 a.m. and 10:00 p.m.

[d] Each of the noise level standards specified may be reduced by 5 decibels for tonal noise (a signal which has a particular and unusual pitch) or for noises consisting primarily of recurring impulse noises (sounds of short duration, usually less than 1 second, with an abrupt onset and rapid decay such as the discharge of firearms).

[e] Night time = Hours between 10:00 p.m. and 7:00 a.m.

3.9.2 Environmental Setting

The Proposed Program is located entirely within Stanislaus County. The Program Area is rural and predominantly surrounded by agricultural uses, with pockets of residential neighborhoods. Sensitive receptors[1] within the Program Area include residences, schools and associated play areas, hospitals, parks, places of worship, and businesses. Sensitive receptors for noise are generally defined as locations where human activity may be adversely affected by program-related noise, including where low noise levels are important and where or on whom excessive noise levels could cause adverse health effects or disrupt activity.

The Program Area is characterized by agricultural uses, including almond orchards, field crops, alfalfa, grains, and truck crops. Native vegetation and rangeland dominate the land immediately outside the Program Area to the north, south, and east. Noise levels within the Program Area are generally low and are seasonally influenced primarily by agricultural operations. Existing noise sources in the Program Area include agricultural equipment (for example, trucks, tractors, and harvesters), traffic from interstate and state routes, railroad operations, aircraft operations, and active recreation and commercial areas. Noise levels are affected to a lesser degree by vehicle traffic, trains, and other noise-generating land uses within the city of Modesto.

Three major highways (State Route 99, State Route 132, and State Route 108) are located near the Program Area. Active rail lines include the Burlington Northern Santa Fe Railroad, which generally runs adjacent and parallel to Santa Fe Avenue on the eastern edge of Modesto; the Union Pacific Railroad, which runs adjacent and parallel to Ninth Street, Brink Avenue, and State Route 99 on the western edge of Modesto; and the Modesto and Empire Traction Company, which runs primarily in the Beard Industrial District along Yosemite Boulevard on the southern edge of Modesto (City of Modesto, 2008). Sensitive receptors in the Program Area primarily include private residences adjacent to farmlands as well as schools, hospitals, parks, and churches. Table 3.9-2 identifies by category the individual projects located within 0.5 mile of sensitive receptors.

Table 3.9-2. Projects with Sensitive Receptors Located within 0.5 Mile
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Project Name	Schools[a]	Hospitals and Nursing Facilities	Residential	Religious Institutions
Regulating Reservoirs				
Lateral 3 and 7 Regulating Reservoir			X	
Lateral 4 and 5 Regulating Reservoir	X		X	
Lateral 6 and 8 Regulating Reservoir	X		X	
Flow Control				
Lateral 3 Long-Crested Weir			X	
Tidewater Pump	X			X
Cavil Drain Rehabilitation – East of Highway 99 – Pump Station at Brink	X			
Ashford/College Drain Flow Redirection	X			X
Waterford Lower Main Canal - Boneyard Check Structure Drain	X		X	
Canal, Lateral, and Tunnel Improvements				
Lateral 2 and Highline Intertie	X	X	X	
Lateral 1 Spill Relocation			X	

[1] A sensitive receptor includes facilities such as schools, residences, hospitals, resident care facilities, and libraries.

Table 3.9-2. Projects with Sensitive Receptors Located within 0.5 Mile
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Project Name	Schools[a]	Hospitals and Nursing Facilities	Residential	Religious Institutions
Groundwater Management				
Highline 197 Irrigation Well	X		X	
Corson 66 Drainage Well	X		X	
Measurement and Automation				
Lateral 4 Headworks Flow Measurement/Level Monitoring	X			X
Lateral 8 Pump Automation			X	
Goldsworthy Headgate Improvements	X			
Briggs Headgate Improvements	X		X	
Lateral W-10 Headworks – SCADA	X			X
Waterford Lateral Improvements – Butcher, W-11, and W-12	X			
OID Spill Mootz Drain – SCADA			X	
OID Spill Pump at Rainbow Field – SCADA			X	
OID Spill at Pelton Weir – SCADA			X	
OID Spill below Roselle Avenue – SCADA	X		X	
Trash Rack Improvements – Lateral 3	X	X		X
Trash Rack Improvements – Lateral 4	X		X	X
Trash Rack Improvements – Lateral 6	X		X	
Trash Rack Improvements – Lateral 7		X		
Trash Rack Improvements – Lateral 8			X	

[a] The Schools category includes libraries, child care facilities, college/universities, private schools, and public schools.

Notes:

OID = Oakdale Irrigation District
SCADA = supervisory control and data acquisition

3.9.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis with respect to potential noise impacts. The thresholds used to evaluate potential noise impacts, analysis methodology and assumptions, and impact analysis are presented in the following sections.

3.9.3.1 Thresholds of Significance

The thresholds that were used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and are listed below. Noise impacts are considered significant if the Proposed Program would result in any of the following:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive ground-borne vibration or ground-borne noise levels.
- For a project located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.

3.9.3.2 Impacts Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is functionally the same as Existing Conditions as related to noise because minimal additional future development is anticipated in the predominantly rural and agricultural areas adjacent to Proposed Program facilities, and both represent a condition without noise generated by proposed activities. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

Operational noise and vibration levels of the Proposed Program facilities would not include noise-generating equipment or activities beyond typical District operations and maintenance and are, therefore, not discussed further in this section. This analysis focuses on impacts associated with Proposed Program construction. To assess construction noise and vibration impacts, anticipated noise and vibration levels are described, and the potential for the presence of sensitive receptors in the vicinity of any of the proposed projects was evaluated.

The following assumptions were made with respect to anticipated Proposed Program noise-related impacts:

- Sensitive receptors, as defined in Table 3.9-2, are identified if they fall within a 0.5-mile radius of an individual project location, given that construction noise levels are anticipated to disperse to relatively low levels beyond 0.5 mile of each construction location/activity.
- With the exception of the proposed regulating reservoirs, individual projects under the Proposed Project would be expected to have minimal noise and vibration impacts. Therefore, each of the project categories is not specifically discussed in the impacts section.
- Proposed construction activity would be restricted to the hours set forth in the local noise regulations described in Section 3.9.1.3.
- Stationary noise-generating equipment would be located as far as possible from nearby sensitive receptors.
- Construction equipment powered by gasoline or diesel engines would have sound control devices at least as effective as those provided by the original equipment manufacturer. No equipment would be allowed to have unmuffled exhaust.
- Noise-generating mobile equipment and machinery would be turned off when not in use.

Noise Characteristics

Noise is typically defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Noise levels are typically stated in terms of dBA, reflecting the response of the human ear by filtering out some of the noise in the low- and high-frequency ranges that the ear does not detect well. The A-weighted scale is used in most ordinances and standards. The equivalent noise level (L_{eq}) is defined as the average noise level, on an energy basis, for a stated period of time (for example, hourly). Table 3.9-3 shows the relative A-weighted noise levels of common sounds measured in the environment and industry for various sound levels (Beranek, 1988).

Table 3.9-3. Typical Sound Levels Measured in the Environment
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Examples of Common, Easily Recognized Sounds	Decibels (dBA) at 50 feet	Subjective Evaluations
Near Jet Engine	140	Deafening
Threshold of Pain (Discomfort)	130	
Threshold of Feeling – Hard Rock Band	120	
Accelerating Motorcycle (at a few feet away)	110	
Loud Horn (at 10 feet away)	100	Very loud
Noisy Urban Street	90	
Noisy Factory	85	
School Cafeteria with Untreated Surfaces	80	Loud
Near Freeway Auto Traffic	60	Moderate
Average Office	50	
Soft Radio Music in Apartment	40	Faint
Average Residence without Stereo Playing	30	
Average Whisper	20	Very faint
Rustle of Leaves in Wind	10	
Human Breathing	5	
Threshold of Audibility	0	

Construction Noise

The *Roadway Construction Noise Model User's Guide* (RCNM User Guide) (FHWA, 2006) is one of the most comprehensive construction noise databases developed in the United States, and the expected equipment noise levels identified in the RCNM User Guide are used for this evaluation. Table 3.9-4 lists the project-specific equipment noise levels as maximum dBA at a reference distance of 50 feet. The acoustical usage factor is the fraction of time that the equipment generates noise at the maximum level.

Table 3.9-4. Construction Equipment Noise Levels from the RCNM User Guide
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Equipment Description	Acoustical Usage Factor (percent)	Specified L_{max} at 50 Feet (dBA)	Actual Measured L_{max} at 50 Feet (dBA)	Number of Actual Data Samples
All Other Equipment > 5 Horsepower	50	85	not applicable	0
Backhoe	40	80	78	372
Compactor (ground)	20	80	83	57
Concrete Pump Truck	20	82	81	30
Bulldozer	40	85	82	55
Dump Truck	40	84	76	31

Table 3.9-4. Construction Equipment Noise Levels from the RCNM User Guide
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Equipment Description	Acoustical Usage Factor (percent)	Specified L_{max} at 50 Feet (dBA)	Actual Measured L_{max} at 50 Feet (dBA)	Number of Actual Data Samples
Excavator	40	85	81	170
Front-end Loader	40	80	79	96
Generator	50	82	81	19
Generator (<25 kilovolt amperes, variable message signs)	50	70	73	74
Grader	40	85	—	0
Pickup Truck	40	55	75	1
Scraper	40	85	84	12
Tractor	40	84	—	0

Source: FHWA, 2006.

Notes:
— = not applicable
> = greater than
< = less than
L_{max} = maximum noise standard

The RCNM User Guide describes the models used to determine the levels generated by each piece of equipment. Construction equipment noise levels at various distances, based on equipment noise levels provided in the RCNM User Guide, are presented in Table 3.9-5. This extrapolation overstates likely noise impacts because it does not account for atmospheric absorption, ground effects, or other noise attenuation mechanisms.

Construction Vibration

The Federal Transit Administration uses an evaluation approach that accounts for anticipated vibration from construction equipment at vibration-sensitive receptors (FTA, 2006). This method evaluates the potential for annoyance to people and damage to buildings. For the Proposed Program, the criterion selected for annoyance is 80 vibration decibels (VdB) (relative to 1 micro-inch/second root-mean-square) based on infrequent vibration events occurring at residences. The criterion selected for damage was a peak particle velocity of 0.2 inch per second based on nonengineered timber and masonry buildings.

Table 3.9-5. Construction Equipment Noise Levels Versus Distance
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Distance from Right-of-Way or Property Line (feet)	L_{eq} Noise Level (dBA)
50	83
100	79
200	74
400	69
800	63

Table 3.9-5. Construction Equipment Noise Levels Versus Distance
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Distance from Right-of-Way or Property Line (feet)	L_{eq} Noise Level (dBA)
1,600	58
3,200	52
6,400	46

The vibration sources selected for analysis for this PEIR include the following:

- A large bulldozer with a peak particle velocity at a reference distance of 25 feet of 0.089 inch per second and a vibration level of 87 VdB at a reference distance of 25 feet
- Loaded haul trucks with a peak particle velocity at a reference distance of 25 feet of 0.076 inch per second and a vibration level of 86 VdB at a reference distance of 25 feet

Calculations based on the algorithms provided by the Federal Transit Administration (2006) indicated that the damage criterion would not be exceeded at distances farther than 15 feet from a bulldozer or loaded haul trucks, and the annoyance criterion would not be exceeded at distances farther than 43 feet from the bulldozer or loaded haul trucks. Under the Proposed Program, construction equipment is expected to operate at greater distances from the nearest noise-sensitive receptors. Impact pile driving is not anticipated for construction under the Proposed Program.

3.9.3.3 Impacts Associated with the Proposed Program

Under CEQA Guidelines, a noise assessment is required that assesses the baseline noise setting of the project area and evaluates how large or perceptible potential project-related noise increases would be in the project area. An assessment of potential noise impacts associated with construction of the Proposed Program is discussed below.

Impact NOI-1: Result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Noise impacts associated with the Proposed Program would result from temporary activities during construction periods. Noise levels resulting from construction would depend on several factors, such as the number and type of machines operating, the level of operation, and the distance between sources, sound, and noise receptors. As shown in Table 3.9-4, the loudest equipment used during construction of the individual projects under the Proposed Program would generally emit noise in the range of 80 to 85 dBA at 50 feet. The following project commitments would be implemented to reduce noise resulting from temporary construction activities:

- Proposed construction activity would be restricted to the hours set forth in the local noise regulations described in Section 3.9.1, unless otherwise approved by the applicable local agency and in coordination with affected landowners.
- Stationary noise-generating equipment would be located as far as possible from nearby sensitive receptors.
- Construction equipment powered by gasoline or diesel engines would have sound control devices at least as effective as those provided by the original equipment manufacturer. No equipment would be allowed to have unmuffled exhaust.
- Noise-generating mobile equipment and machinery would be turned off when not in use.

Regulating Reservoirs

Construction of each of the proposed regulating reservoirs would last approximately 1 year. Standard construction equipment (bulldozers, graders, and excavators) would be used during construction. A complete list of construction equipment required for the proposed regulating reservoirs is provided in Table 2-2 in Section 2, Program Description and Alternatives. As shown in Table 3.9-2, residences are located within 0.5 mile of the potential locations of the proposed regulating reservoirs; however, all construction activity would be temporary and occur within the hours set forth in local noise regulations and would, therefore, be in compliance with local noise regulations described in Section 3.9.1. With implementation of the project commitments and compliance with local noise regulations, noise impacts during construction would be less than significant.

All Other Project Types

Implementation of the Proposed Program is anticipated to occur over the 2040 planning horizon and would require the use of standard construction equipment, including bulldozers, graders, concrete pumps and trucks, and on-site generators (Section 2, Program Description and Alternatives, provides anticipated required equipment by project category). The use of this equipment would result in temporary increases in noise during construction periods. These temporary noise increases would occur throughout the Program Area; however, construction associated with individual projects in specific locations generally would last only one construction season. Anticipated short-term noise impacts would be localized and predominantly limited to rural and agricultural areas adjacent to Proposed Program facilities with no, or a minimal number of, sensitive receptors within 0.5 mile. In addition, all construction activity would occur within the hours set forth in local noise regulations and would, therefore, be in compliance with local noise regulations described in Section 3.9.1. With implementation of the project commitments and compliance with local noise regulations, noise impacts during construction would be less than significant.

Impact NOI-2: Result in exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels.

Construction activities such as ground-disturbing activities (grading, excavation, and movement of heavy construction equipment) associated with the Proposed Program could generate ground-borne vibration and noise. As described in Section 3.9.3.2, the damage criterion for vibration impacts would not be exceeded at distances farther than 15 feet from a bulldozer or loaded haul trucks, and the annoyance criterion would not be exceeded at distances farther than 43 feet from the bulldozer or loaded haul trucks.

Regulating Reservoirs

Construction of each of the proposed regulating reservoirs would last approximately 1 year. Standard construction equipment (bulldozers, graders, and excavators) would be used during construction, which could generate ground-borne vibration and noise. A complete list of construction equipment required for the proposed regulating reservoirs is provided in Table 2-2 in Section 2, Program Description and Alternatives. As shown in Table 3.9-2, residences are located within 0.5 mile of the potential locations of the proposed regulating reservoirs; however, construction would not be concentrated along the property boundary, and equipment would be located more than 50 feet from the nearest sensitive receptors. Therefore, construction of the proposed regulating reservoirs would not result in exposure of excessive ground-borne vibration or noise levels. This impact would be less than significant.

All Other Project Types

Implementation of the Proposed Program is anticipated to occur over the 2040 planning horizon and would include the use of standard construction equipment, which could generate ground-borne vibration and noise during construction periods (Section 2, Program Description and Alternatives, provides all anticipated required equipment by project category). Most of the construction activities associated with individual projects would occur in predominantly rural and agricultural areas adjacent to Proposed Program facilities with no sensitive receptors within 0.5 mile. For projects located within 0.5 mile of sensitive receptors (Table 3.9-2), construction equipment would be located more than 50 feet from the nearest sensitive receptors. Therefore, construction would not result in exposure of excessive ground-borne vibration or noise levels. This impact would be less than significant.

Impact NOI-3: For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the Program Area to excessive noise levels.

Projects implemented as part of the Proposed Program could potentially occur within 2 miles of the Modesto City-County Airport, Mapes Ranch Airport, Peterson Airport, or Yandell Ranch Airport. Construction worker exposure to noise is governed by OSHA and Cal/OSHA. The District would be required to comply with applicable OSHA and Cal/OSHA standards related to protecting construction workers from excessive noise levels. Therefore, impacts would be less than significant.

3.9.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less-than-significant noise and vibration impacts; therefore, mitigation is not required or recommended. As included in Section 2, Program Description and Alternatives, the following project commitments would be implemented as part of the Proposed Program to minimize noise resulting from temporary construction activities:

- Proposed construction activity would be restricted to the hours set forth in the local noise regulations described in Section 3.9.1, unless otherwise approved by the applicable local agency and in coordination with affected landowners.
- Stationary noise-generating equipment would be located as far as possible from nearby sensitive receptors.
- Construction equipment powered by gasoline or diesel engines would have sound control devices at least as effective as those provided by the original equipment manufacturer. No equipment would be allowed to have unmuffled exhaust.
- Noise-generating mobile equipment and machinery would be turned off when not in use.

3.10 Public Services and Utilities

This section describes the regulatory and environmental settings with respect to public services and utilities, and evaluates potential public services and utilities-related impacts that would result from implementation of the Proposed Program. For the purposes of this section, the Study Area is Stanislaus County because the related agencies and systems exist at the county level.

3.10.1 Regulatory Setting

This section identifies and describes guidelines and regulations relevant to the evaluation of potential public services and utilities impacts. No specific federal regulations apply to the Proposed Program with respect to public services and utilities associated with construction or operation activities in the Study Area.

3.10.1.1 State

California Water Code

The California Water Code section of the CCR establishes the regulatory environment governing water management in California. Special districts that provide domestic water service in unincorporated areas of counties, including irrigation districts, must operate in accordance with the California Water Code. Division 11, CCR 20500-29978, specifically outlines laws governing irrigation districts and associated activities.

California Government Code Section 65303

According to Section 65303 of the California Government Code, local governments may adopt or address other elements in their general plans related to the physical development of the county or city. The public services and utilities element in a general plan addresses many of the facilities or services provided by the various local public agencies serving the residents within its sphere of influence. The Land Use Element of the *Stanislaus County General Plan* provides goals and policies that guide the development and use of utilities and services in the county (Stanislaus County, 2015).

California Public Utilities Code

The California Public Utilities Code was enacted in 1951 to provide legislative oversight to public utility organizations operating within the state and to ensure increased public safety. Because the District generates and distributes electricity from the Don Pedro and New Hogan Reservoirs, the District operates as a public utility and is, therefore, subject to the regulations outlined within the code, which provides legal requirements related to governance, consumer protection, renewables, pollution reduction, and fees, among others.

California Integrated Waste Management Act

Under the California Integrated Waste Management Act (AB 939), CalRecycle establishes priorities for local agencies regarding source reduction, recycling, and environmentally safe transformation and land disposal. The act also establishes landfill diversion goals intended to extend the useful life of landfills throughout the state. In accordance with 27 CCR 21600–21900, solid and hazardous waste transfer and disposal facilities in Stanislaus County are regulated jointly by RWQCB and CalRecycle.

3.10.1.2 Local

Stanislaus County

The *Stanislaus County General Plan* contains two elements relevant to the public services and the Proposed Program (Stanislaus County, 2016b). Land Use Element Goal Four is focused on ensuring that an effective level of public service is provided in unincorporated areas. Related Policy Twenty-four states that future growth shall not exceed the capability/capacity of the provider of services, such as sewer, water, public safety, solid waste management, road systems, schools, and health care facilities.

Conservation/Open Space Element Goal Two promotes conserving water resources and protecting water quality in the county. Policy Seven states that new development that does not derive domestic water from pre-existing domestic and public water supply systems shall be required to have a documented water supply that does not adversely affect Stanislaus County water resources.

City of Modesto

The *City of Modesto General Plan* addresses public services and utilities that may be relevant to the Program across Chapter VI: Community Facilities and Services (City of Modesto, 2019a). In Chapter VI, goals and associated policies are as follows:

Goal VI.A: Ensure a consistent, reliable, high-quality water supply for the City of Modesto's residents and businesses.

- Policy VI.A.2: Require water infrastructure master plans for public infrastructure and/or when otherwise pertinent to provision of water service at adopted service levels for the specific plan areas or other projects depending on site issues and location.

Goal VI.B: Pursue additional potential water supply alternatives available to the City to accommodate growth and meet future demand in both normal and dry years and continue to research and develop water reclamation as a water source.

- Policy VI.B.4: Strive to stabilize groundwater levels and minimize groundwater overdraft, as part of a conjunctive groundwater / surface water management program. View regional water resources, such as groundwater, surface water, and recycled wastewater, as an integrated hydrologic system when developing water management programs.

Goal VI.F: Establish and maintain an operating storm drainage system that protects people and property from flood damage.

- Policy VI.F.2: Require stormwater drainage infrastructure master plans for the public infrastructure or when otherwise pertinent to provision of service at adopted service levels for projects depending on site issues and location-specific concerns.
- Policy VI.F.5: Minimize impervious surfaces and generally maximize infiltration of rainwater in soils with development to promote groundwater recharge, where appropriate. Strive to maximize permeable areas to allow more percolation of runoff into the ground through such means as bioretention areas, green strips, planter strips, decomposed granite, porous pavers, vegetated swales, and other water permeable surfaces. Require planter strips between the street and the sidewalk within the community, wherever practical and feasible.

City of Riverbank

The *2005-2025 General Plan* provides guidance for land use, development, and natural resource conservation in the city of Riverbank and includes a Public Service and Facilities Element. The plan includes the following goals and policies to protect, preserve, and enhance public services and utilities within the city that are applicable to the Program (City of Riverbank, 2009):

Goal LAND-5: Full Range of Public Services and Facilities for All Areas of the Community.

- Policy LAND-5.1: The City will maintain public services and facilities in the existing developed City *and* make improvements as necessary to maintain a consistent Citywide level of service.

Goal PUBLIC-1: Public Service and Infrastructure Provision to Meet or Exceed Level of Service Standards Consistent with other Community Goals.

Goal PUBLIC-6: Adequate Public Utilities, Including Gas, Electric, Telecommunications, and Other Utility Services.

- Policy PUBLIC-6.2: The City will work with local gas, communications, and electric providers to maintain and improve current levels of service and meet future demands, including the development of three phase power for industrial areas, as appropriate.

City of Waterford

The broad purpose of the *City of Waterford General Plan Vision 2025* is to express policies that will guide decisions on future growth, development, and conservation of resources through 2025 in a manner consistent with the goals and quality of life desired by residents. Three goals and associated policies relate to providing public services and utilities are applicable to the Proposed Program (City of Waterford, 2007):

Public Services and Facilities Goal: Adequate Public Services and Facilities to Meet the Needs of the City's Residents.

Public Services and Facilities Goal: Cost-Effective Public Service Delivery Systems and Facilities.

Public Services and Facilities Goal: Public Services and Facilities Standards that are Applied Uniformly Throughout the City.

Associated policies include PF-1.1 to establish and maintain adequate and uniform municipal infrastructure and service standards and PF-1.5 to assure that expansion of the city results in the enhancement of municipal services and facilities within Waterford without increasing costs to the existing city.

3.10.2 Environmental Setting

The Proposed Program is located entirely within Stanislaus County. MID provides electrical service to the cities and towns of Modesto, Mountain House, Ripon, Salida, Escalon, Oakdale, Riverbank, Empire, and Waterford, as well as domestic water to the city of Modesto. The areas where individual projects included as part of the overall Proposed Program are rural, sparsely populated, and dominated by agriculture and agricultural facilities.

3.10.2.1 Public Services

Police, Fire Protection, and Emergency Services

The Program Area is primarily served by the Stanislaus County Sheriff's Department, which is responsible for law enforcement services in the unincorporated areas of the county through its Operations Division. The Operations Division also provides law enforcement services under contract to four cities within Stanislaus County: Patterson, Riverbank, Hughson, and Waterford. The Cities of Ceres, Modesto, Newman, Oakdale, and Turlock maintain their own police departments. The Stanislaus County Sheriff's Department operates the Public Safety Center and other county detention facilities; functions as the County Coroner; and issues concealed carry weapons licenses (Stanislaus County Sheriff's Department, 2019). The California Highway Patrol serves as the primary law enforcement agency responsible for state highways traversing the Program Area, providing law enforcement, traffic control, accident investigation, and management of hazardous materials spill incidents on state highways (Cal OES, 2014).

The fire services system in Stanislaus County is a mix of municipal agencies, fire protection districts, and various forms of state fire protection. The Stanislaus County Office of Emergency Services is responsible for developing and maintaining general and specific preparedness programs for the county and its nine cities. The Office of the Fire Warden supports and coordinates all public fire services and agencies in the county, with an emphasis on special fire districts. There are six municipal fire departments in the county; these are

funded through general fund revenues. In addition, 14 special districts provide fire protection services (Stanislaus County, 2016b). The Stanislaus Consolidated Fire Protection District is the largest agency with responsibility for the provision of fire protection, prevention, and emergency services in unincorporated Stanislaus County. The California Department of Forestry and Fire Protection provides service within State Responsibility Areas, predominantly wildland and open space areas within the county.

Schools and Parks

In the 2017–2018 school year, Stanislaus County had a total of 109,990 students enrolled in 187 public elementary schools, junior high/middle schools, high schools, and other types of schools, including alternative/continuation, charter, and special education (SCOE, 2019). Additional education opportunities are provided through the Yosemite Community College District and the California State University, Stanislaus campus.

The Stanislaus County Department of Parks and Recreation manages park and recreational facilities in unincorporated Stanislaus County. The existing system of county parks (more than 6,000 acres) includes 5 regional parks, 12 neighborhood parks, 10 community parks, 2 off-highway vehicle parks, 4 cemeteries, 2 bridges, La Grange historical areas, and 5 fishing access points along rivers and lakes (Stanislaus County Department of Parks and Recreation, 2018).

3.10.2.2 Utilities and Service Systems

Water Supply and Delivery

Stanislaus County is within the San Joaquin River basin, where the larger streams and rivers are regulated by dams and reservoirs that support a variety of water users. Agricultural irrigation constitutes the largest water use in the county, followed by municipal uses and habitat support (Stanislaus County, 2008). Water supply sources in the county include surface water, groundwater, and large-scale state- and federally contracted water conveyances.

MID's primary source of water is surface water runoff from the Tuolumne River watershed. Groundwater within the MID irrigation service area is primarily used as a secondary source of water supply to supplement surface water from the Tuolumne River. MID is primarily an agricultural water supplier, although treated water is provided to the city of Modesto for urban delivery. The City of Modesto supplies drinking water to communities in the surrounding region, including Del Rio, Salida, Empire, Grayson, and small portions of Ceres and Turlock (City of Modesto, 2017). Domestic water systems that provide water to individual communities in the county are generally small and isolated. Several agencies, such as community service districts, public utility districts, sanitary districts, and other irrigation districts provide domestic water to portions of residents in unincorporated areas of the county. Residents in unincorporated areas of the county outside of the service districts must generally rely on private wells as their source for drinking water (Stanislaus County, 2015).

Wastewater Collection and Disposal

The City of Modesto is responsible for collecting and treating sewage and storm drain discharge in Modesto. The City of Modesto owns and operates two wastewater treatment facilities. The facilities on Sutter Avenue and Jennings Road provide treatment to an average of 20 and 15 million gallons per day, respectively (City of Modesto, 2022). Special districts, including community service, sanitary, and sewer maintenance districts, provide the majority of sanitary sewer service within unincorporated Stanislaus County. Septic tank systems are the primary means of on-site wastewater disposal in rural areas, including areas within the Program Area.

Solid and Hazardous Waste

The Stanislaus County Environmental Resources Department operates the Fink Road Sanitary Landfill (Stanislaus County, 2018a). The landfill is located near Interstate 5, east of Crows Landing, and would likely receive solid waste generated from construction of the Proposed Program. The landfill serves the cities of Ceres, Hughson, Modesto, Newman, Oakdale, Patterson, Riverbank, Turlock, Waterford, and unincorporated areas of Stanislaus County. The landfill is permitted to continue operating until December 2023, with a maximum intake of 2,400 tons per day of designated wastes. As of March 1, 2017, an estimated 7,184,701 cubic yards of capacity remained (CalRecycle, 2019a). Residential and commercial garbage service in the unincorporated areas of Stanislaus County is provided by three franchised garbage collection companies: Bertolotti Disposal, Gilton Solid Waste, and Turlock Scavenger. Four large-scale transfer facilities are in Stanislaus County, along with numerous composting operations that handle suitable waste (Stanislaus County, 2015; CalRecycle, 2019b).

The Stanislaus County Environmental Resources Department also operates a household hazardous waste collection facility that collects common household hazardous wastes (Stanislaus County, 2018b). Although not anticipated, currently unidentified but potentially hazardous materials could be present within the Program Area, near specific project sites. Additionally, major transportation corridors through Stanislaus County, including Interstate 5 and State Route 99, and some railroads allow movement of large quantities of hazardous materials.

Electricity and Gas

Within Stanislaus County, electricity is provided by three major utility providers: MID, Pacific Gas and Electric Company, and Turlock Irrigation District. MID has the authority to operate as an electric utility and has been providing wholesale power since 1923. The District has a service area of approximately 560 square miles and serves approximately 123,000 total customers (including residential, commercial, industrial, and other users). The primary source of natural gas in Stanislaus County is a major gas transmission line owned and operated by Pacific Gas and Electric Company, running parallel to Interstate 5. Several smaller distribution lines stem from the main pipeline to serve urban areas along the corridor, including the cities of Modesto and Turlock (CEC, 2017).

Telecommunications

Nationwide service providers, including AT&T, Verizon, and Sprint, provide cellular telephone service within the Program Area. AT&T provides local phone service, long-distance phone service, and high-speed internet service throughout Stanislaus County. Major telephone transmission lines traverse the region and usually follow rights-of-way that parallel major roadways and rail lines. Comcast also provides cable television services and high-speed internet access. Wireless internet access is available in some areas, with services provided by a variety of local providers. Global Valley Networks provides telephone and internet services to the communities of Patterson, Livingston, San Antonio, Diablo Grande, Westley, Cressey, and Grayson (Stanislaus County Planning & Community Development, 2018). Internet access in rural areas is generally limited to dial-up service or satellite connections.

3.10.3 Environmental Impacts

This section includes the approach to and the results of the environmental impact analysis. The thresholds used to evaluate potential impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

3.10.3.1 Thresholds of Significance

The thresholds used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and listed below. Impacts on public services and utilities and service systems are considered significant if the Proposed Program would result in any of the following:

- Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities (the construction of which could cause potentially significant environmental impacts) in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:
  - Fire protection
  - Police protection
  - Schools
  - Parks
  - Other public facilities
- Relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.
- Insufficient water supplies available to serve the Proposed Program and reasonably foreseeable future developments during normal, dry, and multiple dry years.
- A determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
- Generation of solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.
- Non-compliance with federal, state, and local management and reduction statutes and regulations related to solid waste.

3.10.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area as applicable. The No Program Alternative is considered functionally the same as the Existing Conditions related to public services, utilities, and service systems given that no substantial changes in services (including related to anticipated future population growth) are anticipated. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions recognizing that impacts would be generally the same in comparison to the No Program Alternative.

It is assumed that in the absence of the Proposed Program, MID would continue to maintain the existing level of service to its customers. Impacts associated with public services and utilities, including electricity and solid waste disposal, would be related to ongoing MID O&M activities. Similarly, it is assumed that public services provided by entities other than MID would be maintained as necessary, and provision of service would accommodate future growth. Because the Study Area is projected to remain primarily agricultural even in the absence of the Proposed Program, it is assumed that the degree of additional public services in the Study Area in the future would not substantially vary from Existing Conditions.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

A combination of publicly available data (including existing landfill capacity within the Program Area), Program description details, and professional judgment was used to evaluate potential impacts related to public services and utilities. Anticipated construction- and O&M-related impacts are summarized below.

As described in Section 2.4, Project Commitments, projects would be designed and constructed to avoid utility-provider facilities wherever possible. If avoidance is not possible, MID would coordinate with service providers to relocate facilities without interrupting service to customers. MID also would develop a traffic control plan (with Stanislaus County, as appropriate) to address emergency responder access and management of local traffic, including managing construction traffic routing and road use during construction activities associated with the Proposed Program.

3.10.3.3 Impacts Associated with the Proposed Program

Impact Pub-1: A substantial adverse physical impact associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services: fire protection, police protection, schools, parks, and/or other public facilities.

All Project Types

Fire and Police Protection

During construction of the Proposed Program, construction-related traffic would increase in localized areas surrounding proposed projects but would generally be limited to brief periods of time when additional equipment is required to be moved to support a given construction activity. Given the short-term nature of individual project construction in addition to the preparation and implementation of a traffic control plan, as appropriate (Section 2.4, Project Commitments), construction of the Proposed Program would not result in a need for new or altered government facilities. Impacts would be less than significant.

During O&M of the Proposed Program, adequate emergency access to individual landowner properties located along state routes and principal arterials adjacent to project facilities would be maintained through Stanislaus Council of Governments' Congestion Management Process (StanCOG, 2010). Routine maintenance of proposed facilities would be required but would be minimal and would not result in a need for new or altered government facilities. Impacts would be less than significant.

Schools, Parks, and Other Public Services and Utilities

Implementation of the Proposed Program would occur over the planning horizon to 2040. Although construction would require a relatively small labor force that would primarily be filled by local residents, some portion of the construction force could be hired from outside the Program Area. This could cause a slight increase in demand for public services, such as schools, parks, utilities, and community facilities, by construction workers. However, the demand would be both temporary and minimal, and would not require the provision of new or extended public services or require additional schools or parks. Therefore, impacts would be less than significant.

Construction activities are proposed throughout the Program Area and could require the temporary relocation of utility provider facilities such as electric or telephone transmission and distribution lines or gas, water, or wastewater transmission and distribution pipes. Projects would be designed and constructed to avoid utility provider facilities wherever possible. If avoidance is not possible, MID would coordinate with service providers to relocate facilities without interrupting service to customers. Therefore, impacts would be less than significant. O&M of the Proposed Program would not result in the need to hire an appreciable number of additional employees and would not result in an increased demand for schools, parks, public services, utilities, or new/altered governmental facilities. Impacts would be less than significant.

The Proposed Program would not be anticipated to induce increased recreation or generate new recreational visitors to the area. Therefore, demand for schools, parks, and other public services and utilities would not be expected to increase; thus, no additional government facilities would be required. Impacts would be less than significant.

Impact Pub-2: Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

All Project Types

Construction and O&M activities associated with the Proposed Program are not anticipated to generate wastewater that would require treatment, nor would treated potable water be required for Proposed Program facilities. Any negligible increase would be served by one of several water or wastewater treatment plant providers operating within the Program Area, or by individual or community septic and well systems located near specific project sites. Similarly, implementation of the Proposed Program is not anticipated to require additional electric power, natural gas, or telecommunication facilities; existing facilities would serve the needs of the Program. Therefore, no additional public service facilities would be required for the Proposed Program. Impacts would be less than significant.

Construction activities would be conducted primarily during dry periods outside the irrigation season as required to minimize interruptions to MID operations. Construction disturbance would be limited to the project sites and associated staging areas. As described in Section 3.8, Hydrology and Water Quality, best management practices would be implemented to minimize potential erosion and sedimentation impacts associated with stormwater flows. The Proposed Program would not be expected to result in significant impacts on downstream stormwater drainage facilities or require the expansion of existing facilities other than District facilities requiring capacity improvements as part of the Proposed Program. Therefore, impacts during construction activities would be less than significant.

The majority of stormwater runoff within the Program Area is channeled through MID facilities, including channels and laterals. All Proposed Program projects would be designed to avoid impacts on existing stormwater drainage facilities, and the expansion of existing facilities would not be required. Impacts during Program operation would be less than significant.

Impact Pub-3: Have insufficient water supplies available to serve the Proposed Program and reasonably foreseeable future development during normal, dry, and multiple dry years.

All Project Types

Construction activities requiring water supplies would be primarily limited to the use of water for dust suppression and would be met through existing water supplies and associated entitlements. Therefore, impacts during construction would be less than significant. Operation of the Proposed Program would not require new or expanded water rights, and no additional water would be required beyond quantities currently managed by the District. The proposed regulating reservoirs and other system improvements associated with the Proposed Program would improve water supply management of surface water

supplies for which the District has existing entitlements and water rights. Therefore, impacts during Program operation would be less than significant.

Impact Pub-4: Result in a determination by the wastewater treatment provider that serves or may serve the Proposed Program that it does not have adequate capacity to serve the projected demand in addition to the provider's existing commitments.

As described under Impact Pub-2, construction and O&M activities associated with the Proposed Program are not anticipated to generate wastewater that would require treatment. Any negligible increase would be served by one of several wastewater treatment plant providers operating within the Program Area, or by individual and community septic systems. Therefore, impacts would be less than significant.

Impact Pub-5: Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.

Construction of the Proposed Program would include the excavation of earthen material to accommodate project construction identified in Section 2, Program Description and Alternatives.

Regulating Reservoirs

Construction of the proposed regulating reservoirs would require excavation such that most of the excavated material would be suitable for reuse (for example, construction of the berms surrounding the new project facilities and along existing MID canal banks within a 5-mile radius of each project site to support ongoing bank maintenance). Remaining nonsuitable material would either be sold to fill buyers or be permanently stored on District-owned property adjacent to proposed project locations. Demolition of existing facilities would occur as necessary, and materials would be disposed of at local recycling facilities. Therefore, impacts would be less than significant.

General maintenance of the reservoirs would include weed control, levee/berm maintenance, and debris/sediment removal. When water is not present in the reservoir, silts would be removed from the bottom of the reservoir as required with heavy equipment. Excavated silt would be placed on the berms surrounding the reservoirs or along existing MID canal banks within a 5-mile radius of each project site to support ongoing bank maintenance. Excess excavation materials are not anticipated to be diverted to landfills during facility construction. Therefore, impacts would be less than significant.

All Other Project Types

None of the other system improvement projects would require substantial excavation, and excess excavation materials are not anticipated to be diverted to landfills during facility construction. Other solid waste generated in the Program Area during construction would include debris from demolition phases, nonfunctional equipment that is replaced during project construction, and packaging for new equipment and materials. This solid waste would be transported off site to Fink Road Sanitary Landfill or another permitted facility in the Program Area. It is assumed that facilities with sufficient permitted capacity to accept the anticipated solid waste would continue to be available in the Program Area over the planning horizon to 2040. Impacts associated with construction activities would be less than significant.

Program operations would not produce solid waste or require solid waste disposal; however, Program maintenance may generate minimal amounts of solid waste, including discarded equipment and packaging associated with chemicals or new equipment. This waste would be diverted to Fink Road Sanitary Landfill or another permitted facility in the Program Area. It is assumed that facilities with sufficient permitted capacity to accept the anticipated solid waste would continue to be available in the Program Area over the planning horizon to 2040. Impacts during Proposed Program operation would be less than significant.

Impact Pub-6: Compliance with federal, state, and local management and reduction statutes and regulations related to solid waste.

All Project Types

Solid waste materials generated during construction would be disposed of in compliance with federal, State, and local regulations. Solid waste generated during Proposed Program construction would vary by project and would be transported to the appropriate disposal site. Impacts during Program construction would be less than significant. Proposed Program O&M would generate minimal solid waste and would be disposed of in accordance with all applicable regulations. Impacts during operation of the Proposed Program would be less than significant.

3.10.4 Mitigation Measures

Construction and O&M of the Proposed Program would have less-than-significant impacts on public services and utilities; therefore, mitigation is not required or recommended. As included in Section 2, Program Description and Alternatives, the following project commitments would be implemented as part of the Proposed Program to minimize impacts on public services and utilities:

- Projects will be designed and constructed to avoid utility-provider facilities wherever possible. If avoidance is not possible, MID will coordinate with service providers to relocate facilities without interrupting service to customers.

3.11 Transportation

This section describes the regulatory and environmental settings with respect to transportation and evaluates potential transportation-related impacts that could result from implementation of the Proposed Program. For the purposes of this section, the Study Area is the Program Area, which includes Stanislaus County as well as the cities of Modesto, Riverbank, and Waterford.

3.11.1 Regulatory Setting

This section identifies and describes guidelines and regulations relevant to the evaluation of potential transportation impacts. No specific federal regulations apply to the Proposed Program with respect to transportation associated with construction or operation activities in the Study Area.

3.11.1.1 State

Caltrans is responsible for planning, designing, constructing, operating, and maintaining all state-owned roadways. Federal standards for interstate highways are implemented in California by Caltrans. The Program Area is within Caltrans District 10, which includes Alpine, Amador, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus, and Tuolumne Counties and more than 3,500 miles of state routes (Caltrans, 2022). In the vicinity of the Program Area, Caltrans operates and maintains I-5, and SRs 4, 33, 99, 108, 120, 130, 132, and 219, which provide regional access to the cities of Modesto, Riverbank, and Waterford, as well as neighboring cities and communities. Project applicants proposing projects within, under, or over the state highway rights-of-way are required to obtain an encroachment permit from Caltrans (California Streets and Highways Code Sections 660 et seq.).

Vehicle Miles Traveled Metric

In May 2020, Caltrans released the *Vehicle Miles Traveled-Focused Transportation Impact Study Guide* to provide guidance regarding Caltrans' review of a land use project or a plan's transportation analysis using a vehicle miles traveled (VMT) metric (Caltrans, 2020). The guidance is not binding and is intended to be a reference and informational document that can be used for evaluating impacts of local land use projects (Caltrans, 2020).

Senate Bill 743

In January 2018, the Governor's Office of Planning and Research (OPR) transmitted its proposal for the comprehensive updates to the CEQA Guidelines to the California Natural Resources Agency (OPR, 2019). Pursuant to SB 743, the proposal included the replacement of level of service (LOS) with VMT as the primary metric on transportation impact across the state. The guidelines were finalized in late 2018, with the updated guidelines becoming effective on December 28, 2018 (OPR, 2019). Pursuant to the newly incorporated CEQA Guidelines §15064.3(c), the provisions outlined in SB 743 became mandatory for environmental documents starting July 1, 2020. However, SB 743 does not preclude local jurisdictions from continuing to use LOS as part of local plans, studies, or ongoing monitoring.

3.11.1.2 Local

Although most projects within the Program Area would occur within unincorporated Stanislaus County, a portion of projects would occur within the cities of Modesto, Riverbank, and Waterford. Additionally, the Program Area is located within the jurisdiction of the Stanislaus Council of Governments (StanCOG). The following outlines local policies related to transportation resources that are relevant to the Proposed Program.

Stanislaus County

The Circulation Element of the Stanislaus County General Plan provides the policy context to ensure compatibility with land uses, infrastructure, and transportation modes (Stanislaus County, 2016b).

The Circulation Element establishes goals, policies, and implementation measures to provide a system of roadways throughout Stanislaus County that reflect land use needs and to support a broad range of transportation modes.

The Circulation Element identifies road classifications, functional classifications of key roadways (shown on Figure II-1 of the Circulation Element), and typical right-of-way requirements for each classification (shown in Table II-3 in the Circulation Element). The Circulation Element also labels road segments as freeways, arterials, major collectors, minor collectors, and private or local roads. The Circulation Element currently uses LOS. When measuring LOS, Stanislaus County uses the criteria established in the Highway Capacity Manual published and updated by the Transportation Research Board (2010). Table II-1 of the Circulation Element summarizes the criteria used to establish LOS thresholds for each roadway classification type. Stanislaus County strives to maintain LOS D or better for motorized vehicles on roadway segments, and LOS C or better for roadway intersections (Stanislaus County, 2016b). Although the Stanislaus County General Plan policies use LOS criteria, the Stanislaus County General Plan Draft Program EIR (Stanislaus County, 2016c) used VMT to analyze the impacts of adopting the general plan based on a StanCOG model estimate of vehicle trips in Stanislaus County.

City of Modesto

Chapter V of the *City of Modesto General Plan* (City of Modesto, 2019a) establishes goals, policies, and implementation measures to provide a system of roadways throughout the city that reflect land use needs and to support a broad range of transportation modes. Policy V.C.1 indicates that the City of Modesto currently uses LOS criteria as the threshold for performing transportation studies, and Policy V.H.2 identifies LOS "D" as the threshold of significance for measuring traffic impacts (City of Modesto, 2019a). Although the *City of Modesto General Plan* policies use LOS criteria, the *City of Modesto General Plan* Master EIR (City of Modesto, 2019c) included a VMT assessment of the impacts of adopting the general plan.

City of Riverbank

The Circulation Element of the *2005-2025 General Plan* for the City of Riverbank provides the policy context to ensure compatibility with land uses, infrastructure, and transportation modes. The Circulation Element establishes goals, policies, and implementation measures to provide a balanced approach for a circulation system that will serve the entire city of Riverbank's community well. Fundamental concepts of this element focus on connectivity and continuity, accessibility, safety, and livability (City of Riverbank, 2009). The Circulation Element uses LOS as the standard within the city. As identified in the Circulation Element of the *2005-2025 General Plan*, the LOS standard on all streets and intersections is LOS D (City of Riverbank, 2009).

City of Waterford

Chapter 5 (Transportation and Circulation) of the *City of Waterford General Plan Vision 2025* establishes policies and programs that allow for the development of an integrated municipal circulation and transportation system that accommodates all modes of traffic (City of Waterford, 2007). The Transportation and Circulation chapter establishes goals and policies, intended to allow coordination among transportation/circulation, land use, and other aspects of the general plan, while promoting the efficient movement of people, goods, and services within the city. The public, therefore, benefits from a "broader choice of realistic options for circulating through the urban area" because easier and more efficient trips can be made (City of Waterford, 2007). The *City of Waterford General Plan Vision 2025* uses LOS criteria. As described in the general plan, the City's standards and policies require new and upgraded intersections and road segments to be designed and built to function at LOS D during peak traffic periods (City of Waterford, 2007).

Stanislaus Council of Governments

In addition to local rules and regulations, StanCOG also effectively serves as the congestion management agency within Stanislaus County. StanCOG is made up of the cities of Ceres, Hughson, Modesto, Newman, Oakdale, Patterson, Riverbank, Turlock, and Waterford, and Stanislaus County. StanCOG is the Metropolitan Planning Organization, Regional Transportation Planning Agency, and the Local Transportation Authority for the Stanislaus region (StanCOG, 2019).

In February 2020, StanCOG adopted the 2020 StanCOG Congestion Management Process for the Stanislaus County Region, which focuses on key elements of the SAFETEA-LU requirements, and other state and federal requirements. This Congestion Management Process (StanCOG, 2020) fulfills the legislative requirements needed for a Metropolitan Planning Organization planning process, in which a systematic progression of activities to analyze and address regional congestion is integrated in the Regional Transportation Plan (RTP) and Federal Transportation Improvement Program process (StanCOG, 2020). StanCOG recently published a *Regional Transportation Plan/Sustainable Communities Strategy for Stanislaus County* (StanCOG, 2022). The RTP outlines a number of proposed goals and objectives related to highways, streets, and roads; transit; and bicycle and pedestrian transportation (StanCOG, 2022).

3.11.2 Environmental Setting

Because of the rural nature of the local communities, low development densities, and limited alternative travel options, the primary means of travel in Stanislaus County is automobile. Although the Program Area is transected by numerous primary transportation corridors of regional importance and contains an extensive local roadway network, development within the area can be characterized as predominantly rural, with agricultural production being the primary activity in the area. In addition to the primary transportation corridors, many paved and unpaved roadways run adjacent to and transect local farmlands. Communities like Modesto experience comparatively high traffic volumes within areas near the interchanges and in central, downtown areas. Many of these communities have established designated truck routes to help maintain through-traffic flows. Additionally, trains periodically cause traffic to stop for several minutes throughout the day. In general, however, local transportation systems receive limited traffic volumes, and congestion and delays are unusual.

3.11.2.1 Existing Road Network

The major regional and local roadways within the Program Area include SRs 99, 108, 132, and 219. I-5 traverses southwest of Stanislaus County north to south and is located approximately 8 miles west of the westernmost proposed projects. Figure 3.11-1 shows the existing roadway network in the Program Area. The following summarizes the primary roadways potentially affected by the Proposed Program (Caltrans, 2019b):

- SR 99 is a major north-south freeway varying between four and six lanes that traverses the western portion of the Program Area. Access between SR 99 and the Program Area is provided at several interchanges. Annual average daily traffic (AADT) volumes range from 62,000 vehicles per day (vpd) at the Merced/Stanislaus County line to 137,000 vpd at Carpenter Road in Modesto.
- SR 108 is an east-west highway varying between two and four lanes that traverses generally northeast-southwest through the Program Area. Access between SR 108 and the Program Area is provided at several interchanges. AADT volumes range from 4,650 vpd at the SR 132 junction in Modesto to a maximum of 37,000 vpd at Briggsmore Avenue in Modesto, then decline in the eastern portion of the Program Area to around 15,200 vpd beyond Oakdale, east of the junction with SR 120.
- SR 132 is a two-lane east-west highway that traverses generally east-west through the Program Area. Access between SR 132 and the Program Area is provided at several interchanges. AADT volumes range from 1,350 vpd at the Stanislaus/Tuolumne County line on the east to a maximum of 19,200 vpd at El Vista Avenue in Modesto.

- SR 219 is a four-lane arterial east-west highway varying between two and four lanes that traverses generally east-west through the Program Area. Access between SR 219 and the Program Area is provided at several interchanges but is mainly accessible at the intersection of SR 108 and SR 99. AADT volumes range from 14,200 vpd at the SR 108 junction to 27,500 vpd at the SR 99 junction.

3.11.2.2 Air Traffic

As discussed in Section 3.9, Noise, numerous small, private airports and airstrips are primarily used for agricultural-related activities throughout the Program Area. Given the geographically expansive nature of the Program Area, some projects would occur within 2 miles of a public airport, including within the vicinity of the Modesto City-County Airport, Mapes Ranch Airport, Peterson Airport, and Yandell Ranch Airport.

3.11.2.3 Pedestrian and Bicycle Facilities

As noted in the *Stanislaus County General Plan* Circulation Element, excellent conditions for bicycle and pedestrian use exist. Although relatively few marked bicycle facilities have been constructed in the County, the generally flat terrain and a temperate climate are favorable conditions for cyclists and pedestrians. In agricultural areas (where most of the Proposed Program projects are located), adequate striping and paving exist in accordance with Caltrans and the American Association of State Highway and Transportation Officials standards to safely accommodate bicycle travel for most roadway improvements, except rural local or rural minor collector roadways. Marked or signed bicycle lanes and paths are provided in accordance with the *Non-Motorized Transportation Master Plan* adopted by StanCOG (StanCOG, 2021). Additionally, marked and/or signed bicycle lanes and paths are provided in accordance with the adopted community plans for the urban areas of the County and the general plans of the Cities within their spheres of influence (Stanislaus County, 2016b). Sidewalks are provided sporadically throughout the project area and are mostly within city jurisdictions like Modesto.

3.11.2.4 Public Transit

The Stanislaus Regional Transit Authority (StanRTA) was formed in July 2021 and includes the merger of the former Stanislaus Regional Transit and Modesto Area Express, which previously provided intercity bus service in parts of unincorporated Stanislaus County and fixed-route bus service throughout Modesto and parts of unincorporated Stanislaus County, respectively (StanRTA, 2022a). The StanRTA operates a total of 26 routes, with additional commuter services to the Altamont Corridor Express, Amtrak, Bay Area Rapid Transit, and Stockton (StanRTA, 2022b).

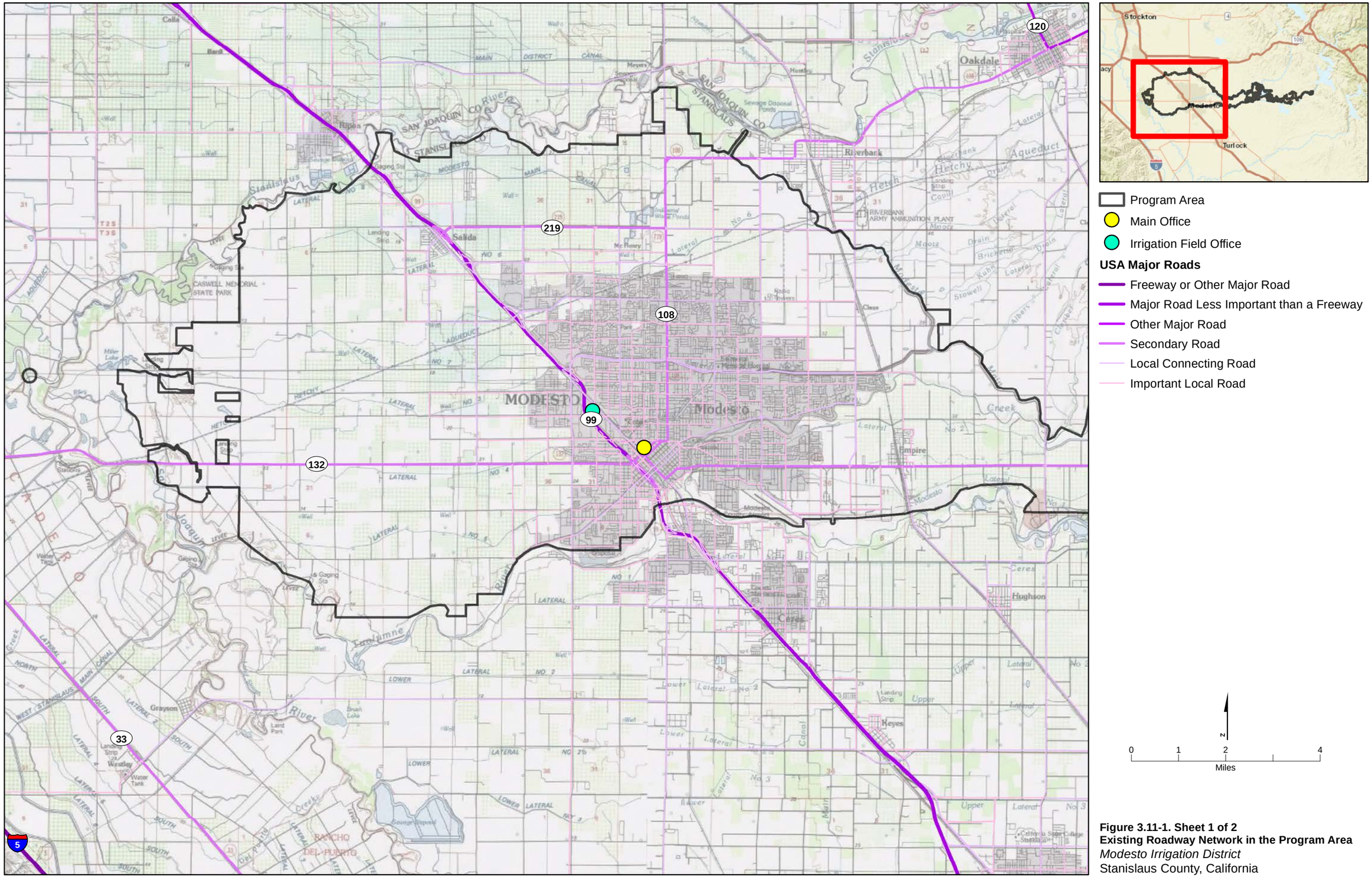

Figure 3.11-1. Sheet 1 of 2
Existing Roadway Network in the Program Area
Modesto Irrigation District
Stanislaus County, California

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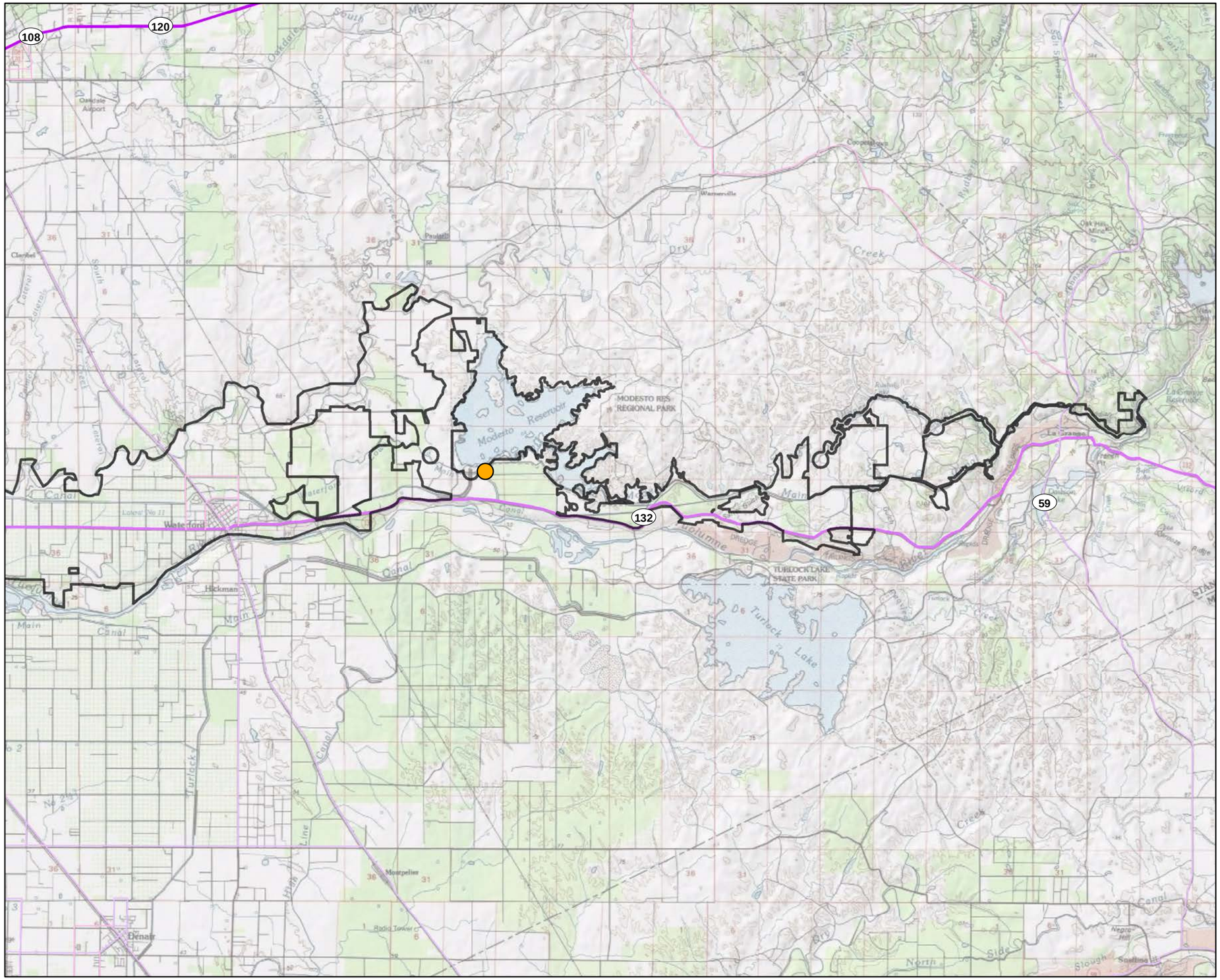

Figure 3.11-1. Sheet 2 of 2
Existing Roadway Network in the Program Area
Modesto Irrigation District
Stanislaus County, California

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3.11.3 Environmental Impacts

The following section provides the approach to and the results of the environmental impact analysis regarding transportation. The thresholds used to evaluate potential transportation impacts, analysis methodology and assumptions, and impact analysis are presented in the following subsections.

3.11.3.1 Thresholds of Significance

The thresholds that were used to evaluate potential impacts are based on Appendix G of the CEQA Guidelines and relevant local policies. Impacts on transportation are considered significant if the Proposed Program would result in any of the following:

- Conflict with a program, plan, ordinance, or policy addressing the traffic circulation system, including transit, roadway, bicycle, and pedestrian facilities
- Conflict or be inconsistent with CEQA Guidelines §15064.3(b)
- Substantially increase hazards because of a geometric design feature (sharp curves or dangerous intersections) or incompatible uses (such as farm equipment)
- Inadequate emergency access

3.11.3.2 Impact Assessment Assumptions and Methodology

As described in Section 2, Program Description and Alternatives, the Proposed Program was evaluated in comparison to Existing Conditions and the No Program Alternative for each resource area, as applicable. With respect to transportation, the No Program Alternative would differ from Existing Conditions because the population within the Program Area is projected to continue growing, which is anticipated to result in increased traffic. However, in the context of the Proposed Program, the No Program Alternative is functionally the same as Existing Conditions because traffic increases are anticipated to be minor in the predominantly rural and agricultural areas adjacent to the Proposed Program facilities, and both represent a condition without the Proposed Program. Therefore, the following analysis evaluates potential impacts associated with the Proposed Program when compared to Existing Conditions, recognizing that impacts would be generally the same in comparison to the No Program Alternative.

The Proposed Program includes projects that have been grouped into categories based on common features as described in Section 2, Program Description and Alternatives, and the introduction to Section 3, Environmental Setting, Impacts, and Mitigation. To avoid repetitive text, where anticipated impacts in the context of a given resource/issue are anticipated to be similar across more than one project category, the analysis is presented as a single discussion with the relevant categories specified.

The following assumptions were made regarding Proposed Program-related construction, operation, and maintenance impacts on transportation:

- As shown in Table 3.11-1, 2025 and 2030 were identified as the years with the highest level of average daily traffic (ADT) and VMT anticipated during construction under the Proposed Program.
- As stated in Section 2, Proposed Program and Alternatives, a maximum of 27 workers would be on site during construction of any specific project, and the majority of these workers would be local residents. As a conservative estimate, it is assumed that none of the workers would carpool.
- Based on projections from the 2022 RTP (StanCOG, 2022), it is anticipated that population change in unincorporated Stanislaus County between 2020 and 2046 would result in a demographic growth change of 13 percent.
- As discussed in Section 3.11.1, local standards and policies require that new and upgraded intersections and road segments be designed and built to function at LOS D during peak traffic periods.

- As discussed in Section 3.11.1, the *Stanislaus County General Plan* Draft Program EIR provided VMT projections for the year 2035 using StanCOG travel demand modeling data from 2014. Estimated Stanislaus County daily VMT for city and unincorporated areas for 2035 would be 8,246,971 miles (Stanislaus County, 2016c).
- Highways anticipated to be used during construction and operation of the Proposed Program are limited to SRs 99, 108, 132, and 219; I-5 is not anticipated to be used during construction or operation of the Proposed Program.
- Work is expected to be conducted consistent with local noise regulations described in Section 3.9, Noise, unless otherwise approved by the applicable local agency and in coordination with affected landowners.
- During construction, work areas would be limited to project sites and disposal sites, which are anticipated to be located on MID-owned lands. Unsuitable material would either be sold to fill buyers or be permanently stored on District-owned property adjacent to project sites. As such, no excess excavation materials are anticipated to be diverted to landfills during facility construction. Suitable material may also be transported within the Program Area for use at nearby project sites, or for ongoing maintenance activities.
- Construction traffic would access each proposed project site via public roadways and existing District roads. Construction equipment would remain on site during construction, and equipment staging would primarily occur within the construction areas or along existing canals and District access roads. A nominal number of material deliveries would be made to the site, and these trips would be spread out over the duration of the individual projects.
- Short-term full or partial road closures may be required to allow for certain construction activities and to maintain public safety as part of implementation of the Proposed Program. As described in Section 2.4, Project Commitments, MID will obtain appropriate encroachment permits and, if necessary, develop a traffic control plan (with Stanislaus County, as determined appropriate) to address emergency responder access and management of local traffic, including managing construction traffic routing and road use during construction activities associated with the Proposed Program. The plan will follow local and state requirements for traffic control, including use of flaggers and signage. Traffic control measures will help ensure that the effects on traffic will not create unsafe conditions. In addition, MID would inform residents of construction activities and potential delays, and coordinate with Caltrans and Stanislaus County to minimize construction impacts to the extent necessary.

Appendix C includes the Proposed Program implementation schedule and anticipated annual project implementation. To estimate the ADT that would result from proposed construction activities, the number of vehicle roundtrips associated with each project category were multiplied by the number of projects scheduled for implementation in each of the years used in the air quality impact analysis, as described in Section 3.3, Air Quality. This calculation provides the total number of annual vehicle roundtrips expected for each year analyzed. The number of annual vehicle roundtrips for each of the years was then divided by the expected number of working days per year to estimate the ADT.

A similar approach was used to calculate the daily VMT. The total VMT per day associated with each project category was multiplied by the number of projects scheduled for implementation in each of the years used in the air quality impact analysis. This calculation provides the worst-case daily VMT expected for each year analyzed by assuming that construction for all project types for that specific year would be operating at the same time. The results of these calculations for the years with the highest estimated annual construction ADT and daily VMT (2025 and 2030) are presented in Table 3.11-1.

Table 3.11-1. Estimated Project-related Construction ADT and Daily VMT for Selected Years
Modesto Irrigation District Comprehensive Water Resources Management Plan PEIR

Implementation Year	2025	2030
Daily VMT	4,170	4,170
Construction AADT	90	90

3.11.3.3 Impacts Associated with the Proposed Program

Impact TT-1: Conflict with a program, plan, ordinance, or policy addressing the traffic circulation system, including transit, roadway, bicycle, and pedestrian facilities.

Implementation of the Proposed Program would occur incrementally over the planning horizon to 2040. Overall Program implementation is shown in Appendix C. This incremental implementation would result in temporary, short-term increases in local traffic as a result of construction-related workforce traffic and equipment and material deliveries. These increases would occur throughout the entire Program Area, with the largest increases resulting from construction of the proposed regulating reservoir projects.

Regulating Reservoirs

Construction of each of the proposed regulating reservoirs would last approximately 1 year. During this time, construction of the regulating reservoirs would result in temporary increases in traffic along roadways near the proposed reservoir projects. This additional traffic would be generated by proposed construction activities and distributed within the roadway network in the Program Area. Although traffic on roadways would increase as a result of construction vehicles and equipment near the individual reservoir project sites, this increase in traffic would not be anticipated to cause a significant impact in the area. The additional trips that would result from construction of the projects represent a minimal increase in traffic compared to the existing roadway volumes; therefore, impacts would be less than significant.

Given that traffic levels on roadways would increase as a result of construction vehicles and equipment near the proposed regulating reservoir projects, MID would develop a traffic control plan, as appropriate, with Stanislaus County, to address emergency responder access and management of local traffic. If necessary, the traffic control plan would include managing construction traffic routing and road use as described in Section 2.4, Project Commitments. MID would also obtain applicable encroachment and transportation permits. Therefore, impacts during construction with the implementation of a traffic control plan during facility construction and in accordance with applicable encroachment and transportation permits would be less than significant.

In addition, proposed construction activities would not be expected to interfere with bicycle and pedestrian access. However, temporary localized use of roadway shoulders could result in limited access near proposed project locations. Construction equipment would be parked so as not to block or impede through-traffic on the roadways, which would also apply to public transit and pedestrian and bicycle traffic. Because these potential interferences would be both temporary and localized to specific project locations, which are predominantly located in rural areas, construction activities associated with the Proposed Program would not substantially reduce the performance or safety of bicycle, pedestrian, or public transit facilities. Therefore, construction activities associated with the Proposed Program would not conflict with an applicable program, plan, ordinance, or policy addressing the traffic circulation system, including transit, roadway, bicycle, and pedestrian facilities. This impact would be less than significant.

Activities related to operation of the proposed regulating reservoirs would include visits by MID operations staff to monitor conditions and make manual changes to local irrigation services near the reservoirs, as needed. This would result in minor vehicle traffic increases throughout the Program Area related to

maintenance activities. Operational activities are anticipated to be infrequent and consistent with existing activity in the Program Area, and no appreciable additional traffic volume would be generated.

Operation of the Proposed Program would not conflict with an applicable congestion management program, including, but not limited to, the 2020 StanCOG Congestion Management Process for the Stanislaus County Region, LOS and VMT standards and travel demand measures, or other standards established by cities within the Program Area. The projects may require periodic maintenance, but vehicle use of the roadways used to maintain service would be minimal and would not result in congestion because of the rural nature of the Program Area and project areas specifically, and because of the use of District access routes to prevent traffic delays. Therefore, operation of the Proposed Program with respect to congestion management would result in a less-than-significant impact.

All Other Project Types

Construction activities associated with the Proposed Program would result in temporary increases in traffic along roadways in the vicinity of proposed projects. In 2025 and 2030, the years with the greatest number of system improvement projects and with the greatest anticipated construction traffic, annual ADT within the Program Area would be increased by approximately 90 vpd, and the daily VMT would increase by approximately 4,170 miles (Table 3.11-1).

Given that traffic on roadways would increase as a result of construction vehicles and equipment near specific project sites, MID would develop a traffic control plan, as appropriate, with Stanislaus County, to address emergency responder access and management of local traffic. If necessary, the traffic control plan would include managing construction traffic routing and road use as described in Section 2.4, Project Commitments. MID would also obtain applicable encroachment and transportation permits. Therefore, impacts during construction would be less than significant.

As described for the regulating reservoirs, proposed construction activities would not be expected to interfere with bicycle and pedestrian access. Potential interference would be both temporary and localized to specific project locations, which are predominantly in rural areas. Construction activities associated with the Proposed Program would not substantially reduce the performance or safety of bicycle, pedestrian, or public transit facilities. Therefore, construction activities associated with these project types under the Proposed Program would not conflict with an applicable program, plan, ordinance, or policy addressing the traffic circulation system, including transit, roadway, bicycle, and pedestrian facilities. This impact would be less than significant.

Operations and maintenance activities would generally include activities similar to those that currently occur within the service area, including regular access to the canals and control structures by MID operations staff to operate and maintain flow control gates, and routine maintenance and inspections of facilities. Operation of the Proposed Program would not conflict with an applicable congestion management program, including, but not limited to, the 2020 StanCOG Congestion Management Process for the Stanislaus County Region, LOS and VMT standards and travel demand measures, or other standards established by cities within the Program Area. The projects may require periodic maintenance, but vehicle use of the roadways used to maintain service would be minimal and would not result in congestion for the following reasons: the minimal number of vehicle trips required, the rural nature of the Program Area and project areas specifically, and the use of District access routes to prevent traffic delays. Therefore, operation of the Proposed Program would result in a less-than-significant impact.

Impact TT-2: Conflict or be inconsistent with CEQA Guidelines §15064.3(b).

All Project Types

As described for Impact TT-1, construction activities associated with the Proposed Program would result in temporary increases in traffic along roadways in the vicinity of proposed projects. In 2025 and 2030, the years with the greatest anticipated construction traffic, implementation of the Proposed Project

would increase daily VMT by approximately 4,170 miles (Table 3.11-1). The *Stanislaus County General Plan* Draft Program EIR estimated daily VMT for city and unincorporated areas in 2035 would be 8,246,971 miles (Stanislaus County, 2016c). In addition, the *Stanislaus County General Plan* EIR concluded that the increase in VMT associated with implementation of the general plan would have a less-than-significant impact on traffic volumes. The additional maximum daily VMT associated with implementation of the Proposed Program (4,170 miles) would represent a less than 1 percent increase in the estimated VMT for Stanislaus County. Therefore, this temporary increase in VMT would not significantly increase daily VMT in the Program Area. This impact would be less than significant.

Transportation increases related to construction activities under the Proposed Program would be localized and predominantly limited to rural roadways operating at LOS A. The increased volume associated with construction activities under the Proposed Program would not be anticipated to result in the deterioration of an acceptable LOS. Therefore, the construction impacts described in Impact TT-1 would not conflict or be inconsistent with CEQA Guidelines §15064.3(b). Impacts would be less than significant.

As described for Impact TT-1, operations and maintenance activities would generally include activities similar to those that currently occur within the Program Area and would not conflict with the 2020 StanCOG Congestion Management Process for the Stanislaus County Region. Some Program facilities would require periodic maintenance; however, vehicle use of the roadways used to maintain service would be minimal and localized, predominantly in rural areas where there is no congestion management program in place. Therefore, the operational impacts described in Impact TT-1 would not conflict or be inconsistent with CEQA Guidelines §15064.3(b). Impacts would be less than significant.

Impact TT-3: Substantially increase hazards because of a geometric design feature (sharp curves or dangerous intersections) or incompatible uses (such as farm equipment).

All Project Types

Construction and operation of the Proposed Program would not substantially increase hazards due to any design features or incompatible uses because the Proposed Program would not alter public roadways or intersections or introduce design features or incompatible uses to the Program Area. Therefore, implementation of the Proposed Program would result in no impact.

Impact TT-4: Result in inadequate emergency access.

All Project Types

During construction, potential traffic delays adjacent to project sites could affect emergency response times or access. MID would develop a traffic control plan, as appropriate, with Stanislaus County to address emergency responder access and management of local traffic. If necessary, the traffic control plan would include managing construction traffic routing and road use as described in Section 2.4, Project Commitments. Therefore, construction of the Proposed Program would not result in inadequate emergency access, and impacts would be less than significant.

During operations and maintenance of the Proposed Program, adequate emergency access to individual landowner properties located along SRs and principal arterials adjacent to project facilities would be maintained through Stanislaus County's congestion management process. Routine maintenance of proposed facilities would be required, but Proposed Program-related vehicle use of the roadways would be minimal and would not result in congestion because of the rural nature of the Program Area and the use of District access routes to prevent traffic delays. Therefore, operation of the Proposed Program would not result in inadequate emergency access, and impacts would be less than significant.

3.11.4 Mitigation Measures

Construction, operations, and maintenance of the Proposed Program would have less than significant transportation impacts; therefore, mitigation is not required or recommended. Section 2, Program Description and Alternatives, includes the following project commitments, which would be implemented as part of the Proposed Program to minimize transportation impacts:

- MID will obtain appropriate encroachment permits and, if necessary, develop a traffic control plan (with Stanislaus County, as determined appropriate) to address emergency responder access and management of local traffic, including managing construction traffic routing and road use during construction activities associated with the Proposed Program. The plan will follow local and state requirements for traffic control, including use of flaggers and signage. Traffic control measures will help ensure that the effects on traffic will not create unsafe conditions. In addition, MID would inform residents of construction activities and potential delays, and coordinate with Caltrans and Stanislaus County to minimize construction impacts to the extent necessary.

SECTION 5

Consultation and Coordination

5.1 Lead Agency

MID is the state lead agency responsible under CEQA.

5.2 Applicable Laws, Policies, and Programs

When implementing CEQA, several federal, state, and local laws and policies must be considered, depending on the project type. At this stage of development, approvals presented below are expected to potentially be required to implement individual projects under the Proposed Program. As these projects under the Proposed Program become more defined, the list below will become more defined. The approvals are summarized below.

5.2.1 Federal Clean Water Act, Section 404

CWA Section 404 regulates the discharge of dredged and fill material into waters of the United States (WOTUS), which include navigable waters, interstate waters, all other waters that could affect interstate or foreign commerce, impoundments of WOTUS, the territorial seas, tributaries of the aforementioned waters, and wetlands adjacent to the aforementioned waters (33 CFR §328.3; 40 CFR §122.2.4). Areas typically not considered to be jurisdictional WOTUS include non-tidal drainage and irrigation ditches excavated on dry land, artificially irrigated areas, and small artificial water bodies such as swimming pools (33 CFR §328).

In June 2015, USACE and EPA published a rule to clarify the definition of WOTUS (2015 WOTUS Rule). In February 2016, the 2015 WOTUS Rule was stayed by the U.S. Court of Appeals for the Sixth Circuit; on August 16, 2018, that stay was enjoined by the U.S. District Court for South Carolina. The 2015 WOTUS Rule was repealed by the 2019 WOTUS Rule, which reinstated the 1980s regulations, implemented consistent with the U.S. Supreme Court cases and applicable guidance. In April 2020, USACE and EPA published the Navigable Waters Protection Rule in the *Federal Register* to finalize a revised definition of WOTUS under the CWA.

The Navigable Waters Protection Rule (NWPR) became effective in 2020 and established the scope of federal regulatory authority under the CWA. The NWPR included four simple categories of jurisdictional waters and provided specific exclusions for many water features that have not traditionally been regulated. In June 2021, EPA and Department of the Army announced their intent to revise the definition of WOTUS to better protect our nation's vital water resources that support public health, environmental protection, agricultural activity, and economic growth. In August 2021, the NWPR was vacated and remanded in the case of *Pascua Yaqui Tribe v. U.S. Environmental Protection Agency*. In light of this order, EPA and USACE have halted implementation of the NWPR and are interpreting WOTUS consistent with the pre-2015 regulatory regime until the definition of WOTUS is revised.

Construction activities involving placement of fill into jurisdictional WOTUS, including such activities as sidecasting material during excavation or temporary fills to provide equipment access during construction, are regulated by USACE through permit requirements. The District will need to obtain a CWA Section 404 permit for any activity that involves discharge of dredged and fill material to WOTUS. No Section 404 permit is effective in the absence of state water quality certification pursuant to Section 401 of the CWA. CWA Section 401 is described further in Section 5.2.6.

5.2.2 Endangered Species Act

The ESA, most recently amended in 1988 (16 U.S.C. 1536), establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the preservation of the ecosystems upon which they depend. ESA Section 7(a) requires federal agencies to consult with USFWS and/or NMFS on any activities that may affect species listed as endangered or threatened. MID will consult with USFWS and NMFS as appropriate either directly or as part of obtaining federal clearances (including a Section 404 permit from USACE).

5.2.3 Lake or Streambed Alteration Agreement

CDFW regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to California Fish and Game Code Sections 1600 through 1607. Authorization, known as a Lake or Streambed Alteration Agreement, is required from CDFW for projects prior to any action that substantially diverts, obstructs, or changes the natural flow of a river, stream, or lake, or uses material from a streambed. This agreement applies to any work undertaken within the 100-year floodplain of a body of water or its tributaries. MID will work with CDFW to ensure that all applicable legal requirements are fulfilled.

5.2.4 California Endangered Species Act

The current version of CESA was enacted in 1984 and patterned after ESA. CDFW is responsible for CESA implementation. CESA requires lead agencies to consult before implementing projects to ensure that any action carried out by the lead agency is not likely to jeopardize the continued existence of any listed endangered species, or destroy or adversely modify essential habitat. “Essential habitat” is defined as habitat necessary for the continued existence of the species. MID will consult with CDFW regarding impacts on State-listed endangered and threatened species as appropriate.

5.2.5 Federal Fish and Wildlife Coordination Act Report

The Fish and Wildlife Coordination Act requires consultation with USFWS when any waterbody is impounded, diverted, controlled, or modified for any purpose by any agency under a federal permit or license. USFWS and state agencies charged with managing fish and wildlife resources are to conduct surveys and investigations to determine the potential damage to fish and wildlife and the mitigation measures to be taken. USFWS may incorporate the concerns and recommendations of State agencies and other federal agencies. Compliance with the Fish and Wildlife Coordination Act will be coordinated with consultation for ESA, as described above.

5.2.6 Clean Water Act Section 401, Water Quality Certification

Under CWA Section 401, activities that may result in the discharge of pollutants into WOTUS must first undergo review and approval by the appropriate RWQCB; in this case, the Central Valley RWQCB has jurisdiction over the Program Area. USACE will not issue a Section 404 permit until the state has issued a certification (or a waiver of certification) of compliance with the state water quality standards.

5.2.7 Clean Water Act Section 402, National Pollutant Discharge Elimination System

The SWRCB regulates both point-source discharges (such as, wastewater treatment plant discharges) and nonpoint-source discharges (such as, urban runoff). NPDES permits are issued for discharges to surface waters. If an activity may result in the discharge of waste (including stormwater runoff for construction activities) to surface water, the owner or operator is required to obtain a NPDES permit. This permit, accompanied by the development of an SWPPP is required for all construction projects that disturb more than 1 acre or are less than 1 acre but are part of a larger common plan of development.

5.2.8 National Historic Preservation Act

Section 106 of the NHPA requires that federal agencies evaluate the effects of federal undertakings on historical, archaeological, and cultural resources, and afford the Advisory Council on Historic Preservation the opportunity to comment on the proposed undertaking. The review process is implemented using the following five-step procedure:

1. Identification and evaluation of historic properties
2. Assessment of the effects of the undertaking on properties that are eligible for NRHP
3. Consultation with the State Historic Preservation Office and other agencies for the development of a Memorandum of Agreement that addresses the treatment of historic properties
4. Receipt of Advisory Council on Historic Preservation comments on the Memorandum of Agreement or results of consultation
5. Project implementation according to the conditions of the Memorandum of Agreement

The NHPA Section 106 compliance process may not consist of all the steps above, depending on the situation. For example, if identification and evaluation result in the documented conclusion that no properties included in or eligible for inclusion are present, then the process ends with the identification and evaluation step. The District will comply with this process as appropriate.

5.2.9 Assembly Bill 52 Tribal Cultural Resources (CEQA Lead Agency)

AB 52 requires early notice and coordination with California Native American tribes by lead agencies under CEQA for all projects issuing an NOP after July 1, 2015. The bill establishes a consultation process with all Native American tribes on the Native American Heritage Commission List. This law creates a new CEQA class of resources termed “Tribal Cultural Resources” and requires consideration of tribal cultural values and resources as well as meaningful consultation as requested by a potentially affected tribe.

5.3 Federal Permits and Authorizations

Following are federal permits and authorizations potentially applicable to the Proposed Program:

- CWA Section 402 – General Construction Stormwater Permit – SWRCB
- CWA Section 404 – USACE
- FESA Consultation (Section 7) – USFWS and NMFS
- Federal Fish and Wildlife Coordination Act Report – USFWS
- NHPA Section 106 – Federal lead agencies

5.4 State Permits and Authorizations

Following are state permits and authorizations potentially applicable to the Proposed Program:

- CWA Section 401 – Water Quality Certification – RWQCB
- California Fish and Game Code Section 1600 Streambed Alteration Agreement – CDFW
- CESA Consultation – CDFW
- Division of Safety of Dams – DWR
- AB 52 Tribal Cultural Resources – CEQA Lead Agency

5.5 Local Permits and Authorizations

Following are local state permits and authorizations potentially applicable to the Proposed Program:

- Encroachment permit
- Site grading and excavating permit[1]
- Zoning variances or revisions[1]

[1] As a "local agency," MID is exempt from City and County building/zoning ordinances during construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy pursuant to Government Code §53091(d)&(e).

SECTION 6

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SECTION 7

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Appendix A
Specific Project Environmental Evaluation Analysis and Checklist

APPENDIX A

Modesto Irrigation District Comprehensive Water Resources Management Plan Site-specific Project Environmental Evaluation Analysis and Checklist

The following checklist/analysis approach would be conducted for all Modesto Irrigation District (MID) Comprehensive Water Resources Management Plan (CWRMP) projects to determine whether a given project would require additional environmental documentation beyond the Programmatic Environmental Impact Report (PEIR) and/or to avoid locations (where feasible) that would potentially result in significant environmental impacts. The checklist below provides a standardized approach to site-specific resource evaluations for general project locations that were previously identified as well as those projects that were not sufficiently developed during the PEIR phase to determine the necessity of further site-specific analysis.

The evaluation criteria identified below are based on those developed in the PEIR. If the potential for a significant impact is identified with respect to these criteria, the specific mitigation measure(s) included in the PEIR would be identified, and it would be documented that implementation of such measure(s) would result in impacts being reduced to a less than significant level.

Completion of the checklist would document whether a proposed project:

- **would not** result in significant impacts/would not require additional documentation because either (1) the proposed project has no potential to result in a potentially significant impact, or (2) the analysis/mitigation identified in the PEIR addresses the potential impact; or
- **would** result in potentially significant impacts not addressed in the PEIR and would require additional documentation or analysis.

Identification of project locations would account for potential environmental resources (including the potential for avoidance) that could result in significant impacts. The checklist would be used to document if potential impacts would be considered less than significant; and thus, further analysis and/or mitigation would not be required. If a project location is required (and cannot be feasibly avoided) where the potential for impacts on biological resources exists, a qualified biologist would visit such proposed project location(s) as specified in the PEIR during the preparation of this checklist. The intent of these visits would be to determine the occurrence of sensitive habitats, including vernal pools, wetlands, and riparian habitat at proposed project locations. Site visits would consist of reconnaissance-level surveys in which observations of special-status species would be recorded, and the general potential for special-status species to occur would be assessed depending on the quality, characteristics, and location of the habitat at the project site. Additionally, environmental permits or clearances that are anticipated to potentially be required would also be indicated as such where indicated below.

Project Analysis and Checklist

(to be completed by MID and/or survey staff)

Project name and type: _____

_____

Date(s) of review: _____

Name of person or persons who completed the review: _____

_____

_____

Project location (attach map): _____

_____

_____

_____

_____

Project description: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Would the project require or result in potentially significant impacts on the following:

Resource	Yes	No
General – All Resources		
Would the project involve a new or larger footprint that was not included in the PEIR?		
Would the project result in new impacts not previously identified in the PEIR?		
Would the project require new mitigation measures not identified in the PEIR?		
Would the project involve construction methods or construction staging not described in the PEIR?		
Are there new sensitive receptors (i.e., hospitals, schools, residents, etc.) or have conditions changed that were not present during preparation of the PEIR?		
Aesthetics		
Are there sensitive receptors nearby (i.e., residents, motorists)?		
Would the project include aboveground structures not similar to those included in the PEIR?		
Would the project result in new light sources or glare?		
Agricultural Resources/Land Use		
Has the land use or habitat type changed since preparation of the PEIR?		
Air Quality/Greenhouse Gas Emissions		
Would the project require substantial construction or earth movement (i.e., fugitive dust)?		
Biological Resources		
Is there native ground present in or adjacent to the project site?		
Cultural and Tribal Cultural Resources		
Are there any known cultural resources located within the project site?		
Geology and Soils		
Would the project require substantial earth movement (i.e., erosion)?		
Hazards and Hazardous Materials		
Are there any known hazardous materials sites located within the project site?		
Hydrology/Water Quality		
Would the project significantly change the topography of the site (i.e., stormwater runoff, flooding)?		
Mineral Resources		
Is the project site known to contain significant mineral resources?		
Noise		
Would construction require heavy equipment not described in the PEIR?		
Population and Housing		
Would the project displace people?		
Would the project result in an increase in population growth?		
Public Services, and Utilities and Service Systems		
Are there new government/public facilities (i.e., parks, schools, fire protection, police protection, etc.) that were not present during preparation of the PEIR?		
Recreation		
Are there new recreation facilities (e.g., neighborhood or regional parks) that were not present during preparation of the PEIR?		
Transportation/Traffic		
Would the project substantially affect or generate traffic conflicts?		

Answering “Yes” to any of the above-listed resource questions does not automatically indicate that the project would have a potentially significant effect on the environment that was not addressed in the PEIR, and that additional environmental review is necessary. However, it does indicate that further evaluation and study is warranted.

This site-specific project environmental evaluation checklist is not meant to substitute for Appendix G of the CEQA Guidelines. The intent of the checklist is to provide a general evaluation of the potential for proposed projects to result in significant environmental impacts not addressed in the PEIR. Future projects considered to potentially result in a variety of potential impacts should use the full checklist provided in Appendix G of the CEQA Guidelines.

On the basis of this review:

☐ The proposed project **would not have a potentially significant effect** on the environment; therefore, no further environmental documentation is required.

☐ The proposed project **would have a potentially significant effect** on the environment; however, by following the mitigation measures identified in the PEIR, the impact(s) would be reduced to a less than significant level, and no further documentation or analysis is required.

☐ The proposed project **would have a potentially significant effect on the environment that was not addressed in the PEIR**, and additional environmental review is required.

Potential Project Required Permits or Approvals

Section 404 Permit – U.S. Army Corps of Engineers	☐
Section 10 or 7 Endangered Species Act – U.S. Fish and Wildlife Service/National Marine Fisheries Service	☐
Section 1602 Lake or Streambed Alteration Agreement – California Department of Fish and Wildlife (CDFW)	☐
Section 2081 Incidental Take Approval – CDFW	☐
Section 401 Water Quality Certification – Central Valley Regional Water Quality Control Board (CVRWQCB)	☐
National Pollutant Discharge Elimination System (NPDES), General Construction Permit – (CVRWQCB)	☐
Grading Permit – Stanislaus County Department of Public Works	☐
Encroachment Permit – Stanislaus County Department of Public Works	☐
Transportation Permit – Stanislaus County Department of Public Works	☐
Grading Permit – City of Modesto Community & Economic Development, Division of Land Development & Engineering	☐
Encroachment Permit – City of Modesto Community & Economic Development, Division of Land Development & Engineering	☐
Transportation (Over Sized) Permit – City of Modesto Community & Economic Development, Division of Land Development & Engineering	☐
Approval of plans and specifications to construct or enlarge a dam or reservoir and certificate of approval to store water – Department of Water Resources, Division of Safety of Dams	☐
Indirect Source Review – San Joaquin Valley Air Pollution Control District	☐
Landowner agreements	☐

Signature _____ Date _____

Appendix B
Notice of Preparation

Notice of Preparation

To: Office of Planning and Research
P.O. Box 3044, Room 113
Sacramento, CA (Address)

From: Modesto Irrigation District
1231 11th Street
Modesto, CA 95354 (Address)

Subject: Notice of Preparation of a Draft Environmental Impact Report

Modesto Irrigation District will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (☐ is ☒ is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to John Davids at the address shown above. We will need the name for a contact person in your agency.

Project Title: Comprehensive Water Resources Management Plan Programmatic EIR

Project Applicant, if any:

Date August 28, 2018

Signature

Title Asst. General Manager, Water Operations

Telephone 209-526-7564

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

Notice of Preparation
Modesto Irrigation District
Comprehensive Water Resources Management Plan Programmatic EIR

The Modesto Irrigation District (MID), located in the northern portion of the San Joaquin Valley in Stanislaus County (Figure 1), conducted an evaluation of its water resources, on-farm systems, land use patterns and projections, infrastructure, and finances. As a result of this assessment, MID has developed and intends to implement an integrated and forward-looking Water Infrastructure Capital Improvements Plan (Proposed Program) to address MID's long-term customer and water management goals, and the specific infrastructure and operational needs throughout the MID irrigation conveyance system. The Proposed Program includes approximately 100 individual projects, which are distributed within MID irrigation district boundaries and support MID's goals through approximately 2040. Executing the Proposed Program over the next decades will allow MID to continue providing a high-level of service to meet customer's evolving water delivery needs and increase operational reliability. The projects in the Proposed Program can be divided into the following 12 categories:

- Drain/Reclamation
- Flow Control and Measurement Structures
- Groundwater Management
- Irrigation Service Turnout Measurement
- Lateral Rehabilitation
- Main Canals and Tunnels Improvements
- Miscellaneous In-System Improvements
- Outflow Management
- Pipeline Replacement
- Regulating Reservoirs and Infrastructure
- Supervisory Control and Data Acquisition (SCADA)
- Stormwater Management

Because the Proposed Program includes a number of individual projects that could have environmental impacts and will be implemented in phases, a Programmatic Environmental Impact Report (PEIR) as referenced in Section 15168 of the California Environmental Quality Act (CEQA) Guidelines (Guidelines) is being prepared. The PEIR will provide programmatic evaluation of the Proposed Program and will facilitate future implementation of individual projects including those that are not anticipated to require additional project-level environmental review. As per CEQA Guidelines Section 15168(b), MID intends to use the PEIR for the following purposes:

- Provide a vehicle for a more comprehensive consideration of effects and alternatives than would be practical in an Environmental Impact Report (EIR) on an individual action.
- Ensure consideration of cumulative impacts that might be overlooked in a case-by-case analysis.
- Avoid duplicative reconsideration of basic policy considerations.
- Allow MID to consider broad policy alternatives and program-wide mitigation measures at an early stage of the planning process when MID has greater flexibility to address basic environmental issues or cumulative impacts.

- Reduce administrative tasks associated with potential projects contemplated in the Proposed Program.

Draft Goals and Objectives

MID recognizes the need for significant investment in its irrigation infrastructure and has developed the Proposed Program to ensure the MID mission is maintained. The Proposed Program will allow MID to:

- Provide a high-level of customer service and meet customer's evolving water delivery needs;
- Ensure compliance with the Water Conservation Act of 2009 (Senate Bill [SB] x7-7); and
- Implement irrigation infrastructure improvements for the stewardship of MID's water resources and increasing operational reliability.

Alternatives

The PEIR will evaluate the No Program Alternative and Proposed Program Alternative. Under the No Program Alternative, present practices are assumed to continue. It is assumed under this alternative that MID would maintain the existing level of service to its customers, only invest in projects to address major service liabilities, and only provide the minimum resources needed to comply with SB x7-7. The No Program Alternative would meet the CEQA requirement of an analysis of a "No Project" alternative in which the Proposed Program is not implemented. The No Program Alternative allows decision-makers to use the PEIR to compare the impacts of approving the Proposed Program with the future conditions of not approving the Program. CEQA Guidelines Section 15126.6, subdivision (e)(2), indicates that the No Project (Program) Alternative should include reasonably foreseeable changes in existing conditions and changes that would be reasonably expected to occur in the foreseeable future if the project (or program) was not approved, based on current plans and consistent with available infrastructure and community services.

Other alternatives that may be raised during the scoping process will be evaluated for feasibility and included in the PEIR as determined appropriate or necessary.

Impact Analysis

The PEIR will evaluate and disclose the potential impacts associated with implementing the projects included in the Proposed Program. Where significant potential impacts are identified, appropriate mitigation measures will be incorporated in coordination with MID. The PEIR will support the preparation of subsequent environmental documents and/or various permit applications as determined to be necessary in cooperation with MID.

Impacts associated with the implementation of the projects included in the Proposed Program will be evaluated qualitatively and quantitatively, as appropriate. Potential effects, such as temporary and/or permanent impacts to terrestrial wildlife, will be evaluated through field surveys and known presence. Where final project locations are not yet known, and will be determined in the future, impact avoidance criteria will be developed and disclosed to support future project/program implementation and minimize potential impacts.

A public draft PEIR is expected to be completed in early 2019.

Scoping Meeting

A public scoping meeting on the Proposed Program and CEQA process to receive public input will be held Tuesday, October 2, 2018 at 9:00 am in the Board Room at the MID Main Office. The MID office is located at 1231 11th Street, Modesto, California 95354. Scoping comments from interested parties will be accepted for 60 days from the date the Notice of Preparation is filed with the Governor's Office of Planning and Research. Scoping comments can be submitted in-person at the public scoping meeting or by mail to:

John Davids

Modesto Irrigation District

PO Box 4060

Modesto, CA 95352

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Comprehensive Water Resources Management Plan Programmatic EIR

Lead Agency: Modesto Irrigation District — Contact Person: John Davids

Mailing Address: P.O. Box 4060 — Phone: 209-526-7564

City: Modesto — Zip: 95352 — County: Stanislaus

Project Location: County: Stanislaus — City/Nearest Community: Modesto

Cross Streets: _____ — Zip Code: _____

Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W Total Acres: _____

Assessor's Parcel No.: _____ Section: _____ Twp.: _____ Range: _____ Base: _____

Within 2 Miles: State Hwy #: _____ Waterways: _____

Airports: _____ Railways: _____ Schools: _____

Document Type:

CEQA: ☒ NOP ☐ Draft EIR — NEPA: ☐ NOI — Other: ☐ Joint Document
☐ Early Cons ☐ Supplement/Subsequent EIR ☐ EA ☐ Final Document
☐ Neg Dec (Prior SCH No.) _____ ☐ Draft EIS ☐ Other: _____
☐ Mit Neg Dec Other: _____ ☐ FONSI

Local Action Type:

☐ General Plan Update ☐ Specific Plan ☐ Rezone ☐ Annexation
☐ General Plan Amendment ☒ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☐ Planned Unit Development ☐ Use Permit ☐ Coastal Permit
☐ Community Plan ☐ Site Plan ☐ Land Division (Subdivision, etc.) ☐ Other: _____

Development Type:

☐ Residential: Units _____ Acres _____
☐ Office: Sq.ft. _____ Acres _____ Employees _____
☐ Commercial: Sq.ft. _____ Acres _____ Employees _____
☐ Industrial: Sq.ft. _____ Acres _____ Employees _____
☐ Educational: _____
☐ Recreational: _____
☐ Water Facilities: Type _____ MGD _____
☐ Transportation: Type _____
☐ Mining: Mineral _____
☐ Power: Type _____ MW _____
☐ Waste Treatment: Type _____ MGD _____
☐ Hazardous Waste: Type _____
☒ Other: Irrigation Facilities

Project Issues Discussed in Document:

☐ Aesthetic/Visual ☐ Fiscal ☐ Recreation/Parks ☐ Vegetation
☐ Agricultural Land ☐ Flood Plain/Flooding ☐ Schools/Universities ☐ Water Quality
☐ Air Quality ☐ Forest Land/Fire Hazard ☐ Septic Systems ☐ Water Supply/Groundwater
☐ Archeological/Historical ☐ Geologic/Seismic ☐ Sewer Capacity ☐ Wetland/Riparian
☐ Biological Resources ☐ Minerals ☐ Soil Erosion/Compaction/Grading ☐ Growth Inducement
☐ Coastal Zone ☐ Noise ☐ Solid Waste ☐ Land Use
☐ Drainage/Absorption ☐ Population/Housing Balance ☐ Toxic/Hazardous ☐ Cumulative Effects
☐ Economic/Jobs ☐ Public Services/Facilities ☐ Traffic/Circulation ☐ Other: _____

Present Land Use/Zoning/General Plan Designation:

Project Description: *(please use a separate page if necessary)*
See attachment "Notice of Preparation Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic EIR"

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

X	Air Resources Board		Office of Historic Preservation
	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency		Parks & Recreation, Department of
	California Highway Patrol		Pesticide Regulation, Department of
	Caltrans District #		Public Utilities Commission
	Caltrans Division of Aeronautics	X	Regional WQCB #5
	Caltrans Planning		Resources Agency
X	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board	X	San Joaquin River Conservancy
X	Conservation, Department of		Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission	X	SWRCB: Clean Water Grants
	Education, Department of	X	SWRCB: Water Quality
	Energy Commission	X	SWRCB: Water Rights
X	Fish & Game Region #4		Tahoe Regional Planning Agency
X	Food & Agriculture, Department of		Toxic Substances Control, Department of
	Forestry and Fire Protection, Department of	X	Water Resources, Department of
	General Services, Department of		
	Health Services, Department of		Other:
	Housing & Community Development		Other:
	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date September 4, 2018 Ending Date November 2, 2018

Lead Agency (Complete if applicable):

Consulting Firm: Jacobs
Address: 2525 Airpark Drive
City/State/Zip: Redding, CA 96001
Contact: John Schoonover
Phone: 530-229-3305

Applicant:
Address:
City/State/Zip:
Phone:

Signature of Lead Agency Representative: **Date:** 8/30/18

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

Distribution List for the
Notice of Preparation for
MID's Comprehensive Water Resources Management Plan PEIR
(Excludes state agencies handled by State Clearinghouse)

Following is a list of the parties to whom the Notice of Preparation has been distributed:

MID INTERNAL:

Modesto Irrigation District
Ed Franciosa
P.O. Box 4060
Modesto, CA 95352-4060

Modesto Irrigation District
Legal Department
P.O. Box 4060
Modesto, CA 95352-4060

STANISLAUS COUNTY OFFICES:

Chief Executive Office
Stanislaus County
Attn: Environmental Review Committee
1010 10th Street, Suite 6800
Modesto, CA 95354

Stanislaus County
Department of Environmental Resources
3800 Cornucopia Way, Suite C
Modesto, CA 95358

Stanislaus County
Community Development Department
1010 10th Street, Suite 3400
Modesto, CA 95354

Stanislaus County Emergency Services
3705 Oakdale Road
Modesto, CA 95357

Stanislaus County Fire Authority
3705 Oakdale Road
Modesto, CA 95357

Riverbank Library Reference Desk
3442 Santa Fe Street
Riverbank, CA

Salida Library Reference Desk
4835 Sisk Rd
Salida, CA

CITIES:

City of Modesto
Patrick Kelly, Planning Manager
PO Box 642
Modesto, CA 95353

City of Waterford
Tim Ogden, City Manager
City Hall
PO Box 199
Waterford, CA 95386

City of Riverbank
6707 3rd Street
Riverbank, CA

OTHER:

San Joaquin Valley Air Pollution Control District (SJVAPCD),
NORTHERN REGION
4800 Enterprise Way
Modesto, CA 9535

Tuolumne County
County Administrator
2 S Green Street
Sonora, CA 95370

USACOE Regulatory
Sacramento District
1325 J Street
Sacramento, CA 95814

U.S. Army Corps Engineers
Regulatory Branch
1325 J Street, Room 1480
Sacramento, CA 95814-2922

StanCOG
111 "I" Street, Suite 308
Modesto, CA 95354

Stanislaus County Department of Public Works
1716 Morgan Rd
Modesto, CA 95358

Stanislaus Consolidated Fire Protection District
3324 Topeka St
Riverbank, CA 95367

IRRIGATION DISTRICTS:

Oakdale Irrigation District
Steve Knell, P.E., General Manager
1205 East F Street
Oakdale, CA 95361

Turlock Irrigation District
Casey Hashimoto, General Manager
PO Box 949
Turlock, CA 95381-0949

South San Joaquin Irrigation District
Peter Rietkirk, General Manager
PO Box 747
Ripon, CA 95366

Merced Irrigation District
Mike Morris, Associate Engineer
744 West 20th Street
Merced, CA 95340

LIBRARIES:

Waterford Public Library Reference Desk
324 E Street
Waterford, CA

Modesto County Library Reference Desk
1500 I Street
Modesto, CA

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

OCT - 1 2018

John Davids
Modesto Irrigation District
1231 11th Street
Modesto, CA, 95354

Project: Notice of Preparation (NOP) – Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report

District CEQA Reference No: 20180955

Dear Mr. Davids:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the Notice of Preparation (NOP) for the Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic Environmental Impact Report (Project). The proposed project consists of water infrastructure capital improvements including drian reclamation, outflow management, flow control and measurement structures, pipeline replacement, groundwater structures, regulating reservoirs and infrastructure, irrigation service turnout measurement, lateral rehabilitation, stormwater management, main canals and tunnels improvements, and miscellaneous in-system improvements (Project). The District offers the following comments:

Emissions Analysis

1) At the federal level for the National Ambient Air Quality Standards (NAAQS), the District is currently designated as extreme nonattainment for the 8-hour ozone standards; nonattainment for the PM2.5 standards; and attainment for the 1-Hour ozone, PM10 and CO standards. At the state level, the District is currently designated as nonattainment for the 8-hour ozone, PM10, and PM2.5 California Ambient Air Quality Standards (CAAQS). The District recommends that the Air Quality section of the Environmental Impact Report (EIR) include a discussion of the following impacts:

   a) **Criteria Pollutants:** Project related criteria pollutant emissions should be identified and quantified. The discussion should include existing and post-project emissions.

Samir Sheikh
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

i) Construction Emissions: Construction emissions are short-term emissions and should be evaluated separately from operational emissions. For reference, the District's annual criteria thresholds of significance for construction are: 100 tons per year of carbon monoxide (CO), 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), 27 tons per year of oxides of sulfur (SOx), 15 tons per year of particulate matter of 10 microns or less in size (PM10), or 15 tons per year of particulate matter of 2.5 microns or less in size (PM2.5).

- *Recommended Mitigation Measure if needed:* To reduce impacts from construction related exhaust emissions, the District recommends feasible mitigation for the project to utilize off-road construction fleets that can achieve fleet average emissions equal to or cleaner than the Tier III emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations. This can be achieved through any combination of uncontrolled engines and engines complying with Tier III and above engine standards.

ii) Operational Emissions: Permitted (stationary sources) and non-permitted (mobile sources) sources should be analyzed separately. For reference, the annual criteria thresholds of significance for operation of permitted and non-permitted sources each are: 100 tons per year of carbon monoxide (CO), 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), 27 tons per year of oxides of sulfur (SOx), 15 tons per year of particulate matter of 10 microns or less in size (PM10), or 15 tons per year of particulate matter of 2.5 microns or less in size (PM2.5).

- *Recommended Mitigation Measure if needed:* Project related impacts on air quality can be reduced through incorporation of design elements, for example, that increase energy efficiency, reduce vehicle miles traveled, and reduce construction exhaust related emissions.

iii) Recommended Model: Project related criteria pollutant emissions from construction and operation non-permitted (limited to equipment not subject to District permits) should be identified and quantified. Emissions analysis should be performed using CalEEMod (**Cal**ifornia **E**mission **E**stimator **Mod**el), which uses the most recent approved version of relevant Air Resources Board (ARB) emissions models and emission factors. CalEEMod is available to the public and can be downloaded from the CalEEMod website at: www.caleemod.com.

b) **Nuisance Odors:** The Project should be evaluated to determine the likelihood that the Project would result in nuisance odors. Nuisance orders are subjective, thus the District has not established thresholds of significance for nuisance odors. Nuisance odors may be assessed qualitatively taking into consideration of Project design elements and proximity to off-site receptors that potentially would be exposed objectionable odors.

c) **Health Risk Screening/Assessment:** A Health Risk Screening/Assessment identifies potential Toxic Air Contaminants (TAC's) impact on surrounding sensitive receptors such as hospitals, daycare centers, schools, work-sites, and residences. TAC's are air pollutants identified by the Office of Environmental Health Hazard Assessment/California Air Resources Board (OEHHA/CARB) (https://www.arb.ca.gov/toxics/healthval/healthval.htm) that pose a present or potential hazard to human health. A common source of TACs can be attributed to diesel exhaust emitted from both mobile and stationary sources. Industry specific TACs generated must also be identified and quantified.

The District recommends the Project be evaluated for potential health impacts to surrounding receptors (on-site and off-site) resulting from operational and multi-year construction TAC emissions.

i) The District recommends conducting a screening analysis that includes all sources of emissions. A screening analysis is used to identify projects which may have a significant health impact. A prioritization, using CAPCOA's updated methodology, is the recommended screening method. A prioritization score of 10 or greater is considered to be significant and a refined Health Risk Assessment (HRA) should be performed. The prioritization calculator can be found at: http:www.valleyair.org/busind/pto/emission_factors/Criteria/Toxics/Utilities/PRIORITIZATION%20RMR%202016.XLS.

ii) The District recommends a refined HRA for projects that result in a prioritization score of 10 or greater. It is recommended that the Project proponent contact the District to review the proposed modeling protocol. The Project would be considered to have a significant health risk if the HRA demonstrates that the Project related health impacts would exceed the Districts significance threshold of 20 in a million for carcinogenic risk and 1.0 for the Acute and Chronic Hazard Indices.

More information on toxic emission factors, prioritizations and HRAs can be obtained by:

- E-Mailing inquiries to: hramodeler@valleyair.org; or
- The District can be contacted at (559) 230-6000 for assistance; or
- Visiting the Districts website (Modeling Guidance) at http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm

d) **Ambient Air Quality Analysis:** An ambient air quality analysis (AAQA) uses air dispersion modeling to determine if emissions increases from a project will cause or contribute to a violation of the ambient air quality standards. The District recommends that an AAQA be performed for the Project if emissions exceed 100 pounds per day of any pollutant.

If an AAQA is performed, the analysis should include emissions from both Project specific permitted and non-permitted equipment and activities. The District recommends consultation with District staff to determine the appropriate model and input data to use in the analysis. Specific information for assessing significance, including screening tools and modeling guidance is available online at the District's website www.valleyair.org/ceqa.

2) In addition to the discussions on potential impacts identified above, if preliminary review indicates that an EIR should be prepared, the District recommends the EIR also include the following discussions:

a) A discussion of the methodology, model assumptions, inputs and results used in characterizing the Project's impact on air quality. To comply with CEQA requirements for full disclosure, the District recommends that the modeling outputs be provided as appendices to the EIR. The District further recommends that the District be provided with an electronic copy of all input and output files for all modeling.

b) A discussion of the components and phases of the Project and the associated emission projections, including ongoing emissions from each previous phase.

c) A discussion of Project design elements and mitigation measures, including characterization of the effectiveness of each mitigation measure incorporated into the Project.

d) A discussion of whether the Project would result in a cumulatively considerable net increase of any criteria pollutant or precursor for which the San Joaquin Valley Air Basin is in non-attainment. More information on the District's attainment status can be found online by visiting the District's website at: http://valleyair.org/aqinfo/attainment.htm.

District Rules and Regulations

3) The proposed Project may be subject to District rules and regulations, including: Regulation VIII (Fugitive PM10 Prohibitions), Rule 4102 (Nuisance), and Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations). In the event an existing building will be renovated, partially demolished or removed, the Project may be subject to District Rule 4002 (National Emission Standards for Hazardous Air Pollutants).

4) This Project may be subject to District Rule 2010 (Permits Required) and Rule 2201 (New and Modified Stationary Source Review) and will require District permits. Prior to construction, the Project proponent should submit to the District an application for an Authority to Construct (ATC). For further information or assistance, the project proponent may contact the District's Small Business Assistance (SBA) Office at (209) 557-6446.

5) Based on information provided, the proposed Project would equal or exceed the relevant District Rule 9510 (Indirect Source Review) applicability threshold of 9,000 square feet of other space. Therefore, the District concludes that the proposed Project is subject to District Rule 9510.

   Any applicant subject to District Rule 9510 is required to submit an Air Impact Assessment (AIA) application to the District no later than applying for final discretionary approval. If approval of the subject project constitutes the last discretionary approval by your agency, the District recommends that demonstration of compliance with District Rule 9510, including payment of all applicable fees before issuance of the first building permit, be made a condition of project approval. Information about how to comply with District Rule 9510 can be found online at: http://www.valleyair.org/ISR/ISRHome.htm.

6) The above list of rules is neither exhaustive nor exclusive. To identify other District rules or regulations that apply to this Project or to obtain information about District permit requirements, the applicant is strongly encouraged to contact the District's Small Business Assistance (SBA) Office at (209) 557-6446. Current District rules can be found online at the District's website at: www.valleyair.org/rules/1ruleslist.htm.

The District recommends that a copy of the District's comments be provided to the Project proponent. If you have any questions or require further information, please call Eric McLaughlin at (559) 230-5808.

Sincerely,

Arnaud Marjollet
Director of Permit Services

for: Brian Clements
Program Manager

AM: em

STATE OF CALIFORNIA
NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

RECEIVED OCT 09 2018

October 4, 2018

John Davids
Modesto Irrigation District
P.O. Box 4060
Modesto, CA 95352

RE: SCH#2018092056 Comprehensive Water Resources Management Plan Programmatic EIR, Stanislaus County

Dear Mr. Davids:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
    b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Sharaya.Souza@nahc.ca.gov.

Sincerely,

for

Sharaya Souza
Staff Services Analyst

cc: State Clearinghouse

CHIEF EXECUTIVE OFFICE

Jody L. Hayes
Chief Executive Officer

Patricia Hill Thomas
Chief Operations Officer/
Assistant Executive Officer

Keith D. Boggs
Assistant Executive Officer

Patrice M. Dietrich
Assistant Executive Officer

STANISLAUS COUNTY ENVIRONMENTAL REVIEW COMMITTEE

October 5, 2018

John Davids, Assistant General Manager
Water Operations
Modesto Irrigation District
1231 11th Street
Modesto, CA 95354

SUBJECT: ENVIRONMENTAL REFERRAL – MODESTO IRRIGATION DISTRICT (MID) – COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT – NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

Mr. Davids:

Thank you for the opportunity to review the above-referenced project.

The Stanislaus County Environmental Review Committee (ERC) has reviewed the subject project and has no comments at this time.

The ERC appreciates the opportunity to comment on this project.

Sincerely,

Patrick Cavanah
Sr. Management Consultant
Environmental Review Committee

PC:ss

cc: ERC Members

1010 10th Street, Ste. 6800, Modesto, CA 95354 Post Office Box 3404
Modesto, California 95353 Phone: 209.525.6333 Fax: 209.544.6226

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Water Boards

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EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

26 October 2018

John Davids
Modesto Irrigation District
PO Box 4060
Modesto, CA 95352

CERTIFIED MAIL
7018 1830 0001 0062 2643

COMMENTS TO REQUEST FOR REVIEW FOR THE NOTICE OF PREPATATION FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN PROJECT, SCH# 2018092056, STANISLAUS COUNTY

Pursuant to the State Clearinghouse's 24 September 2018 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Notice of Preparation for the Draft Environment Impact Report* for the Comprehensive Water Resources Management Plan Project, located in Stanislaus County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases,

the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues.

For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website:
http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/.

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Policy is available on page IV-15.01 at:
http://www.waterboards.ca.gov/centralvalleywater_issues/basin_plans/sacsjr.pdf

In part it states:

> *Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.*
>
> *This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.*

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan

(SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/.

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit

Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml.

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACOE). If a Section 404 permit is required by the USACOE, the Central Valley Water Board will review the permit application to ensure

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Wildlife for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACOE at (916) 557-5250.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACOE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

Waste Discharge Requirements – Discharges to Waters of the State

If USACOE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

For more information on the Water Quality Certification and WDR processes, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit2.shtml.

Dewatering Permit

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Risk General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Risk Waiver) R5-2013-0145. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Risk General Order and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Risk Waiver and the application process, visit the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2013-0145_res.pdf

Regulatory Compliance for Commercially Irrigated Agriculture

If the property will be used for commercial irrigated agricultural, the discharger will be required to obtain regulatory coverage under the Irrigated Lands Regulatory Program. There are two options to comply:

1. **Obtain Coverage Under a Coalition Group.** Join the local Coalition Group that supports land owners with the implementation of the Irrigated Lands Regulatory Program. The Coalition Group conducts water quality monitoring and reporting to the Central Valley Water Board on behalf of its growers. The Coalition Groups charge an annual membership fee, which varies by Coalition Group. To find the Coalition Group in your area, visit the Central Valley Water Board's website at: http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/for_growers/apply_coalition_group/index.shtml or contact water board staff at (916) 464-4611 or via email at IrrLands@waterboards.ca.gov.

2. **Obtain Coverage Under the General Waste Discharge Requirements for Individual Growers, General Order R5-2013-0100**. Dischargers not participating in a third-party group (Coalition) are regulated individually. Depending on the specific site conditions, growers may be required to monitor runoff from their property, install monitoring wells, and submit a notice of intent, farm plan, and other action plans regarding their actions to comply with their General Order. Yearly costs would include State administrative fees (for example, annual fees for farm sizes from 10-100 acres are currently $1,084 + $6.70/Acre); the cost to prepare annual monitoring reports; and water quality monitoring costs. To enroll as an Individual Discharger under the Irrigated Lands Regulatory Program, call the Central Valley Water Board phone line at (916) 464-4611 or e-mail board staff at IrrLands@waterboards.ca.gov.

Low or Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Dewatering and Other Low Threat Discharges to Surface Waters* (Low Threat General Order) or the General Order for *Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water*

(Limited Threat General Order). A complete application must be submitted to the Central Valley Water Board to obtain coverage under these General NPDES permits.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0074.pdf

For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2013-0073.pdf

NPDES Permit

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit.

For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/help/business_help/permit3.shtml

If you have questions regarding these comments, please contact me at (916) 464-4812 or Jordan.Hensley@waterboards.ca.gov.

Jordan Hensley
Environmental Scientist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

Appendix C
Proposed Program Implementation Schedule and Anticipated Annual Project Implementation

Appendix C. Proposed Program Implementation Schedule and Anticipated Annual Project Implementation

Project Category	Total Number of Projects	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Regulating Reservoirs and Infrastructure	3 projects			1					1					1					
Canal, Lateral, and Tunnel Improvements	16 projects		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Measurement and Automation	33 projects	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Flow Control	13 projects	2	1	1	1	1	1	1	1	1	1	1	1						
Groundwater Management	7 projects	1	1		1	1	1	1			1								

Appendix D
Air Quality and Greenhouse Gas Emissions

Appendix D. Air Quality and Greenhouse Gas Emissions

Table D-1. Total Emissions by Construction Year

	Total Emissions with Multiple Projects						
Year/ Scenario	**ROG ton/year**	**NO_x ton/year**	**CO ton/year**	**SO_2 ton/year**	**PM_{10} ton/year**	**$PM_{2.5}$ ton/year**	**CO_2e MT/year**
2023	0.19	1.48	1.57	0.01	0.74	0.13	446.22
2024	0.34	2.85	2.74	0.01	2.04	0.61	785.89
2025	1.16	**9.68**	**8.82**	0.03	**11.07**	**3.41**	3034.97
2030	**1.30**	5.13	7.97	**0.03**	10.87	3.24	**3395.79**
2031	0.32	1.26	2.35	0.01	2.01	0.56	809.66
2033	0.46	1.51	3.40	0.01	3.61	0.76	1212.48
Worst-Case	1.30	9.68	8.82	0.03	11.07	3.41	3395.79

Note:
With the same construction activities and due to the lower emission factors in future years, the following are expected:

- Emissions from 2026 to 2029, and 2032 are lower than 2024.
- Emissions of 2034 are lower than 2033.
- Emissions of 2035 are lower than 2030.
- Emissions of 2036 to 2040 are lower than 2033.

CO = carbon monoxide
CO_2e = carbon dioxide equivalent
MT/year = million ton(s) per year
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in aerodynamic diameter
PM_{10} = particulate matter less than 10 micrometers in aerodynamic diameter
NO_x = oxides of nitrogen
ROG = reactive organic gas
SO_2 = sulfur dioxide
ton/year = ton(s) per year

Project Schedule and Potential Overlapping in Each Analysis Year

Projects	Maximum Construction Months Per Year	Construction Schedule	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Regulating Reservoirs and Infrastructure	12	3 projects (2025, 2030, and 2035)			1					1					1					
Canal, Lateral, and Tunnel Improvements	5	16 projects		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Flow Control	2	13 projects	2	1	1	1	1	1	1	1	1	1	1	1						
Groundwater Management	2	7 projects	1	1		1	1	1	1			1								
Measurement and Automation	1	33 projects	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Breakout Project - Butler Communications Tower[a]	2	1 project									1									
Breakout Project - Dry Creek Flume Replacement	12	1 project											1							

[1]Breakout Projects - Butler Communications Tower is part of the 2031 Measurement and Automation projects. Dry Creek flume replacement is part of the 2033 Canal, Lateral, and Tunnel Improvement projects. Additional emissions were calculated separately for these Breakout Projects to account for additional equipment needed compared to a typical project in other years.

Analysis Year: **2023**

Construction Emissions Summary

Total Emissions Summary (by Project) **2023** (Emissions from Construction of Each Individual Project if Constructed)

Onsite Equipment	**Number**	Maximum Daily Emissions							Annual Emissions						
		ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	equipment	25.674	218.247	173.108	0.575	8.676	7.982	55031.589	0.929	7.903	6.442	0.021	0.313	0.288	1826.431
	vehicles	0.088	6.886	2.140	0.042	0.450	0.214	4565.680	0.011	0.883	0.277	0.005	0.058	0.027	531.773
	dust	NA	NA	NA	NA	#N/A	#N/A	NA	NA	NA	NA	NA	8.813	2.571	NA
	Sub Total	**25.762**	**225.133**	**175.248**	**0.617**	**#N/A**	**#N/A**	**59597.269**	**0.940**	**8.786**	**6.719**	**0.026**	**9.184**	**2.887**	**2358.204**
Canal, Lateral, and Tunnel Improvements	equipment	5.363	44.972	41.551	0.116	1.921	1.795	11111.026	0.210	1.771	1.541	0.004	0.075	0.070	385.953
	vehicles	0.031	1.952	0.939	0.013	0.144	0.067	1397.302	0.002	0.105	0.051	0.001	0.008	0.004	68.452
	dust	NA	NA	NA	NA	#N/A	#N/A	NA	NA	NA	NA	NA	1.467	0.456	NA
	Sub Total	**5.394**	**46.923**	**42.490**	**0.129**	**#N/A**	**#N/A**	**12508.329**	**0.211**	**1.876**	**1.592**	**0.005**	**1.551**	**0.530**	**454.405**
Flow control	equipment	3.993	30.718	35.338	0.099	1.279	1.206	9442.123	0.045	0.343	0.386	0.001	0.014	0.013	97.375
	vehicles	0.020	1.147	0.679	0.008	0.094	0.043	871.965	0.000	0.022	0.014	0.000	0.002	0.001	15.503
	dust	NA	NA	NA	NA	#N/A	#N/A	NA	NA	NA	NA	NA	0.225	0.024	NA
	Sub Total	**4.013**	**31.864**	**36.017**	**0.107**	**#N/A**	**#N/A**	**10314.088**	**0.045**	**0.365**	**0.401**	**0.001**	**0.241**	**0.038**	**112.879**
Groundwater Management	equipment	4.559	36.573	39.205	0.114	1.505	1.413	10929.676	0.036	0.294	0.282	0.001	0.012	0.011	80.736
	vehicles	0.008	0.337	0.319	0.003	0.035	0.016	297.808	0.000	0.003	0.005	0.000	0.000	0.000	2.841
	dust	NA	NA	NA	NA	#N/A	#N/A	NA	NA	NA	NA	NA	0.068	0.007	NA
	Sub Total	**4.567**	**36.910**	**39.524**	**0.117**	**#N/A**	**#N/A**	**11227.484**	**0.036**	**0.297**	**0.287**	**0.001**	**0.080**	**0.018**	**83.576**
Masurement and automation	equipment	3.477	26.416	28.355	0.087	1.068	1.002	8313.667	0.030	0.225	0.237	0.001	0.009	0.008	65.353
	vehicles	0.009	0.341	0.364	0.003	0.038	0.017	316.206	0.000	0.003	0.005	0.000	0.000	0.000	3.091
	dust	NA	NA	NA	NA	#N/A	#N/A	NA	NA	NA	NA	NA	0.078	0.008	NA
	Sub Total	**3.486**	**26.757**	**28.720**	**0.090**	**#N/A**	**#N/A**	**8629.873**	**0.030**	**0.228**	**0.243**	**0.001**	**0.087**	**0.017**	**68.445**
Butler communicaitaons Tower Project	equipment	3.728	32.305	31.069	0.082	1.375	1.284	7797.748	0.009	0.072	0.062	0.000	0.003	0.003	18.626
	vehicles	0.019	0.691	0.865	0.006	0.085	0.038	687.606	0.000	0.002	0.006	0.000	0.000	0.000	3.091
	dust	NA	NA	NA	NA	#N/A	#N/A	NA	NA	NA	NA	NA	0.111	0.020	NA
	Sub Total	**3.747**	**32.996**	**31.934**	**0.088**	**#N/A**	**#N/A**	**8485.354**	**0.009**	**0.074**	**0.068**	**0.000**	**0.114**	**0.023**	**21.717**
Dry Creek Flume Replacement Project	equipment	4.727	38.189	41.235	0.111	1.618	1.506	10662.020	0.143	1.059	1.109	0.004	0.041	0.038	322.056
	vehicles	0.022	1.006	0.893	0.008	0.101	0.046	871.839	0.002	0.054	0.109	0.001	0.009	0.004	61.873
	dust	NA	NA	NA	NA	#N/A	#N/A	NA	NA	NA	NA	NA	1.704	0.211	NA
	Sub Total	**4.750**	**39.195**	**42.127**	**0.120**	**#N/A**	**#N/A**	**11533.859**	**0.145**	**1.113**	**1.219**	**0.004**	**1.754**	**0.253**	**383.929**

Note: Emissions presented in this table are potential emissions if a project is constructed in the analysis year. Emissions may or may not occur in this year depending on the program schedule.

Analysis Year: **2023**

Construction Emissions Summary

Total Emissions of Potential Overlapping Projects **2023**

		Emissions/year Per Project							Total Emissions with Multiple Projects						
	Number of Projects	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	#N/A	0.94	8.79	6.72	0.03	9.18	2.89	2358.20	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Canal, Lateral, and Tunnel Improvements	#N/A	0.21	1.88	1.59	0.01	1.55	0.53	454.40	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Flow Control	#N/A	0.05	0.36	0.40	0.00	0.24	0.04	112.88	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Groundwater Management	#N/A	0.04	0.30	0.29	0.00	0.08	0.02	83.58	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Measurement and Automation	#N/A	0.03	0.23	0.24	0.00	0.09	0.02	68.44	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Butler Communications Tower project	#N/A	0.01	0.07	0.07	0.00	0.11	0.02	21.72	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Dry Creek Flume Replacement Project	#N/A	0.14	1.11	1.22	0.00	1.75	0.25	383.93	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Total Emissions of Potential Overlapping Projects in Analysis Year									**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**	**#N/A**
SJVAPCD CEQA Thresholds									**10**	**10**	**100**	**27**	**15**	**15**	**NA**

Analysis Year: **2023**

Onsite Equipment Emissions

Onsite Equipment Information and Emission Factors **2023**

	Projects	Operation Data							CalEEMod Emission Factors (100% load)								
		Equipment	Number	HP	Days/Year	Hour/day	Emission	CalEEMod	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	CO_2e
				per equipment	per equipment	per equipment	Factor Year	Default Load Factor	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	2	247	20	8	2023	0.40	0.393	4.090	1.783	0.005	0.184	0.169	474.597	0.153	478.881
		Grader	1	187	20	8	2023	0.41	0.284	3.441	1.252	0.005	0.111	0.103	473.926	0.153	478.210
		Backhoe	1	97	20	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		Loader	1	97	20	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		Dump Trucks	3	402	20	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
	Earthwork (topsoil stripping and removal)	Bulldozers	2	247	20	8	2023	0.40	0.393	4.090	1.783	0.005	0.184	0.169	474.597	0.153	478.881
		Loader	1	97	20	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		Dump Trucks	10	402	20	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
	Earthwork (reservoir construction)	Scrapers	4	367	100	8	2023	0.48	0.253	2.666	1.975	0.005	0.105	0.096	473.177	0.153	477.461
		Bulldozers	3	247	100	8	2023	0.4	0.393	4.090	1.783	0.005	0.184	0.169	474.597	0.153	478.881
		Loader	1	97	100	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		Grader	1	187	100	8	2023	0.41	0.284	3.441	1.252	0.005	0.111	0.103	473.926	0.153	478.210
		Compactors	2	8	100	8	2023	0.43	0.661	4.142	3.469	0.008	0.161	0.161	568.299	0.059	569.951
		Water Truck	1	402	100	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		Dump Trucks	12	402	100	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
	Structure/Equipment Installation	Excavator	1	158	100	8	2023	0.38	0.178	1.462	3.076	0.005	0.072	0.066	472.277	0.153	476.561
		Backhoe	1	97	100	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		Dump Truck	1	402	100	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	100	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
		Generator	1	84	100	8	2023	0.74	0.279	2.477	3.347	0.006	0.117	0.117	568.299	0.025	568.999
		Power screed	1	172	100	8	2023	0.42	0.273	2.698	3.142	0.005	0.140	0.129	469.558	0.152	473.814
		25-ton crane	1	231	100	8	2023	0.29	0.297	3.229	1.553	0.005	0.135	0.124	472.974	0.153	477.258
	Dust Control	Water Truck	2	402	200	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	40	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		excavator	1	158	40	8	2023	0.38	0.178	1.462	3.076	0.005	0.072	0.066	472.277	0.153	476.561
		water truck	1	402	40	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		dump truck	1	402	40	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	40	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Construction	Bulldozers	2	247	90	8	2023	0.4	0.393	4.090	1.783	0.005	0.184	0.169	474.597	0.153	478.881
		backhoe (with hydraulic hammer)	1	97	90	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		water truck	1	402	90	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		dump trucks	1	402	90	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	2	84	90	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Dust Control	Water Truck	1	402	130	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		excavator	1	158	20	8	2023	0.38	0.178	1.462	3.076	0.005	0.072	0.066	472.277	0.153	476.561
		water truck	1	402	20	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		dump truck	1	402	20	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	2	84	20	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		water truck	1	402	20	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		dump trucks	1	402	20	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	20	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Dust Control	Water Truck	1	402	40	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
Groundwater Management	Site Clearing, Earthwork	excavator	1	158	2	8	2023	0.38	0.178	1.462	3.076	0.005	0.072	0.066	472.277	0.153	476.561
		backhoe	1	97	2	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		dump truck	1	402	2	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	2	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Construction	backhoe (with hydraulic hammer)	1	97	26	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		drill rig	1	221	26	8	2023	0.5	0.110	1.047	1.043	0.005	0.034	0.031	469.706	0.152	473.962
		crane	1	231	26	8	2023	0.29	0.297	3.229	1.553	0.005	0.135	0.124	472.974	0.153	477.258
		Water Truck	1	402	26	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		dump trucks	1	402	26	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	26	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Development	truck	1	402	2	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		pump trailer	1	84	2	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Dust Control	Water Truck	1	402	30	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361

Analysis Year: **2023**

Onsite Equipment Emissions

Measurement and Automation	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		Water Truck	1	402	20	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		dump truck	1	402	20	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	20	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	SCADA Equipment Installation	backhoe	1	97	10	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		Water Truck	1	402	10	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		dump truck	1	402	10	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	10	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Dust Control	Water Truck	1	402	30	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	0	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		excavator	1	158	5	8	2023	0.38	0.178	1.462	3.076	0.005	0.072	0.066	472.277	0.153	476.561
		dump truck	1	402	5	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	0	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
		Bulldozers	1	247	5	8	2023	0.4	0.393	4.090	1.783	0.005	0.184	0.169	474.597	0.153	478.881
	Construction	backhoe (with hydraulic hammer)	1	97	0	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		dump trucks	1	402	5	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		boom lift	1	63	2	8	2023	0.31	0.100	1.548	3.170	0.005	0.027	0.025	472.114	0.153	476.398
		crane	1	231	2	8	2023	0.29	0.297	3.229	1.553	0.005	0.135	0.124	472.974	0.153	477.258
		concrete truck/pumping equipment	1	84	1	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Dust Control	Water Truck	1	402	15	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		excavator	1	158	40	8	2023	0.38	0.178	1.462	3.076	0.005	0.072	0.066	472.277	0.153	476.561
		dump truck	2	402	40	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		concrete truck/pumping equipment	1	84	5	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
		Bulldozers	1	247	20	8	2023	0.4	0.393	4.090	1.783	0.005	0.184	0.169	474.597	0.153	478.881
	Construction	loader	1	97	10	8	2023	0.37	0.239	2.426	3.525	0.005	0.120	0.110	476.431	0.154	480.743
		dump trucks	2	402	60	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361
		excavator	2	158	60	8	2023	0.38	0.178	1.462	3.076	0.005	0.072	0.066	472.277	0.153	476.561
		concrete truck/pumping equipment	1	84	10	8	2023	0.74	0.299	2.511	3.398	0.006	0.123	0.123	568.299	0.026	569.027
	Dust Control	Water Truck	1	402	260	8	2023	0.38	0.187	1.324	1.221	0.005	0.048	0.044	475.049	0.154	479.361

Assumptions:

1. CO2e were calculated using the following global warming potential (GWP, 100-year GWP from IPCC Fifth Assessment Report , 2014)

CO2 1

CH4 28

N2O 265

2. Load factor and emission factors are from CalEEMod Appendix D: Table 3.4 Offroad Equipment Emission Factors (g/hp-hr) and Table 3.3 OFFROAD Default Horsepower and Load Factors (October 2017)

Analysis Year: **2023**

Onsite Equipment Emissions

Onsite Equipment Emissions

			Daily Emissions							Annual Emissions						
			ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	Projects	**Onsite Equipment**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	1.37	14.25	6.21	0.02	0.64	0.59	1668.90	0.014	0.14	0.06	0.00017	0.006	0.006	15.14
		Grader	0.38	4.65	1.69	0.01	0.15	0.14	646.64	0.004	0.05	0.02	0.00007	0.002	0.001	5.87
		Backhoe	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.002	0.02	0.02	0.00003	0.001	0.001	2.76
		Loader	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.002	0.02	0.02	0.00003	0.001	0.001	2.76
		Dump Trucks	1.51	10.70	9.87	0.04	0.39	0.36	3874.45	0.015	0.11	0.10	0.00040	0.004	0.004	35.15
	Earthwork	Bulldozers	1.37	14.25	6.21	0.02	0.64	0.59	1668.90	0.014	0.14	0.06	0.00017	0.006	0.006	15.14
	(topsoil stripping and removal)	Loader	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.002	0.02	0.02	0.00003	0.001	0.001	2.76
		Dump Trucks	5.04	35.68	32.88	0.13	1.29	1.19	12914.84	0.050	0.36	0.33	0.00135	0.013	0.012	117.16
	Earthwork (reservoir construction)	Scrapers	3.14	33.13	24.55	0.06	1.30	1.19	5933.66	0.157	1.66	1.23	0.00311	0.065	0.060	269.15
		Bulldozers	2.05	21.38	9.32	0.03	0.96	0.88	2503.36	0.103	1.07	0.47	0.00131	0.048	0.044	113.55
		Loader	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.008	0.08	0.11	0.00016	0.004	0.003	13.80
		Grader	0.38	4.65	1.69	0.01	0.15	0.14	646.64	0.019	0.23	0.08	0.00034	0.008	0.007	29.33
		Compactors	0.08	0.50	0.42	0.00	0.02	0.02	69.16	0.004	0.03	0.02	0.00005	0.001	0.001	3.14
		Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.025	0.18	0.16	0.00067	0.006	0.006	58.58
		Dump Trucks	6.05	42.81	39.46	0.16	1.55	1.42	15497.81	0.302	2.14	1.97	0.00808	0.078	0.071	702.98
	Structure/Equipment Installation	Excavator	0.19	1.55	3.26	0.01	0.08	0.07	504.63	0.009	0.08	0.16	0.00026	0.004	0.003	22.89
		Backhoe	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.008	0.08	0.11	0.00016	0.004	0.003	13.80
		Dump Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.025	0.18	0.16	0.00067	0.006	0.006	58.58
		Concrete pump	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.016	0.14	0.19	0.00033	0.007	0.007	28.30
		Generator	0.31	2.72	3.67	0.01	0.13	0.13	623.79	0.015	0.14	0.18	0.00033	0.006	0.006	28.30
		Power screed	0.35	3.44	4.00	0.01	0.18	0.16	603.67	0.017	0.17	0.20	0.00032	0.009	0.008	27.38
		25-ton crane	0.35	3.82	1.83	0.01	0.16	0.15	563.87	0.018	0.19	0.09	0.00030	0.008	0.007	25.58
	Dust Control	Water Truck	1.01	7.14	6.58	0.03	0.26	0.24	2582.97	0.101	0.71	0.66	0.00269	0.026	0.024	234.33

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Onsite Equipment Emissions

Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.003	0.03	0.04	0.00006	0.002	0.001	5.52
		excavator	0.19	1.55	3.26	0.01	0.08	0.07	504.63	0.004	0.03	0.07	0.00011	0.002	0.001	9.16
		water truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.010	0.07	0.07	0.00027	0.003	0.002	23.43
		dump truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.010	0.07	0.07	0.00027	0.003	0.002	23.43
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.007	0.06	0.07	0.00013	0.003	0.003	11.32
	Construction	Bulldozers	1.37	14.25	6.21	0.02	0.64	0.59	1668.90	0.062	0.64	0.28	0.00078	0.029	0.027	68.13
		backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.007	0.07	0.10	0.00014	0.003	0.003	12.42
		water truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.023	0.16	0.15	0.00061	0.006	0.005	52.72
		dump trucks	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.023	0.16	0.15	0.00061	0.006	0.005	52.72
		concrete truck/pumping equipment	0.66	5.51	7.45	0.01	0.27	0.27	1247.64	0.030	0.25	0.34	0.00059	0.012	0.012	50.93
	Dust Control	Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.033	0.23	0.21	0.00088	0.008	0.008	76.16
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.002	0.02	0.02	0.00003	0.001	0.001	2.76
		excavator	0.19	1.55	3.26	0.01	0.08	0.07	504.63	0.002	0.02	0.03	0.00005	0.001	0.001	4.58
		water truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.005	0.04	0.03	0.00013	0.001	0.001	11.72
		dump truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.005	0.04	0.03	0.00013	0.001	0.001	11.72
		concrete truck/pumping equipment	0.66	5.51	7.45	0.01	0.27	0.27	1247.64	0.007	0.06	0.07	0.00013	0.003	0.003	11.32
	Construction	backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.002	0.02	0.02	0.00003	0.001	0.001	2.76
		water truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.005	0.04	0.03	0.00013	0.001	0.001	11.72
		dump trucks	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.005	0.04	0.03	0.00013	0.001	0.001	11.72
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.003	0.03	0.04	0.00007	0.001	0.001	5.66
	Dust Control	Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.010	0.07	0.07	0.00027	0.003	0.002	23.43
Groundwater Management	Site Clearing, Earthwork	excavator	0.19	1.55	3.26	0.01	0.08	0.07	504.63	0.000	0.00	0.00	0.00001	0.000	0.000	0.46
		backhoe	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
		dump truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.001	0.00	0.00	0.00001	0.000	0.000	1.17
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Construction	backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.002	0.02	0.03	0.00004	0.001	0.001	3.59
		drill rig	0.21	2.04	2.03	0.01	0.07	0.06	923.68	0.003	0.03	0.03	0.00013	0.001	0.001	10.89
		crane	0.35	3.82	1.83	0.01	0.16	0.15	563.87	0.005	0.05	0.02	0.00008	0.002	0.002	6.65
		Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.007	0.05	0.04	0.00018	0.002	0.002	15.23
		dump trucks	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.007	0.05	0.04	0.00018	0.002	0.002	15.23
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.004	0.04	0.05	0.00009	0.002	0.002	7.36
	Development	truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.001	0.00	0.00	0.00001	0.000	0.000	1.17
		pump trailer	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Dust Control	Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.008	0.05	0.05	0.00020	0.002	0.002	17.57
Measurement and Automation	Construction	backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.002	0.02	0.02	0.00003	0.001	0.001	2.76
		Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.005	0.04	0.03	0.00013	0.001	0.001	11.72
		dump truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.005	0.04	0.03	0.00013	0.001	0.001	11.72
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.003	0.03	0.04	0.00007	0.001	0.001	5.66
	SCADA Equipment Installation	backhoe	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.001	0.01	0.01	0.00002	0.000	0.000	1.38
		Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.003	0.02	0.02	0.00007	0.001	0.001	5.86
		dump truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.003	0.02	0.02	0.00007	0.001	0.001	5.86
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.002	0.01	0.02	0.00003	0.001	0.001	2.83
	Dust Control	Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.008	0.05	0.05	0.00020	0.002	0.002	17.57
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		excavator	0.19	1.55	3.26	0.01	0.08	0.07	504.63	0.000	0.00	0.01	0.00001	0.000	0.000	1.14
		dump truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.001	0.01	0.01	0.00003	0.000	0.000	2.93
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		Bulldozers	0.68	7.13	3.11	0.01	0.32	0.29	834.45	0.002	0.02	0.01	0.00002	0.001	0.001	1.89
	Construction	backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		dump trucks	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.001	0.01	0.01	0.00003	0.000	0.000	2.93
		boom lift	0.03	0.53	1.09	0.00	0.01	0.01	164.09	0.000	0.00	0.00	0.00000	0.000	0.000	0.15
		crane	0.35	3.82	1.83	0.01	0.16	0.15	563.87	0.000	0.00	0.00	0.00001	0.000	0.000	0.51
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
	Dust Control	Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.004	0.03	0.02	0.00010	0.001	0.001	8.79
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.002	0.02	0.02	0.00003	0.001	0.001	2.76
		excavator	0.19	1.55	3.26	0.01	0.08	0.07	504.63	0.004	0.03	0.07	0.00011	0.002	0.001	9.16
		dump truck	1.01	7.14	6.58	0.03	0.26	0.24	2582.97	0.020	0.14	0.13	0.00054	0.005	0.005	46.87
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.001	0.01	0.01	0.00002	0.000	0.000	1.41
		Bulldozers	0.68	7.13	3.11	0.01	0.32	0.29	834.45	0.007	0.07	0.03	0.00009	0.003	0.003	7.57
	Construction	loader	0.15	1.54	2.23	0.00	0.08	0.07	304.30	0.001	0.01	0.01	0.00002	0.000	0.000	1.38
		dump trucks	1.01	7.14	6.58	0.03	0.26	0.24	2582.97	0.030	0.21	0.20	0.00081	0.008	0.007	70.30
		excavator	0.38	3.10	6.52	0.01	0.15	0.14	1009.27	0.011	0.09	0.20	0.00032	0.005	0.004	27.47
		concrete truck/pumping equipment	0.33	2.75	3.73	0.01	0.13	0.13	623.82	0.002	0.01	0.02	0.00003	0.001	0.001	2.83
	Dust Control	Water Truck	0.50	3.57	3.29	0.01	0.13	0.12	1291.48	0.065	0.46	0.43	0.00175	0.017	0.015	152.31

Analysis Year: **2023**

Onsite Equipment Emissions

Total Equipment Emissions per Project **2023**

	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	25.67	218.25	173.11	0.57	8.68	7.98	55031.59	0.93	7.90	6.44	0.02	0.31	0.29	1826.43
Canal, Lateral, and Tunnel Improvements	5.36	44.97	41.55	0.12	1.92	1.80	11111.03	0.21	1.77	1.54	0.00	0.08	0.07	385.95
Flow Control	3.99	30.72	35.34	0.10	1.28	1.21	9442.12	0.04	0.34	0.39	0.00	0.01	0.01	97.38
Groundwater Management	4.56	36.57	39.21	0.11	1.51	1.41	10929.68	0.04	0.29	0.28	0.00	0.01	0.01	80.74
Measurement and Automation	3.48	26.42	28.36	0.09	1.07	1.00	8313.67	0.03	0.22	0.24	0.00	0.01	0.01	65.35
Butler Communications Tower project	3.73	32.30	31.07	0.08	1.38	1.28	7797.75	0.01	0.07	0.06	0.00	0.00	0.00	18.63
Dry Creek Plume Replacement Project	4.73	38.19	41.23	0.11	1.62	1.51	10662.02	0.14	1.06	1.11	0.00	0.04	0.04	322.06

Analysis Year: **2023**

Vehicle Emissions

Vehicle Emission Factors (EMFAC2017) 2023

	Year	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		g/mile	g/mile	g/mile	g/mile	g/mile	g/mile	g/mile
Worker Commute	2023	0.011	0.050	0.688	0.003	0.046	0.019	278.178
Haul Trucks, Ready Mix Trucks	2023	0.022	2.379	0.208	0.013	0.124	0.061	1392.801
pickup	2023	0.019	0.090	0.965	0.003	0.046	0.019	326.364

Note:

Vehicle emission factors were obtained from EMFAC2017:

Region: SJVAPCD

Speed and model year: aggregated

Worker commute vehicles include auto and light duty trucks.

Haul trucks and ready mix trucks include heavy heavy-duty diesel trucks.

Vehicle Emissions **2023**

					Daily Emissions							Annual Emissions						
					ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	**Vehicle Types**	**Round Trips/day**	**miles/round trip**	**days/year**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Worker Commute	27	30	260	0.020	0.090	1.228	0.005	0.083	0.034	496.747	0.003	0.012	0.160	0.001	0.011	0.004	58.584
	Haul Truck	42	30	260	0.061	6.609	0.579	0.035	0.344	0.169	3868.892	0.008	0.859	0.075	0.005	0.045	0.022	456.282
	Ready Mix Trucks	1	30	100	0.001	0.157	0.014	0.001	0.008	0.004	92.116	0.000	0.008	0.001	0.000	0.000	0.000	4.178
	pickup	5	30	260	0.006	0.030	0.319	0.001	0.015	0.006	107.924	0.001	0.004	0.041	0.000	0.002	0.001	12.728
Canal, Lateral, and Tunnel Improvements	Worker Commute	10	30	108	0.007	0.033	0.455	0.002	0.031	0.013	183.980	0.000	0.002	0.025	0.000	0.002	0.001	9.013
	Haul Truck	9	30	108	0.013	1.416	0.124	0.008	0.074	0.036	829.048	0.001	0.076	0.007	0.000	0.004	0.002	40.614
	Ready Mix Trucks	3	30	108	0.004	0.472	0.041	0.003	0.025	0.012	276.349	0.000	0.025	0.002	0.000	0.001	0.001	13.538
	pickup	5	30	108	0.006	0.030	0.319	0.001	0.015	0.006	107.924	0.000	0.002	0.017	0.000	0.001	0.000	5.287
Flow Control	Worker Commute	10	30	43	0.007	0.033	0.455	0.002	0.031	0.013	183.980	0.000	0.001	0.010	0.000	0.001	0.000	3.588
	Haul Truck	6	30	43	0.009	0.944	0.083	0.005	0.049	0.024	552.699	0.000	0.020	0.002	0.000	0.001	0.001	10.780
	Ready Mix Trucks	1	30	7	0.001	0.157	0.014	0.001	0.008	0.004	92.116	0.000	0.001	0.000	0.000	0.000	0.000	0.292
	pickup	2	30	43	0.002	0.012	0.128	0.000	0.006	0.003	43.170	0.000	0.000	0.003	0.000	0.000	0.000	0.842
Groundwater Management	Worker Commute	5	30	30	0.004	0.017	0.227	0.001	0.015	0.006	91.990	0.000	0.000	0.003	0.000	0.000	0.000	1.252
	Haul Truck	1	30	30	0.001	0.157	0.014	0.001	0.008	0.004	92.116	0.000	0.002	0.000	0.000	0.000	0.000	1.254
	Ready Mix Trucks	1	30	1	0.001	0.157	0.014	0.001	0.008	0.004	92.116	0.000	0.000	0.000	0.000	0.000	0.000	0.042
	pickup	1	30	30	0.001	0.006	0.064	0.000	0.003	0.001	21.585	0.000	0.000	0.001	0.000	0.000	0.000	0.294
Measurement and Automation	Worker Commute	6	30	30	0.004	0.020	0.273	0.001	0.018	0.008	110.388	0.000	0.000	0.004	0.000	0.000	0.000	1.502
	Haul Truck	1	30	30	0.001	0.157	0.014	0.001	0.008	0.004	92.116	0.000	0.002	0.000	0.000	0.000	0.000	1.254
	Ready Mix Trucks	1	30	1	0.001	0.157	0.014	0.001	0.008	0.004	92.116	0.000	0.000	0.000	0.000	0.000	0.000	0.042
	pickup	1	30	30	0.001	0.006	0.064	0.000	0.003	0.001	21.585	0.000	0.000	0.001	0.000	0.000	0.000	0.294
Butler Communications Tower project	Worker Commute	15	30	15	0.011	0.050	0.682	0.003	0.046	0.019	275.970	0.000	0.000	0.005	0.000	0.000	0.000	1.878
	Haul Truck	2	30	10	0.003	0.315	0.028	0.002	0.016	0.008	184.233	0.000	0.002	0.000	0.000	0.000	0.000	0.836
	Ready Mix Trucks	2	30	1	0.003	0.315	0.028	0.002	0.016	0.008	184.233	0.000	0.000	0.000	0.000	0.000	0.000	0.084
	pickup	2	30	15	0.002	0.012	0.128	0.000	0.006	0.003	43.170	0.000	0.000	0.001	0.000	0.000	0.000	0.294
Dry Creek Flume Replacement Project	Worker Commute	15	30	260	0.011	0.050	0.682	0.003	0.046	0.019	275.970	0.001	0.007	0.089	0.000	0.006	0.002	32.547
	Haul Truck	2	30	260	0.003	0.315	0.028	0.002	0.016	0.008	184.233	0.000	0.041	0.004	0.000	0.002	0.001	21.728
	Ready Mix Trucks	4	30	15	0.006	0.629	0.055	0.003	0.033	0.016	368.466	0.000	0.005	0.000	0.000	0.000	0.000	2.507
	pickup	2	30	260	0.002	0.012	0.128	0.000	0.006	0.003	43.170	0.000	0.002	0.017	0.000	0.001	0.000	5.091

Analysis Year: **2023**

Vehicle Emissions

Total Vehicle Emissions 2023

Projects	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0.09	6.89	2.14	0.04	0.45	0.21	4565.68	0.01	0.88	0.28	0.01	0.06	0.03	531.77
Canal, Lateral, and Tunnel Improvements	0.03	1.95	0.94	0.01	0.14	0.07	1397.30	0.00	0.11	0.05	0.00	0.01	0.00	68.45
Flow Control	0.02	1.15	0.68	0.01	0.09	0.04	871.97	0.00	0.02	0.01	0.00	0.00	0.00	15.50
Groundwater Management	0.01	0.34	0.32	0.00	0.03	0.02	297.81	0.00	0.00	0.00	0.00	0.00	0.00	2.84
Measurement and Automation	0.01	0.34	0.36	0.00	0.04	0.02	316.21	0.00	0.00	0.01	0.00	0.00	0.00	3.09
Butler Communications Tower project	0.02	0.69	0.87	0.01	0.08	0.04	687.61	0.00	0.00	0.01	0.00	0.00	0.00	3.09
Dry Creek Flume Replacement Project	0.02	1.01	0.89	0.01	0.10	0.05	871.84	0.00	0.05	0.11	0.00	0.01	0.00	61.87

VMT on Paved and Unpaved Roads 2023

Onsite Equipment	**Number**	Total VMT/day	Total VMT/year	Unpaved road%	Unpaved VMT/day	Unpaved VMT/Year	Paved VMT/day	Paved VMT/year
Regulating Reservoirs and Infrastructure	Worker Commute	810	210600	5%	40.5	10,530	770	200,070
	Haul Truck	1260	327600	2.5%	31.5	8,190	1,229	319,410
	Ready Mix Truck	30	3000	2.5%	0.75	75	29	2,925
	pickup	150	39000	5%	7.5	1,950	143	37,050
Canal, Lateral, and Tunnel Improvements	Worker Commute	300	32400	5%	15	1,620	285	30,780
	Haul Truck	270	29160	2.5%	6.75	729	263	28,431
	Ready Mix Truck	90	9720	2.5%	2.25	243	88	9,477
	pickup	150	16200	5%	7.5	810	143	15,390
Flow Control	Worker Commute	300	12900	5%	15	645	285	12,255
	Haul Truck	180	7740	2.5%	4.5	194	176	7,547
	Ready Mix Truck	30	210	2.5%	0.75	5	29	205
	pickup	60	2580	5%	3	129	57	2,451
Groundwater Management	Worker Commute	150	4500	5%	7.5	225	143	4,275
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Measurement and Automation	Worker Commute	180	5400	5%	9	270	171	5,130
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Butler Communications Tower project	Worker Commute	450	6750	5%	22.5	338	428	6,413
	Haul Truck	60	600	2.5%	1.5	15	59	585
	Ready Mix Truck	60	60	2.5%	1.5	2	59	59
	pickup	60	900	5%	3	45	57	855
Dry Creek Flume Replacement Project	Worker Commute	450	117000	5%	22.5	5,850	428	111,150
	Haul Truck	60	15600	2.5%	1.5	390	59	15,210
	Ready Mix Truck	120	1800	2.5%	3	45	117	1,755
	pickup	60	15600	5%	3	780	57	14,820

Analysis Year **2023**
Fugitive Dust Emissions Northern Commute Scenario

A) Bulldozing - Demolition
Fugitive dust emissions from bulldozing **2023**

Activity	Number of Equipment	Maximum daily hours	Days	Emission Factor		Daily Emissions		Annual Emissions	
				PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
				lb/hr	lb/hr	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	7	10	140	0.753	0.414	52.69	28.96	3.69	2.03
Canal, Lateral, and Tunnel Improvements	2	10	90	0.753	0.414	15.06	8.28	0.68	0.37
Flow Control	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Groundwater Management	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Measurement and Automation	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Butler Communications Tower project	1	10	5	0.753	0.414	7.53	4.14	0.02	0.01
Dry Creek Flume Replacement Project	1	10	20	0.753	0.414	7.53	4.14	0.08	0.04

Note:
PM emissions were calculated using the following equation and parameters (CalEEMod Appendix A):
Emission Factor (lb/hr)= k x $(s)^{1.5}$ / $(M)^{1.4}$ For PM10 and k x 5.7 x $(s)^{1.2}$ / $(M)^{1.3}$ for PM2.5
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 6.9% - CalEEMod default for overburden)
M = Moisture Content = 7.9% (CalEEMod default)

B) Grading
Fugitive dust emissions from grading **2023**

Activity		Number of Grading Equipment	# acres/equipment	Acreage Graded/Day	Number of Days/Year	Grader/Scaper VMT		Emission Factors		Daily Emissions		Annual Emissions	
								PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
				acres		miles/day	miles/year	lb/VMT	lb/VMT	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	Grader	2	0.5	1	120	0.69	82.50	1.54	0.167	1.06	0.11	0.06	0.01
	Scaper	4	1	4	100	2.75	275.00	1.54	0.167	4.24	0.46	0.21	0.02
Canal, Lateral, and Tunnel Improvements	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Flow Control	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Groundwater Management	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Measurement and Automation	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Butler Communications Tower project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00

Analysis Year **2023**

Fugitive Dust Emissions Northern Commute Scenario

Grading Emission Summary

	Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	5.30	0.57	0.28	0.03
Canal, Lateral, and Tunnel Improvements	0.00	0.00	0.00	0.00
Flow Control	0.00	0.00	0.00	0.00
Groundwater Management	0.00	0.00	0.00	0.00
Measurement and Automation	0.00	0.00	0.00	0.00
Butler Communications Tower project	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0.00	0.00	0.00	0.00

Note:

PM emissions were calculated using the following equation and parameters:

Emission factor (lb/VMT) = k x 0.051 x $(S)^{2.0}$ for PM10 and k x 0.040 x $(S)^{2.5}$ for PM2.5

k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)

S = Mean Vehicle Speed, CalEEMod default = 7.1 miles/hour

VMT = As / Wb X 43,560 (sqft/acre) /5280 (ft/mile)

VMT: vehicle miles traveled

As: the acreage of the grading site (0.5 acres per grader, 1 acre for scapter, CalEEMod defaults)

Wb: blade width of the grader. CalEEMod default Wb = 12 ft.

Analysis Year **2023**
Fugitive Dust Emissions Northern Commute Scenario

C). Earth Material Loading/Handling
Dust from soil loading **2023**

Projects	Total Amount Handled	Material Amount		Material Amount		Emission Factors		Daily Emissions		Annual Emissions	
						PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	cy	cy/day	cy/year	ton/day	ton/year	lb/ton	lb/ton	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	280,000	#N/A	280,000	#N/A	353966.5	0.00012	0.000018	#N/A	#N/A	0.0206	0.0031
Canal, Lateral, and Tunnel Improvements	9,684	#N/A	9,684	#N/A	12242.2	0.00012	0.000018	#N/A	#N/A	0.0007	0.0001
Flow Control	2,677	#N/A	2,677	#N/A	3384.2	0.00012	0.000018	#N/A	#N/A	0.0002	0.0000
Groundwater Management	9	#N/A	9	#N/A	11.4	0.00012	0.000018	#N/A	#N/A	0.0000	0.0000
Measurement and Automation	4	#N/A	4	#N/A	5.1	0.00012	0.000018	#N/A	#N/A	0.0000	0.0000
Butler Communications Tower project	50	#N/A	50	#N/A	63.2	0.00012	0.000018	#N/A	#N/A	0.0000	0.0000
Dry Creek Flume Replacement Project	2,575	#N/A	2,575	#N/A	3255.2	0.00012	0.000018	#N/A	#N/A	0.0002	0.0000

Note:
Fugitive dust from materials unloading from trains and/or trucks are calculated using the following equations and parameters:
Emission factor (lb/ton) = $(k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
U = average wind speed = 2.7 m/s (6.04 mph) for SJVAPCD (CalEEMOd default)
M = moisture content = 12% (CalEEMod Default)
Material density (CalEEMod default) 1.264 ton/CY

C) Vehicle Fugitive Dust Emissions on Paved Roads
Emission factor (g/VMT) = k X (sL)^0.91 X W^1.02

		PM10	**PM2.5**
k		1.0	0.25
sL	g/m2	0.10	0.10
W	tons	2.4	2.4
EF	(g/VMT)	0.300	0.075

Equation from: AP-42 13.2.1
sL and W (silt loading and vehicle weight) are CalEEMod default values

Projects	Maximum Daily Emissions			Annual Emissions		
	Trip miles	PM10	PM2.5	Trip miles	PM10	PM2.5
	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	2,170	1.44	0.36	559,455	0.185	0.046
Canal, Lateral, and Tunnel Improvements	779	0.52	0.13	84,078	0.028	0.007
Flow Control	547	0.36	0.09	22,457	0.007	0.002
Groundwater Management	230	0.15	0.04	6,037	0.002	0.000
Measurement and Automation	258	0.17	0.04	6,892	0.002	0.001
Butler Communications Tower project	602	0.40	0.10	7,911	0.003	0.001
Dry Creek Flume Replacement Project	660	0.44	0.11	142,935	0.047	0.012

Analysis Year **2023**
Fugitive Dust Emissions Northern Commute Scenario

D) Vehicle Fugitive Dust Emissions on Unpaved Roads

Uncontrolled Emission Factors and Emissions

	Emission Factors (lb/VMT)	
	PM10	PM2.5
Unpaved Road (uncontrolled)	0.87	0.09
Unpaved Road (with watering unpaved road twice a day)	0.45	0.04

Emission factor (lb/VMT) = $(k)[(s/12)^{0.9}][(W/3)^{0.45}]*(1-P/365)$ (EPA AP-42, 13.2.2, for industrial sites)
k = constant (lb/VMT) = 1.5 lb/VMT for PM10 and 0.15 lb/VMT for PM2.5
s = Silt Content (8.5%, construction sites, AP-42, Table 13.2.2.1)
W = avg. vehicle weight (tons) = 2.4 ton
P = number of days in a year with at least 0.1 inch of precipitation, 46 days for Stanislaus County (CalEEMod)
Control efficiency of watering the unpaved road twice a day 55% (data from SCAQMD CEQA Handbook, TABLE XI-D, MITIGATION MEASURE EXAMPLES: FUGITIVE DUST FROM UNPAVED ROADs, 2007)

Emissions from Unpaved Roads

	Maximum Daily Emissions			Annual Emissions		
	Total Trip miles	PM10	PM2.5	Total Trip miles	PM10	PM2.5
Projects	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	80	35.92	3.59	20,745	4.643	0.464
Canal, Lateral, and Tunnel Improvements	32	14.10	1.41	3,402	0.761	0.076
Flow Control	23	10.41	1.04	973	0.218	0.022
Groundwater Management	11	4.70	0.47	293	0.066	0.007
Measurement and Automation	12	5.37	0.54	338	0.076	0.008
Butler Communications Tower project	29	12.76	1.28	399	0.089	0.009
Dry Creek Flume Replacement Project	30	13.43	1.34	7,065	1.581	0.158

Summary of Fugitive Dust Emissions

	Maximum Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
Projects	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	#N/A	#N/A	8.81	2.57
Canal, Lateral, and Tunnel Improvements	#N/A	#N/A	1.47	0.46
Flow Control	#N/A	#N/A	0.23	0.02
Groundwater Management	#N/A	#N/A	0.07	0.01
Measurement and Automation	#N/A	#N/A	0.08	0.01
Butler Communications Tower project	#N/A	#N/A	0.11	0.02
Dry Creek Flume Replacement Project	#N/A	#N/A	1.70	0.21

Analysis Year: **2024**

Construction Emissions Summary

Total Emissions Summary (by Project) **2024** (Emissions from Construction of Each Individual Project if Constructed)

Onsite Equipment	**Number**	Maximum Daily Emissions							Annual Emissions						
		ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	equipment	25.230	206.477	171.387	0.575	8.130	7.550	55041.024	0.911	7.446	6.369	0.021	0.292	0.271	1826.678
	vehicles	0.085	6.862	2.023	0.041	0.451	0.214	4473.686	0.011	0.879	0.262	0.005	0.058	0.027	521.044
	dust	NA	NA	NA	NA	95.511	33.512	NA	NA	NA	NA	NA	8.813	2.571	NA
	Sub Total	**25.315**	**213.339**	**173.410**	**0.616**	**104.092**	**41.276**	**59514.710**	**0.922**	**8.325**	**6.631**	**0.026**	**9.163**	**2.870**	**2347.722**
Canal, Lateral, and Tunnel Improvements	equipment	5.254	42.929	41.408	0.116	1.788	1.683	11113.745	0.206	1.696	1.535	0.004	0.071	0.066	386.044
	vehicles	0.029	1.941	0.878	0.013	0.144	0.067	1367.338	0.002	0.105	0.047	0.001	0.008	0.004	66.984
	dust	NA	NA	NA	NA	29.684	9.816	NA	NA	NA	NA	NA	1.467	0.456	NA
	Sub Total	**5.283**	**44.870**	**42.286**	**0.129**	**31.616**	**11.567**	**12481.084**	**0.207**	**1.801**	**1.583**	**0.005**	**1.546**	**0.526**	**453.028**
Flow control	equipment	3.864	28.674	35.146	0.099	1.146	1.091	9444.881	0.044	0.320	0.384	0.001	0.013	0.012	97.405
	vehicles	0.019	1.140	0.634	0.008	0.094	0.043	852.608	0.000	0.022	0.013	0.000	0.002	0.001	15.153
	dust	NA	NA	NA	NA	10.778	1.133	NA	NA	NA	NA	NA	0.225	0.024	NA
	Sub Total	**3.882**	**29.813**	**35.780**	**0.107**	**12.019**	**2.267**	**10297.489**	**0.044**	**0.342**	**0.397**	**0.001**	**0.240**	**0.037**	**112.557**
Groundwater Management	equipment	4.406	34.079	38.959	0.114	1.354	1.284	10934.383	0.035	0.274	0.280	0.001	0.011	0.010	80.779
	vehicles	0.007	0.334	0.296	0.003	0.035	0.016	290.621	0.000	0.003	0.004	0.000	0.000	0.000	2.765
	dust	NA	NA	NA	NA	4.852	0.508	NA	NA	NA	NA	NA	0.068	0.007	NA
	Sub Total	**4.413**	**34.413**	**39.255**	**0.117**	**6.241**	**1.807**	**11225.004**	**0.035**	**0.276**	**0.284**	**0.001**	**0.079**	**0.017**	**83.544**
Masurement and automation	equipment	3.378	24.692	28.161	0.087	0.960	0.910	8316.297	0.029	0.210	0.236	0.001	0.008	0.008	65.374
	vehicles	0.008	0.337	0.338	0.003	0.038	0.017	308.400	0.000	0.003	0.005	0.000	0.000	0.000	3.007
	dust	NA	NA	NA	NA	5.542	0.580	NA	NA	NA	NA	NA	0.078	0.008	NA
	Sub Total	**3.386**	**25.029**	**28.500**	**0.090**	**6.540**	**1.506**	**8624.696**	**0.029**	**0.213**	**0.240**	**0.001**	**0.087**	**0.016**	**68.381**
Butler communicaitaons Tower Project	equipment	3.628	30.598	30.925	0.082	1.267	1.192	7799.582	0.009	0.068	0.061	0.000	0.003	0.002	18.631
	vehicles	0.017	0.683	0.802	0.006	0.085	0.038	670.135	0.000	0.002	0.006	0.000	0.000	0.000	3.000
	dust	NA	NA	NA	NA	20.683	5.513	NA	NA	NA	NA	NA	0.111	0.020	NA
	Sub Total	**3.645**	**31.280**	**31.727**	**0.088**	**22.035**	**6.742**	**8469.716**	**0.009**	**0.070**	**0.067**	**0.000**	**0.114**	**0.023**	**21.632**
Dry Creek Flume Replacement Project	equipment	4.613	36.028	41.087	0.111	1.487	1.397	10665.109	0.140	0.990	1.101	0.004	0.038	0.035	322.166
	vehicles	0.020	0.997	0.830	0.008	0.101	0.046	851.045	0.002	0.053	0.101	0.001	0.009	0.004	60.159
	dust	NA	NA	NA	NA	21.395	5.590	NA	NA	NA	NA	NA	1.704	0.211	NA
	Sub Total	**4.633**	**37.025**	**41.917**	**0.119**	**22.983**	**7.032**	**11516.154**	**0.142**	**1.043**	**1.203**	**0.004**	**1.751**	**0.251**	**382.325**

Note: Emissions presented in this table are potential emissions if a project is constructed in the analysis year. Emissions may or may not occur in this year depending on the program schedule.

Analysis Year: **2024**

Construction Emissions Summary

Total Emissions of Potential Overlapping Projects **2024**

		Emissions/year Per Project							Total Emissions with Multiple Projects						
	Number of Projects	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0	0.92	8.33	6.63	0.03	9.16	2.87	2347.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Canal, Lateral, and Tunnel Improvements	1	0.21	1.80	1.58	0.01	1.55	0.53	453.03	0.21	1.80	1.58	0.01	1.55	0.53	453.03
Flow Control	1	0.04	0.34	0.40	0.00	0.24	0.04	112.56	0.04	0.34	0.40	0.00	0.24	0.04	112.56
Groundwater Management	1	0.04	0.28	0.28	0.00	0.08	0.02	83.54	0.04	0.28	0.28	0.00	0.08	0.02	83.54
Measurement and Automation	2	0.03	0.21	0.24	0.00	0.09	0.02	68.38	0.06	0.43	0.48	0.00	0.17	0.03	136.76
Butler Communications Tower project	0	0.01	0.07	0.07	0.00	0.11	0.02	21.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0	0.14	1.04	1.20	0.00	1.75	0.25	382.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions of Potential Overlapping Projects in Analysis Year									**0.34**	**2.85**	**2.74**	**0.01**	**2.04**	**0.61**	**785.89**
SJVAPCD CEQA Thresholds									**10**	**10**	**100**	**27**	**15**	**15**	**NA**

Analysis Year: **2024**

Onsite Equipment Emissions

Onsite Equipment Information and Emission Factors **2024**

	Projects	Operation Data							CalEEMod Emission Factors (100% load)								
		Equipment	Number	HP	Days/Year	Hour/day	Emission	CalEEMod Default	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	CO_2e
				per equipment	per equipment	per equipment	Factor Year	Load Factor	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	2	247	20	8	2024	0.40	0.399	4.090	1.797	0.005	0.184	0.170	474.585	0.153	478.869
		Grader	1	187	20	8	2024	0.41	0.262	3.073	1.225	0.005	0.100	0.092	473.669	0.153	477.953
		Backhoe	1	97	20	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		Loader	1	97	20	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		Dump Trucks	3	402	20	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
	Earthwork (topsoil stripping and removal)	Bulldozers	2	247	20	8	2024	0.40	0.399	4.090	1.797	0.005	0.184	0.170	474.585	0.153	478.869
		Loader	1	97	20	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		Dump Trucks	10	402	20	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
	Earthwork (reservoir construction)	Scrapers	4	367	100	8	2024	0.48	0.245	2.477	1.921	0.005	0.098	0.090	472.846	0.153	477.130
		Bulldozers	3	247	100	8	2024	0.4	0.399	4.090	1.797	0.005	0.184	0.170	474.585	0.153	478.869
		Loader	1	97	100	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		Grader	1	187	100	8	2024	0.41	0.262	3.073	1.225	0.005	0.100	0.092	473.669	0.153	477.953
		Compactors	2	8	100	8	2024	0.43	0.661	4.142	3.469	0.008	0.161	0.161	568.299	0.059	569.951
		Water Truck	1	402	100	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		Dump Trucks	12	402	100	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
	Structure/Equipment Installation	Excavator	1	158	100	8	2024	0.38	0.170	1.325	3.083	0.005	0.065	0.060	472.428	0.153	476.712
		Backhoe	1	97	100	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		Dump Truck	1	402	100	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	100	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
		Generator	1	84	100	8	2024	0.74	0.260	2.321	3.342	0.006	0.101	0.101	568.299	0.023	568.943
		Power screed	1	172	100	8	2024	0.42	0.261	2.520	3.150	0.005	0.130	0.120	469.545	0.152	473.801
		25-ton crane	1	231	100	8	2024	0.29	0.281	2.966	1.502	0.005	0.123	0.114	472.964	0.153	477.248
	Dust Control	Water Truck	2	402	200	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	40	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		excavator	1	158	40	8	2024	0.38	0.170	1.325	3.083	0.005	0.065	0.060	472.428	0.153	476.712
		water truck	1	402	40	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		dump truck	1	402	40	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	40	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Construction	Bulldozers	2	247	90	8	2024	0.4	0.399	4.090	1.797	0.005	0.184	0.170	474.585	0.153	478.869
		backhoe (with hydraulic hammer)	1	97	90	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		water truck	1	402	90	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		dump trucks	1	402	90	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	2	84	90	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Dust Control	Water Truck	1	402	130	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		excavator	1	158	20	8	2024	0.38	0.170	1.325	3.083	0.005	0.065	0.060	472.428	0.153	476.712
		water truck	1	402	20	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		dump truck	1	402	20	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	2	84	20	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		water truck	1	402	20	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		dump trucks	1	402	20	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	20	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Dust Control	Water Truck	1	402	40	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
Groundwater Management	Site Clearing, Earthwork	excavator	1	158	2	8	2024	0.38	0.170	1.325	3.083	0.005	0.065	0.060	472.428	0.153	476.712
		backhoe	1	97	2	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		dump truck	1	402	2	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	2	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Construction	backhoe (with hydraulic hammer)	1	97	26	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		drill rig	1	221	26	8	2024	0.5	0.108	0.975	1.046	0.005	0.032	0.030	470.712	0.152	474.968
		crane	1	231	26	8	2024	0.29	0.281	2.966	1.502	0.005	0.123	0.114	472.964	0.153	477.248
		Water Truck	1	402	26	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		dump trucks	1	402	26	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	26	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Development	truck	1	402	2	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		pump trailer	1	84	2	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Dust Control	Water Truck	1	402	30	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532

Analysis Year: **2024**

Onsite Equipment Emissions

Measurement and Automation	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		Water Truck	1	402	20	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		dump truck	1	402	20	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	20	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	SCADA Equipment Installation	backhoe	1	97	10	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		Water Truck	1	402	10	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		dump truck	1	402	10	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	10	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Dust Control	Water Truck	1	402	30	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	0	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		excavator	1	158	5	8	2024	0.38	0.170	1.325	3.083	0.005	0.065	0.060	472.428	0.153	476.712
		dump truck	1	402	5	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	0	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
		Bulldozers	1	247	5	8	2024	0.4	0.399	4.090	1.797	0.005	0.184	0.170	474.585	0.153	478.869
	Construction	backhoe (with hydraulic hammer)	1	97	0	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		dump trucks	1	402	5	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		boom lift	1	63	2	8	2024	0.31	0.100	1.528	3.173	0.005	0.026	0.024	472.114	0.153	476.398
		crane	1	231	2	8	2024	0.29	0.281	2.966	1.502	0.005	0.123	0.114	472.964	0.153	477.248
		concrete truck/pumping equipment	1	84	1	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Dust Control	Water Truck	1	402	15	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		excavator	1	158	40	8	2024	0.38	0.170	1.325	3.083	0.005	0.065	0.060	472.428	0.153	476.712
		dump truck	2	402	40	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		concrete truck/pumping equipment	1	84	5	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
		Bulldozers	1	247	20	8	2024	0.4	0.399	4.090	1.797	0.005	0.184	0.170	474.585	0.153	478.869
	Construction	loader	1	97	10	8	2024	0.37	0.227	2.288	3.532	0.005	0.105	0.097	476.731	0.154	481.043
		dump trucks	2	402	60	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532
		excavator	2	158	60	8	2024	0.38	0.170	1.325	3.083	0.005	0.065	0.060	472.428	0.153	476.712
		concrete truck/pumping equipment	1	84	10	8	2024	0.74	0.279	2.352	3.393	0.006	0.107	0.107	568.299	0.025	568.999
	Dust Control	Water Truck	1	402	260	8	2024	0.38	0.184	1.235	1.206	0.005	0.044	0.041	475.220	0.154	479.532

Assumptions:

1. CO2e were calculated using the following global warming potential (GWP, 100-year GWP from IPCC Fifth Assessment Report , 2014)

CO2 1

CH4 28

N2O 265

2. Load factor and emission factors are from CalEEMod Appendix D: Table 3.4 Offroad Equipment Emission Factors (g/hp-hr) and Table 3.3 OFFROAD Default Horsepower and Load Factors (October 2017)

Analysis Year: **2024**

Onsite Equipment Emissions

Onsite Equipment Emissions

			Daily Emissions							Annual Emissions						
			ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	Projects	**Onsite Equipment**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	1.39	14.26	6.26	0.02	0.64	0.59	1668.86	0.014	0.14	0.06	0.00017	0.006	0.006	15.14
		Grader	0.35	4.16	1.66	0.01	0.14	0.12	646.29	0.004	0.04	0.02	0.00007	0.001	0.001	5.86
		Backhoe	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		Loader	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		Dump Trucks	1.49	9.98	9.75	0.04	0.36	0.33	3875.84	0.015	0.10	0.10	0.00040	0.004	0.003	35.16
	Earthwork	Bulldozers	1.39	14.26	6.26	0.02	0.64	0.59	1668.86	0.014	0.14	0.06	0.00017	0.006	0.006	15.14
	(topsoil stripping and removal)	Loader	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		Dump Trucks	4.96	33.28	32.50	0.13	1.19	1.10	12919.46	0.050	0.33	0.33	0.00135	0.012	0.011	117.21
	Earthwork (reservoir construction)	Scrapers	3.04	30.78	23.87	0.06	1.22	1.12	5929.53	0.152	1.54	1.19	0.00311	0.061	0.056	268.96
		Bulldozers	2.09	21.38	9.39	0.03	0.96	0.89	2503.30	0.104	1.07	0.47	0.00131	0.048	0.044	113.55
		Loader	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.007	0.07	0.11	0.00016	0.003	0.003	13.81
		Grader	0.35	4.16	1.66	0.01	0.14	0.12	646.29	0.018	0.21	0.08	0.00034	0.007	0.006	29.32
		Compactors	0.08	0.50	0.42	0.00	0.02	0.02	69.16	0.004	0.03	0.02	0.00005	0.001	0.001	3.14
		Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.025	0.17	0.16	0.00067	0.006	0.006	58.60
		Dump Trucks	5.95	39.93	39.00	0.16	1.42	1.33	15503.36	0.297	2.00	1.95	0.00808	0.071	0.066	703.23
	Structure/Equipment Installation	Excavator	0.18	1.40	3.26	0.01	0.07	0.06	504.79	0.009	0.07	0.16	0.00026	0.003	0.003	22.90
		Backhoe	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.007	0.07	0.11	0.00016	0.003	0.003	13.81
		Dump Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.025	0.17	0.16	0.00067	0.006	0.006	58.60
		Concrete pump	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.015	0.13	0.19	0.00033	0.006	0.006	28.30
		Generator	0.29	2.54	3.66	0.01	0.11	0.11	623.73	0.014	0.13	0.18	0.00033	0.006	0.006	28.29
		Power screed	0.33	3.21	4.01	0.01	0.17	0.15	603.66	0.017	0.16	0.20	0.00032	0.008	0.008	27.38
		25-ton crane	0.33	3.50	1.77	0.01	0.15	0.13	563.86	0.017	0.18	0.09	0.00030	0.007	0.007	25.58
	Dust Control	Water Truck	0.99	6.66	6.50	0.03	0.24	0.22	2583.89	0.099	0.67	0.65	0.00269	0.024	0.022	234.41

Analysis Year: **2024**

Onsite Equipment Emissions

Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.003	0.03	0.04	0.00006	0.001	0.001	5.52
		excavator	0.18	1.40	3.26	0.01	0.07	0.06	504.79	0.004	0.03	0.07	0.00011	0.001	0.001	9.16
		water truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.010	0.07	0.07	0.00027	0.002	0.002	23.44
		dump truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.010	0.07	0.07	0.00027	0.002	0.002	23.44
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.006	0.05	0.07	0.00013	0.002	0.002	11.32
	Construction	Bulldozers	1.39	14.26	6.26	0.02	0.64	0.59	1668.86	0.063	0.64	0.28	0.00078	0.029	0.027	68.13
		backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.006	0.07	0.10	0.00014	0.003	0.003	12.43
		water truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.022	0.15	0.15	0.00061	0.005	0.005	52.74
		dump trucks	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.022	0.15	0.15	0.00061	0.005	0.005	52.74
		concrete truck/pumping equipment	0.61	5.16	7.44	0.01	0.23	0.23	1247.58	0.028	0.23	0.33	0.00059	0.011	0.011	50.93
	Dust Control	Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.032	0.22	0.21	0.00088	0.008	0.007	76.18
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		excavator	0.18	1.40	3.26	0.01	0.07	0.06	504.79	0.002	0.01	0.03	0.00005	0.001	0.001	4.58
		water truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.005	0.03	0.03	0.00013	0.001	0.001	11.72
		dump truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.005	0.03	0.03	0.00013	0.001	0.001	11.72
		concrete truck/pumping equipment	0.61	5.16	7.44	0.01	0.23	0.23	1247.58	0.006	0.05	0.07	0.00013	0.002	0.002	11.32
	Construction	backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		water truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.005	0.03	0.03	0.00013	0.001	0.001	11.72
		dump trucks	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.005	0.03	0.03	0.00013	0.001	0.001	11.72
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.003	0.03	0.04	0.00007	0.001	0.001	5.66
	Dust Control	Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.010	0.07	0.07	0.00027	0.002	0.002	23.44
Groundwater Management	Site Clearing, Earthwork	excavator	0.18	1.40	3.26	0.01	0.07	0.06	504.79	0.000	0.00	0.00	0.00001	0.000	0.000	0.46
		backhoe	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
		dump truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.000	0.00	0.00	0.00001	0.000	0.000	1.17
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Construction	backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.002	0.02	0.03	0.00004	0.001	0.001	3.59
		drill rig	0.21	1.90	2.04	0.01	0.06	0.06	925.64	0.003	0.02	0.03	0.00013	0.001	0.001	10.92
		crane	0.33	3.50	1.77	0.01	0.15	0.13	563.86	0.004	0.05	0.02	0.00008	0.002	0.002	6.65
		Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.006	0.04	0.04	0.00018	0.002	0.001	15.24
		dump trucks	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.006	0.04	0.04	0.00018	0.002	0.001	15.24
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.004	0.03	0.05	0.00009	0.002	0.002	7.36
	Development	truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.000	0.00	0.00	0.00001	0.000	0.000	1.17
		pump trailer	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Dust Control	Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.007	0.05	0.05	0.00020	0.002	0.002	17.58
Measurement and Automation	Construction	backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.005	0.03	0.03	0.00013	0.001	0.001	11.72
		dump truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.005	0.03	0.03	0.00013	0.001	0.001	11.72
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.003	0.03	0.04	0.00007	0.001	0.001	5.66
	SCADA Equipment Installation	backhoe	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.01	0.00002	0.000	0.000	1.38
		Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.002	0.02	0.02	0.00007	0.001	0.001	5.86
		dump truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.002	0.02	0.02	0.00007	0.001	0.001	5.86
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.002	0.01	0.02	0.00003	0.001	0.001	2.83
	Dust Control	Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.007	0.05	0.05	0.00020	0.002	0.002	17.58
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		excavator	0.18	1.40	3.26	0.01	0.07	0.06	504.79	0.000	0.00	0.01	0.00001	0.000	0.000	1.14
		dump truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.001	0.01	0.01	0.00003	0.000	0.000	2.93
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		Bulldozers	0.70	7.13	3.13	0.01	0.32	0.30	834.43	0.002	0.02	0.01	0.00002	0.001	0.001	1.89
	Construction	backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		dump trucks	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.001	0.01	0.01	0.00003	0.000	0.000	2.93
		boom lift	0.03	0.53	1.09	0.00	0.01	0.01	164.09	0.000	0.00	0.00	0.00000	0.000	0.000	0.15
		crane	0.33	3.50	1.77	0.01	0.15	0.13	563.86	0.000	0.00	0.00	0.00001	0.000	0.000	0.51
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
	Dust Control	Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.004	0.02	0.02	0.00010	0.001	0.001	8.79
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		excavator	0.18	1.40	3.26	0.01	0.07	0.06	504.79	0.004	0.03	0.07	0.00011	0.001	0.001	9.16
		dump truck	0.99	6.66	6.50	0.03	0.24	0.22	2583.89	0.020	0.13	0.13	0.00054	0.005	0.004	46.88
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.001	0.01	0.01	0.00002	0.000	0.000	1.41
		Bulldozers	0.70	7.13	3.13	0.01	0.32	0.30	834.43	0.007	0.07	0.03	0.00009	0.003	0.003	7.57
	Construction	loader	0.14	1.45	2.24	0.00	0.07	0.06	304.49	0.001	0.01	0.01	0.00002	0.000	0.000	1.38
		dump trucks	0.99	6.66	6.50	0.03	0.24	0.22	2583.89	0.030	0.20	0.20	0.00081	0.007	0.007	70.32
		excavator	0.36	2.81	6.53	0.01	0.14	0.13	1009.59	0.011	0.08	0.20	0.00032	0.004	0.004	27.48
		concrete truck/pumping equipment	0.31	2.58	3.72	0.01	0.12	0.12	623.79	0.002	0.01	0.02	0.00003	0.001	0.001	2.83
	Dust Control	Water Truck	0.50	3.33	3.25	0.01	0.12	0.11	1291.95	0.064	0.43	0.42	0.00175	0.015	0.014	152.37

Analysis Year: **2024**

Onsite Equipment Emissions

Total Equipment Emissions per Project **2024**

	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	25.23	206.48	171.39	0.57	8.13	7.55	55041.02	0.91	7.45	6.37	0.02	0.29	0.27	1826.68
Canal, Lateral, and Tunnel Improvements	5.25	42.93	41.41	0.12	1.79	1.68	11113.75	0.21	1.70	1.54	0.00	0.07	0.07	386.04
Flow Control	3.86	28.67	35.15	0.10	1.15	1.09	9444.88	0.04	0.32	0.38	0.00	0.01	0.01	97.40
Groundwater Management	4.41	34.08	38.96	0.11	1.35	1.28	10934.38	0.04	0.27	0.28	0.00	0.01	0.01	80.78
Measurement and Automation	3.38	24.69	28.16	0.09	0.96	0.91	8316.30	0.03	0.21	0.24	0.00	0.01	0.01	65.37
Butler Communications Tower project	3.63	30.60	30.92	0.08	1.27	1.19	7799.58	0.01	0.07	0.06	0.00	0.00	0.00	18.63
Dry Creek Plume Replacement Project	4.61	36.03	41.09	0.11	1.49	1.40	10665.11	0.14	0.99	1.10	0.00	0.04	0.04	322.17

Analysis Year: **2024**

Vehicle Emissions

Vehicle Emission Factors (EMFAC2017) 2024

	Year	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		g/mile	g/mile	g/mile	g/mile	g/mile	g/mile	g/mile
Worker Commute	2024	0.010	0.044	0.635	0.003	0.046	0.019	268.811
Haul Trucks, Ready Mix Trucks	2024	0.022	2.376	0.210	0.012	0.124	0.061	1367.684
pickup	2024	0.016	0.078	0.879	0.003	0.046	0.019	314.767

Note:

Vehicle emission factors were obtained from EMFAC2017:

Region: SJVAPCD

Speed and model year: aggregated

Worker commute vehicles include auto and light duty trucks.

Haul trucks and ready mix trucks include heavy heavy-duty diesel trucks.

Vehicle Emissions **2024**

					Daily Emissions							Annual Emissions						
					ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	**Vehicle Types**	**Round Trips/day**	**miles/round trip**	**days/year**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Worker Commute	27	30	260	0.017	0.079	1.135	0.005	0.082	0.034	480.020	0.002	0.010	0.148	0.001	0.011	0.004	56.612
	Haul Truck	42	30	260	0.061	6.600	0.583	0.034	0.345	0.170	3799.121	0.008	0.858	0.076	0.004	0.045	0.022	448.053
	Ready Mix Trucks	1	30	100	0.001	0.157	0.014	0.001	0.008	0.004	90.455	0.000	0.008	0.001	0.000	0.000	0.000	4.103
	pickup	5	30	260	0.005	0.026	0.291	0.001	0.015	0.006	104.090	0.001	0.003	0.038	0.000	0.002	0.001	12.276
Canal, Lateral, and Tunnel Improvements	Worker Commute	10	30	108	0.006	0.029	0.420	0.002	0.031	0.013	177.785	0.000	0.002	0.023	0.000	0.002	0.001	8.709
	Haul Truck	9	30	108	0.013	1.414	0.125	0.007	0.074	0.036	814.097	0.001	0.076	0.007	0.000	0.004	0.002	39.882
	Ready Mix Trucks	3	30	108	0.004	0.471	0.042	0.002	0.025	0.012	271.366	0.000	0.025	0.002	0.000	0.001	0.001	13.294
	pickup	5	30	108	0.005	0.026	0.291	0.001	0.015	0.006	104.090	0.000	0.001	0.016	0.000	0.001	0.000	5.099
Flow Control	Worker Commute	10	30	43	0.006	0.029	0.420	0.002	0.031	0.013	177.785	0.000	0.001	0.009	0.000	0.001	0.000	3.468
	Haul Truck	6	30	43	0.009	0.943	0.083	0.005	0.049	0.024	542.732	0.000	0.020	0.002	0.000	0.001	0.001	10.586
	Ready Mix Trucks	1	30	7	0.001	0.157	0.014	0.001	0.008	0.004	90.455	0.000	0.001	0.000	0.000	0.000	0.000	0.287
	pickup	2	30	43	0.002	0.010	0.116	0.000	0.006	0.003	41.636	0.000	0.000	0.002	0.000	0.000	0.000	0.812
Groundwater Management	Worker Commute	5	30	30	0.003	0.015	0.210	0.001	0.015	0.006	88.893	0.000	0.000	0.003	0.000	0.000	0.000	1.210
	Haul Truck	1	30	30	0.001	0.157	0.014	0.001	0.008	0.004	90.455	0.000	0.002	0.000	0.000	0.000	0.000	1.231
	Ready Mix Trucks	1	30	1	0.001	0.157	0.014	0.001	0.008	0.004	90.455	0.000	0.000	0.000	0.000	0.000	0.000	0.041
	pickup	1	30	30	0.001	0.005	0.058	0.000	0.003	0.001	20.818	0.000	0.000	0.001	0.000	0.000	0.000	0.283
Measurement and Automation	Worker Commute	6	30	30	0.004	0.017	0.252	0.001	0.018	0.008	106.671	0.000	0.000	0.004	0.000	0.000	0.000	1.452
	Haul Truck	1	30	30	0.001	0.157	0.014	0.001	0.008	0.004	90.455	0.000	0.002	0.000	0.000	0.000	0.000	1.231
	Ready Mix Trucks	1	30	1	0.001	0.157	0.014	0.001	0.008	0.004	90.455	0.000	0.000	0.000	0.000	0.000	0.000	0.041
	pickup	1	30	30	0.001	0.005	0.058	0.000	0.003	0.001	20.818	0.000	0.000	0.001	0.000	0.000	0.000	0.283
Butler Communications Tower project	Worker Commute	15	30	15	0.009	0.044	0.630	0.003	0.046	0.019	266.678	0.000	0.000	0.005	0.000	0.000	0.000	1.814
	Haul Truck	2	30	10	0.003	0.314	0.028	0.002	0.016	0.008	180.911	0.000	0.002	0.000	0.000	0.000	0.000	0.821
	Ready Mix Trucks	2	30	1	0.003	0.314	0.028	0.002	0.016	0.008	180.911	0.000	0.000	0.000	0.000	0.000	0.000	0.082
	pickup	2	30	15	0.002	0.010	0.116	0.000	0.006	0.003	41.636	0.000	0.000	0.001	0.000	0.000	0.000	0.283
Dry Creek Flume Replacement Project	Worker Commute	15	30	260	0.009	0.044	0.630	0.003	0.046	0.019	266.678	0.001	0.006	0.082	0.000	0.006	0.002	31.451
	Haul Truck	2	30	260	0.003	0.314	0.028	0.002	0.016	0.008	180.911	0.000	0.041	0.004	0.000	0.002	0.001	21.336
	Ready Mix Trucks	4	30	15	0.006	0.629	0.056	0.003	0.033	0.016	361.821	0.000	0.005	0.000	0.000	0.000	0.000	2.462
	pickup	2	30	260	0.002	0.010	0.116	0.000	0.006	0.003	41.636	0.000	0.001	0.015	0.000	0.001	0.000	4.910

Analysis Year: **2024**

Vehicle Emissions

Total Vehicle Emissions 2024

Projects	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0.08	6.86	2.02	0.04	0.45	0.21	4473.69	0.01	0.88	0.26	0.01	0.06	0.03	521.04
Canal, Lateral, and Tunnel Improvements	0.03	1.94	0.88	0.01	0.14	0.07	1367.34	0.00	0.10	0.05	0.00	0.01	0.00	66.98
Flow Control	0.02	1.14	0.63	0.01	0.09	0.04	852.61	0.00	0.02	0.01	0.00	0.00	0.00	15.15
Groundwater Management	0.01	0.33	0.30	0.00	0.03	0.02	290.62	0.00	0.00	0.00	0.00	0.00	0.00	2.76
Measurement and Automation	0.01	0.34	0.34	0.00	0.04	0.02	308.40	0.00	0.00	0.00	0.00	0.00	0.00	3.01
Butler Communications Tower project	0.02	0.68	0.80	0.01	0.08	0.04	670.13	0.00	0.00	0.01	0.00	0.00	0.00	3.00
Dry Creek Flume Replacement Project	0.02	1.00	0.83	0.01	0.10	0.05	851.05	0.00	0.05	0.10	0.00	0.01	0.00	60.16

VMT on Paved and Unpaved Roads 2024

Onsite Equipment	**Number**	Total VMT/day	Total VMT/year	Unpaved road%	Unpaved VMT/day	Unpaved VMT/Year	Paved VMT/day	Paved VMT/year
Regulating Reservoirs and Infrastructure	Worker Commute	810	210600	5%	40.5	10,530	770	200,070
	Haul Truck	1260	327600	2.5%	31.5	8,190	1,229	319,410
	Ready Mix Truck	30	3000	2.5%	0.75	75	29	2,925
	pickup	150	39000	5%	7.5	1,950	143	37,050
Canal, Lateral, and Tunnel Improvements	Worker Commute	300	32400	5%	15	1,620	285	30,780
	Haul Truck	270	29160	2.5%	6.75	729	263	28,431
	Ready Mix Truck	90	9720	2.5%	2.25	243	88	9,477
	pickup	150	16200	5%	7.5	810	143	15,390
Flow Control	Worker Commute	300	12900	5%	15	645	285	12,255
	Haul Truck	180	7740	2.5%	4.5	194	176	7,547
	Ready Mix Truck	30	210	2.5%	0.75	5	29	205
	pickup	60	2580	5%	3	129	57	2,451
Groundwater Management	Worker Commute	150	4500	5%	7.5	225	143	4,275
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Measurement and Automation	Worker Commute	180	5400	5%	9	270	171	5,130
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Butler Communications Tower project	Worker Commute	450	6750	5%	22.5	338	428	6,413
	Haul Truck	60	600	2.5%	1.5	15	59	585
	Ready Mix Truck	60	60	2.5%	1.5	2	59	59
	pickup	60	900	5%	3	45	57	855
Dry Creek Flume Replacement Project	Worker Commute	450	117000	5%	22.5	5,850	428	111,150
	Haul Truck	60	15600	2.5%	1.5	390	59	15,210
	Ready Mix Truck	120	1800	2.5%	3	45	117	1,755
	pickup	60	15600	5%	3	780	57	14,820

Analysis Year **2024**
Fugitive Dust Emissions Northern Commute Scenario

A) Bulldozing - Demolition
Fugitive dust emissions from bulldozing **2024**

Activity	Number of Equipment	Maximum daily hours	Days	Emission Factor		Daily Emissions		Annual Emissions	
				PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
				lb/hr	lb/hr	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	7	10	140	0.753	0.414	52.69	28.96	3.69	2.03
Canal, Lateral, and Tunnel Improvements	2	10	90	0.753	0.414	15.06	8.28	0.68	0.37
Flow Control	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Groundwater Management	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Measurement and Automation	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Butler Communications Tower project	1	10	5	0.753	0.414	7.53	4.14	0.02	0.01
Dry Creek Flume Replacement Project	1	10	20	0.753	0.414	7.53	4.14	0.08	0.04

Note:
PM emissions were calculated using the following equation and parameters (CalEEMod Appendix A):
Emission Factor (lb/hr)= k x $(s)^{1.5}$ / $(M)^{1.4}$ For PM10 and k x 5.7 x $(s)^{1.2}$ / $(M)^{1.3}$ for PM2.5
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 6.9% - CalEEMod default for overburden)
M = Moisture Content = 7.9% (CalEEMod default)

B) Grading
Fugitive dust emissions from grading **2024**

Activity		Number of Grading Equipment	# acres/equipment	Acreage Graded/Day	Number of Days/Year	Grader/Scaper VMT		Emission Factors		Daily Emissions		Annual Emissions	
								PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
				acres		miles/day	miles/year	lb/VMT	lb/VMT	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	Grader	2	0.5	1	120	0.69	82.50	1.54	0.167	1.06	0.11	0.06	0.01
	Scaper	4	1	4	100	2.75	275.00	1.54	0.167	4.24	0.46	0.21	0.02
Canal, Lateral, and Tunnel Improvements	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Flow Control	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Groundwater Management	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Measurement and Automation	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Butler Communications Tower project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00

Analysis Year **2024**

Fugitive Dust Emissions Northern Commute Scenario

Grading Emission Summary

	Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	5.30	0.57	0.28	0.03
Canal, Lateral, and Tunnel Improvements	0.00	0.00	0.00	0.00
Flow Control	0.00	0.00	0.00	0.00
Groundwater Management	0.00	0.00	0.00	0.00
Measurement and Automation	0.00	0.00	0.00	0.00
Butler Communications Tower project	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0.00	0.00	0.00	0.00

Note:

PM emissions were calculated using the following equation and parameters:

Emission factor (lb/VMT) = k x 0.051 x $(S)^{2.0}$ for PM10 and k x 0.040 x $(S)^{2.5}$ for PM2.5

k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)

S = Mean Vehicle Speed, CalEEMod default = 7.1 miles/hour

VMT = As / Wb X 43,560 (sqft/acre) /5280 (ft/mile)

VMT: vehicle miles traveled

As: the acreage of the grading site (0.5 acres per grader, 1 acre for scapter, CalEEMod defaults)

Wb: blade width of the grader. CalEEMod default Wb = 12 ft.

Analysis Year **2024**
Fugitive Dust Emissions Northern Commute Scenario

C). Earth Material Loading/Handling
Dust from soil loading **2024**

Projects	Total Amount Handled	Material Amount		Material Amount		Emission Factors		Daily Emissions		Annual Emissions	
						PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	cy	cy/day	cy/year	ton/day	ton/year	lb/ton	lb/ton	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	280,000	1060.6	280,000	1340.8	353966.5	0.00012	0.000018	0.16	0.024	0.0206	0.0031
Canal, Lateral, and Tunnel Improvements	9,684	88.0	9,684	111.3	12242.2	0.00012	0.000018	0.01	0.002	0.0007	0.0001
Flow Control	2,677	60.8	2,677	76.9	3384.2	0.00012	0.000018	0.01	0.001	0.0002	0.0000
Groundwater Management	9	0.2	9	0.3	11.4	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Measurement and Automation	4	0.2	4	0.2	5.1	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Butler Communications Tower project	50	1.1	50	1.4	63.2	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Dry Creek Flume Replacement Project	2,575	9.8	2,575	12.3	3255.2	0.00012	0.000018	0.00	0.000	0.0002	0.0000

Note:
Fugitive dust from materials unloading from trains and/or trucks are calculated using the following equations and parameters:
Emission factor (lb/ton) = $(k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
U = average wind speed = 2.7 m/s (6.04 mph) for SJVAPCD (CalEEMOd default)
M = moisture content = 12% (CalEEMod Default)
Material density (CalEEMod default) 1.264 ton/CY

C) Vehicle Fugitive Dust Emissions on Paved Roads
Emission factor (g/VMT) = k X (sL)^0.91 X W^1.02

		PM10	**PM2.5**
k		1.0	0.25
sL	g/m2	0.10	0.10
W	tons	2.4	2.4
EF	(g/VMT)	0.300	0.075

Equation from: AP-42 13.2.1
sL and W (silt loading and vehicle weight) are CalEEMod default values

Projects	Maximum Daily Emissions			Annual Emissions		
	Trip miles	PM10	PM2.5	Trip miles	PM10	PM2.5
	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	2,170	1.44	0.36	559,455	0.185	0.046
Canal, Lateral, and Tunnel Improvements	779	0.52	0.13	84,078	0.028	0.007
Flow Control	547	0.36	0.09	22,457	0.007	0.002
Groundwater Management	230	0.15	0.04	6,037	0.002	0.000
Measurement and Automation	258	0.17	0.04	6,892	0.002	0.001
Butler Communications Tower project	602	0.40	0.10	7,911	0.003	0.001
Dry Creek Flume Replacement Project	660	0.44	0.11	142,935	0.047	0.012

Analysis Year **2024**
Fugitive Dust Emissions Northern Commute Scenario

D) Vehicle Fugitive Dust Emissions on Unpaved Roads

Uncontrolled Emission Factors and Emissions

	Emission Factors (lb/VMT)	
	PM10	PM2.5
Unpaved Road (uncontrolled)	0.87	0.09
Unpaved Road (with watering unpaved road twice a day)	0.45	0.04

Emission factor (lb/VMT) = $(k)[(s/12)^{0.9}][(W/3)^{0.45}]*(1-P/365)$ (EPA AP-42, 13.2.2, for industrial sites)
k = constant (lb/VMT) = 1.5 lb/VMT for PM10 and 0.15 lb/VMT for PM2.5
s = Silt Content (8.5%, construction sites, AP-42, Table 13.2.2.1)
W = avg. vehicle weight (tons) = 2.4 ton
P = number of days in a year with at least 0.1 inch of precipitation, 46 days for Stanislaus County (CalEEMod)
Control efficiency of watering the unpaved road twice a day 55% (data from SCAQMD CEQA Handbook, TABLE XI-D, MITIGATION MEASURE EXAMPLES: FUGITIVE DUST FROM UNPAVED ROADs, 2007)

Emissions from Unpaved Roads

	Maximum Daily Emissions			Annual Emissions		
	Total Trip miles	PM10	PM2.5	Total Trip miles	PM10	PM2.5
Projects	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	80	35.92	3.59	20,745	4.643	0.464
Canal, Lateral, and Tunnel Improvements	32	14.10	1.41	3,402	0.761	0.076
Flow Control	23	10.41	1.04	973	0.218	0.022
Groundwater Management	11	4.70	0.47	293	0.066	0.007
Measurement and Automation	12	5.37	0.54	338	0.076	0.008
Butler Communications Tower project	29	12.76	1.28	399	0.089	0.009
Dry Creek Flume Replacement Project	30	13.43	1.34	7,065	1.581	0.158

Summary of Fugitive Dust Emissions

	Maximum Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
Projects	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	95.51	33.51	8.81	2.57
Canal, Lateral, and Tunnel Improvements	29.68	9.82	1.47	0.46
Flow Control	10.78	1.13	0.23	0.02
Groundwater Management	4.85	0.51	0.07	0.01
Measurement and Automation	5.54	0.58	0.08	0.01
Butler Communications Tower project	20.68	5.51	0.11	0.02
Dry Creek Flume Replacement Project	21.39	5.59	1.70	0.21

Analysis Year: **2025**

Construction Emissions Summary

Total Emissions Summary (by Project) **2025** (Emissions from Construction of Each Individual Project if Constructed)

Onsite Equipment	**Number**	Maximum Daily Emissions							Annual Emissions						
		ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	equipment	23.747	181.079	166.006	0.575	7.057	6.502	55018.752	0.855	6.491	6.152	0.021	0.252	0.233	1825.906
	vehicles	0.081	6.795	1.917	0.040	0.451	0.214	4371.034	0.010	0.871	0.248	0.005	0.058	0.027	509.076
	dust	NA	NA	NA	NA	95.511	33.512	NA	NA	NA	NA	NA	8.813	2.571	NA
	Sub Total	**23.829**	**187.874**	**167.924**	**0.615**	**103.018**	**40.228**	**59389.786**	**0.866**	**7.362**	**6.400**	**0.026**	**9.123**	**2.831**	**2334.983**
Canal, Lateral, and Tunnel Improvements	equipment	4.971	38.762	40.787	0.116	1.564	1.462	11110.794	0.195	1.534	1.510	0.004	0.062	0.058	385.935
	vehicles	0.027	1.919	0.823	0.012	0.144	0.067	1334.453	0.001	0.104	0.044	0.001	0.008	0.004	65.373
	dust	NA	NA	NA	NA	29.684	9.816	NA	NA	NA	NA	NA	1.467	0.456	NA
	Sub Total	**4.999**	**40.681**	**41.610**	**0.128**	**31.393**	**11.346**	**12445.248**	**0.196**	**1.637**	**1.554**	**0.005**	**1.537**	**0.517**	**451.308**
Flow control	equipment	3.675	25.500	34.792	0.099	0.982	0.929	9441.972	0.042	0.284	0.380	0.001	0.011	0.010	97.372
	vehicles	0.017	1.126	0.594	0.008	0.094	0.043	831.547	0.000	0.021	0.013	0.000	0.002	0.001	14.773
	dust	NA	NA	NA	NA	10.778	1.133	NA	NA	NA	NA	NA	0.225	0.024	NA
	Sub Total	**3.692**	**26.626**	**35.385**	**0.106**	**11.855**	**2.105**	**10273.519**	**0.042**	**0.305**	**0.392**	**0.001**	**0.238**	**0.035**	**112.145**
Groundwater Management	equipment	4.196	30.534	38.564	0.114	1.178	1.110	10931.380	0.034	0.245	0.276	0.001	0.009	0.009	80.754
	vehicles	0.007	0.329	0.276	0.003	0.035	0.016	282.959	0.000	0.003	0.004	0.000	0.000	0.000	2.686
	dust	NA	NA	NA	NA	4.852	0.508	NA	NA	NA	NA	NA	0.068	0.007	NA
	Sub Total	**4.203**	**30.863**	**38.840**	**0.117**	**6.064**	**1.633**	**11214.339**	**0.034**	**0.248**	**0.280**	**0.001**	**0.077**	**0.016**	**83.440**
Masurement and automation	equipment	3.221	21.853	27.817	0.087	0.821	0.773	8313.376	0.028	0.185	0.233	0.001	0.007	0.007	65.350
	vehicles	0.007	0.332	0.315	0.003	0.038	0.017	300.121	0.000	0.003	0.005	0.000	0.000	0.000	2.919
	dust	NA	NA	NA	NA	5.542	0.580	NA	NA	NA	NA	NA	0.078	0.008	NA
	Sub Total	**3.228**	**22.184**	**28.132**	**0.090**	**6.401**	**1.370**	**8613.497**	**0.028**	**0.188**	**0.237**	**0.001**	**0.085**	**0.015**	**68.269**
Butler communicaitaons Tower Project	equipment	3.430	27.661	30.531	0.082	1.111	1.039	7798.082	0.008	0.060	0.060	0.000	0.002	0.002	18.624
	vehicles	0.016	0.671	0.747	0.006	0.085	0.037	651.728	0.000	0.002	0.005	0.000	0.000	0.000	2.908
	dust	NA	NA	NA	NA	20.683	5.513	NA	NA	NA	NA	NA	0.111	0.020	NA
	Sub Total	**3.446**	**28.333**	**31.278**	**0.088**	**21.879**	**6.589**	**8449.810**	**0.009**	**0.062**	**0.065**	**0.000**	**0.114**	**0.022**	**21.532**
Dry Creek Flume Replacement Project	equipment	4.371	32.148	40.593	0.111	1.293	1.205	10662.385	0.134	0.861	1.085	0.004	0.033	0.030	322.034
	vehicles	0.019	0.983	0.775	0.008	0.101	0.046	828.814	0.002	0.051	0.094	0.001	0.009	0.004	58.387
	dust	NA	NA	NA	NA	21.395	5.590	NA	NA	NA	NA	NA	1.704	0.211	NA
	Sub Total	**4.390**	**33.131**	**41.368**	**0.119**	**22.789**	**6.841**	**11491.199**	**0.135**	**0.913**	**1.179**	**0.004**	**1.746**	**0.246**	**380.421**

Note: Emissions presented in this table are potential emissions if a project is constructed in the analysis year. Emissions may or may not occur in this year depending on the program schedule.

Analysis Year: **2025**

Construction Emissions Summary

Total Emissions of Potential Overlapping Projects **2025**

		Emissions/year Per Project							Total Emissions with Multiple Projects						
	Number of Projects	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	1	0.87	7.36	6.40	0.03	9.12	2.83	2334.98	0.87	7.36	6.40	0.03	9.12	2.83	2334.98
Canal, Lateral, and Tunnel Improvements	1	0.20	1.64	1.55	0.01	1.54	0.52	451.31	0.20	1.64	1.55	0.01	1.54	0.52	451.31
Flow Control	1	0.04	0.31	0.39	0.00	0.24	0.03	112.15	0.04	0.31	0.39	0.00	0.24	0.03	112.15
Groundwater Management	0	0.03	0.25	0.28	0.00	0.08	0.02	83.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Measurement and Automation	2	0.03	0.19	0.24	0.00	0.09	0.01	68.27	0.06	0.38	0.47	0.00	0.17	0.03	136.54
Butler Communications Tower project	0	0.01	0.06	0.07	0.00	0.11	0.02	21.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0	0.14	0.91	1.18	0.00	1.75	0.25	380.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions of Potential Overlapping Projects in Analysis Year									**1.16**	**9.68**	**8.82**	**0.03**	**11.07**	**3.41**	**3034.97**
SJVAPCD CEQA Thresholds									**10**	**10**	**100**	**27**	**15**	**15**	**NA**

Analysis Year: **2025**

Onsite Equipment Emissions

Onsite Equipment Information and Emission Factors **2025**

	Projects	Operation Data							CalEEMod Emission Factors (100% load)								
		Equipment	Number	HP	Days/Year	Hour/day	Emission	CalEEMod Default	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	CO_2e
				per equipment	per equipment	per equipment	Factor Year	Load Factor	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	2	247	20	8	2025	0.40	0.372	3.805	1.720	0.005	0.167	0.153	474.573	0.153	478.857
		Grader	1	187	20	8	2025	0.41	0.230	2.556	1.179	0.005	0.082	0.076	473.470	0.153	477.754
		Backhoe	1	97	20	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		Loader	1	97	20	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		Dump Trucks	3	402	20	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
	Earthwork (topsoil stripping and removal)	Bulldozers	2	247	20	8	2025	0.40	0.372	3.805	1.720	0.005	0.167	0.153	474.573	0.153	478.857
		Loader	1	97	20	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		Dump Trucks	10	402	20	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
	Earthwork (reservoir construction)	Scrapers	4	367	100	8	2025	0.48	0.216	2.051	1.732	0.005	0.081	0.074	472.539	0.153	476.823
		Bulldozers	3	247	100	8	2025	0.4	0.372	3.805	1.720	0.005	0.167	0.153	474.573	0.153	478.857
		Loader	1	97	100	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		Grader	1	187	100	8	2025	0.41	0.230	2.556	1.179	0.005	0.082	0.076	473.470	0.153	477.754
		Compactors	2	8	100	8	2025	0.43	0.661	4.142	3.469	0.008	0.161	0.161	568.299	0.059	569.951
		Water Truck	1	402	100	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		Dump Trucks	12	402	100	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
	Structure/Equipment Installation	Excavator	1	158	100	8	2025	0.38	0.158	1.154	3.078	0.005	0.057	0.052	472.496	0.153	476.780
		Backhoe	1	97	100	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		Dump Truck	1	402	100	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	100	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
		Generator	1	84	100	8	2025	0.74	0.243	2.185	3.338	0.006	0.087	0.087	568.299	0.021	568.887
		Power screed	1	172	100	8	2025	0.42	0.235	2.167	3.136	0.005	0.112	0.103	469.843	0.152	474.099
		25-ton crane	1	231	100	8	2025	0.29	0.265	2.681	1.470	0.005	0.114	0.105	472.980	0.153	477.264
	Dust Control	Water Truck	2	402	200	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	40	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		excavator	1	158	40	8	2025	0.38	0.158	1.154	3.078	0.005	0.057	0.052	472.496	0.153	476.780
		water truck	1	402	40	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		dump truck	1	402	40	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	40	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Construction	Bulldozers	2	247	90	8	2025	0.4	0.372	3.805	1.720	0.005	0.167	0.153	474.573	0.153	478.857
		backhoe (with hydraulic hammer)	1	97	90	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		water truck	1	402	90	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		dump trucks	1	402	90	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	2	84	90	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Dust Control	Water Truck	1	402	130	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		excavator	1	158	20	8	2025	0.38	0.158	1.154	3.078	0.005	0.057	0.052	472.496	0.153	476.780
		water truck	1	402	20	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		dump truck	1	402	20	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	2	84	20	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		water truck	1	402	20	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		dump trucks	1	402	20	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	20	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Dust Control	Water Truck	1	402	40	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
Groundwater Management	Site Clearing, Earthwork	excavator	1	158	2	8	2025	0.38	0.158	1.154	3.078	0.005	0.057	0.052	472.496	0.153	476.780
		backhoe	1	97	2	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		dump truck	1	402	2	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	2	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Construction	backhoe (with hydraulic hammer)	1	97	26	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		drill rig	1	221	26	8	2025	0.5	0.107	0.957	1.045	0.005	0.031	0.029	470.654	0.152	474.910
		crane	1	231	26	8	2025	0.29	0.265	2.681	1.470	0.005	0.114	0.105	472.980	0.153	477.264
		Water Truck	1	402	26	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		dump trucks	1	402	26	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	26	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Development	truck	1	402	2	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		pump trailer	1	84	2	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Dust Control	Water Truck	1	402	30	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282

Analysis Year: **2025**

Onsite Equipment Emissions

Measurement and Automation	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		Water Truck	1	402	20	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		dump truck	1	402	20	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	20	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	SCADA Equipment Installation	backhoe	1	97	10	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		Water Truck	1	402	10	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		dump truck	1	402	10	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	10	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Dust Control	Water Truck	1	402	30	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	0	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		excavator	1	158	5	8	2025	0.38	0.158	1.154	3.078	0.005	0.057	0.052	472.496	0.153	476.780
		dump truck	1	402	5	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	0	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
		Bulldozers	1	247	5	8	2025	0.4	0.372	3.805	1.720	0.005	0.167	0.153	474.573	0.153	478.857
	Construction	backhoe (with hydraulic hammer)	1	97	0	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		dump trucks	1	402	5	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		boom lift	1	63	2	8	2025	0.31	0.099	1.511	3.167	0.005	0.026	0.024	472.114	0.153	476.398
		crane	1	231	2	8	2025	0.29	0.265	2.681	1.470	0.005	0.114	0.105	472.980	0.153	477.264
		concrete truck/pumping equipment	1	84	1	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Dust Control	Water Truck	1	402	15	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		excavator	1	158	40	8	2025	0.38	0.158	1.154	3.078	0.005	0.057	0.052	472.496	0.153	476.780
		dump truck	2	402	40	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		concrete truck/pumping equipment	1	84	5	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
		Bulldozers	1	247	20	8	2025	0.4	0.372	3.805	1.720	0.005	0.167	0.153	474.573	0.153	478.857
	Construction	loader	1	97	10	8	2025	0.37	0.209	2.109	3.522	0.005	0.085	0.079	477.188	0.154	481.500
		dump trucks	2	402	60	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282
		excavator	2	158	60	8	2025	0.38	0.158	1.154	3.078	0.005	0.057	0.052	472.496	0.153	476.780
		concrete truck/pumping equipment	1	84	10	8	2025	0.74	0.261	2.213	3.389	0.006	0.092	0.092	568.299	0.023	568.943
	Dust Control	Water Truck	1	402	260	8	2025	0.38	0.177	1.064	1.182	0.005	0.038	0.035	474.970	0.154	479.282

Assumptions:

1. CO2e were calculated using the following global warming potential (GWP, 100-year GWP from IPCC Fifth Assessment Report , 2014)

CO2 1

CH4 28

N2O 265

2. Load factor and emission factors are from CalEEMod Appendix D: Table 3.4 Offroad Equipment Emission Factors (g/hp-hr) and Table 3.3 OFFROAD Default Horsepower and Load Factors (October 2017)

Analysis Year: **2025**

Onsite Equipment Emissions

Onsite Equipment Emissions

			Daily Emissions							Annual Emissions						
			ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	Projects	**Onsite Equipment**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	1.30	13.26	6.00	0.02	0.58	0.53	1668.82	0.013	0.13	0.06	0.00017	0.006	0.005	15.14
		Grader	0.31	3.46	1.59	0.01	0.11	0.10	646.02	0.003	0.03	0.02	0.00007	0.001	0.001	5.86
		Backhoe	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		Loader	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		Dump Trucks	1.43	8.60	9.56	0.04	0.31	0.28	3873.81	0.014	0.09	0.10	0.00040	0.003	0.003	35.14
	Earthwork	Bulldozers	1.30	13.26	6.00	0.02	0.58	0.53	1668.82	0.013	0.13	0.06	0.00017	0.006	0.005	15.14
	(topsoil stripping and removal)	Loader	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		Dump Trucks	4.77	28.66	31.85	0.13	1.02	0.94	12912.71	0.048	0.29	0.32	0.00135	0.010	0.009	117.14
	Earthwork (reservoir construction)	Scrapers	2.68	25.48	21.52	0.06	1.01	0.92	5925.73	0.134	1.27	1.08	0.00311	0.050	0.046	268.79
		Bulldozers	1.94	19.89	8.99	0.03	0.87	0.80	2503.23	0.097	0.99	0.45	0.00131	0.044	0.040	113.55
		Loader	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.007	0.07	0.11	0.00016	0.003	0.003	13.82
		Grader	0.31	3.46	1.59	0.01	0.11	0.10	646.02	0.016	0.17	0.08	0.00034	0.006	0.005	29.30
		Compactors	0.08	0.50	0.42	0.00	0.02	0.02	69.16	0.004	0.03	0.02	0.00005	0.001	0.001	3.14
		Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.024	0.14	0.16	0.00067	0.005	0.005	58.57
		Dump Trucks	5.72	34.39	38.22	0.16	1.23	1.13	15495.25	0.286	1.72	1.91	0.00808	0.061	0.057	702.86
	Structure/Equipment Installation	Excavator	0.17	1.22	3.26	0.01	0.06	0.06	504.87	0.008	0.06	0.16	0.00026	0.003	0.003	22.90
		Backhoe	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.007	0.07	0.11	0.00016	0.003	0.003	13.82
		Dump Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.024	0.14	0.16	0.00067	0.005	0.005	58.57
		Concrete pump	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.014	0.12	0.19	0.00033	0.005	0.005	28.29
		Generator	0.27	2.40	3.66	0.01	0.10	0.10	623.67	0.013	0.12	0.18	0.00033	0.005	0.005	28.29
		Power screed	0.30	2.76	4.00	0.01	0.14	0.13	604.04	0.015	0.14	0.20	0.00032	0.007	0.007	27.40
		25-ton crane	0.31	3.17	1.74	0.01	0.13	0.12	563.88	0.016	0.16	0.09	0.00030	0.007	0.006	25.58
	Dust Control	Water Truck	0.95	5.73	6.37	0.03	0.20	0.19	2582.54	0.095	0.57	0.64	0.00269	0.020	0.019	234.29

Analysis Year: **2025**

Onsite Equipment Emissions

Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.003	0.03	0.04	0.00006	0.001	0.001	5.53
		excavator	0.17	1.22	3.26	0.01	0.06	0.06	504.87	0.003	0.02	0.07	0.00011	0.001	0.001	9.16
		water truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.010	0.06	0.06	0.00027	0.002	0.002	23.43
		dump truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.010	0.06	0.06	0.00027	0.002	0.002	23.43
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.006	0.05	0.07	0.00013	0.002	0.002	11.32
	Construction	Bulldozers	1.30	13.26	6.00	0.02	0.58	0.53	1668.82	0.058	0.60	0.27	0.00078	0.026	0.024	68.13
		backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.006	0.06	0.10	0.00014	0.002	0.002	12.44
		water truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.021	0.13	0.14	0.00061	0.005	0.004	52.71
		dump trucks	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.021	0.13	0.14	0.00061	0.005	0.004	52.71
		concrete truck/pumping equipment	0.57	4.85	7.43	0.01	0.20	0.20	1247.46	0.026	0.22	0.33	0.00059	0.009	0.009	50.93
	Dust Control	Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.031	0.19	0.21	0.00088	0.007	0.006	76.14
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		excavator	0.17	1.22	3.26	0.01	0.06	0.06	504.87	0.002	0.01	0.03	0.00005	0.001	0.001	4.58
		water truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.005	0.03	0.03	0.00013	0.001	0.001	11.71
		dump truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.005	0.03	0.03	0.00013	0.001	0.001	11.71
		concrete truck/pumping equipment	0.57	4.85	7.43	0.01	0.20	0.20	1247.46	0.006	0.05	0.07	0.00013	0.002	0.002	11.32
	Construction	backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		water truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.005	0.03	0.03	0.00013	0.001	0.001	11.71
		dump trucks	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.005	0.03	0.03	0.00013	0.001	0.001	11.71
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.003	0.02	0.04	0.00007	0.001	0.001	5.66
	Dust Control	Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.010	0.06	0.06	0.00027	0.002	0.002	23.43
Groundwater Management	Site Clearing, Earthwork	excavator	0.17	1.22	3.26	0.01	0.06	0.06	504.87	0.000	0.00	0.00	0.00001	0.000	0.000	0.46
		backhoe	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
		dump truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.000	0.00	0.00	0.00001	0.000	0.000	1.17
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Construction	backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.002	0.02	0.03	0.00004	0.001	0.001	3.59
		drill rig	0.21	1.87	2.04	0.01	0.06	0.06	925.53	0.003	0.02	0.03	0.00013	0.001	0.001	10.92
		crane	0.31	3.17	1.74	0.01	0.13	0.12	563.88	0.004	0.04	0.02	0.00008	0.002	0.002	6.65
		Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.006	0.04	0.04	0.00018	0.001	0.001	15.23
		dump trucks	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.006	0.04	0.04	0.00018	0.001	0.001	15.23
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.004	0.03	0.05	0.00009	0.001	0.001	7.36
	Development	truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.000	0.00	0.00	0.00001	0.000	0.000	1.17
		pump trailer	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Dust Control	Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.007	0.04	0.05	0.00020	0.002	0.001	17.57
Measurement and Automation	Construction	backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.005	0.03	0.03	0.00013	0.001	0.001	11.71
		dump truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.005	0.03	0.03	0.00013	0.001	0.001	11.71
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.003	0.02	0.04	0.00007	0.001	0.001	5.66
	SCADA Equipment Installation	backhoe	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.01	0.00002	0.000	0.000	1.38
		Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.002	0.01	0.02	0.00007	0.001	0.000	5.86
		dump truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.002	0.01	0.02	0.00007	0.001	0.000	5.86
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.001	0.01	0.02	0.00003	0.001	0.001	2.83
	Dust Control	Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.007	0.04	0.05	0.00020	0.002	0.001	17.57
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		excavator	0.17	1.22	3.26	0.01	0.06	0.06	504.87	0.000	0.00	0.01	0.00001	0.000	0.000	1.15
		dump truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.001	0.01	0.01	0.00003	0.000	0.000	2.93
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		Bulldozers	0.65	6.63	3.00	0.01	0.29	0.27	834.41	0.002	0.02	0.01	0.00002	0.001	0.001	1.89
	Construction	backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		dump trucks	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.001	0.01	0.01	0.00003	0.000	0.000	2.93
		boom lift	0.03	0.52	1.09	0.00	0.01	0.01	164.09	0.000	0.00	0.00	0.00000	0.000	0.000	0.15
		crane	0.31	3.17	1.74	0.01	0.13	0.12	563.88	0.000	0.00	0.00	0.00001	0.000	0.000	0.51
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
	Dust Control	Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.004	0.02	0.02	0.00010	0.001	0.001	8.79
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.02	0.00003	0.001	0.001	2.76
		excavator	0.17	1.22	3.26	0.01	0.06	0.06	504.87	0.003	0.02	0.07	0.00011	0.001	0.001	9.16
		dump truck	0.95	5.73	6.37	0.03	0.20	0.19	2582.54	0.019	0.11	0.13	0.00054	0.004	0.004	46.86
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.001	0.01	0.01	0.00002	0.000	0.000	1.41
		Bulldozers	0.65	6.63	3.00	0.01	0.29	0.27	834.41	0.006	0.07	0.03	0.00009	0.003	0.003	7.57
	Construction	loader	0.13	1.34	2.23	0.00	0.05	0.05	304.78	0.001	0.01	0.01	0.00002	0.000	0.000	1.38
		dump trucks	0.95	5.73	6.37	0.03	0.20	0.19	2582.54	0.029	0.17	0.19	0.00081	0.006	0.006	70.29
		excavator	0.33	2.44	6.52	0.01	0.12	0.11	1009.73	0.010	0.07	0.20	0.00032	0.004	0.003	27.48
		concrete truck/pumping equipment	0.29	2.43	3.72	0.01	0.10	0.10	623.73	0.001	0.01	0.02	0.00003	0.001	0.001	2.83
	Dust Control	Water Truck	0.48	2.87	3.19	0.01	0.10	0.09	1291.27	0.062	0.37	0.41	0.00175	0.013	0.012	152.29

Analysis Year: **2025**

Onsite Equipment Emissions

Total Equipment Emissions per Project **2025**

	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	23.75	181.08	166.01	0.57	7.06	6.50	55018.75	0.86	6.49	6.15	0.02	0.25	0.23	1825.91
Canal, Lateral, and Tunnel Improvements	4.97	38.76	40.79	0.12	1.56	1.46	11110.79	0.19	1.53	1.51	0.00	0.06	0.06	385.93
Flow Control	3.67	25.50	34.79	0.10	0.98	0.93	9441.97	0.04	0.28	0.38	0.00	0.01	0.01	97.37
Groundwater Management	4.20	30.53	38.56	0.11	1.18	1.11	10931.38	0.03	0.24	0.28	0.00	0.01	0.01	80.75
Measurement and Automation	3.22	21.85	27.82	0.09	0.82	0.77	8313.38	0.03	0.19	0.23	0.00	0.01	0.01	65.35
Butler Communications Tower project	3.43	27.66	30.53	0.08	1.11	1.04	7798.08	0.01	0.06	0.06	0.00	0.00	0.00	18.62
Dry Creek Plume Replacement Project	4.37	32.15	40.59	0.11	1.29	1.21	10662.38	0.13	0.86	1.08	0.00	0.03	0.03	322.03

Analysis Year: **2025**

Vehicle Emissions

Vehicle Emission Factors (EMFAC2017) 2025

	Year	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		g/mile	g/mile	g/mile	g/mile	g/mile	g/mile	g/mile
Worker Commute	2025	0.008	0.039	0.590	0.003	0.046	0.019	259.488
Haul Trucks, Ready Mix Trucks	2025	0.022	2.357	0.210	0.012	0.124	0.061	1338.768
pickup	2025	0.014	0.068	0.804	0.003	0.046	0.019	303.368

Note:

Vehicle emission factors were obtained from EMFAC2017:

Region: SJVAPCD

Speed and model year: aggregated

Worker commute vehicles include auto and light duty trucks.

Haul trucks and ready mix trucks include heavy heavy-duty diesel trucks.

Vehicle Emissions **2025**

					Daily Emissions							Annual Emissions						
					ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	**Vehicle Types**	**Round Trips/day**	**miles/round trip**	**days/year**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Worker Commute	27	30	260	0.015	0.070	1.054	0.005	0.082	0.034	463.372	0.002	0.009	0.137	0.001	0.011	0.004	54.648
	Haul Truck	42	30	260	0.061	6.547	0.584	0.034	0.345	0.169	3718.799	0.008	0.851	0.076	0.004	0.045	0.022	438.580
	Ready Mix Trucks	1	30	100	0.001	0.156	0.014	0.001	0.008	0.004	88.543	0.000	0.008	0.001	0.000	0.000	0.000	4.016
	pickup	5	30	260	0.005	0.022	0.266	0.001	0.015	0.006	100.320	0.001	0.003	0.035	0.000	0.002	0.001	11.831
Canal, Lateral, and Tunnel Improvements	Worker Commute	10	30	108	0.005	0.026	0.390	0.002	0.030	0.013	171.619	0.000	0.001	0.021	0.000	0.002	0.001	8.407
	Haul Truck	9	30	108	0.013	1.403	0.125	0.007	0.074	0.036	796.886	0.001	0.076	0.007	0.000	0.004	0.002	39.038
	Ready Mix Trucks	3	30	108	0.004	0.468	0.042	0.002	0.025	0.012	265.629	0.000	0.025	0.002	0.000	0.001	0.001	13.013
	pickup	5	30	108	0.005	0.022	0.266	0.001	0.015	0.006	100.320	0.000	0.001	0.014	0.000	0.001	0.000	4.915
Flow Control	Worker Commute	10	30	43	0.005	0.026	0.390	0.002	0.030	0.013	171.619	0.000	0.001	0.008	0.000	0.001	0.000	3.347
	Haul Truck	6	30	43	0.009	0.935	0.083	0.005	0.049	0.024	531.257	0.000	0.020	0.002	0.000	0.001	0.001	10.362
	Ready Mix Trucks	1	30	7	0.001	0.156	0.014	0.001	0.008	0.004	88.543	0.000	0.001	0.000	0.000	0.000	0.000	0.281
	pickup	2	30	43	0.002	0.009	0.106	0.000	0.006	0.003	40.128	0.000	0.000	0.002	0.000	0.000	0.000	0.783
Groundwater Management	Worker Commute	5	30	30	0.003	0.013	0.195	0.001	0.015	0.006	85.810	0.000	0.000	0.003	0.000	0.000	0.000	1.168
	Haul Truck	1	30	30	0.001	0.156	0.014	0.001	0.008	0.004	88.543	0.000	0.002	0.000	0.000	0.000	0.000	1.205
	Ready Mix Trucks	1	30	1	0.001	0.156	0.014	0.001	0.008	0.004	88.543	0.000	0.000	0.000	0.000	0.000	0.000	0.040
	pickup	1	30	30	0.001	0.004	0.053	0.000	0.003	0.001	20.064	0.000	0.000	0.001	0.000	0.000	0.000	0.273
Measurement and Automation	Worker Commute	6	30	30	0.003	0.015	0.234	0.001	0.018	0.008	102.972	0.000	0.000	0.004	0.000	0.000	0.000	1.401
	Haul Truck	1	30	30	0.001	0.156	0.014	0.001	0.008	0.004	88.543	0.000	0.002	0.000	0.000	0.000	0.000	1.205
	Ready Mix Trucks	1	30	1	0.001	0.156	0.014	0.001	0.008	0.004	88.543	0.000	0.000	0.000	0.000	0.000	0.000	0.040
	pickup	1	30	30	0.001	0.004	0.053	0.000	0.003	0.001	20.064	0.000	0.000	0.001	0.000	0.000	0.000	0.273
Butler Communications Tower project	Worker Commute	15	30	15	0.008	0.039	0.585	0.003	0.046	0.019	257.429	0.000	0.000	0.004	0.000	0.000	0.000	1.752
	Haul Truck	2	30	10	0.003	0.312	0.028	0.002	0.016	0.008	177.086	0.000	0.002	0.000	0.000	0.000	0.000	0.803
	Ready Mix Trucks	2	30	1	0.003	0.312	0.028	0.002	0.016	0.008	177.086	0.000	0.000	0.000	0.000	0.000	0.000	0.080
	pickup	2	30	15	0.002	0.009	0.106	0.000	0.006	0.003	40.128	0.000	0.000	0.001	0.000	0.000	0.000	0.273
Dry Creek Flume Replacement Project	Worker Commute	15	30	260	0.008	0.039	0.585	0.003	0.046	0.019	257.429	0.001	0.005	0.076	0.000	0.006	0.002	30.360
	Haul Truck	2	30	260	0.003	0.312	0.028	0.002	0.016	0.008	177.086	0.000	0.041	0.004	0.000	0.002	0.001	20.885
	Ready Mix Trucks	4	30	15	0.006	0.624	0.056	0.003	0.033	0.016	354.171	0.000	0.005	0.000	0.000	0.000	0.000	2.410
	pickup	2	30	260	0.002	0.009	0.106	0.000	0.006	0.003	40.128	0.000	0.001	0.014	0.000	0.001	0.000	4.733

Analysis Year: **2025**

Vehicle Emissions

Total Vehicle Emissions 2025

Projects	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0.08	6.79	1.92	0.04	0.45	0.21	4371.03	0.01	0.87	0.25	0.01	0.06	0.03	509.08
Canal, Lateral, and Tunnel Improvements	0.03	1.92	0.82	0.01	0.14	0.07	1334.45	0.00	0.10	0.04	0.00	0.01	0.00	65.37
Flow Control	0.02	1.13	0.59	0.01	0.09	0.04	831.55	0.00	0.02	0.01	0.00	0.00	0.00	14.77
Groundwater Management	0.01	0.33	0.28	0.00	0.03	0.02	282.96	0.00	0.00	0.00	0.00	0.00	0.00	2.69
Measurement and Automation	0.01	0.33	0.32	0.00	0.04	0.02	300.12	0.00	0.00	0.00	0.00	0.00	0.00	2.92
Butler Communications Tower project	0.02	0.67	0.75	0.01	0.08	0.04	651.73	0.00	0.00	0.01	0.00	0.00	0.00	2.91
Dry Creek Flume Replacement Project	0.02	0.98	0.78	0.01	0.10	0.05	828.81	0.00	0.05	0.09	0.00	0.01	0.00	58.39

VMT on Paved and Unpaved Roads 2025

Onsite Equipment	**Number**	Total VMT/day	Total VMT/year	Unpaved road%	Unpaved VMT/day	Unpaved VMT/Year	Paved VMT/day	Paved VMT/year
Regulating Reservoirs and Infrastructure	Worker Commute	810	210600	5%	40.5	10,530	770	200,070
	Haul Truck	1260	327600	2.5%	31.5	8,190	1,229	319,410
	Ready Mix Truck	30	3000	2.5%	0.75	75	29	2,925
	pickup	150	39000	5%	7.5	1,950	143	37,050
Canal, Lateral, and Tunnel Improvements	Worker Commute	300	32400	5%	15	1,620	285	30,780
	Haul Truck	270	29160	2.5%	6.75	729	263	28,431
	Ready Mix Truck	90	9720	2.5%	2.25	243	88	9,477
	pickup	150	16200	5%	7.5	810	143	15,390
Flow Control	Worker Commute	300	12900	5%	15	645	285	12,255
	Haul Truck	180	7740	2.5%	4.5	194	176	7,547
	Ready Mix Truck	30	210	2.5%	0.75	5	29	205
	pickup	60	2580	5%	3	129	57	2,451
Groundwater Management	Worker Commute	150	4500	5%	7.5	225	143	4,275
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Measurement and Automation	Worker Commute	180	5400	5%	9	270	171	5,130
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Butler Communications Tower project	Worker Commute	450	6750	5%	22.5	338	428	6,413
	Haul Truck	60	600	2.5%	1.5	15	59	585
	Ready Mix Truck	60	60	2.5%	1.5	2	59	59
	pickup	60	900	5%	3	45	57	855
Dry Creek Flume Replacement Project	Worker Commute	450	117000	5%	22.5	5,850	428	111,150
	Haul Truck	60	15600	2.5%	1.5	390	59	15,210
	Ready Mix Truck	120	1800	2.5%	3	45	117	1,755
	pickup	60	15600	5%	3	780	57	14,820

Analysis Year **2025**
Fugitive Dust Emissions Northern Commute Scenario

A) Bulldozing - Demolition
Fugitive dust emissions from bulldozing **2025**

Activity	Number of Equipment	Maximum daily hours	Days	Emission Factor		Daily Emissions		Annual Emissions	
				PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
				lb/hr	lb/hr	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	7	10	140	0.753	0.414	52.69	28.96	3.69	2.03
Canal, Lateral, and Tunnel Improvements	2	10	90	0.753	0.414	15.06	8.28	0.68	0.37
Flow Control	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Groundwater Management	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Measurement and Automation	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Butler Communications Tower project	1	10	5	0.753	0.414	7.53	4.14	0.02	0.01
Dry Creek Flume Replacement Project	1	10	20	0.753	0.414	7.53	4.14	0.08	0.04

Note:
PM emissions were calculated using the following equation and parameters (CalEEMod Appendix A):
Emission Factor (lb/hr)= k x $(s)^{1.5}$ / $(M)^{1.4}$ For PM10 and k x 5.7 x $(s)^{1.2}$ / $(M)^{1.3}$ for PM2.5
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 6.9% - CalEEMod default for overburden)
M = Moisture Content = 7.9% (CalEEMod default)

B) Grading
Fugitive dust emissions from grading **2025**

Activity		Number of Grading Equipment	# acres/equipment	Acreage Graded/Day	Number of Days/Year	Grader/Scaper VMT		Emission Factors		Daily Emissions		Annual Emissions	
								PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
				acres		miles/day	miles/year	lb/VMT	lb/VMT	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	Grader	2	0.5	1	120	0.69	82.50	1.54	0.167	1.06	0.11	0.06	0.01
	Scaper	4	1	4	100	2.75	275.00	1.54	0.167	4.24	0.46	0.21	0.02
Canal, Lateral, and Tunnel Improvements	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Flow Control	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Groundwater Management	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Measurement and Automation	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Butler Communications Tower project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00

Analysis Year **2025**

Fugitive Dust Emissions Northern Commute Scenario

Grading Emission Summary

	Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	5.30	0.57	0.28	0.03
Canal, Lateral, and Tunnel Improvements	0.00	0.00	0.00	0.00
Flow Control	0.00	0.00	0.00	0.00
Groundwater Management	0.00	0.00	0.00	0.00
Measurement and Automation	0.00	0.00	0.00	0.00
Butler Communications Tower project	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0.00	0.00	0.00	0.00

Note:

PM emissions were calculated using the following equation and parameters:

Emission factor (lb/VMT) = k x 0.051 x $(S)^{2.0}$ for PM10 and k x 0.040 x $(S)^{2.5}$ for PM2.5

k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)

S = Mean Vehicle Speed, CalEEMod default = 7.1 miles/hour

VMT = As / Wb X 43,560 (sqft/acre) /5280 (ft/mile)

VMT: vehicle miles traveled

As: the acreage of the grading site (0.5 acres per grader, 1 acre for scapter, CalEEMod defaults)

Wb: blade width of the grader. CalEEMod default Wb = 12 ft.

Analysis Year **2025**
Fugitive Dust Emissions Northern Commute Scenario

C). Earth Material Loading/Handling
Dust from soil loading **2025**

Projects	Total Amount Handled	Material Amount		Material Amount		Emission Factors		Daily Emissions		Annual Emissions	
						PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	cy	cy/day	cy/year	ton/day	ton/year	lb/ton	lb/ton	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	280,000	1060.6	280,000	1340.8	353966.5	0.00012	0.000018	0.16	0.024	0.0206	0.0031
Canal, Lateral, and Tunnel Improvements	9,684	88.0	9,684	111.3	12242.2	0.00012	0.000018	0.01	0.002	0.0007	0.0001
Flow Control	2,677	60.8	2,677	76.9	3384.2	0.00012	0.000018	0.01	0.001	0.0002	0.0000
Groundwater Management	9	0.2	9	0.3	11.4	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Measurement and Automation	4	0.2	4	0.2	5.1	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Butler Communications Tower project	50	1.1	50	1.4	63.2	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Dry Creek Flume Replacement Project	2,575	9.8	2,575	12.3	3255.2	0.00012	0.000018	0.00	0.000	0.0002	0.0000

Note:
Fugitive dust from materials unloading from trains and/or trucks are calculated using the following equations and parameters:
Emission factor (lb/ton) = $(k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
U = average wind speed = 2.7 m/s (6.04 mph) for SJVAPCD (CalEEMOd default)
M = moisture content = 12% (CalEEMod Default)
Material density (CalEEMod default) 1.264 ton/CY

C) Vehicle Fugitive Dust Emissions on Paved Roads
Emission factor (g/VMT) = k X (sL)^0.91 X W^1.02

		PM10	**PM2.5**
k		1.0	0.25
sL	g/m2	0.10	0.10
W	tons	2.4	2.4
EF	(g/VMT)	0.300	0.075

Equation from: AP-42 13.2.1
sL and W (silt loading and vehicle weight) are CalEEMod default values

Projects	Maximum Daily Emissions			Annual Emissions		
	Trip miles	PM10	PM2.5	Trip miles	PM10	PM2.5
	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	2,170	1.44	0.36	559,455	0.185	0.046
Canal, Lateral, and Tunnel Improvements	779	0.52	0.13	84,078	0.028	0.007
Flow Control	547	0.36	0.09	22,457	0.007	0.002
Groundwater Management	230	0.15	0.04	6,037	0.002	0.000
Measurement and Automation	258	0.17	0.04	6,892	0.002	0.001
Butler Communications Tower project	602	0.40	0.10	7,911	0.003	0.001
Dry Creek Flume Replacement Project	660	0.44	0.11	142,935	0.047	0.012

Analysis Year **2025**

Fugitive Dust Emissions Northern Commute Scenario

D) Vehicle Fugitive Dust Emissions on Unpaved Roads

Uncontrolled Emission Factors and Emissions

	Emission Factors (lb/VMT)	
	PM10	PM2.5
Unpaved Road (uncontrolled)	0.87	0.09
Unpaved Road (with watering unpaved road twice a day)	0.45	0.04

Emission factor (lb/VMT) = $(k)[(s/12)^{0.9}][(W/3)^{0.45}]*(1-P/365)$ (EPA AP-42, 13.2.2, for industrial sites)

k = constant (lb/VMT) = 1.5 lb/VMT for PM10 and 0.15 lb/VMT for PM2.5

s = Silt Content (8.5%, construction sites, AP-42, Table 13.2.2.1)

W = avg. vehicle weight (tons) = 2.4 ton

P = number of days in a year with at least 0.1 inch of precipitation, 46 days for Stanislaus County (CalEEMod)

Control efficiency of watering the unpaved road twice a day 55% (data from SCAQMD CEQA Handbook, TABLE XI-D, MITIGATION MEASURE EXAMPLES: FUGITIVE DUST FROM UNPAVED ROADs, 2007)

Emissions from Unpaved Roads

	Maximum Daily Emissions			Annual Emissions		
	Total Trip miles	PM10	PM2.5	Total Trip miles	PM10	PM2.5
Projects	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	80	35.92	3.59	20,745	4.643	0.464
Canal, Lateral, and Tunnel Improvements	32	14.10	1.41	3,402	0.761	0.076
Flow Control	23	10.41	1.04	973	0.218	0.022
Groundwater Management	11	4.70	0.47	293	0.066	0.007
Measurement and Automation	12	5.37	0.54	338	0.076	0.008
Butler Communications Tower project	29	12.76	1.28	399	0.089	0.009
Dry Creek Flume Replacement Project	30	13.43	1.34	7,065	1.581	0.158

Summary of Fugitive Dust Emissions

	Maximum Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
Projects	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	95.51	33.51	8.81	2.57
Canal, Lateral, and Tunnel Improvements	29.68	9.82	1.47	0.46
Flow Control	10.78	1.13	0.23	0.02
Groundwater Management	4.85	0.51	0.07	0.01
Measurement and Automation	5.54	0.58	0.08	0.01
Butler Communications Tower project	20.68	5.51	0.11	0.02
Dry Creek Flume Replacement Project	21.39	5.59	1.70	0.21

Analysis Year: **2030**

Construction Emissions Summary

Total Emissions Summary (by Project) **2030** (Emissions from Construction of Each Individual Project if Constructed)

Onsite Equipment	**Number**	Maximum Daily Emissions							Annual Emissions						
		ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	equipment	26.809	84.359	148.574	0.596	3.000	3.000	65110.394	0.970	3.030	5.467	0.022	0.108	0.108	2158.405
	vehicles	0.071	6.419	1.607	0.035	0.447	0.210	3870.000	0.009	0.823	0.208	0.005	0.057	0.027	450.707
	dust	NA	NA	NA	NA	95.511	33.512	NA	NA	NA	NA	NA	8.813	2.571	NA
	Sub Total	**26.879**	**90.778**	**150.180**	**0.632**	**98.957**	**36.722**	**68980.394**	**0.979**	**3.852**	**5.675**	**0.026**	**8.978**	**2.706**	**2609.112**
Canal, Lateral, and Tunnel Improvements	equipment	5.282	20.618	38.803	0.122	0.650	0.650	12839.391	0.205	0.806	1.417	0.005	0.026	0.026	446.475
	vehicles	0.022	1.804	0.662	0.011	0.143	0.066	1179.040	0.001	0.097	0.036	0.001	0.008	0.004	57.760
	dust	NA	NA	NA	NA	29.684	9.816	NA	NA	NA	NA	NA	1.467	0.456	NA
	Sub Total	**5.304**	**22.423**	**39.465**	**0.133**	**30.477**	**10.533**	**14018.431**	**0.206**	**0.903**	**1.453**	**0.005**	**1.501**	**0.485**	**504.234**
Flow control	equipment	4.114	14.248	34.196	0.101	0.410	0.410	10855.937	0.047	0.155	0.372	0.001	0.005	0.005	112.388
	vehicles	0.014	1.057	0.478	0.007	0.093	0.043	734.168	0.000	0.020	0.010	0.000	0.002	0.001	13.036
	dust	NA	NA	NA	NA	10.778	1.133	NA	NA	NA	NA	NA	0.225	0.024	NA
	Sub Total	**4.128**	**15.305**	**34.674**	**0.108**	**11.281**	**1.585**	**11590.106**	**0.047**	**0.175**	**0.382**	**0.001**	**0.232**	**0.029**	**125.424**
Groundwater Management	equipment	4.627	15.665	37.568	0.120	0.458	0.458	12636.165	0.037	0.114	0.263	0.001	0.003	0.003	94.385
	vehicles	0.005	0.307	0.219	0.002	0.034	0.015	249.160	0.000	0.002	0.003	0.000	0.000	0.000	2.356
	dust	NA	NA	NA	NA	4.852	0.508	NA	NA	NA	NA	NA	0.068	0.007	NA
	Sub Total	**4.631**	**15.972**	**37.787**	**0.122**	**5.344**	**0.981**	**12885.325**	**0.038**	**0.116**	**0.267**	**0.001**	**0.072**	**0.011**	**96.741**
Masurement and automation	equipment	3.677	11.870	26.945	0.088	0.346	0.346	9630.052	0.032	0.098	0.224	0.001	0.003	0.003	75.950
	vehicles	0.005	0.308	0.249	0.002	0.037	0.017	264.093	0.000	0.002	0.004	0.000	0.000	0.000	2.560
	dust	NA	NA	NA	NA	5.542	0.580	NA	NA	NA	NA	NA	0.078	0.008	NA
	Sub Total	**3.682**	**12.178**	**27.194**	**0.091**	**5.926**	**0.942**	**9894.145**	**0.032**	**0.101**	**0.228**	**0.001**	**0.081**	**0.011**	**78.510**
Butler communicaitaons Tower Project	equipment	3.652	14.598	29.369	0.087	0.440	0.440	9027.060	0.010	0.027	0.056	0.000	0.001	0.001	22.065
	vehicles	0.011	0.622	0.590	0.005	0.084	0.037	572.984	0.000	0.002	0.004	0.000	0.000	0.000	2.543
	dust	NA	NA	NA	NA	20.683	5.513	NA	NA	NA	NA	NA	0.111	0.020	NA
	Sub Total	**3.663**	**15.219**	**29.959**	**0.093**	**21.207**	**5.990**	**9600.044**	**0.010**	**0.029**	**0.060**	**0.000**	**0.112**	**0.021**	**24.608**
Dry Creek Flume Replacement Project	equipment	4.938	16.723	39.928	0.118	0.539	0.539	12428.796	0.162	0.389	1.055	0.004	0.014	0.014	381.628
	vehicles	0.014	0.917	0.617	0.007	0.100	0.045	730.216	0.001	0.047	0.074	0.001	0.009	0.004	51.172
	dust	NA	NA	NA	NA	21.395	5.590	NA	NA	NA	NA	NA	1.704	0.211	NA
	Sub Total	**4.952**	**17.640**	**40.546**	**0.124**	**22.034**	**6.174**	**13159.012**	**0.163**	**0.436**	**1.128**	**0.004**	**1.727**	**0.230**	**432.800**

Note: Emissions presented in this table are potential emissions if a project is constructed in the analysis year. Emissions may or may not occur in this year depending on the program schedule.

Analysis Year: **2030**

Construction Emissions Summary

Total Emissions of Potential Overlapping Projects **2030**

		Emissions/year Per Project							Total Emissions with Multiple Projects						
	Number of Projects	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	1	0.98	3.85	5.68	0.03	8.98	2.71	2609.11	0.98	3.85	5.68	0.03	8.98	2.71	2609.11
Canal, Lateral, and Tunnel Improvements	1	0.21	0.90	1.45	0.01	1.50	0.48	504.23	0.21	0.90	1.45	0.01	1.50	0.48	504.23
Flow Control	1	0.05	0.17	0.38	0.00	0.23	0.03	125.42	0.05	0.17	0.38	0.00	0.23	0.03	125.42
Groundwater Management	0	0.04	0.12	0.27	0.00	0.07	0.01	96.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Measurement and Automation	2	0.03	0.10	0.23	0.00	0.08	0.01	78.51	0.06	0.20	0.46	0.00	0.16	0.02	157.02
Butler Communications Tower project	0	0.01	0.03	0.06	0.00	0.11	0.02	24.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0	0.16	0.44	1.13	0.00	1.73	0.23	432.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions of Potential Overlapping Projects in Analysis Year									**1.30**	**5.13**	**7.97**	**0.03**	**10.87**	**3.24**	**3395.79**
SJVAPCD CEQA Thresholds									**10**	**10**	**100**	**27**	**15**	**15**	**NA**

Analysis Year: **2030**

Onsite Equipment Emissions

Onsite Equipment Information and Emission Factors **2030**

	Projects	Operation Data							CalEEMod Emission Factors (100% load)								
		Equipment	Number	HP	Days/Year	Hour/day	Emission	CalEEMod Default	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	CO_2e
				per equipment	per equipment	per equipment	Factor Year	Load Factor	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr	g/hp-hr
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	2	247	20	8	2030	0.40	0.335	1.828	1.322	0.006	0.069	0.069	568.299	0.030	569.139
		Grader	1	187	20	8	2030	0.41	0.216	0.684	1.148	0.006	0.024	0.024	568.299	0.019	568.831
		Backhoe	1	97	20	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		Loader	1	97	20	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		Dump Trucks	3	402	20	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
	Earthwork (topsoil stripping and removal)	Bulldozers	2	247	20	8	2030	0.40	0.335	1.828	1.322	0.006	0.069	0.069	568.299	0.030	569.139
		Loader	1	97	20	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		Dump Trucks	10	402	20	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
	Earthwork (reservoir construction)	Scrapers	4	367	100	8	2030	0.48	0.259	1.057	1.184	0.005	0.040	0.040	568.299	0.023	568.943
		Bulldozers	3	247	100	8	2030	0.4	0.335	1.828	1.322	0.006	0.069	0.069	568.299	0.030	569.139
		Loader	1	97	100	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		Grader	1	187	100	8	2030	0.41	0.216	0.684	1.148	0.006	0.024	0.024	568.299	0.019	568.831
		Compactors	2	8	100	8	2030	0.43	0.661	4.142	3.469	0.008	0.161	0.161	568.299	0.059	569.951
		Water Truck	1	402	100	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		Dump Trucks	12	402	100	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
	Structure/Equipment Installation	Excavator	1	158	100	8	2030	0.38	0.213	0.525	3.362	0.006	0.023	0.023	568.299	0.019	568.831
		Backhoe	1	97	100	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		Dump Truck	1	402	100	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	100	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
		Generator	1	84	100	8	2030	0.74	0.178	1.645	3.316	0.006	0.034	0.034	568.299	0.016	568.747
		Power screed	1	172	100	8	2030	0.42	0.161	0.459	3.127	0.006	0.019	0.019	568.299	0.014	568.691
		25-ton crane	1	231	100	8	2030	0.29	0.224	0.748	1.147	0.006	0.024	0.024	568.299	0.020	568.859
	Dust Control	Water Truck	2	402	200	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	40	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		excavator	1	158	40	8	2030	0.38	0.213	0.525	3.362	0.006	0.023	0.023	568.299	0.019	568.831
		water truck	1	402	40	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		dump truck	1	402	40	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	40	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Construction	Bulldozers	2	247	90	8	2030	0.4	0.335	1.828	1.322	0.006	0.069	0.069	568.299	0.030	569.139
		backhoe (with hydraulic hammer)	1	97	90	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		water truck	1	402	90	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		dump trucks	1	402	90	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	2	84	90	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Dust Control	Water Truck	1	402	130	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		excavator	1	158	20	8	2030	0.38	0.213	0.525	3.362	0.006	0.023	0.023	568.299	0.019	568.831
		water truck	1	402	20	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		dump truck	1	402	20	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	2	84	20	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		water truck	1	402	20	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		dump trucks	1	402	20	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	20	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Dust Control	Water Truck	1	402	40	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
Groundwater Management	Site Clearing, Earthwork	excavator	1	158	2	8	2030	0.38	0.213	0.525	3.362	0.006	0.023	0.023	568.299	0.019	568.831
		backhoe	1	97	2	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		dump truck	1	402	2	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	2	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Construction	backhoe (with hydraulic hammer)	1	97	26	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		drill rig	1	221	26	8	2030	0.5	0.127	0.274	1.035	0.006	0.010	0.010	568.299	0.011	568.607
		crane	1	231	26	8	2030	0.29	0.224	0.748	1.147	0.006	0.024	0.024	568.299	0.020	568.859
		Water Truck	1	402	26	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		dump trucks	1	402	26	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	26	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Development	truck	1	402	2	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		pump trailer	1	84	2	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Dust Control	Water Truck	1	402	30	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831

Analysis Year: **2030**

Onsite Equipment Emissions

Measurement and Automation	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		Water Truck	1	402	20	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		dump truck	1	402	20	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	20	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	SCADA Equipment Installation	backhoe	1	97	10	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		Water Truck	1	402	10	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		dump truck	1	402	10	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	10	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Dust Control	Water Truck	1	402	30	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	0	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		excavator	1	158	5	8	2030	0.38	0.213	0.525	3.362	0.006	0.023	0.023	568.299	0.019	568.831
		dump truck	1	402	5	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	0	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
		Bulldozers	1	247	5	8	2030	0.4	0.335	1.828	1.322	0.006	0.069	0.069	568.299	0.030	569.139
	Construction	backhoe (with hydraulic hammer)	1	97	0	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		dump trucks	1	402	5	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		boom lift	1	63	2	8	2030	0.31	0.188	1.657	3.352	0.006	0.036	0.036	568.299	0.017	568.775
		crane	1	231	2	8	2030	0.29	0.224	0.748	1.147	0.006	0.024	0.024	568.299	0.020	568.859
		concrete truck/pumping equipment	1	84	1	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Dust Control	Water Truck	1	402	15	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		excavator	1	158	40	8	2030	0.38	0.213	0.525	3.362	0.006	0.023	0.023	568.299	0.019	568.831
		dump truck	2	402	40	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	5	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
		Bulldozers	1	247	20	8	2030	0.4	0.335	1.828	1.322	0.006	0.069	0.069	568.299	0.030	569.139
	Construction	loader	1	97	10	8	2030	0.37	0.272	1.624	3.705	0.006	0.030	0.030	568.299	0.024	568.971
		dump trucks	2	402	60	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831
		excavator	2	158	60	8	2030	0.38	0.213	0.525	3.362	0.006	0.023	0.023	568.299	0.019	568.831
		concrete truck/pumping equipment	1	84	10	8	2030	0.74	0.193	1.662	3.367	0.006	0.036	0.036	568.299	0.017	568.775
	Dust Control	Water Truck	1	402	260	8	2030	0.38	0.216	0.458	1.104	0.005	0.017	0.017	568.299	0.019	568.831

Assumptions:

1. CO2e were calculated using the following global warming potential (GWP, 100-year GWP from IPCC Fifth Assessment Report , 2014)

CO2 1

CH4 28

N2O 265

2. Load factor and emission factors are from CalEEMod Appendix D: Table 3.4 Offroad Equipment Emission Factors (g/hp-hr) and Table 3.3 OFFROAD Default Horsepower and Load Factors (October 2017)

Analysis Year: **2030**

Onsite Equipment Emissions

Onsite Equipment Emissions

			Daily Emissions							Annual Emissions						
			ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	Projects	**Onsite Equipment**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	1.17	6.37	4.61	0.02	0.24	0.24	1983.45	0.012	0.06	0.05	0.00021	0.002	0.002	17.99
		Grader	0.29	0.92	1.55	0.01	0.03	0.03	769.18	0.003	0.01	0.02	0.00008	0.000	0.000	6.98
		Backhoe	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Loader	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Dump Trucks	1.75	3.70	8.92	0.04	0.14	0.14	4597.60	0.017	0.04	0.09	0.00040	0.001	0.001	41.71
	Earthwork	Bulldozers	1.17	6.37	4.61	0.02	0.24	0.24	1983.45	0.012	0.06	0.05	0.00021	0.002	0.002	17.99
	(topsoil stripping and removal)	Loader	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Dump Trucks	5.82	12.34	29.74	0.13	0.46	0.46	15325.33	0.058	0.12	0.30	0.00135	0.005	0.005	139.03
	Earthwork (reservoir construction)	Scrapers	3.22	13.14	14.71	0.06	0.50	0.50	7070.55	0.161	0.66	0.74	0.00311	0.025	0.025	320.72
		Bulldozers	1.75	9.56	6.91	0.03	0.36	0.36	2975.18	0.088	0.48	0.35	0.00157	0.018	0.018	134.95
		Loader	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.009	0.05	0.12	0.00019	0.001	0.001	16.34
		Grader	0.29	0.92	1.55	0.01	0.03	0.03	769.18	0.015	0.05	0.08	0.00041	0.002	0.002	34.89
		Compactors	0.08	0.50	0.42	0.00	0.02	0.02	69.16	0.004	0.03	0.02	0.00005	0.001	0.001	3.14
		Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.029	0.06	0.15	0.00067	0.002	0.002	69.52
		Dump Trucks	6.98	14.81	35.69	0.16	0.55	0.55	18390.40	0.349	0.74	1.78	0.00808	0.027	0.027	834.19
	Structure/Equipment Installation	Excavator	0.23	0.56	3.56	0.01	0.02	0.02	602.34	0.011	0.03	0.18	0.00032	0.001	0.001	27.32
		Backhoe	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.009	0.05	0.12	0.00019	0.001	0.001	16.34
		Dump Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.029	0.06	0.15	0.00067	0.002	0.002	69.52
		Concrete pump	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.011	0.09	0.18	0.00033	0.002	0.002	28.28
		Generator	0.20	1.80	3.64	0.01	0.04	0.04	623.52	0.010	0.09	0.18	0.00033	0.002	0.002	28.28
		Power screed	0.21	0.58	3.98	0.01	0.02	0.02	724.55	0.010	0.03	0.20	0.00038	0.001	0.001	32.87
		25-ton crane	0.26	0.88	1.36	0.01	0.03	0.03	672.10	0.013	0.04	0.07	0.00035	0.001	0.001	30.49
	Dust Control	Water Truck	1.16	2.47	5.95	0.03	0.09	0.09	3065.07	0.116	0.25	0.59	0.00269	0.009	0.009	278.06

Analysis Year: **2030**

Onsite Equipment Emissions

Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.003	0.02	0.05	0.00008	0.000	0.000	6.53
		excavator	0.23	0.56	3.56	0.01	0.02	0.02	602.34	0.005	0.01	0.07	0.00013	0.000	0.000	10.93
		water truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.012	0.02	0.06	0.00027	0.001	0.001	27.81
		dump truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.012	0.02	0.06	0.00027	0.001	0.001	27.81
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.004	0.04	0.07	0.00013	0.001	0.001	11.31
	Construction	Bulldozers	1.17	6.37	4.61	0.02	0.24	0.24	1983.45	0.053	0.29	0.21	0.00094	0.011	0.011	80.97
		backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.008	0.05	0.11	0.00017	0.001	0.001	14.70
		water truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.026	0.06	0.13	0.00061	0.002	0.002	62.56
		dump trucks	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.026	0.06	0.13	0.00061	0.002	0.002	62.56
		concrete truck/pumping equipment	0.42	3.64	7.38	0.01	0.08	0.08	1247.09	0.019	0.16	0.33	0.00059	0.004	0.004	50.91
	Dust Control	Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.038	0.08	0.19	0.00088	0.003	0.003	90.37
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		excavator	0.23	0.56	3.56	0.01	0.02	0.02	602.34	0.002	0.01	0.04	0.00006	0.000	0.000	5.46
		water truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.42	3.64	7.38	0.01	0.08	0.08	1247.09	0.004	0.04	0.07	0.00013	0.001	0.001	11.31
	Construction	backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		water truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump trucks	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.002	0.02	0.04	0.00007	0.000	0.000	5.66
	Dust Control	Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.012	0.02	0.06	0.00027	0.001	0.001	27.81
Groundwater Management	Site Clearing, Earthwork	excavator	0.23	0.56	3.56	0.01	0.02	0.02	602.34	0.000	0.00	0.00	0.00001	0.000	0.000	0.55
		backhoe	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.000	0.00	0.00	0.00000	0.000	0.000	0.33
		dump truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.001	0.00	0.00	0.00001	0.000	0.000	1.39
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Construction	backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.002	0.01	0.03	0.00005	0.000	0.000	4.25
		drill rig	0.25	0.53	2.02	0.01	0.02	0.02	1108.13	0.003	0.01	0.03	0.00015	0.000	0.000	13.07
		crane	0.26	0.88	1.36	0.01	0.03	0.03	672.10	0.003	0.01	0.02	0.00009	0.000	0.000	7.93
		Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.008	0.02	0.04	0.00018	0.001	0.001	18.07
		dump trucks	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.008	0.02	0.04	0.00018	0.001	0.001	18.07
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.003	0.02	0.05	0.00009	0.001	0.001	7.35
	Development	truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.001	0.00	0.00	0.00001	0.000	0.000	1.39
		pump trailer	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Dust Control	Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.009	0.02	0.04	0.00020	0.001	0.001	20.85
Measurement and Automation	Construction	backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.002	0.02	0.04	0.00007	0.000	0.000	5.66
	SCADA Equipment Installation	backhoe	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.001	0.01	0.01	0.00002	0.000	0.000	1.63
		Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.003	0.01	0.01	0.00007	0.000	0.000	6.95
		dump truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.003	0.01	0.01	0.00007	0.000	0.000	6.95
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.001	0.01	0.02	0.00003	0.000	0.000	2.83
	Dust Control	Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.009	0.02	0.04	0.00020	0.001	0.001	20.85
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		excavator	0.23	0.56	3.56	0.01	0.02	0.02	602.34	0.001	0.00	0.01	0.00002	0.000	0.000	1.37
		dump truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.001	0.00	0.01	0.00003	0.000	0.000	3.48
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		Bulldozers	0.58	3.19	2.30	0.01	0.12	0.12	991.73	0.001	0.01	0.01	0.00003	0.000	0.000	2.25
	Construction	backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		dump trucks	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.001	0.00	0.01	0.00003	0.000	0.000	3.48
		boom lift	0.06	0.57	1.15	0.00	0.01	0.01	195.91	0.000	0.00	0.00	0.00000	0.000	0.000	0.18
		crane	0.26	0.88	1.36	0.01	0.03	0.03	672.10	0.000	0.00	0.00	0.00001	0.000	0.000	0.61
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
	Dust Control	Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.004	0.01	0.02	0.00010	0.000	0.000	10.43
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		excavator	0.23	0.56	3.56	0.01	0.02	0.02	602.34	0.005	0.01	0.07	0.00013	0.000	0.000	10.93
		dump truck	1.16	2.47	5.95	0.03	0.09	0.09	3065.07	0.023	0.05	0.12	0.00054	0.002	0.002	55.61
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.001	0.00	0.01	0.00002	0.000	0.000	1.41
		Bulldozers	0.58	3.19	2.30	0.01	0.12	0.12	991.73	0.006	0.03	0.02	0.00010	0.001	0.001	9.00
	Construction	loader	0.17	1.03	2.35	0.00	0.02	0.02	360.15	0.001	0.01	0.01	0.00002	0.000	0.000	1.63
		dump trucks	1.16	2.47	5.95	0.03	0.09	0.09	3065.07	0.035	0.07	0.18	0.00081	0.003	0.003	83.42
		excavator	0.45	1.11	7.12	0.01	0.05	0.05	1204.68	0.014	0.03	0.21	0.00038	0.001	0.001	32.79
		concrete truck/pumping equipment	0.21	1.82	3.69	0.01	0.04	0.04	623.55	0.001	0.01	0.02	0.00003	0.000	0.000	2.83
	Dust Control	Water Truck	0.58	1.23	2.97	0.01	0.05	0.05	1532.53	0.076	0.16	0.39	0.00175	0.006	0.006	180.74

Analysis Year: **2030**

Onsite Equipment Emissions

Total Equipment Emissions per Project **2030**

	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	26.81	84.36	148.57	0.60	3.00	3.00	65110.39	0.97	3.03	5.47	0.02	0.11	0.11	2158.41
Canal, Lateral, and Tunnel Improvements	5.28	20.62	38.80	0.12	0.65	0.65	12839.39	0.20	0.81	1.42	0.00	0.03	0.03	446.47
Flow Control	4.11	14.25	34.20	0.10	0.41	0.41	10855.94	0.05	0.15	0.37	0.00	0.00	0.00	112.39
Groundwater Management	4.63	15.67	37.57	0.12	0.46	0.46	12636.17	0.04	0.11	0.26	0.00	0.00	0.00	94.38
Measurement and Automation	3.68	11.87	26.94	0.09	0.35	0.35	9630.05	0.03	0.10	0.22	0.00	0.00	0.00	75.95
Butler Communications Tower project	3.65	14.60	29.37	0.09	0.44	0.44	9027.06	0.01	0.03	0.06	0.00	0.00	0.00	22.06
Dry Creek Plume Replacement Project	4.94	16.72	39.93	0.12	0.54	0.54	12428.80	0.16	0.39	1.05	0.00	0.01	0.01	381.63

Analysis Year: **2030**

Vehicle Emissions

Vehicle Emission Factors (EMFAC2017) 2030

	Year	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		g/mile	g/mile	g/mile	g/mile	g/mile	g/mile	g/mile
Worker Commute	2030	0.005	0.025	0.462	0.002	0.046	0.019	225.784
Haul Trucks, Ready Mix Trucks	2030	0.021	2.237	0.207	0.011	0.123	0.060	1188.677
pickup	2030	0.008	0.038	0.580	0.003	0.046	0.019	261.022

Note:

Vehicle emission factors were obtained from EMFAC2017:

Region: SJVAPCD

Speed and model year: aggregated

Worker commute vehicles include auto and light duty trucks.

Haul trucks and ready mix trucks include heavy heavy-duty diesel trucks.

Vehicle Emissions **2030**

					Daily Emissions							Annual Emissions						
					ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	**Vehicle Types**	**Round Trips/day**	**miles/round trip**	**days/year**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Worker Commute	27	30	260	0.008	0.045	0.825	0.004	0.082	0.033	403.186	0.001	0.006	0.107	0.001	0.011	0.004	47.550
	Haul Truck	42	30	260	0.059	6.214	0.576	0.030	0.342	0.167	3301.881	0.008	0.808	0.075	0.004	0.044	0.022	389.411
	Ready Mix Trucks	1	30	100	0.001	0.148	0.014	0.001	0.008	0.004	78.616	0.000	0.007	0.001	0.000	0.000	0.000	3.566
	pickup	5	30	260	0.003	0.013	0.192	0.001	0.015	0.006	86.317	0.000	0.002	0.025	0.000	0.002	0.001	10.180
Canal, Lateral, and Tunnel Improvements	Worker Commute	10	30	108	0.003	0.016	0.306	0.001	0.030	0.012	149.328	0.000	0.001	0.017	0.000	0.002	0.001	7.315
	Haul Truck	9	30	108	0.013	1.332	0.123	0.006	0.073	0.036	707.546	0.001	0.072	0.007	0.000	0.004	0.002	34.662
	Ready Mix Trucks	3	30	108	0.004	0.444	0.041	0.002	0.024	0.012	235.849	0.000	0.024	0.002	0.000	0.001	0.001	11.554
	pickup	5	30	108	0.003	0.013	0.192	0.001	0.015	0.006	86.317	0.000	0.001	0.010	0.000	0.001	0.000	4.229
Flow Control	Worker Commute	10	30	43	0.003	0.016	0.306	0.001	0.030	0.012	149.328	0.000	0.000	0.007	0.000	0.001	0.000	2.913
	Haul Truck	6	30	43	0.008	0.888	0.082	0.004	0.049	0.024	471.697	0.000	0.019	0.002	0.000	0.001	0.001	9.200
	Ready Mix Trucks	1	30	7	0.001	0.148	0.014	0.001	0.008	0.004	78.616	0.000	0.001	0.000	0.000	0.000	0.000	0.250
	pickup	2	30	43	0.001	0.005	0.077	0.000	0.006	0.002	34.527	0.000	0.000	0.002	0.000	0.000	0.000	0.673
Groundwater Management	Worker Commute	5	30	30	0.002	0.008	0.153	0.001	0.015	0.006	74.664	0.000	0.000	0.002	0.000	0.000	0.000	1.016
	Haul Truck	1	30	30	0.001	0.148	0.014	0.001	0.008	0.004	78.616	0.000	0.002	0.000	0.000	0.000	0.000	1.070
	Ready Mix Trucks	1	30	1	0.001	0.148	0.014	0.001	0.008	0.004	78.616	0.000	0.000	0.000	0.000	0.000	0.000	0.036
	pickup	1	30	30	0.001	0.003	0.038	0.000	0.003	0.001	17.263	0.000	0.000	0.001	0.000	0.000	0.000	0.235
Measurement and Automation	Worker Commute	6	30	30	0.002	0.010	0.183	0.001	0.018	0.007	89.597	0.000	0.000	0.003	0.000	0.000	0.000	1.219
	Haul Truck	1	30	30	0.001	0.148	0.014	0.001	0.008	0.004	78.616	0.000	0.002	0.000	0.000	0.000	0.000	1.070
	Ready Mix Trucks	1	30	1	0.001	0.148	0.014	0.001	0.008	0.004	78.616	0.000	0.000	0.000	0.000	0.000	0.000	0.036
	pickup	1	30	30	0.001	0.003	0.038	0.000	0.003	0.001	17.263	0.000	0.000	0.001	0.000	0.000	0.000	0.235
Butler Communications Tower project	Worker Commute	15	30	15	0.005	0.025	0.458	0.002	0.045	0.019	223.992	0.000	0.000	0.003	0.000	0.000	0.000	1.524
	Haul Truck	2	30	10	0.003	0.296	0.027	0.001	0.016	0.008	157.232	0.000	0.001	0.000	0.000	0.000	0.000	0.713
	Ready Mix Trucks	2	30	1	0.003	0.296	0.027	0.001	0.016	0.008	157.232	0.000	0.000	0.000	0.000	0.000	0.000	0.071
	pickup	2	30	15	0.001	0.005	0.077	0.000	0.006	0.002	34.527	0.000	0.000	0.001	0.000	0.000	0.000	0.235
Dry Creek Flume Replacement Project	Worker Commute	15	30	260	0.005	0.025	0.458	0.002	0.045	0.019	223.992	0.001	0.003	0.060	0.000	0.006	0.002	26.417
	Haul Truck	2	30	260	0.003	0.296	0.027	0.001	0.016	0.008	157.232	0.000	0.038	0.004	0.000	0.002	0.001	18.543
	Ready Mix Trucks	4	30	15	0.006	0.592	0.055	0.003	0.033	0.016	314.465	0.000	0.004	0.000	0.000	0.000	0.000	2.140
	pickup	2	30	260	0.001	0.005	0.077	0.000	0.006	0.002	34.527	0.000	0.001	0.010	0.000	0.001	0.000	4.072

Analysis Year: **2030**

Vehicle Emissions

Total Vehicle Emissions 2030

Projects	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0.07	6.42	1.61	0.04	0.45	0.21	3870.00	0.01	0.82	0.21	0.00	0.06	0.03	450.71
Canal, Lateral, and Tunnel Improvements	0.02	1.80	0.66	0.01	0.14	0.07	1179.04	0.00	0.10	0.04	0.00	0.01	0.00	57.76
Flow Control	0.01	1.06	0.48	0.01	0.09	0.04	734.17	0.00	0.02	0.01	0.00	0.00	0.00	13.04
Groundwater Management	0.00	0.31	0.22	0.00	0.03	0.02	249.16	0.00	0.00	0.00	0.00	0.00	0.00	2.36
Measurement and Automation	0.01	0.31	0.25	0.00	0.04	0.02	264.09	0.00	0.00	0.00	0.00	0.00	0.00	2.56
Butler Communications Tower project	0.01	0.62	0.59	0.01	0.08	0.04	572.98	0.00	0.00	0.00	0.00	0.00	0.00	2.54
Dry Creek Flume Replacement Project	0.01	0.92	0.62	0.01	0.10	0.04	730.22	0.00	0.05	0.07	0.00	0.01	0.00	51.17

VMT on Paved and Unpaved Roads 2030

Onsite Equipment	**Number**	Total VMT/day	Total VMT/year	Unpaved road%	Unpaved VMT/day	Unpaved VMT/Year	Paved VMT/day	Paved VMT/year
Regulating Reservoirs and Infrastructure	Worker Commute	810	210600	5%	40.5	10,530	770	200,070
	Haul Truck	1260	327600	2.5%	31.5	8,190	1,229	319,410
	Ready Mix Truck	30	3000	2.5%	0.75	75	29	2,925
	pickup	150	39000	5%	7.5	1,950	143	37,050
Canal, Lateral, and Tunnel Improvements	Worker Commute	300	32400	5%	15	1,620	285	30,780
	Haul Truck	270	29160	2.5%	6.75	729	263	28,431
	Ready Mix Truck	90	9720	2.5%	2.25	243	88	9,477
	pickup	150	16200	5%	7.5	810	143	15,390
Flow Control	Worker Commute	300	12900	5%	15	645	285	12,255
	Haul Truck	180	7740	2.5%	4.5	194	176	7,547
	Ready Mix Truck	30	210	2.5%	0.75	5	29	205
	pickup	60	2580	5%	3	129	57	2,451
Groundwater Management	Worker Commute	150	4500	5%	7.5	225	143	4,275
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Measurement and Automation	Worker Commute	180	5400	5%	9	270	171	5,130
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Butler Communications Tower project	Worker Commute	450	6750	5%	22.5	338	428	6,413
	Haul Truck	60	600	2.5%	1.5	15	59	585
	Ready Mix Truck	60	60	2.5%	1.5	2	59	59
	pickup	60	900	5%	3	45	57	855
Dry Creek Flume Replacement Project	Worker Commute	450	117000	5%	22.5	5,850	428	111,150
	Haul Truck	60	15600	2.5%	1.5	390	59	15,210
	Ready Mix Truck	120	1800	2.5%	3	45	117	1,755
	pickup	60	15600	5%	3	780	57	14,820

Analysis Year **2030**
Fugitive Dust Emissions Northern Commute Scenario

A) Bulldozing - Demolition
Fugitive dust emissions from bulldozing **2030**

Activity	Number of Equipment	Maximum daily hours	Days	Emission Factor		Daily Emissions		Annual Emissions	
				PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
				lb/hr	lb/hr	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	7	10	140	0.753	0.414	52.69	28.96	3.69	2.03
Canal, Lateral, and Tunnel Improvements	2	10	90	0.753	0.414	15.06	8.28	0.68	0.37
Flow Control	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Groundwater Management	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Measurement and Automation	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Butler Communications Tower project	1	10	5	0.753	0.414	7.53	4.14	0.02	0.01
Dry Creek Flume Replacement Project	1	10	20	0.753	0.414	7.53	4.14	0.08	0.04

Note:
PM emissions were calculated using the following equation and parameters (CalEEMod Appendix A):
Emission Factor (lb/hr)= k x $(s)^{1.5}$ / $(M)^{1.4}$ For PM10 and k x 5.7 x $(s)^{1.2}$ / $(M)^{1.3}$ for PM2.5
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 6.9% - CalEEMod default for overburden)
M = Moisture Content = 7.9% (CalEEMod default)

B) Grading
Fugitive dust emissions from grading **2030**

Activity		Number of Grading Equipment	# acres/equipment	Acreage Graded/Day	Number of Days/Year	Grader/Scaper VMT		Emission Factors		Daily Emissions		Annual Emissions	
								PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
				acres		miles/day	miles/year	lb/VMT	lb/VMT	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	Grader	2	0.5	1	120	0.69	82.50	1.54	0.167	1.06	0.11	0.06	0.01
	Scaper	4	1	4	100	2.75	275.00	1.54	0.167	4.24	0.46	0.21	0.02
Canal, Lateral, and Tunnel Improvements	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Flow Control	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Groundwater Management	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Measurement and Automation	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Butler Communications Tower project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00

Analysis Year **2030**

Fugitive Dust Emissions Northern Commute Scenario

Grading Emission Summary

	Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	5.30	0.57	0.28	0.03
Canal, Lateral, and Tunnel Improvements	0.00	0.00	0.00	0.00
Flow Control	0.00	0.00	0.00	0.00
Groundwater Management	0.00	0.00	0.00	0.00
Measurement and Automation	0.00	0.00	0.00	0.00
Butler Communications Tower project	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0.00	0.00	0.00	0.00

Note:

PM emissions were calculated using the following equation and parameters:

Emission factor (lb/VMT) = k x 0.051 x $(S)^{2.0}$ for PM10 and k x 0.040 x $(S)^{2.5}$ for PM2.5

k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)

S = Mean Vehicle Speed, CalEEMod default = 7.1 miles/hour

VMT = As / Wb X 43,560 (sqft/acre) /5280 (ft/mile)

VMT: vehicle miles traveled

As: the acreage of the grading site (0.5 acres per grader, 1 acre for scapter, CalEEMod defaults)

Wb: blade width of the grader. CalEEMod default Wb = 12 ft.

Analysis Year **2030**
Fugitive Dust Emissions Northern Commute Scenario

C). Earth Material Loading/Handling
Dust from soil loading **2030**

Projects	Total Amount Handled	Material Amount		Material Amount		Emission Factors PM_{10}	Emission Factors $PM_{2.5}$	Daily Emissions PM_{10}	Daily Emissions $PM_{2.5}$	Annual Emissions PM_{10}	Annual Emissions $PM_{2.5}$
	cy	cy/day	cy/year	ton/day	ton/year	lb/ton	lb/ton	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	280,000	1060.6	280,000	1340.8	353966.5	0.00012	0.000018	0.16	0.024	0.0206	0.0031
Canal, Lateral, and Tunnel Improvements	9,684	88.0	9,684	111.3	12242.2	0.00012	0.000018	0.01	0.002	0.0007	0.0001
Flow Control	2,677	60.8	2,677	76.9	3384.2	0.00012	0.000018	0.01	0.001	0.0002	0.0000
Groundwater Management	9	0.2	9	0.3	11.4	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Measurement and Automation	4	0.2	4	0.2	5.1	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Butler Communications Tower project	50	1.1	50	1.4	63.2	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Dry Creek Flume Replacement Project	2,575	9.8	2,575	12.3	3255.2	0.00012	0.000018	0.00	0.000	0.0002	0.0000

Note:
Fugitive dust from materials unloading from trains and/or trucks are calculated using the following equations and parameters:
Emission factor (lb/ton) = (k)(0.0032)[(U/5)$^{1.3}$]/[(M/2)$^{1.4}$]
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
U = average wind speed = 2.7 m/s (6.04 mph) for SJVAPCD (CalEEMOd default)
M = moisture content = 12% (CalEEMod Default)
Material density (CalEEMod default) 1.264 ton/CY

C) Vehicle Fugitive Dust Emissions on Paved Roads
Emission factor (g/VMT) = k X (sL)^0.91 X W^1.02

		PM10	**PM2.5**
k		1.0	0.25
sL	g/m2	0.10	0.10
W	tons	2.4	2.4
EF	(g/VMT)	0.300	0.075

Equation from: AP-42 13.2.1
sL and W (silt loading and vehicle weight) are CalEEMod default values

Projects	Maximum Daily Emissions Trip miles	Maximum Daily Emissions PM10	Maximum Daily Emissions PM2.5	Annual Emissions Trip miles	Annual Emissions PM10	Annual Emissions PM2.5
	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	2,170	1.44	0.36	559,455	0.185	0.046
Canal, Lateral, and Tunnel Improvements	779	0.52	0.13	84,078	0.028	0.007
Flow Control	547	0.36	0.09	22,457	0.007	0.002
Groundwater Management	230	0.15	0.04	6,037	0.002	0.000
Measurement and Automation	258	0.17	0.04	6,892	0.002	0.001
Butler Communications Tower project	602	0.40	0.10	7,911	0.003	0.001
Dry Creek Flume Replacement Project	660	0.44	0.11	142,935	0.047	0.012

Analysis Year **2030**
Fugitive Dust Emissions Northern Commute Scenario

D) Vehicle Fugitive Dust Emissions on Unpaved Roads

Uncontrolled Emission Factors and Emissions

	Emission Factors (lb/VMT)	
	PM10	PM2.5
Unpaved Road (uncontrolled)	0.87	0.09
Unpaved Road (with watering unpaved road twice a day)	0.45	0.04

Emission factor (lb/VMT) = $(k)[(s/12)^{0.9}][(W/3)^{0.45}]*(1-P/365)$ (EPA AP-42, 13.2.2, for industrial sites)
k = constant (lb/VMT) = 1.5 lb/VMT for PM10 and 0.15 lb/VMT for PM2.5
s = Silt Content (8.5%, construction sites, AP-42, Table 13.2.2.1)
W = avg. vehicle weight (tons) = 2.4 ton
P = number of days in a year with at least 0.1 inch of precipitation, 46 days for Stanislaus County (CalEEMod)
Control efficiency of watering the unpaved road twice a day 55% (data from SCAQMD CEQA Handbook, TABLE XI-D, MITIGATION MEASURE EXAMPLES: FUGITIVE DUST FROM UNPAVED ROADs, 2007)

Emissions from Unpaved Roads

	Maximum Daily Emissions			Annual Emissions		
	Total Trip miles	PM10	PM2.5	Total Trip miles	PM10	PM2.5
Projects	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	80	35.92	3.59	20,745	4.643	0.464
Canal, Lateral, and Tunnel Improvements	32	14.10	1.41	3,402	0.761	0.076
Flow Control	23	10.41	1.04	973	0.218	0.022
Groundwater Management	11	4.70	0.47	293	0.066	0.007
Measurement and Automation	12	5.37	0.54	338	0.076	0.008
Butler Communications Tower project	29	12.76	1.28	399	0.089	0.009
Dry Creek Flume Replacement Project	30	13.43	1.34	7,065	1.581	0.158

Summary of Fugitive Dust Emissions

	Maximum Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
Projects	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	95.51	33.51	8.81	2.57
Canal, Lateral, and Tunnel Improvements	29.68	9.82	1.47	0.46
Flow Control	10.78	1.13	0.23	0.02
Groundwater Management	4.85	0.51	0.07	0.01
Measurement and Automation	5.54	0.58	0.08	0.01
Butler Communications Tower project	20.68	5.51	0.11	0.02
Dry Creek Flume Replacement Project	21.39	5.59	1.70	0.21

Analysis Year: **2031**

Construction Emissions Summary

Total Emissions Summary (by Project) **2031** (Emissions from Construction of Each Individual Project if Constructed)

Onsite Equipment	**Number**	Maximum Daily Emissions							Annual Emissions						
		ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	equipment	26.441	79.757	148.281	0.596	2.820	2.820	65109.304	0.957	2.863	5.456	0.022	0.101	0.101	2158.370
	vehicles	0.069	6.380	1.570	0.035	0.446	0.209	3791.256	0.009	0.818	0.203	0.004	0.057	0.027	441.535
	dust	NA	NA	NA	NA	95.511	33.512	NA	NA	NA	NA	NA	8.813	2.571	NA
	Sub Total	**26.511**	**86.137**	**149.850**	**0.631**	**98.777**	**36.542**	**68900.560**	**0.966**	**3.681**	**5.659**	**0.026**	**8.972**	**2.699**	**2599.905**
Canal, Lateral, and Tunnel Improvements	equipment	5.204	19.700	38.759	0.122	0.607	0.607	12839.163	0.202	0.768	1.415	0.005	0.024	0.024	446.466
	vehicles	0.022	1.792	0.642	0.011	0.143	0.066	1154.845	0.001	0.097	0.035	0.001	0.008	0.004	56.574
	dust	NA	NA	NA	NA	29.684	9.816	NA	NA	NA	NA	NA	1.467	0.456	NA
	Sub Total	**5.226**	**21.492**	**39.402**	**0.133**	**30.433**	**10.489**	**13994.008**	**0.203**	**0.865**	**1.450**	**0.005**	**1.499**	**0.483**	**503.041**
Flow control	equipment	4.071	13.765	34.194	0.101	0.382	0.382	10855.806	0.046	0.149	0.372	0.001	0.004	0.004	112.387
	vehicles	0.013	1.050	0.464	0.007	0.093	0.042	719.125	0.000	0.020	0.010	0.000	0.002	0.001	12.769
	dust	NA	NA	NA	NA	10.778	1.133	NA	NA	NA	NA	NA	0.225	0.024	NA
	Sub Total	**4.084**	**14.815**	**34.658**	**0.108**	**11.254**	**1.557**	**11574.931**	**0.047**	**0.169**	**0.381**	**0.001**	**0.231**	**0.029**	**125.155**
Groundwater Management	equipment	4.578	15.115	37.565	0.120	0.428	0.428	12636.021	0.037	0.109	0.263	0.001	0.003	0.003	94.384
	vehicles	0.005	0.304	0.212	0.002	0.034	0.015	244.022	0.000	0.002	0.003	0.000	0.000	0.000	2.307
	dust	NA	NA	NA	NA	4.852	0.508	NA	NA	NA	NA	NA	0.068	0.007	NA
	Sub Total	**4.582**	**15.419**	**37.777**	**0.122**	**5.315**	**0.952**	**12880.042**	**0.037**	**0.112**	**0.266**	**0.001**	**0.071**	**0.011**	**96.691**
Masurement and automation	equipment	3.642	11.463	26.944	0.088	0.324	0.324	9629.945	0.032	0.095	0.224	0.001	0.003	0.003	75.949
	vehicles	0.005	0.306	0.241	0.002	0.037	0.017	258.643	0.000	0.002	0.003	0.000	0.000	0.000	2.506
	dust	NA	NA	NA	NA	5.542	0.580	NA	NA	NA	NA	NA	0.078	0.008	NA
	Sub Total	**3.647**	**11.769**	**27.185**	**0.091**	**5.904**	**0.921**	**9888.588**	**0.032**	**0.097**	**0.228**	**0.001**	**0.081**	**0.011**	**78.456**
Butler communicaitaons Tower Project	equipment	3.599	13.977	29.345	0.087	0.409	0.409	9026.903	0.010	0.026	0.056	0.000	0.001	0.001	22.064
	vehicles	0.011	0.616	0.571	0.005	0.084	0.037	561.149	0.000	0.002	0.004	0.000	0.000	0.000	2.490
	dust	NA	NA	NA	NA	20.683	5.513	NA	NA	NA	NA	NA	0.111	0.020	NA
	Sub Total	**3.609**	**14.594**	**29.916**	**0.092**	**21.177**	**5.959**	**9588.052**	**0.010**	**0.027**	**0.060**	**0.000**	**0.112**	**0.021**	**24.555**
Dry Creek Flume Replacement Project	equipment	4.875	15.997	39.907	0.118	0.504	0.504	12428.605	0.160	0.370	1.055	0.004	0.014	0.014	381.623
	vehicles	0.013	0.911	0.599	0.007	0.100	0.045	715.204	0.001	0.046	0.071	0.001	0.009	0.004	50.107
	dust	NA	NA	NA	NA	21.395	5.590	NA	NA	NA	NA	NA	1.704	0.211	NA
	Sub Total	**4.889**	**16.907**	**40.506**	**0.124**	**21.999**	**6.139**	**13143.808**	**0.161**	**0.416**	**1.126**	**0.004**	**1.727**	**0.229**	**431.731**

Note: Emissions presented in this table are potential emissions if a project is constructed in the analysis year. Emissions may or may not occur in this year depending on the program schedule.

Analysis Year: **2031**

Construction Emissions Summary

Total Emissions of Potential Overlapping Projects **2031**

		Emissions/year Per Project							Total Emissions with Multiple Projects						
	Number of Projects	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0	0.97	3.68	5.66	0.03	8.97	2.70	2599.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Canal, Lateral, and Tunnel Improvements	1	0.20	0.87	1.45	0.01	1.50	0.48	503.04	0.20	0.87	1.45	0.01	1.50	0.48	503.04
Flow Control	1	0.05	0.17	0.38	0.00	0.23	0.03	125.16	0.05	0.17	0.38	0.00	0.23	0.03	125.16
Groundwater Management	0	0.04	0.11	0.27	0.00	0.07	0.01	96.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Measurement and Automation	2	0.03	0.10	0.23	0.00	0.08	0.01	78.46	0.06	0.19	0.46	0.00	0.16	0.02	156.91
Butler Communications Tower project	1	0.01	0.03	0.06	0.00	0.11	0.02	24.55	0.01	0.03	0.06	0.00	0.11	0.02	24.55
Dry Creek Flume Replacement Project	0	0.16	0.42	1.13	0.00	1.73	0.23	431.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions of Potential Overlapping Projects in Analysis Year									**0.32**	**1.26**	**2.35**	**0.01**	**2.01**	**0.56**	**809.66**
SJVAPCD CEQA Thresholds									**10**	**10**	**100**	**27**	**15**	**15**	**NA**

Analysis Year: **2031**

Onsite Equipment Emissions

Onsite Equipment Information and Emission Factors **2031**

	Projects	Operation Data							CalEEMod Emission Factors (100% load)								
		Equipment	Number	HP per equipment	Days/Year per equipment	Hour/day per equipment	Emission Factor Year	CalEEMod Default Load Factor	ROG g/hp-hr	NOx g/hp-hr	CO g/hp-hr	SO_2 g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO_2 g/hp-hr	CH_4 g/hp-hr	CO_2e g/hp-hr
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	2	247	20	8	2031	0.40	0.325	1.703	1.310	0.006	0.064	0.064	568.299	0.029	569.111
		Grader	1	187	20	8	2031	0.41	0.212	0.638	1.146	0.006	0.022	0.022	568.299	0.019	568.820
		Backhoe	1	97	20	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		Loader	1	97	20	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		Dump Trucks	3	402	20	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
	Earthwork (topsoil stripping and removal)	Bulldozers	2	247	20	8	2031	0.40	0.325	1.703	1.310	0.006	0.064	0.064	568.299	0.029	569.111
		Loader	1	97	20	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		Dump Trucks	10	402	20	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
	Earthwork (reservoir construction)	Scrapers	4	367	100	8	2031	0.48	0.252	0.980	1.172	0.005	0.037	0.037	568.299	0.022	568.926
		Bulldozers	3	247	100	8	2031	0.4	0.325	1.703	1.310	0.006	0.064	0.064	568.299	0.029	569.111
		Loader	1	97	100	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		Grader	1	187	100	8	2031	0.41	0.212	0.638	1.146	0.006	0.022	0.022	568.299	0.019	568.820
		Compactors	2	8	100	8	2031	0.43	0.661	4.142	3.469	0.008	0.161	0.161	568.299	0.059	569.951
		Water Truck	1	402	100	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		Dump Trucks	12	402	100	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
	Structure/Equipment Installation	Excavator	1	158	100	8	2031	0.38	0.210	0.493	3.362	0.006	0.021	0.021	568.299	0.019	568.820
		Backhoe	1	97	100	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		Dump Truck	1	402	100	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	100	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
		Generator	1	84	100	8	2031	0.74	0.174	1.608	3.315	0.006	0.030	0.030	568.299	0.016	568.736
		Power screed	1	172	100	8	2031	0.42	0.159	0.434	3.127	0.006	0.018	0.018	568.299	0.014	568.685
		25-ton crane	1	231	100	8	2031	0.29	0.220	0.691	1.146	0.006	0.022	0.022	568.299	0.020	568.848
	Dust Control	Water Truck	2	402	200	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	40	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		excavator	1	158	40	8	2031	0.38	0.210	0.493	3.362	0.006	0.021	0.021	568.299	0.019	568.820
		water truck	1	402	40	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		dump truck	1	402	40	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	40	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Construction	Bulldozers	2	247	90	8	2031	0.4	0.325	1.703	1.310	0.006	0.064	0.064	568.299	0.029	569.111
		backhoe (with hydraulic hammer)	1	97	90	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		water truck	1	402	90	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		dump trucks	1	402	90	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	2	84	90	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Dust Control	Water Truck	1	402	130	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		excavator	1	158	20	8	2031	0.38	0.210	0.493	3.362	0.006	0.021	0.021	568.299	0.019	568.820
		water truck	1	402	20	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		dump truck	1	402	20	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	2	84	20	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		water truck	1	402	20	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		dump trucks	1	402	20	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	20	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Dust Control	Water Truck	1	402	40	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
Groundwater Management	Site Clearing, Earthwork	excavator	1	158	2	8	2031	0.38	0.210	0.493	3.362	0.006	0.021	0.021	568.299	0.019	568.820
		backhoe	1	97	2	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		dump truck	1	402	2	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	2	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Construction	backhoe (with hydraulic hammer)	1	97	26	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		drill rig	1	221	26	8	2031	0.5	0.127	0.274	1.035	0.006	0.010	0.010	568.299	0.011	568.607
		crane	1	231	26	8	2031	0.29	0.220	0.691	1.146	0.006	0.022	0.022	568.299	0.020	568.848
		Water Truck	1	402	26	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		dump trucks	1	402	26	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	26	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Development	truck	1	402	2	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		pump trailer	1	84	2	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Dust Control	Water Truck	1	402	30	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825

Analysis Year: **2031**

Onsite Equipment Emissions

Measurement and Automation	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		Water Truck	1	402	20	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		dump truck	1	402	20	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	20	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	SCADA Equipment Installation	backhoe	1	97	10	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		Water Truck	1	402	10	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		dump truck	1	402	10	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	10	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Dust Control	Water Truck	1	402	30	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	0	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		excavator	1	158	5	8	2031	0.38	0.210	0.493	3.362	0.006	0.021	0.021	568.299	0.019	568.820
		dump truck	1	402	5	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	0	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
		Bulldozers	1	247	5	8	2031	0.4	0.325	1.703	1.310	0.006	0.064	0.064	568.299	0.029	569.111
	Construction	backhoe (with hydraulic hammer)	1	97	0	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		dump trucks	1	402	5	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		boom lift	1	63	2	8	2031	0.31	0.184	1.619	3.351	0.006	0.032	0.032	568.299	0.016	568.758
		crane	1	231	2	8	2031	0.29	0.220	0.691	1.146	0.006	0.022	0.022	568.299	0.020	568.848
		concrete truck/pumping equipment	1	84	1	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Dust Control	Water Truck	1	402	15	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		excavator	1	158	40	8	2031	0.38	0.210	0.493	3.362	0.006	0.021	0.021	568.299	0.019	568.820
		dump truck	2	402	40	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	5	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
		Bulldozers	1	247	20	8	2031	0.4	0.325	1.703	1.310	0.006	0.064	0.064	568.299	0.029	569.111
	Construction	loader	1	97	10	8	2031	0.37	0.269	1.603	3.705	0.006	0.028	0.028	568.299	0.024	568.965
		dump trucks	2	402	60	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825
		excavator	2	158	60	8	2031	0.38	0.210	0.493	3.362	0.006	0.021	0.021	568.299	0.019	568.820
		concrete truck/pumping equipment	1	84	10	8	2031	0.74	0.188	1.624	3.366	0.006	0.032	0.032	568.299	0.017	568.764
	Dust Control	Water Truck	1	402	260	8	2031	0.38	0.214	0.436	1.104	0.005	0.016	0.016	568.299	0.019	568.825

Assumptions:

1. CO2e were calculated using the following global warming potential (GWP, 100-year GWP from IPCC Fifth Assessment Report , 2014)

CO2 1

CH4 28

N2O 265

2. Load factor and emission factors are from CalEEMod Appendix D: Table 3.4 Offroad Equipment Emission Factors (g/hp-hr) and Table 3.3 OFFROAD Default Horsepower and Load Factors (October 2017)

Analysis Year: **2031**

Onsite Equipment Emissions

Onsite Equipment Emissions

			Daily Emissions							Annual Emissions						
			ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	Projects	**Onsite Equipment**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	1.13	5.93	4.57	0.02	0.22	0.22	1983.36	0.011	0.06	0.05	0.00021	0.002	0.002	17.99
		Grader	0.29	0.86	1.55	0.01	0.03	0.03	769.16	0.003	0.01	0.02	0.00008	0.000	0.000	6.98
		Backhoe	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Loader	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Dump Trucks	1.73	3.52	8.92	0.04	0.13	0.13	4597.55	0.017	0.04	0.09	0.00040	0.001	0.001	41.71
	Earthwork	Bulldozers	1.13	5.93	4.57	0.02	0.22	0.22	1983.36	0.011	0.06	0.05	0.00021	0.002	0.002	17.99
	(topsoil stripping and removal)	Loader	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Dump Trucks	5.78	11.75	29.75	0.13	0.44	0.44	15325.18	0.058	0.12	0.30	0.00135	0.004	0.004	139.03
	Earthwork (reservoir construction)	Scrapers	3.14	12.18	14.56	0.06	0.46	0.46	7070.34	0.157	0.61	0.73	0.00311	0.023	0.023	320.71
		Bulldozers	1.70	8.90	6.85	0.03	0.34	0.34	2975.04	0.085	0.45	0.34	0.00157	0.017	0.017	134.95
		Loader	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.009	0.05	0.12	0.00019	0.001	0.001	16.34
		Grader	0.29	0.86	1.55	0.01	0.03	0.03	769.16	0.014	0.04	0.08	0.00041	0.002	0.002	34.89
		Compactors	0.08	0.50	0.42	0.00	0.02	0.02	69.16	0.004	0.03	0.02	0.00005	0.001	0.001	3.14
		Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.029	0.06	0.15	0.00067	0.002	0.002	69.52
		Dump Trucks	6.93	14.10	35.70	0.16	0.52	0.52	18390.22	0.347	0.70	1.78	0.00808	0.026	0.026	834.18
	Structure/Equipment Installation	Excavator	0.22	0.52	3.56	0.01	0.02	0.02	602.33	0.011	0.03	0.18	0.00032	0.001	0.001	27.32
		Backhoe	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.009	0.05	0.12	0.00019	0.001	0.001	16.34
		Dump Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.029	0.06	0.15	0.00067	0.002	0.002	69.52
		Concrete pump	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.010	0.09	0.18	0.00033	0.002	0.002	28.28
		Generator	0.19	1.76	3.63	0.01	0.03	0.03	623.50	0.010	0.09	0.18	0.00033	0.002	0.002	28.28
		Power screed	0.20	0.55	3.98	0.01	0.02	0.02	724.55	0.010	0.03	0.20	0.00038	0.001	0.001	32.87
		25-ton crane	0.26	0.82	1.35	0.01	0.03	0.03	672.08	0.013	0.04	0.07	0.00035	0.001	0.001	30.49
	Dust Control	Water Truck	1.16	2.35	5.95	0.03	0.09	0.09	3065.04	0.116	0.23	0.59	0.00269	0.009	0.009	278.06

Analysis Year: **2031**

Onsite Equipment Emissions

Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.003	0.02	0.05	0.00008	0.000	0.000	6.53
		excavator	0.22	0.52	3.56	0.01	0.02	0.02	602.33	0.004	0.01	0.07	0.00013	0.000	0.000	10.93
		water truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.012	0.02	0.06	0.00027	0.001	0.001	27.81
		dump truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.012	0.02	0.06	0.00027	0.001	0.001	27.81
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.004	0.04	0.07	0.00013	0.001	0.001	11.31
	Construction	Bulldozers	1.13	5.93	4.57	0.02	0.22	0.22	1983.36	0.051	0.27	0.21	0.00094	0.010	0.010	80.97
		backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.008	0.05	0.11	0.00017	0.001	0.001	14.70
		water truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.026	0.05	0.13	0.00061	0.002	0.002	62.56
		dump trucks	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.026	0.05	0.13	0.00061	0.002	0.002	62.56
		concrete truck/pumping equipment	0.41	3.56	7.38	0.01	0.07	0.07	1247.07	0.019	0.16	0.33	0.00059	0.003	0.003	50.91
	Dust Control	Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.038	0.08	0.19	0.00088	0.003	0.003	90.37
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		excavator	0.22	0.52	3.56	0.01	0.02	0.02	602.33	0.002	0.01	0.04	0.00006	0.000	0.000	5.46
		water truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.41	3.56	7.38	0.01	0.07	0.07	1247.07	0.004	0.04	0.07	0.00013	0.001	0.001	11.31
	Construction	backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		water truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump trucks	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.002	0.02	0.04	0.00007	0.000	0.000	5.66
	Dust Control	Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.012	0.02	0.06	0.00027	0.001	0.001	27.81
Groundwater Management	Site Clearing, Earthwork	excavator	0.22	0.52	3.56	0.01	0.02	0.02	602.33	0.000	0.00	0.00	0.00001	0.000	0.000	0.55
		backhoe	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.000	0.00	0.00	0.00000	0.000	0.000	0.33
		dump truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.001	0.00	0.00	0.00001	0.000	0.000	1.39
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Construction	backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.03	0.00005	0.000	0.000	4.25
		drill rig	0.25	0.53	2.02	0.01	0.02	0.02	1108.13	0.003	0.01	0.03	0.00015	0.000	0.000	13.07
		crane	0.26	0.82	1.35	0.01	0.03	0.03	672.08	0.003	0.01	0.02	0.00009	0.000	0.000	7.93
		Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.008	0.02	0.04	0.00018	0.001	0.001	18.07
		dump trucks	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.008	0.02	0.04	0.00018	0.001	0.001	18.07
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.003	0.02	0.05	0.00009	0.000	0.000	7.35
	Development	truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.001	0.00	0.00	0.00001	0.000	0.000	1.39
		pump trailer	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Dust Control	Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.009	0.02	0.04	0.00020	0.001	0.001	20.85
Measurement and Automation	Construction	backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.002	0.02	0.04	0.00007	0.000	0.000	5.66
	SCADA Equipment Installation	backhoe	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.001	0.01	0.01	0.00002	0.000	0.000	1.63
		Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.003	0.01	0.01	0.00007	0.000	0.000	6.95
		dump truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.003	0.01	0.01	0.00007	0.000	0.000	6.95
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.001	0.01	0.02	0.00003	0.000	0.000	2.83
	Dust Control	Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.009	0.02	0.04	0.00020	0.001	0.001	20.85
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		excavator	0.22	0.52	3.56	0.01	0.02	0.02	602.33	0.001	0.00	0.01	0.00002	0.000	0.000	1.37
		dump truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.001	0.00	0.01	0.00003	0.000	0.000	3.48
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		Bulldozers	0.57	2.97	2.28	0.01	0.11	0.11	991.68	0.001	0.01	0.01	0.00003	0.000	0.000	2.25
	Construction	backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		dump trucks	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.001	0.00	0.01	0.00003	0.000	0.000	3.48
		boom lift	0.06	0.56	1.15	0.00	0.01	0.01	195.91	0.000	0.00	0.00	0.00000	0.000	0.000	0.18
		crane	0.26	0.82	1.35	0.01	0.03	0.03	672.08	0.000	0.00	0.00	0.00001	0.000	0.000	0.61
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
	Dust Control	Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.004	0.01	0.02	0.00010	0.000	0.000	10.43
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		excavator	0.22	0.52	3.56	0.01	0.02	0.02	602.33	0.004	0.01	0.07	0.00013	0.000	0.000	10.93
		dump truck	1.16	2.35	5.95	0.03	0.09	0.09	3065.04	0.023	0.05	0.12	0.00054	0.002	0.002	55.61
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.001	0.00	0.01	0.00002	0.000	0.000	1.41
		Bulldozers	0.57	2.97	2.28	0.01	0.11	0.11	991.68	0.006	0.03	0.02	0.00010	0.001	0.001	9.00
	Construction	loader	0.17	1.01	2.34	0.00	0.02	0.02	360.14	0.001	0.01	0.01	0.00002	0.000	0.000	1.63
		dump trucks	1.16	2.35	5.95	0.03	0.09	0.09	3065.04	0.035	0.07	0.18	0.00081	0.003	0.003	83.42
		excavator	0.44	1.04	7.12	0.01	0.05	0.05	1204.65	0.013	0.03	0.21	0.00038	0.001	0.001	32.79
		concrete truck/pumping equipment	0.21	1.78	3.69	0.01	0.04	0.04	623.53	0.001	0.01	0.02	0.00003	0.000	0.000	2.83
	Dust Control	Water Truck	0.58	1.17	2.97	0.01	0.04	0.04	1532.52	0.075	0.15	0.39	0.00175	0.006	0.006	180.74

Analysis Year: **2031**

Onsite Equipment Emissions

Total Equipment Emissions per Project **2031**

	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	26.44	79.76	148.28	0.60	2.82	2.82	65109.30	0.96	2.86	5.46	0.02	0.10	0.10	2158.37
Canal, Lateral, and Tunnel Improvements	5.20	19.70	38.76	0.12	0.61	0.61	12839.16	0.20	0.77	1.42	0.00	0.02	0.02	446.47
Flow Control	4.07	13.77	34.19	0.10	0.38	0.38	10855.81	0.05	0.15	0.37	0.00	0.00	0.00	112.39
Groundwater Management	4.58	15.11	37.57	0.12	0.43	0.43	12636.02	0.04	0.11	0.26	0.00	0.00	0.00	94.38
Measurement and Automation	3.64	11.46	26.94	0.09	0.32	0.32	9629.95	0.03	0.09	0.22	0.00	0.00	0.00	75.95
Butler Communications Tower project	3.60	13.98	29.35	0.09	0.41	0.41	9026.90	0.01	0.03	0.06	0.00	0.00	0.00	22.06
Dry Creek Plume Replacement Project	4.88	16.00	39.91	0.12	0.50	0.50	12428.60	0.16	0.37	1.05	0.00	0.01	0.01	381.62

Analysis Year: **2031**

Vehicle Emissions

Vehicle Emission Factors (EMFAC2017) 2031

	Year	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		g/mile	g/mile	g/mile	g/mile	g/mile	g/mile	g/mile
Worker Commute	2031	0.004	0.023	0.447	0.002	0.046	0.019	221.072
Haul Trucks, Ready Mix Trucks	2031	0.021	2.225	0.207	0.011	0.123	0.060	1164.655
pickup	2031	0.007	0.034	0.552	0.003	0.046	0.019	254.935

Note:

Vehicle emission factors were obtained from EMFAC2017:

Region: SJVAPCD

Speed and model year: aggregated

Worker commute vehicles include auto and light duty trucks.

Haul trucks and ready mix trucks include heavy heavy-duty diesel trucks.

Vehicle Emissions **2031**

					Daily Emissions							Annual Emissions						
					ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	**Vehicle Types**	**Round Trips/day**	**miles/round trip**	**days/year**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Worker Commute	27	30	260	0.008	0.042	0.798	0.004	0.082	0.033	394.771	0.001	0.005	0.104	0.001	0.011	0.004	46.558
	Haul Truck	42	30	260	0.058	6.180	0.576	0.029	0.341	0.166	3235.154	0.008	0.803	0.075	0.004	0.044	0.022	381.541
	Ready Mix Trucks	1	30	100	0.001	0.147	0.014	0.001	0.008	0.004	77.027	0.000	0.007	0.001	0.000	0.000	0.000	3.494
	pickup	5	30	260	0.002	0.011	0.182	0.001	0.015	0.006	84.304	0.000	0.001	0.024	0.000	0.002	0.001	9.942
Canal, Lateral, and Tunnel Improvements	Worker Commute	10	30	108	0.003	0.015	0.296	0.001	0.030	0.012	146.212	0.000	0.001	0.016	0.000	0.002	0.001	7.163
	Haul Truck	9	30	108	0.012	1.324	0.123	0.006	0.073	0.036	693.247	0.001	0.072	0.007	0.000	0.004	0.002	33.961
	Ready Mix Trucks	3	30	108	0.004	0.441	0.041	0.002	0.024	0.012	231.082	0.000	0.024	0.002	0.000	0.001	0.001	11.320
	pickup	5	30	108	0.002	0.011	0.182	0.001	0.015	0.006	84.304	0.000	0.001	0.010	0.000	0.001	0.000	4.130
Flow Control	Worker Commute	10	30	43	0.003	0.015	0.296	0.001	0.030	0.012	146.212	0.000	0.000	0.006	0.000	0.001	0.000	2.852
	Haul Truck	6	30	43	0.008	0.883	0.082	0.004	0.049	0.024	462.165	0.000	0.019	0.002	0.000	0.001	0.001	9.014
	Ready Mix Trucks	1	30	7	0.001	0.147	0.014	0.001	0.008	0.004	77.027	0.000	0.001	0.000	0.000	0.000	0.000	0.245
	pickup	2	30	43	0.001	0.005	0.073	0.000	0.006	0.002	33.722	0.000	0.000	0.002	0.000	0.000	0.000	0.658
Groundwater Management	Worker Commute	5	30	30	0.001	0.008	0.148	0.001	0.015	0.006	73.106	0.000	0.000	0.002	0.000	0.000	0.000	0.995
	Haul Truck	1	30	30	0.001	0.147	0.014	0.001	0.008	0.004	77.027	0.000	0.002	0.000	0.000	0.000	0.000	1.048
	Ready Mix Trucks	1	30	1	0.001	0.147	0.014	0.001	0.008	0.004	77.027	0.000	0.000	0.000	0.000	0.000	0.000	0.035
	pickup	1	30	30	0.000	0.002	0.036	0.000	0.003	0.001	16.861	0.000	0.000	0.001	0.000	0.000	0.000	0.229
Measurement and Automation	Worker Commute	6	30	30	0.002	0.009	0.177	0.001	0.018	0.007	87.727	0.000	0.000	0.003	0.000	0.000	0.000	1.194
	Haul Truck	1	30	30	0.001	0.147	0.014	0.001	0.008	0.004	77.027	0.000	0.002	0.000	0.000	0.000	0.000	1.048
	Ready Mix Trucks	1	30	1	0.001	0.147	0.014	0.001	0.008	0.004	77.027	0.000	0.000	0.000	0.000	0.000	0.000	0.035
	pickup	1	30	30	0.000	0.002	0.036	0.000	0.003	0.001	16.861	0.000	0.000	0.001	0.000	0.000	0.000	0.229
Butler Communications Tower project	Worker Commute	15	30	15	0.004	0.023	0.443	0.002	0.045	0.018	219.317	0.000	0.000	0.003	0.000	0.000	0.000	1.492
	Haul Truck	2	30	10	0.003	0.294	0.027	0.001	0.016	0.008	154.055	0.000	0.001	0.000	0.000	0.000	0.000	0.699
	Ready Mix Trucks	2	30	1	0.003	0.294	0.027	0.001	0.016	0.008	154.055	0.000	0.000	0.000	0.000	0.000	0.000	0.070
	pickup	2	30	15	0.001	0.005	0.073	0.000	0.006	0.002	33.722	0.000	0.000	0.001	0.000	0.000	0.000	0.229
Dry Creek Flume Replacement Project	Worker Commute	15	30	260	0.004	0.023	0.443	0.002	0.045	0.018	219.317	0.001	0.003	0.058	0.000	0.006	0.002	25.865
	Haul Truck	2	30	260	0.003	0.294	0.027	0.001	0.016	0.008	154.055	0.000	0.038	0.004	0.000	0.002	0.001	18.169
	Ready Mix Trucks	4	30	15	0.006	0.589	0.055	0.003	0.033	0.016	308.110	0.000	0.004	0.000	0.000	0.000	0.000	2.096
	pickup	2	30	260	0.001	0.005	0.073	0.000	0.006	0.002	33.722	0.000	0.001	0.009	0.000	0.001	0.000	3.977

Analysis Year: **2031**

Vehicle Emissions

Total Vehicle Emissions 2031

Projects	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0.07	6.38	1.57	0.03	0.45	0.21	3791.26	0.01	0.82	0.20	0.00	0.06	0.03	441.54
Canal, Lateral, and Tunnel Improvements	0.02	1.79	0.64	0.01	0.14	0.07	1154.85	0.00	0.10	0.03	0.00	0.01	0.00	56.57
Flow Control	0.01	1.05	0.46	0.01	0.09	0.04	719.13	0.00	0.02	0.01	0.00	0.00	0.00	12.77
Groundwater Management	0.00	0.30	0.21	0.00	0.03	0.02	244.02	0.00	0.00	0.00	0.00	0.00	0.00	2.31
Measurement and Automation	0.00	0.31	0.24	0.00	0.04	0.02	258.64	0.00	0.00	0.00	0.00	0.00	0.00	2.51
Butler Communications Tower project	0.01	0.62	0.57	0.01	0.08	0.04	561.15	0.00	0.00	0.00	0.00	0.00	0.00	2.49
Dry Creek Flume Replacement Project	0.01	0.91	0.60	0.01	0.10	0.04	715.20	0.00	0.05	0.07	0.00	0.01	0.00	50.11

VMT on Paved and Unpaved Roads 2031

Onsite Equipment	**Number**	Total VMT/day	Total VMT/year	Unpaved road%	Unpaved VMT/day	Unpaved VMT/Year	Paved VMT/day	Paved VMT/year
Regulating Reservoirs and Infrastructure	Worker Commute	810	210600	5%	40.5	10,530	770	200,070
	Haul Truck	1260	327600	2.5%	31.5	8,190	1,229	319,410
	Ready Mix Truck	30	3000	2.5%	0.75	75	29	2,925
	pickup	150	39000	5%	7.5	1,950	143	37,050
Canal, Lateral, and Tunnel Improvements	Worker Commute	300	32400	5%	15	1,620	285	30,780
	Haul Truck	270	29160	2.5%	6.75	729	263	28,431
	Ready Mix Truck	90	9720	2.5%	2.25	243	88	9,477
	pickup	150	16200	5%	7.5	810	143	15,390
Flow Control	Worker Commute	300	12900	5%	15	645	285	12,255
	Haul Truck	180	7740	2.5%	4.5	194	176	7,547
	Ready Mix Truck	30	210	2.5%	0.75	5	29	205
	pickup	60	2580	5%	3	129	57	2,451
Groundwater Management	Worker Commute	150	4500	5%	7.5	225	143	4,275
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Measurement and Automation	Worker Commute	180	5400	5%	9	270	171	5,130
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Butler Communications Tower project	Worker Commute	450	6750	5%	22.5	338	428	6,413
	Haul Truck	60	600	2.5%	1.5	15	59	585
	Ready Mix Truck	60	60	2.5%	1.5	2	59	59
	pickup	60	900	5%	3	45	57	855
Dry Creek Flume Replacement Project	Worker Commute	450	117000	5%	22.5	5,850	428	111,150
	Haul Truck	60	15600	2.5%	1.5	390	59	15,210
	Ready Mix Truck	120	1800	2.5%	3	45	117	1,755
	pickup	60	15600	5%	3	780	57	14,820

Analysis Year **2031**
Fugitive Dust Emissions Northern Commute Scenario

A) Bulldozing - Demolition
Fugitive dust emissions from bulldozing **2031**

Activity	Number of Equipment	Maximum daily hours	Days	Emission Factor		Daily Emissions		Annual Emissions	
				PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
				lb/hr	lb/hr	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	7	10	140	0.753	0.414	52.69	28.96	3.69	2.03
Canal, Lateral, and Tunnel Improvements	2	10	90	0.753	0.414	15.06	8.28	0.68	0.37
Flow Control	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Groundwater Management	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Measurement and Automation	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Butler Communications Tower project	1	10	5	0.753	0.414	7.53	4.14	0.02	0.01
Dry Creek Flume Replacement Project	1	10	20	0.753	0.414	7.53	4.14	0.08	0.04

Note:
PM emissions were calculated using the following equation and parameters (CalEEMod Appendix A):
Emission Factor (lb/hr)= k x $(s)^{1.5}$ / $(M)^{1.4}$ For PM10 and k x 5.7 x $(s)^{1.2}$ / $(M)^{1.3}$ for PM2.5
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 6.9% - CalEEMod default for overburden)
M = Moisture Content = 7.9% (CalEEMod default)

B) Grading
Fugitive dust emissions from grading **2031**

Activity		Number of Grading Equipment	# acres/equipment	Acreage Graded/Day	Number of Days/Year	Grader/Scaper VMT		Emission Factors		Daily Emissions		Annual Emissions	
								PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
				acres		miles/day	miles/year	lb/VMT	lb/VMT	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	Grader	2	0.5	1	120	0.69	82.50	1.54	0.167	1.06	0.11	0.06	0.01
	Scaper	4	1	4	100	2.75	275.00	1.54	0.167	4.24	0.46	0.21	0.02
Canal, Lateral, and Tunnel Improvements	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Flow Control	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Groundwater Management	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Measurement and Automation	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Butler Communications Tower project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00

Analysis Year **2031**

Fugitive Dust Emissions Northern Commute Scenario

Grading Emission Summary

	Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	5.30	0.57	0.28	0.03
Canal, Lateral, and Tunnel Improvements	0.00	0.00	0.00	0.00
Flow Control	0.00	0.00	0.00	0.00
Groundwater Management	0.00	0.00	0.00	0.00
Measurement and Automation	0.00	0.00	0.00	0.00
Butler Communications Tower project	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0.00	0.00	0.00	0.00

Note:

PM emissions were calculated using the following equation and parameters:

Emission factor (lb/VMT) = k x 0.051 x $(S)^{2.0}$ for PM10 and k x 0.040 x $(S)^{2.5}$ for PM2.5

k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)

S = Mean Vehicle Speed, CalEEMod default = 7.1 miles/hour

VMT = As / Wb X 43,560 (sqft/acre) /5280 (ft/mile)

VMT: vehicle miles traveled

As: the acreage of the grading site (0.5 acres per grader, 1 acre for scapter, CalEEMod defaults)

Wb: blade width of the grader. CalEEMod default Wb = 12 ft.

Analysis Year **2031**
Fugitive Dust Emissions Northern Commute Scenario

C). Earth Material Loading/Handling
Dust from demolition and soil loading **2031**

Projects	Total Amount Handled	Material Amount		Material Amount		Emission Factors		Daily Emissions		Annual Emissions	
						PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	cy	cy/day	cy/year	ton/day	ton/year	lb/ton	lb/ton	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	280,000	1060.6	280,000	1340.8	353966.5	0.00012	0.000018	0.16	0.024	0.0206	0.0031
Canal, Lateral, and Tunnel Improvements	9,684	88.0	9,684	111.3	12242.2	0.00012	0.000018	0.01	0.002	0.0007	0.0001
Flow Control	2,677	60.8	2,677	76.9	3384.2	0.00012	0.000018	0.01	0.001	0.0002	0.0000
Groundwater Management	9	0.2	9	0.3	11.4	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Measurement and Automation	4	0.2	4	0.2	5.1	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Butler Communications Tower project	50	1.1	50	1.4	63.2	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Dry Creek Flume Replacement Project	2,575	9.8	2,575	12.3	3255.2	0.00012	0.000018	0.00	0.000	0.0002	0.0000

Note:
Fugitive dust from materials unloading from trains and/or trucks are calculated using the following equations and parameters:
Emission factor (lb/ton) = $(k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
U = average wind speed = 2.7 m/s (6.04 mph) for SJVAPCD (CalEEMOd default)
M = moisture content = 12% (CalEEMod Default)
Material density (CalEEMod default) 1.264 ton/CY

C) Vehicle Fugitive Dust Emissions on Paved Roads
Emission factor (g/VMT) = k X (sL)^0.91 X W^1.02

		PM10	**PM2.5**
k		1.0	0.25
sL	g/m2	0.10	0.10
W	tons	2.4	2.4
EF	(g/VMT)	0.300	0.075

Equation from: AP-42 13.2.1
sL and W (silt loading and vehicle weight) are CalEEMod default values

Projects	Maximum Daily Emissions			Annual Emissions		
	Trip miles	PM10	PM2.5	Trip miles	PM10	PM2.5
	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	2,170	1.44	0.36	559,455	0.185	0.046
Canal, Lateral, and Tunnel Improvements	779	0.52	0.13	84,078	0.028	0.007
Flow Control	547	0.36	0.09	22,457	0.007	0.002
Groundwater Management	230	0.15	0.04	6,037	0.002	0.000
Measurement and Automation	258	0.17	0.04	6,892	0.002	0.001
Butler Communications Tower project	602	0.40	0.10	7,911	0.003	0.001
Dry Creek Flume Replacement Project	660	0.44	0.11	142,935	0.047	0.012

Analysis Year **2031**
Fugitive Dust Emissions Northern Commute Scenario

D) Vehicle Fugitive Dust Emissions on Unpaved Roads

Uncontrolled Emission Factors and Emissions

	Emission Factors (lb/VMT)	
	PM10	PM2.5
Unpaved Road (uncontrolled)	0.87	0.09
Unpaved Road (with watering unpaved road twice a day)	0.45	0.04

Emission factor (lb/VMT) = $(k)[(s/12)^{0.9}][(W/3)^{0.45}]*(1-P/365)$ (EPA AP-42, 13.2.2, for industrial sites)
k = constant (lb/VMT) = 1.5 lb/VMT for PM10 and 0.15 lb/VMT for PM2.5
s = Silt Content (8.5%, construction sites, AP-42, Table 13.2.2.1)
W = avg. vehicle weight (tons) = 2.4 ton
P = number of days in a year with at least 0.1 inch of precipitation, 46 days for Stanislaus County (CalEEMod)
Control efficiency of watering the unpaved road twice a day 55% (data from SCAQMD CEQA Handbook, TABLE XI-D, MITIGATION MEASURE EXAMPLES: FUGITIVE DUST FROM UNPAVED ROADs, 2007)

Emissions from Unpaved Roads

	Maximum Daily Emissions			Annual Emissions		
	Total Trip miles	PM10	PM2.5	Total Trip miles	PM10	PM2.5
Projects	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	80	35.92	3.59	20,745	4.643	0.464
Canal, Lateral, and Tunnel Improvements	32	14.10	1.41	3,402	0.761	0.076
Flow Control	23	10.41	1.04	973	0.218	0.022
Groundwater Management	11	4.70	0.47	293	0.066	0.007
Measurement and Automation	12	5.37	0.54	338	0.076	0.008
Butler Communications Tower project	29	12.76	1.28	399	0.089	0.009
Dry Creek Flume Replacement Project	30	13.43	1.34	7,065	1.581	0.158

Summary of Fugitive Dust Emissions

	Maximum Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
Projects	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	95.51	33.51	8.81	2.57
Canal, Lateral, and Tunnel Improvements	29.68	9.82	1.47	0.46
Flow Control	10.78	1.13	0.23	0.02
Groundwater Management	4.85	0.51	0.07	0.01
Measurement and Automation	5.54	0.58	0.08	0.01
Butler Communications Tower project	20.68	5.51	0.11	0.02
Dry Creek Flume Replacement Project	21.39	5.59	1.70	0.21

Analysis Year: **2033**

Construction Emissions Summary

Total Emissions Summary (by Project) **2033** (Emissions from Construction of Each Individual Project if Constructed)

Onsite Equipment	**Number**	Maximum Daily Emissions							Annual Emissions						
		ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	equipment	25.707	70.552	147.695	0.596	2.461	2.461	65107.124	0.930	2.531	5.433	0.022	0.088	0.088	2158.298
	vehicles	0.067	6.313	1.512	0.034	0.445	0.209	3661.790	0.009	0.809	0.195	0.004	0.057	0.027	426.456
	dust	NA	NA	NA	NA	95.511	33.512	NA	NA	NA	NA	NA	8.813	2.571	NA
	Sub Total	**25.774**	**76.865**	**149.207**	**0.630**	**98.417**	**36.181**	**68768.914**	**0.939**	**3.340**	**5.629**	**0.026**	**8.959**	**2.686**	**2584.754**
Canal, Lateral, and Tunnel Improvements	equipment	5.049	17.864	38.671	0.122	0.520	0.520	12838.705	0.196	0.694	1.411	0.005	0.021	0.021	446.450
	vehicles	0.021	1.772	0.612	0.010	0.143	0.066	1115.007	0.001	0.096	0.033	0.001	0.008	0.004	54.623
	dust	NA	NA	NA	NA	29.684	9.816	NA	NA	NA	NA	NA	1.467	0.456	NA
	Sub Total	**5.069**	**19.636**	**39.283**	**0.132**	**30.346**	**10.402**	**13953.712**	**0.197**	**0.789**	**1.444**	**0.005**	**1.496**	**0.480**	**501.073**
Flow control	equipment	3.984	12.800	34.189	0.101	0.327	0.327	10855.543	0.046	0.139	0.372	0.001	0.004	0.004	112.384
	vehicles	0.013	1.038	0.443	0.006	0.093	0.042	694.355	0.000	0.020	0.009	0.000	0.002	0.001	12.328
	dust	NA	NA	NA	NA	10.778	1.133	NA	NA	NA	NA	NA	0.225	0.024	NA
	Sub Total	**3.996**	**13.838**	**34.632**	**0.107**	**11.198**	**1.502**	**11549.898**	**0.046**	**0.158**	**0.381**	**0.001**	**0.231**	**0.028**	**124.712**
Groundwater Management	equipment	4.480	14.013	37.559	0.120	0.369	0.369	12635.732	0.036	0.101	0.263	0.001	0.003	0.003	94.382
	vehicles	0.004	0.300	0.201	0.002	0.034	0.015	235.548	0.000	0.002	0.003	0.000	0.000	0.000	2.226
	dust	NA	NA	NA	NA	4.852	0.508	NA	NA	NA	NA	NA	0.068	0.007	NA
	Sub Total	**4.484**	**14.314**	**37.760**	**0.122**	**5.256**	**0.893**	**12871.280**	**0.036**	**0.103**	**0.266**	**0.001**	**0.071**	**0.010**	**96.608**
Masurement and automation	equipment	3.572	10.650	26.942	0.088	0.281	0.281	9629.731	0.031	0.088	0.224	0.001	0.002	0.002	75.948
	vehicles	0.005	0.302	0.229	0.002	0.037	0.016	249.653	0.000	0.002	0.003	0.000	0.000	0.000	2.418
	dust	NA	NA	NA	NA	5.542	0.580	NA	NA	NA	NA	NA	0.078	0.008	NA
	Sub Total	**3.576**	**10.952**	**27.171**	**0.090**	**5.861**	**0.877**	**9879.384**	**0.031**	**0.090**	**0.228**	**0.001**	**0.081**	**0.011**	**78.366**
Butler communicaitaons Tower Project	equipment	3.492	12.737	29.297	0.087	0.349	0.349	9026.590	0.009	0.023	0.056	0.000	0.001	0.001	22.064
	vehicles	0.010	0.608	0.541	0.005	0.084	0.037	541.621	0.000	0.002	0.004	0.000	0.000	0.000	2.402
	dust	NA	NA	NA	NA	20.683	5.513	NA	NA	NA	NA	NA	0.111	0.020	NA
	Sub Total	**3.501**	**13.344**	**29.838**	**0.092**	**21.116**	**5.899**	**9568.212**	**0.009**	**0.025**	**0.060**	**0.000**	**0.112**	**0.021**	**24.466**
Dry Creek Flume Replacement Project	equipment	4.750	14.544	39.865	0.118	0.435	0.435	12428.222	0.157	0.332	1.055	0.004	0.012	0.012	381.614
	vehicles	0.012	0.899	0.569	0.006	0.100	0.044	690.460	0.001	0.045	0.067	0.001	0.009	0.004	48.349
	dust	NA	NA	NA	NA	21.395	5.590	NA	NA	NA	NA	NA	1.704	0.211	NA
	Sub Total	**4.763**	**15.444**	**40.434**	**0.124**	**21.930**	**6.070**	**13118.682**	**0.158**	**0.378**	**1.122**	**0.004**	**1.725**	**0.227**	**429.963**

Note: Emissions presented in this table are potential emissions if a project is constructed in the analysis year. Emissions may or may not occur in this year depending on the program schedule.

Analysis Year: **2033**

Construction Emissions Summary

Total Emissions of Potential Overlapping Projects **2033**

		Emissions/year Per Project							Total Emissions with Multiple Projects						
	Number of Projects	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0	0.94	3.34	5.63	0.03	8.96	2.69	2584.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Canal, Lateral, and Tunnel Improvements	1	0.20	0.79	1.44	0.01	1.50	0.48	501.07	0.20	0.79	1.44	0.01	1.50	0.48	501.07
Flow Control	1	0.05	0.16	0.38	0.00	0.23	0.03	124.71	0.05	0.16	0.38	0.00	0.23	0.03	124.71
Groundwater Management	0	0.04	0.10	0.27	0.00	0.07	0.01	96.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Measurement and Automation	2	0.03	0.09	0.23	0.00	0.08	0.01	78.37	0.06	0.18	0.46	0.00	0.16	0.02	156.73
Butler Communications Tower project	0	0.01	0.02	0.06	0.00	0.11	0.02	24.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	1	0.16	0.38	1.12	0.00	1.73	0.23	429.96	0.16	0.38	1.12	0.00	1.73	0.23	429.96
Total Emissions of Potential Overlapping Projects in Analysis Year									**0.46**	**1.51**	**3.40**	**0.01**	**3.61**	**0.76**	**1212.48**
SJVAPCD CEQA Thresholds									**10**	**10**	**100**	**27**	**15**	**15**	**NA**

Analysis Year: **2033**

Onsite Equipment Emissions

Onsite Equipment Information and Emission Factors **2033**

	Projects	Operation Data							CalEEMod Emission Factors (100% load)								
		Equipment	Number	HP per equipment	Days/Year per equipment	Hour/day per equipment	Emission Factor Year	CalEEMod Default Load Factor	ROG g/hp-hr	NOx g/hp-hr	CO g/hp-hr	SO_2 g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO_2 g/hp-hr	CH_4 g/hp-hr	CO_2e g/hp-hr
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	2	247	20	8	2033	0.40	0.306	1.453	1.286	0.006	0.055	0.055	568.299	0.027	569.055
		Grader	1	187	20	8	2033	0.41	0.204	0.545	1.141	0.006	0.019	0.019	568.299	0.018	568.797
		Backhoe	1	97	20	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		Loader	1	97	20	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		Dump Trucks	3	402	20	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
	Earthwork (topsoil stripping and removal)	Bulldozers	2	247	20	8	2033	0.40	0.306	1.453	1.286	0.006	0.055	0.055	568.299	0.027	569.055
		Loader	1	97	20	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		Dump Trucks	10	402	20	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
	Earthwork (reservoir construction)	Scrapers	4	367	100	8	2033	0.48	0.239	0.827	1.147	0.005	0.031	0.031	568.300	0.021	568.893
		Bulldozers	3	247	100	8	2033	0.4	0.306	1.453	1.286	0.006	0.055	0.055	568.299	0.027	569.055
		Loader	1	97	100	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		Grader	1	187	100	8	2033	0.41	0.204	0.545	1.141	0.006	0.019	0.019	568.299	0.018	568.797
		Compactors	2	8	100	8	2033	0.43	0.661	4.142	3.470	0.008	0.161	0.161	568.299	0.059	569.951
		Water Truck	1	402	100	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		Dump Trucks	12	402	100	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
	Structure/Equipment Installation	Excavator	1	158	100	8	2033	0.38	0.203	0.429	3.363	0.006	0.018	0.018	568.299	0.018	568.797
		Backhoe	1	97	100	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		Dump Truck	1	402	100	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	100	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
		Generator	1	84	100	8	2033	0.74	0.165	1.533	3.312	0.006	0.023	0.023	568.299	0.015	568.713
		Power screed	1	172	100	8	2033	0.42	0.154	0.384	3.128	0.006	0.015	0.015	568.299	0.013	568.674
		25-ton crane	1	231	100	8	2033	0.29	0.211	0.577	1.145	0.006	0.019	0.019	568.299	0.019	568.825
	Dust Control	Water Truck	2	402	200	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	40	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		excavator	1	158	40	8	2033	0.38	0.203	0.429	3.363	0.006	0.018	0.018	568.299	0.018	568.797
		water truck	1	402	40	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		dump truck	1	402	40	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	40	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Construction	Bulldozers	2	247	90	8	2033	0.4	0.306	1.453	1.286	0.006	0.055	0.055	568.299	0.027	569.055
		backhoe (with hydraulic hammer)	1	97	90	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		water truck	1	402	90	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		dump trucks	1	402	90	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	2	84	90	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Dust Control	Water Truck	1	402	130	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		excavator	1	158	20	8	2033	0.38	0.203	0.429	3.363	0.006	0.018	0.018	568.299	0.018	568.797
		water truck	1	402	20	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		dump truck	1	402	20	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	2	84	20	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		water truck	1	402	20	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		dump trucks	1	402	20	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	20	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Dust Control	Water Truck	1	402	40	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
Groundwater Management	Site Clearing, Earthwork	excavator	1	158	2	8	2033	0.38	0.203	0.429	3.363	0.006	0.018	0.018	568.299	0.018	568.797
		backhoe	1	97	2	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		dump truck	1	402	2	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	2	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Construction	backhoe (with hydraulic hammer)	1	97	26	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		drill rig	1	221	26	8	2033	0.5	0.126	0.273	1.035	0.006	0.010	0.010	568.299	0.011	568.607
		crane	1	231	26	8	2033	0.29	0.211	0.577	1.145	0.006	0.019	0.019	568.299	0.019	568.825
		Water Truck	1	402	26	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		dump trucks	1	402	26	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	26	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Development	truck	1	402	2	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		pump trailer	1	84	2	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Dust Control	Water Truck	1	402	30	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814

Analysis Year: **2033**

Onsite Equipment Emissions

Measurement and Automation	Construction	backhoe (with hydraulic hammer)	1	97	20	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		Water Truck	1	402	20	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		dump truck	1	402	20	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	20	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	SCADA Equipment Installation	backhoe	1	97	10	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		Water Truck	1	402	10	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		dump truck	1	402	10	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	10	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Dust Control	Water Truck	1	402	30	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	0	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		excavator	1	158	5	8	2033	0.38	0.203	0.429	3.363	0.006	0.018	0.018	568.299	0.018	568.797
		dump truck	1	402	5	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	0	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
		Bulldozers	1	247	5	8	2033	0.4	0.306	1.453	1.286	0.006	0.055	0.055	568.299	0.027	569.055
	Construction	backhoe (with hydraulic hammer)	1	97	0	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		dump trucks	1	402	5	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		boom lift	1	63	2	8	2033	0.31	0.175	1.542	3.348	0.006	0.025	0.025	568.299	0.015	568.725
		crane	1	231	2	8	2033	0.29	0.211	0.577	1.145	0.006	0.019	0.019	568.299	0.019	568.825
		concrete truck/pumping equipment	1	84	1	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Dust Control	Water Truck	1	402	15	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	1	97	20	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		excavator	1	158	40	8	2033	0.38	0.203	0.429	3.363	0.006	0.018	0.018	568.299	0.018	568.797
		dump truck	2	402	40	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		concrete truck/pumping equipment	1	84	5	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
		Bulldozers	1	247	20	8	2033	0.4	0.306	1.453	1.286	0.006	0.055	0.055	568.299	0.027	569.055
	Construction	loader	1	97	10	8	2033	0.37	0.264	1.562	3.704	0.006	0.024	0.024	568.299	0.023	568.954
		dump trucks	2	402	60	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814
		excavator	2	158	60	8	2033	0.38	0.203	0.429	3.363	0.006	0.018	0.018	568.299	0.018	568.797
		concrete truck/pumping equipment	1	84	10	8	2033	0.74	0.179	1.547	3.363	0.006	0.025	0.025	568.299	0.016	568.741
	Dust Control	Water Truck	1	402	260	8	2033	0.38	0.211	0.392	1.105	0.005	0.015	0.015	568.299	0.018	568.814

Assumptions:

1. CO2e were calculated using the following global warming potential (GWP, 100-year GWP from IPCC Fifth Assessment Report , 2014)

CO2 1

CH4 28

N2O 265

2. Load factor and emission factors are from CalEEMod Appendix D: Table 3.4 Offroad Equipment Emission Factors (g/hp-hr) and Table 3.3 OFFROAD Default Horsepower and Load Factors (October 2017)

Analysis Year: **2033**

Onsite Equipment Emissions

Onsite Equipment Emissions

			Daily Emissions							Annual Emissions						
			ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	Projects	**Onsite Equipment**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Site Clearing	Bulldozers with brush attachments	1.07	5.06	4.48	0.02	0.19	0.19	1983.16	0.011	0.05	0.04	0.00021	0.002	0.002	17.99
		Grader	0.28	0.74	1.54	0.01	0.03	0.03	769.13	0.003	0.01	0.02	0.00008	0.000	0.000	6.98
		Backhoe	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Loader	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Dump Trucks	1.71	3.17	8.93	0.04	0.12	0.12	4597.46	0.017	0.03	0.09	0.00040	0.001	0.001	41.71
	Earthwork	Bulldozers	1.07	5.06	4.48	0.02	0.19	0.19	1983.16	0.011	0.05	0.04	0.00021	0.002	0.002	17.99
	(topsoil stripping and removal)	Loader	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Dump Trucks	5.69	10.56	29.76	0.13	0.39	0.39	15324.88	0.057	0.11	0.30	0.00135	0.004	0.004	139.03
	Earthwork (reservoir construction)	Scrapers	2.97	10.28	14.26	0.06	0.39	0.39	7069.93	0.149	0.51	0.71	0.00311	0.019	0.019	320.69
		Bulldozers	1.60	7.60	6.72	0.03	0.29	0.29	2974.74	0.080	0.38	0.34	0.00157	0.014	0.014	134.93
		Loader	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.008	0.05	0.12	0.00019	0.001	0.001	16.34
		Grader	0.28	0.74	1.54	0.01	0.03	0.03	769.13	0.014	0.04	0.08	0.00041	0.001	0.001	34.89
		Compactors	0.08	0.50	0.42	0.00	0.02	0.02	69.16	0.004	0.03	0.02	0.00005	0.001	0.001	3.14
		Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.028	0.05	0.15	0.00067	0.002	0.002	69.51
		Dump Trucks	6.83	12.67	35.71	0.16	0.47	0.47	18389.85	0.341	0.63	1.79	0.00808	0.024	0.024	834.16
	Structure/Equipment Installation	Excavator	0.22	0.45	3.56	0.01	0.02	0.02	602.30	0.011	0.02	0.18	0.00032	0.001	0.001	27.32
		Backhoe	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.008	0.05	0.12	0.00019	0.001	0.001	16.34
		Dump Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.028	0.05	0.15	0.00067	0.002	0.002	69.51
		Concrete pump	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.010	0.08	0.18	0.00033	0.001	0.001	28.28
		Generator	0.18	1.68	3.63	0.01	0.03	0.03	623.48	0.009	0.08	0.18	0.00033	0.001	0.001	28.28
		Power screed	0.20	0.49	3.98	0.01	0.02	0.02	724.53	0.010	0.02	0.20	0.00038	0.001	0.001	32.86
		25-ton crane	0.25	0.68	1.35	0.01	0.02	0.02	672.06	0.012	0.03	0.07	0.00035	0.001	0.001	30.48
	Dust Control	Water Truck	1.14	2.11	5.95	0.03	0.08	0.08	3064.98	0.114	0.21	0.60	0.00269	0.008	0.008	278.05

Analysis Year: **2033**

Onsite Equipment Emissions

Canal, Lateral, and Tunnel Improvements	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.003	0.02	0.05	0.00008	0.000	0.000	6.53
		excavator	0.22	0.45	3.56	0.01	0.02	0.02	602.30	0.004	0.01	0.07	0.00013	0.000	0.000	10.93
		water truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.011	0.02	0.06	0.00027	0.001	0.001	27.81
		dump truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.011	0.02	0.06	0.00027	0.001	0.001	27.81
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.004	0.03	0.07	0.00013	0.001	0.001	11.31
	Construction	Bulldozers	1.07	5.06	4.48	0.02	0.19	0.19	1983.16	0.048	0.23	0.20	0.00094	0.009	0.009	80.96
		backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.008	0.04	0.11	0.00017	0.001	0.001	14.70
		water truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.026	0.05	0.13	0.00061	0.002	0.002	62.56
		dump trucks	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.026	0.05	0.13	0.00061	0.002	0.002	62.56
		concrete truck/pumping equipment	0.39	3.39	7.37	0.01	0.05	0.05	1247.02	0.018	0.15	0.33	0.00059	0.002	0.002	50.91
	Dust Control	Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.037	0.07	0.19	0.00088	0.003	0.003	90.37
Flow Control	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		excavator	0.22	0.45	3.56	0.01	0.02	0.02	602.30	0.002	0.00	0.04	0.00006	0.000	0.000	5.46
		water truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.39	3.39	7.37	0.01	0.05	0.05	1247.02	0.004	0.03	0.07	0.00013	0.001	0.001	11.31
	Construction	backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		water truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump trucks	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.002	0.02	0.04	0.00007	0.000	0.000	5.66
	Dust Control	Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.011	0.02	0.06	0.00027	0.001	0.001	27.81
Groundwater Management	Site Clearing, Earthwork	excavator	0.22	0.45	3.56	0.01	0.02	0.02	602.30	0.000	0.00	0.00	0.00001	0.000	0.000	0.55
		backhoe	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.000	0.00	0.00	0.00000	0.000	0.000	0.33
		dump truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.001	0.00	0.00	0.00001	0.000	0.000	1.39
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Construction	backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.03	0.00005	0.000	0.000	4.25
		drill rig	0.25	0.53	2.02	0.01	0.02	0.02	1108.13	0.003	0.01	0.03	0.00015	0.000	0.000	13.07
		crane	0.25	0.68	1.35	0.01	0.02	0.02	672.06	0.003	0.01	0.02	0.00009	0.000	0.000	7.93
		Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.007	0.01	0.04	0.00018	0.001	0.001	18.07
		dump trucks	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.007	0.01	0.04	0.00018	0.001	0.001	18.07
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.003	0.02	0.05	0.00009	0.000	0.000	7.35
	Development	truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.001	0.00	0.00	0.00001	0.000	0.000	1.39
		pump trailer	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.000	0.00	0.00	0.00001	0.000	0.000	0.57
	Dust Control	Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.009	0.02	0.04	0.00020	0.001	0.001	20.85
Measurement and Automation	Construction	backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		dump truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.006	0.01	0.03	0.00013	0.000	0.000	13.90
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.002	0.02	0.04	0.00007	0.000	0.000	5.66
	SCADA Equipment Installation	backhoe	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.001	0.00	0.01	0.00002	0.000	0.000	1.63
		Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.003	0.01	0.01	0.00007	0.000	0.000	6.95
		dump truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.003	0.01	0.01	0.00007	0.000	0.000	6.95
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.001	0.01	0.02	0.00003	0.000	0.000	2.83
	Dust Control	Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.009	0.02	0.04	0.00020	0.001	0.001	20.85
Butler Communications Tower project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		excavator	0.22	0.45	3.56	0.01	0.02	0.02	602.30	0.001	0.00	0.01	0.00002	0.000	0.000	1.37
		dump truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.001	0.00	0.01	0.00003	0.000	0.000	3.48
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		Bulldozers	0.53	2.53	2.24	0.01	0.10	0.10	991.58	0.001	0.01	0.01	0.00003	0.000	0.000	2.25
	Construction	backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.000	0.00	0.00	0.00000	0.000	0.000	0.00
		dump trucks	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.001	0.00	0.01	0.00003	0.000	0.000	3.48
		boom lift	0.06	0.53	1.15	0.00	0.01	0.01	195.89	0.000	0.00	0.00	0.00000	0.000	0.000	0.18
		crane	0.25	0.68	1.35	0.01	0.02	0.02	672.06	0.000	0.00	0.00	0.00001	0.000	0.000	0.61
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.000	0.00	0.00	0.00000	0.000	0.000	0.28
	Dust Control	Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.004	0.01	0.02	0.00010	0.000	0.000	10.43
Dry Creek Flume Replacement project	Demolition or modification of existing facilities	backhoe (with hydraulic hammer)	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.002	0.01	0.02	0.00004	0.000	0.000	3.27
		excavator	0.22	0.45	3.56	0.01	0.02	0.02	602.30	0.004	0.01	0.07	0.00013	0.000	0.000	10.93
		dump truck	1.14	2.11	5.95	0.03	0.08	0.08	3064.98	0.023	0.04	0.12	0.00054	0.002	0.002	55.61
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.000	0.00	0.01	0.00002	0.000	0.000	1.41
		Bulldozers	0.53	2.53	2.24	0.01	0.10	0.10	991.58	0.005	0.03	0.02	0.00010	0.001	0.001	9.00
	Construction	loader	0.17	0.99	2.34	0.00	0.02	0.02	360.14	0.001	0.00	0.01	0.00002	0.000	0.000	1.63
		dump trucks	1.14	2.11	5.95	0.03	0.08	0.08	3064.98	0.034	0.06	0.18	0.00081	0.002	0.002	83.42
		excavator	0.43	0.91	7.12	0.01	0.04	0.04	1204.61	0.013	0.03	0.21	0.00038	0.001	0.001	32.78
		concrete truck/pumping equipment	0.20	1.70	3.69	0.01	0.03	0.03	623.51	0.001	0.01	0.02	0.00003	0.000	0.000	2.83
	Dust Control	Water Truck	0.57	1.06	2.98	0.01	0.04	0.04	1532.49	0.074	0.14	0.39	0.00175	0.005	0.005	180.74

Analysis Year: **2033**

Onsite Equipment Emissions

Total Equipment Emissions per Project **2033**

	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	25.71	70.55	147.69	0.60	2.46	2.46	65107.12	0.93	2.53	5.43	0.02	0.09	0.09	2158.30
Canal, Lateral, and Tunnel Improvements	5.05	17.86	38.67	0.12	0.52	0.52	12838.71	0.20	0.69	1.41	0.00	0.02	0.02	446.45
Flow Control	3.98	12.80	34.19	0.10	0.33	0.33	10855.54	0.05	0.14	0.37	0.00	0.00	0.00	112.38
Groundwater Management	4.48	14.01	37.56	0.12	0.37	0.37	12635.73	0.04	0.10	0.26	0.00	0.00	0.00	94.38
Measurement and Automation	3.57	10.65	26.94	0.09	0.28	0.28	9629.73	0.03	0.09	0.22	0.00	0.00	0.00	75.95
Butler Communications Tower project	3.49	12.74	29.30	0.09	0.35	0.35	9026.59	0.01	0.02	0.06	0.00	0.00	0.00	22.06
Dry Creek Plume Replacement Project	4.75	14.54	39.86	0.12	0.43	0.43	12428.22	0.16	0.33	1.05	0.00	0.01	0.01	381.61

Analysis Year: **2033**

Vehicle Emissions

Vehicle Emission Factors (EMFAC2017) 2033

	Year	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
		g/mile	g/mile	g/mile	g/mile	g/mile	g/mile	g/mile
Worker Commute	2033	0.004	0.021	0.423	0.002	0.046	0.019	213.266
Haul Trucks, Ready Mix Trucks	2033	0.021	2.203	0.207	0.010	0.123	0.060	1125.220
pickup	2033	0.005	0.029	0.508	0.002	0.046	0.019	244.721

Note:

Vehicle emission factors were obtained from EMFAC2017:

Region: SJVAPCD

Speed and model year: aggregated

Worker commute vehicles include auto and light duty trucks.

Haul trucks and ready mix trucks include heavy heavy-duty diesel trucks.

Vehicle Emissions **2033**

					Daily Emissions							Annual Emissions						
					ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Projects	**Vehicle Types**	**Round Trips/day**	**miles/round trip**	**days/year**	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	Worker Commute	27	30	260	0.006	0.038	0.755	0.004	0.081	0.033	380.832	0.001	0.005	0.098	0.000	0.011	0.004	44.914
	Haul Truck	42	30	260	0.058	6.120	0.576	0.028	0.341	0.165	3125.612	0.008	0.796	0.075	0.004	0.044	0.022	368.622
	Ready Mix Trucks	1	30	100	0.001	0.146	0.014	0.001	0.008	0.004	74.419	0.000	0.007	0.001	0.000	0.000	0.000	3.376
	pickup	5	30	260	0.002	0.010	0.168	0.001	0.015	0.006	80.926	0.000	0.001	0.022	0.000	0.002	0.001	9.544
Canal, Lateral, and Tunnel Improvements	Worker Commute	10	30	108	0.002	0.014	0.280	0.001	0.030	0.012	141.049	0.000	0.001	0.015	0.000	0.002	0.001	6.910
	Haul Truck	9	30	108	0.012	1.311	0.123	0.006	0.073	0.035	669.774	0.001	0.071	0.007	0.000	0.004	0.002	32.811
	Ready Mix Trucks	3	30	108	0.004	0.437	0.041	0.002	0.024	0.012	223.258	0.000	0.024	0.002	0.000	0.001	0.001	10.937
	pickup	5	30	108	0.002	0.010	0.168	0.001	0.015	0.006	80.926	0.000	0.001	0.009	0.000	0.001	0.000	3.964
Flow Control	Worker Commute	10	30	43	0.002	0.014	0.280	0.001	0.030	0.012	141.049	0.000	0.000	0.006	0.000	0.001	0.000	2.751
	Haul Truck	6	30	43	0.008	0.874	0.082	0.004	0.049	0.024	446.516	0.000	0.019	0.002	0.000	0.001	0.001	8.709
	Ready Mix Trucks	1	30	7	0.001	0.146	0.014	0.001	0.008	0.004	74.419	0.000	0.001	0.000	0.000	0.000	0.000	0.236
	pickup	2	30	43	0.001	0.004	0.067	0.000	0.006	0.002	32.370	0.000	0.000	0.001	0.000	0.000	0.000	0.631
Groundwater Management	Worker Commute	5	30	30	0.001	0.007	0.140	0.001	0.015	0.006	70.525	0.000	0.000	0.002	0.000	0.000	0.000	0.960
	Haul Truck	1	30	30	0.001	0.146	0.014	0.001	0.008	0.004	74.419	0.000	0.002	0.000	0.000	0.000	0.000	1.013
	Ready Mix Trucks	1	30	1	0.001	0.146	0.014	0.001	0.008	0.004	74.419	0.000	0.000	0.000	0.000	0.000	0.000	0.034
	pickup	1	30	30	0.000	0.002	0.034	0.000	0.003	0.001	16.185	0.000	0.000	0.001	0.000	0.000	0.000	0.220
Measurement and Automation	Worker Commute	6	30	30	0.001	0.008	0.168	0.001	0.018	0.007	84.629	0.000	0.000	0.003	0.000	0.000	0.000	1.152
	Haul Truck	1	30	30	0.001	0.146	0.014	0.001	0.008	0.004	74.419	0.000	0.002	0.000	0.000	0.000	0.000	1.013
	Ready Mix Trucks	1	30	1	0.001	0.146	0.014	0.001	0.008	0.004	74.419	0.000	0.000	0.000	0.000	0.000	0.000	0.034
	pickup	1	30	30	0.000	0.002	0.034	0.000	0.003	0.001	16.185	0.000	0.000	0.001	0.000	0.000	0.000	0.220
Butler Communications Tower project	Worker Commute	15	30	15	0.003	0.021	0.419	0.002	0.045	0.018	211.574	0.000	0.000	0.003	0.000	0.000	0.000	1.440
	Haul Truck	2	30	10	0.003	0.291	0.027	0.001	0.016	0.008	148.839	0.000	0.001	0.000	0.000	0.000	0.000	0.675
	Ready Mix Trucks	2	30	1	0.003	0.291	0.027	0.001	0.016	0.008	148.839	0.000	0.000	0.000	0.000	0.000	0.000	0.068
	pickup	2	30	15	0.001	0.004	0.067	0.000	0.006	0.002	32.370	0.000	0.000	0.001	0.000	0.000	0.000	0.220
Dry Creek Flume Replacement Project	Worker Commute	15	30	260	0.003	0.021	0.419	0.002	0.045	0.018	211.574	0.000	0.003	0.055	0.000	0.006	0.002	24.952
	Haul Truck	2	30	260	0.003	0.291	0.027	0.001	0.016	0.008	148.839	0.000	0.038	0.004	0.000	0.002	0.001	17.553
	Ready Mix Trucks	4	30	15	0.006	0.583	0.055	0.003	0.032	0.016	297.677	0.000	0.004	0.000	0.000	0.000	0.000	2.025
	pickup	2	30	260	0.001	0.004	0.067	0.000	0.006	0.002	32.370	0.000	0.000	0.009	0.000	0.001	0.000	3.818

Analysis Year: **2033**

Vehicle Emissions

Total Vehicle Emissions 2033

Projects	Daily Emissions							Annual Emissions						
	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	ton/year	ton/year	ton/year	ton/year	ton/year	ton/year	MT/year
Regulating Reservoirs and Infrastructure	0.07	6.31	1.51	0.03	0.45	0.21	3661.79	0.01	0.81	0.20	0.00	0.06	0.03	426.46
Canal, Lateral, and Tunnel Improvements	0.02	1.77	0.61	0.01	0.14	0.07	1115.01	0.00	0.10	0.03	0.00	0.01	0.00	54.62
Flow Control	0.01	1.04	0.44	0.01	0.09	0.04	694.35	0.00	0.02	0.01	0.00	0.00	0.00	12.33
Groundwater Management	0.00	0.30	0.20	0.00	0.03	0.02	235.55	0.00	0.00	0.00	0.00	0.00	0.00	2.23
Measurement and Automation	0.00	0.30	0.23	0.00	0.04	0.02	249.65	0.00	0.00	0.00	0.00	0.00	0.00	2.42
Butler Communications Tower project	0.01	0.61	0.54	0.01	0.08	0.04	541.62	0.00	0.00	0.00	0.00	0.00	0.00	2.40
Dry Creek Flume Replacement Project	0.01	0.90	0.57	0.01	0.10	0.04	690.46	0.00	0.05	0.07	0.00	0.01	0.00	48.35

VMT on Paved and Unpaved Roads 2033

Onsite Equipment	**Number**	Total VMT/day	Total VMT/year	Unpaved road%	Unpaved VMT/day	Unpaved VMT/Year	Paved VMT/day	Paved VMT/year
Regulating Reservoirs and Infrastructure	Worker Commute	810	210600	5%	40.5	10,530	770	200,070
	Haul Truck	1260	327600	2.5%	31.5	8,190	1,229	319,410
	Ready Mix Truck	30	3000	2.5%	0.75	75	29	2,925
	pickup	150	39000	5%	7.5	1,950	143	37,050
Canal, Lateral, and Tunnel Improvements	Worker Commute	300	32400	5%	15	1,620	285	30,780
	Haul Truck	270	29160	2.5%	6.75	729	263	28,431
	Ready Mix Truck	90	9720	2.5%	2.25	243	88	9,477
	pickup	150	16200	5%	7.5	810	143	15,390
Flow Control	Worker Commute	300	12900	5%	15	645	285	12,255
	Haul Truck	180	7740	2.5%	4.5	194	176	7,547
	Ready Mix Truck	30	210	2.5%	0.75	5	29	205
	pickup	60	2580	5%	3	129	57	2,451
Groundwater Management	Worker Commute	150	4500	5%	7.5	225	143	4,275
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Measurement and Automation	Worker Commute	180	5400	5%	9	270	171	5,130
	Haul Truck	30	900	2.5%	0.75	23	29	878
	Ready Mix Truck	30	30	2.5%	0.75	1	29	29
	pickup	30	900	5%	1.5	45	29	855
Butler Communications Tower project	Worker Commute	450	6750	5%	22.5	338	428	6,413
	Haul Truck	60	600	2.5%	1.5	15	59	585
	Ready Mix Truck	60	60	2.5%	1.5	2	59	59
	pickup	60	900	5%	3	45	57	855
Dry Creek Flume Replacement Project	Worker Commute	450	117000	5%	22.5	5,850	428	111,150
	Haul Truck	60	15600	2.5%	1.5	390	59	15,210
	Ready Mix Truck	120	1800	2.5%	3	45	117	1,755
	pickup	60	15600	5%	3	780	57	14,820

Analysis Year **2033**
Fugitive Dust Emissions Northern Commute Scenario

A) Bulldozing - Demolition
Fugitive dust emissions from bulldozing **2033**

Activity	Number of Equipment	Maximum daily hours	Days	Emission Factor		Daily Emissions		Annual Emissions	
				PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
				lb/hr	lb/hr	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	7	10	140	0.753	0.414	52.69	28.96	3.69	2.03
Canal, Lateral, and Tunnel Improvements	2	10	90	0.753	0.414	15.06	8.28	0.68	0.37
Flow Control	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Groundwater Management	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Measurement and Automation	0	10	0	0.753	0.414	0.00	0.00	0.00	0.00
Butler Communications Tower project	1	10	5	0.753	0.414	7.53	4.14	0.02	0.01
Dry Creek Flume Replacement Project	1	10	20	0.753	0.414	7.53	4.14	0.08	0.04

Note:
PM emissions were calculated using the following equation and parameters (CalEEMod Appendix A):
Emission Factor (lb/hr)= k x $(s)^{1.5}$ / $(M)^{1.4}$ For PM10 and k x 5.7 x $(s)^{1.2}$ / $(M)^{1.3}$ for PM2.5
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 6.9% - CalEEMod default for overburden)
M = Moisture Content = 7.9% (CalEEMod default)

B) Grading
Fugitive dust emissions from grading **2033**

Activity		Number of Grading Equipment	# acres/equipment	Acreage Graded/Day	Number of Days/Year	Grader/Scaper VMT		Emission Factors		Daily Emissions		Annual Emissions	
								PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
				acres		miles/day	miles/year	lb/VMT	lb/VMT	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	Grader	2	0.5	1	120	0.69	82.50	1.54	0.167	1.06	0.11	0.06	0.01
	Scaper	4	1	4	100	2.75	275.00	1.54	0.167	4.24	0.46	0.21	0.02
Canal, Lateral, and Tunnel Improvements	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Flow Control	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Groundwater Management	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Measurement and Automation	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Butler Communications Tower project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	Grader	0	0.5	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00
	Scaper	0	1	0	0	0.00	0.00	1.54	0.167	0.00	0.00	0.00	0.00

Analysis Year **2033**

Fugitive Dust Emissions Northern Commute Scenario

Grading Emission Summary

	Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	5.30	0.57	0.28	0.03
Canal, Lateral, and Tunnel Improvements	0.00	0.00	0.00	0.00
Flow Control	0.00	0.00	0.00	0.00
Groundwater Management	0.00	0.00	0.00	0.00
Measurement and Automation	0.00	0.00	0.00	0.00
Butler Communications Tower project	0.00	0.00	0.00	0.00
Dry Creek Flume Replacement Project	0.00	0.00	0.00	0.00

Note:

PM emissions were calculated using the following equation and parameters:

Emission factor (lb/VMT) = k x 0.051 x $(S)^{2.0}$ for PM10 and k x 0.040 x $(S)^{2.5}$ for PM2.5

k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)

S = Mean Vehicle Speed, CalEEMod default = 7.1 miles/hour

VMT = As / Wb X 43,560 (sqft/acre) /5280 (ft/mile)

VMT: vehicle miles traveled

As: the acreage of the grading site (0.5 acres per grader, 1 acre for scapter, CalEEMod defaults)

Wb: blade width of the grader. CalEEMod default Wb = 12 ft.

Analysis Year **2033**
Fugitive Dust Emissions Northern Commute Scenario

C). Earth Material Loading/Handling
Dust from demolition and soil loading **2033**

Projects	Total Amount Handled	Material Amount		Material Amount		Emission Factors		Daily Emissions		Annual Emissions	
						PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
	cy	cy/day	cy/year	ton/day	ton/year	lb/ton	lb/ton	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	280,000	1060.6	280,000	1340.8	353966.5	0.00012	0.000018	0.16	0.024	0.0206	0.0031
Canal, Lateral, and Tunnel Improvements	9,684	88.0	9,684	111.3	12242.2	0.00012	0.000018	0.01	0.002	0.0007	0.0001
Flow Control	2,677	60.8	2,677	76.9	3384.2	0.00012	0.000018	0.01	0.001	0.0002	0.0000
Groundwater Management	9	0.2	9	0.3	11.4	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Measurement and Automation	4	0.2	4	0.2	5.1	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Butler Communications Tower project	50	1.1	50	1.4	63.2	0.00012	0.000018	0.00	0.000	0.0000	0.0000
Dry Creek Flume Replacement Project	2,575	9.8	2,575	12.3	3255.2	0.00012	0.000018	0.00	0.000	0.0002	0.0000

Note:
Fugitive dust from materials unloading from trains and/or trucks are calculated using the following equations and parameters:
Emission factor (lb/ton) = $(k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
k = Particle Size Constant (0.35 for PM10 and 0.053 for PM2.5)
U = average wind speed = 2.7 m/s (6.04 mph) for SJVAPCD (CalEEMOd default)
M = moisture content = 12% (CalEEMod Default)
Material density (CalEEMod default) 1.264 ton/CY

C) Vehicle Fugitive Dust Emissions on Paved Roads
Emission factor (g/VMT) = k X (sL)^0.91 X W^1.02

		PM10	**PM2.5**
k		1.0	0.25
sL	g/m2	0.10	0.10
W	tons	2.4	2.4
EF	(g/VMT)	0.300	0.075

Equation from: AP-42 13.2.1
sL and W (silt loading and vehicle weight) are CalEEMod default values

Projects	Maximum Daily Emissions			Annual Emissions		
	Trip miles	PM10	PM2.5	Trip miles	PM10	PM2.5
	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	2,170	1.44	0.36	559,455	0.185	0.046
Canal, Lateral, and Tunnel Improvements	779	0.52	0.13	84,078	0.028	0.007
Flow Control	547	0.36	0.09	22,457	0.007	0.002
Groundwater Management	230	0.15	0.04	6,037	0.002	0.000
Measurement and Automation	258	0.17	0.04	6,892	0.002	0.001
Butler Communications Tower project	602	0.40	0.10	7,911	0.003	0.001
Dry Creek Flume Replacement Project	660	0.44	0.11	142,935	0.047	0.012

Analysis Year **2033**
Fugitive Dust Emissions Northern Commute Scenario

D) Vehicle Fugitive Dust Emissions on Unpaved Roads

Uncontrolled Emission Factors and Emissions

	Emission Factors (lb/VMT)	
	PM10	PM2.5
Unpaved Road (uncontrolled)	0.87	0.09
Unpaved Road (with watering unpaved road twice a day)	0.45	0.04

Emission factor (lb/VMT) = $(k)[(s/12)^{0.9}][(W/3)^{0.45}]*(1-P/365)$ (EPA AP-42, 13.2.2, for industrial sites)
k = constant (lb/VMT) = 1.5 lb/VMT for PM10 and 0.15 lb/VMT for PM2.5
s = Silt Content (8.5%, construction sites, AP-42, Table 13.2.2.1)
W = avg. vehicle weight (tons) = 2.4 ton
P = number of days in a year with at least 0.1 inch of precipitation, 46 days for Stanislaus County (CalEEMod)
Control efficiency of watering the unpaved road twice a day 55% (data from SCAQMD CEQA Handbook, TABLE XI-D, MITIGATION MEASURE EXAMPLES: FUGITIVE DUST FROM UNPAVED ROADs, 2007)

Emissions from Unpaved Roads

	Maximum Daily Emissions			Annual Emissions		
	Total Trip miles	PM10	PM2.5	Total Trip miles	PM10	PM2.5
Projects	VMT/day	lb/day	lb/day	VMT/year	ton/year	ton/year
Regulating Reservoirs and Infrastructure	80	35.92	3.59	20,745	4.643	0.464
Canal, Lateral, and Tunnel Improvements	32	14.10	1.41	3,402	0.761	0.076
Flow Control	23	10.41	1.04	973	0.218	0.022
Groundwater Management	11	4.70	0.47	293	0.066	0.007
Measurement and Automation	12	5.37	0.54	338	0.076	0.008
Butler Communications Tower project	29	12.76	1.28	399	0.089	0.009
Dry Creek Flume Replacement Project	30	13.43	1.34	7,065	1.581	0.158

Summary of Fugitive Dust Emissions

	Maximum Daily Emissions		Annual Emissions	
	PM10	PM2.5	PM10	PM2.5
Projects	lb/day	lb/day	ton/year	ton/year
Regulating Reservoirs and Infrastructure	95.51	33.51	8.81	2.57
Canal, Lateral, and Tunnel Improvements	29.68	9.82	1.47	0.46
Flow Control	10.78	1.13	0.23	0.02
Groundwater Management	4.85	0.51	0.07	0.01
Measurement and Automation	5.54	0.58	0.08	0.01
Butler Communications Tower project	20.68	5.51	0.11	0.02
Dry Creek Flume Replacement Project	21.39	5.59	1.70	0.21

Appendix E
Modesto Irrigation District Comprehensive Water Resources Management Plan Biological Evaluation, Stanislaus County, California, Final Technical Memorandum

TECHNICAL MEMORANDUM

TO: John Schoonover, Project Manager, Jacobs

FROM: Michael Bumgardner, Bumgardner Biological Consulting

SUBJECT: Modesto Irrigation District Comprehensive Water Resources Management Plan Programmatic EIR (PEIR) Biological Evaluation, Stanislaus County, California

DATE: 10/7/2019

INTRODUCTION

This technical memorandum (TM) identifies potential biological constraints/issues associated with the proposed construction and operation of capital improvement projects and annual maintenance activities identified in the Modesto Irrigation District (MID) Comprehensive Water Resources Management Plan (Proposed Program) Programmatic Environmental Impact Report (PEIR). The Proposed Project is intended to address MID's long-term customer and water management goals, and the specific infrastructure and operational needs throughout the MID irrigation conveyance system. The Program Area includes individual projects, which are distributed within the MID boundaries and support MID's future water service goals. The Study Area for this TM includes the MID Service Area as well as all surrounding lands out to 5 miles from each project (Figure 1; all figures located at the end of this TM). The identified constraints/issues are based on reconnaissance-level surveys of representative project sites within the Program Area conducted on May 30 and 31, 2018, and May 15, 2019; data queries of the California Department of Fish and Wildlife's (CDFW's) California Natural Diversity Database (CNDDB) (CDFW 2019); California Native Plant Society's Inventory of Rare and Endangered Plants (CNPS 2019); and review of other appropriate sources of information.

SUMMARY OF THE PROPOSED PROGRAM

MID conducted an evaluation of its water resources, on-farm systems, land use patterns and projections, infrastructure, and finances. As a result of this assessment, MID has developed and intends to implement an integrated and forward-looking Comprehensive Water Resources Management Plan (Proposed Program) to address MID's long-term customer and water management goals, and the specific infrastructure and operational needs throughout the MID service area. The Proposed Program includes over 100 individual projects, which are distributed within the Program Area and support MID's goals through approximately year 2040. Executing the Proposed Program over the next decades will allow MID to continue providing a high level of

service to meet customers' evolving water delivery needs and increase operational reliability. The proposed system improvement projects included in the Proposed Program can be divided into the following categories:

- Regulating Reservoirs
- Canal, Lateral, and Tunnel Improvements
- Flow Control
- Groundwater Management
- Measurement and Automation

The timing and phasing for implementation of any specific project is dependent on many factors, such as funding availability, year-to-year repair and rehabilitation priorities, and project-specific environmental review. Overall plan implementation is based on the draft schedule included in Appendix C of the PEIR. It is anticipated that Proposed Program implementation would differ to some degree from what is outlined currently as requisite supporting activities are completed. Future factors, including potential shifts in priorities, as determined necessary by MID, are expected to be key schedule and funding drivers.

LIKELIHOOD OF OCCURRENCE ANALYSIS

A special-status species likelihood of occurrence analysis was conducted for the Study Area prior to conducting the reconnaissance-level surveys within the area (Table A-1 in Appendix A). As described above, the Study Area for the likelihood of occurrence analysis was based on the proposed locations of all currently identified proposed projects as well as all surrounding lands out to 5 miles from each project (Figure 1). The initial search for special-status species that could occur within the Study Area was based on a Rarefind 5 query of the CNDDB. The CNDDB contains records for special-status species, as well as sensitive natural communities, which have been reported to CDFW. The Rarefind 5 report for the Study Area is provided in Appendix B. Each of the species identified in the Rarefind 5 report were then evaluated in terms of their likelihood of occurrence within and immediately adjacent to the project sites (i.e., draft likelihood of occurrence analysis). This draft analysis considered the known distribution and habitat requirements of the species/taxa such that one of the following findings was prepared:

- Known to Occur – species has previously been documented within or immediately adjacent to a project site.
- Potential to Occur – has not been documented within or immediately adjacent to a project site, but its presence cannot be completely discounted due to incomplete information on the taxon's distribution or habitat requirements and lack of focused surveys for the taxon.

- No Potential to Occur – species does not occur within a project site due to the lack of required habitat features for the species, or the known range of the species is well defined and does not include a project site.

Other sources of information on special-status species in California were subsequently reviewed given that the CNDDB is not inclusive of all special-status species that may occur in an area. Therefore, additional review was based on the professional experience of the author within the region and elsewhere in California, but also included review of other published sources of information on special-status species in California. These additional sources include the following:

- The Jepson Manual: Vascular Plants of California. (Baldwin and Goldman 2012).
- California Native Plant Society (CNPS), Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). website http://www.rareplants.cnps.org (Last Accessed: June 28, 2019).
- California Fish Species of Special Concern, 3rd Edition. California Department of Fish and Wildlife and the University of California, Davis. (Moyle et al. 2015).
- Fish Species of Special Concern in California. Sacramento: California Department of Fish and Wildlife (1995). www.wildlife.ca.govhttps://www.wildlife.ca.gov/Conservation/Fishes/Special-Concern.
- Amphibian and Reptile Species of Special Concern in California (Jennings and Hayes 1994).
- California Herps: A Guide to the Amphibians and Reptiles of California. website http://www.californiaherps.com (Last Accessed: November 15, 2018).
- California Bird Species of Special Concern. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California and California Department of Fish and Game (Shuford and Gardali 2008).
- The Distribution of the Birds of California (Grinnell and Miller 1944).
- California Birds: Their Status and Distribution (Small 1994).
- California's Wildlife Volume II Birds (Zeiner et al. 1990).
- eBird. 2019. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Available: http://www.ebird.org. (Last Accessed: June 28, 2019).
- Mammalian Species of Special Concern in California (Williams 1986).
- Terrestrial Mammal Species of Special Concern in California (unfinished 1998 update) (Bolster 1998).
- Mammals of the Pacific States: California, Oregon, and Washington (Ingles 1978).

- Bat species accounts prepared as course materials for Ecology and Conservation of California Bats offered through San Francisco State University's Sierra Nevada Field Campus.
- Western Bat Working Group website (http://wbwg.org/western-bat-species/).
- Recovery Plan for Upland Species of the San Joaquin Valley, California (USFWS 1998).
- Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands (Volmar Consulting 2002).
- United States Fish and Wildlife Service (USFWS) list of federally threatened or endangered species that may occur in Modesto Irrigation District Comprehensive Water Resources Management Plan Study Area from the Information for Planning and Consultation (IPaC) website (Last Accessed: August 2, 2019) (included in Appendix B).
- National Marine Fisheries Service (NMFS) list of federally threatened or endangered species that may occur in USGS quads containing the Modesto Irrigation District proposed Comprehensive Water Resources Management Plan Study Area generated using the West Coast Region, California Species List Tool (Last Accessed: August 2, 2019) (included in Appendix B).

The draft likelihood of occurrence analysis was created on May 5, 2018 (revised on November 15, 2018; revised again on June 28, 2019) and used to develop a "focus list" of species that should be searched for during any subsequent surveys of potential project sites. The final likelihood of occurrence analysis was then prepared to include any additional species not addressed by the Rarefind 5 report, but that were recorded during subsequent surveys of the project sites and review of other sources of information on special-status species that occur in the vicinity of the projects. Species that are known or expected to occur in the vicinity of the project sites were then further evaluated. It should be noted that unlike other likelihood of occurrence analyses that have been prepared for single projects, this likelihood of occurrence analysis addresses multiple projects. As such, the likelihood of species occurrence in Table A-1 in Appendix A is based on evaluation of all lands within the Study Area. Where a special-status species is known to occur within or immediately adjacent to a specific project site (including observations from the May 30 and 31, 2018, and May 15, 2019 reconnaissance-level surveys) or has some potential given the onsite and adjacent cover types, that project is considered to have some potential to affect the identified special-status species.

SURVEY METHODS

On May 30 and 31, 2018, biological reconnaissance-level surveys were conducted by Michael Bumgardner (Bumgardner Biological Consulting), Lindsay Larson and Catherine Burrell (Jacobs), and Dave Bakker, Seylin Savy, and Chad Tienken (MID) at various representative project sites within the Study Area. These surveys were used to identify habitat types, potential wetlands, environmentally sensitive areas, and potential special-status species issues associated with

implementation of the Proposed Program. Twelve (12) individual locations were evaluated. The sites that were selected for evaluation included sites that are being proposed for upgrades to existing facilities or proposed new facilities. In addition, existing MID pipelines, service canals, and groundwater wells were reviewed as a general point of reference for proposed system improvements included as part of the Proposed Program. These surveys were conducted to provide a baseline understanding of existing habitat and potential for special-status species within the Program Area. The Study Area was evaluated on foot and by vehicle where legal access was available. Surrounding areas to which legal access was not available were surveyed from the nearest road to which legal access was available. The surveys focused on identifying and characterizing sensitive biological resources (e.g., important habitats, vegetation communities, and species) that could be adversely affected by the Proposed Program (particularly where existing research or documentation suggests that sensitive biological resources might currently exist).

Additional reconnaissance-level biological surveys were conducted by Michael Bumgardner (Bumgardner Biological Consulting), Jeremy Hollins (Jacobs), and Seylin Savy and Dave Bakker (MID) on May 15, 2019, at 9 other representative project sites within the Study Area. The purpose of the surveys at these additional project sites was to provide additional coverage for certain system improvement categories where sensitive biological resources not addressed by the original 12 project sites might be found. The additional surveys were also chosen to provide more thorough geographic coverage within the Study Area. The locations of each site that was surveyed in 2018 and 2019 are shown on Figures 2a and 2b.

RESEARCH RESULTS

The following information on important, sensitive, or special-status biological resources applies broadly to all lands within the Program Area. It should be noted that this information is based on documentation from various existing sources of information.

Vegetation Communities, Land Cover Types

The Study Area is a predominately agricultural region in an area that was once mostly marshland, riparian woodland, oak woodland/savannah, valley alkali scrub, and vernal pool grassland. Although most of the land cover in the Study Area is now agricultural, remnant natural vegetation communities are scattered throughout the area (with larger tracts of natural vegetation in some areas, particularly in the higher easternmost rolling hills of the Program Area). See figures in Appendix C for land cover types in the Study Area. Most of the lands in the interior portions of the Study Area are either urban or in active agricultural production (i.e., row and field crops, hay/alfalfa, irrigated pasture, orchards, silage-corn, etc.). However, depending on the crop pattern and the land's proximity to natural vegetation communities, agricultural lands can provide relatively high-value habitat for many wildlife species (including special-status species), particularly as foraging habitat. Raptor species use grazing and alfalfa agricultural lands for

foraging because several species of common rodents are found in such fields. Agricultural habitats also provide foraging and resting habitat for migrating and wintering waterfowl and shorebirds.

Special-status Plants

The majority of the special-status plants that are known to occur (Figures 3a and 3b) or have some potential to occur within the Study Area are mostly associated with vernal pools, playas, or similar seasonal wetlands (i.e., 14 of the 30 plant taxa [i.e., 47%] considered to have some potential to occur). As such, most of these taxa would not be expected to be directly affected by the proposed projects apart from projects that flood or destroy vernal pool grasslands, playas, or similar seasonal wetlands. However, some of these taxa could also be indirectly affected by the proposed projects (e.g., due to changes in watersheds that provide surface and subsurface water to nearby, offsite seasonal water features).

Another seven taxa are associated with drier valley and foothill grassland but could occur in areas of vernal pool grassland where there is a mosaic of drier and wetter grassland. Another two taxa occur in other wetlands (mostly perennial) and, therefore, have some potential to be affected in canals or where new reservoirs would flood existing wetlands. Given that most of the proposed projects are on lands that are already in agricultural production or used for water conveyance, the next mostly likely opportunities for adverse effects to special-status plants in the Study Area are associated with edge habitats (e.g., the banks of unlined canals, edges of agricultural fields that are regularly unplowed or otherwise unmanaged, and unusable riparian areas along ephemeral and perennial drainages).

Special-status Animals

As with special-status plants, many of the special-status animals, at least non-avian species, that occur or have some potential to occur within the Study Area (Figures 4a and 4b) are associated with vernal pools, playas, or similar seasonal wetlands (i.e., 9 of the 45 animal species [i.e., 20%] considered to have some potential). As with the plant species, the special-status animals associated with vernal pools, playas, or similar seasonal wetlands would not be expected to be directly affected by any proposed projects other than new reservoirs that flood vernal pool grasslands, playas, or similar seasonal wetlands. Again, some of these species could be indirectly affected by proposed projects (e.g., due to changes in watersheds that provide surface and subsurface water to nearby, offsite seasonal water features).

Several of the avian species with some potential to nest within the Study Area are birds that can nest in suitable agricultural and other edge habitats (as described above) (i.e., 9 of the 19 nesting species [i.e., 47%] with some potential to occur).

There are also several avian species with some potential to occur in the Study Area that are strictly or almost strictly wintering species. These latter species (e.g., ferruginous hawk [*Buteo regalis*], merlin [*Falco columbarius*], bald eagle [*Haliaeetus leucocephalus*], mountain plover [*Charadrius*

montanus], etc.) tend to be wide-ranging, can often use fallow agricultural fields, and have substantial acreage of suitable wintering habitat within the Study Area, and hence, are unlikely to be substantially affected by the proposed projects.

Native Fishes

The Stanislaus and Tuolumne Rivers are major perennial watersheds that encompass the Program Area and provide habitat for both anadromous and resident fish communities within the Study Area and vicinity. Steelhead (*Oncorhynchus mykiss*), considered by NMFS to be part of the California Central Valley steelhead distinct population segment (DPS) spawn in the reach of the Tuolumne River below La Grange Dam (as passage beyond the dam is not possible). The California Central Valley steelhead DPS is listed as threatened under the federal Endangered Species Act (ESA). Fall-run and late-fall-run Chinook salmon (*Oncorhynchus tshawytscha*), state-designated species of special concern, have also been documented in the lower Tuolumne River below La Grange Dam. Other special-status fish species that have been found in the lower Tuolumne River as far upstream as La Grange Dam include the anadromous Pacific lamprey (*Lampetra tridentata*) and resident hardhead (*Mylopharodon conocephalus*) (Stillwater Sciences 2014).

Both steelhead and fall- and late fall-run Chinook salmon occur in and spawn within the Stanislaus River reaches below Goodwin Dam (above MID's service area) (CFS 2012, USFWS 2001). In addition, hardhead and lamprey (*Lampetra* spp.) have been documented in the lower Stanislaus River (CFS 2012). Hardhead has even been found in tributary streams of the San Joaquin River drainage above the valley floor.

Special-status Bats

Several species of bats have been documented from the Study Area, but due to difficulties with and the failure to conduct surveys for these species, their distribution in the area is not well known and likely under-represented in data sources such as the CNDDB. Hence, there are six species of special-status bats considered to have some potential to occur in or adjacent to Proposed Program project sites.

Raptors and Migratory Birds

Other species of nesting birds that are not designated by CDFW as special-status species are nonetheless provided protection under the applicable sections of the California Fish and Game Code (e.g., sections 3503, 3503.5, and 3513). Almost all project sites have some potential nesting habitat for one or more species of birds that are regulated by the above state statutes. Furthermore, active nests were observed within some project sites during the May 2018 and May 2019 reconnaissance-level surveys (e.g., cliff swallow, barn swallow, and black phoebe). As such, nesting birds should be expected at or near all proposed projects that are to be constructed between February 1 and August 15.

Designated Critical Habitat

When a species is proposed for listing as endangered or threatened under the ESA, USFWS or NMFS must consider whether there are areas of habitat believed to be essential to the species' conservation. Those areas may be proposed for designation as critical habitat. Only activities that involve a federal permit, license, funding, or authorization (i.e., federal nexus) and are likely to destroy or adversely modify an area of critical habitat can be affected by the designation. In such a case, USFWS or NMFS typically work with the federal agency and, where appropriate, private or other landowners to amend their project to allow it to proceed without adversely affecting the critical habitat. Thus, most projects with a federal nexus are likely to go forward, but some may be modified to minimize harm to critical habitat.

Critical habitat units for eight federally listed species have been designated within the MID Program Area (figures in Appendix D), five of which have proposed projects within unit boundaries.

Each of the 19 proposed projects that are located within designated critical habitat units are shown in Table 1. However, it should be noted that future currently undefined projects under the Proposed Program could result in currently unidentified impacts within these or other critical habitat units. A summary of the critical habitat units designated for federally listed vernal pool crustaceans and plants (four of the five species for which critical habitat could be affected by currently defined projects in the MID Study Area) is provided in Federal Register Notice 71 FR 7118; February 10, 2006. This latter summary provides the unit number, name, and boundaries/location, as well as the "physical or biological features" (formerly primary constituent elements [PCEs]) found within the unit and special management considerations and protections that may be required for actions within the unit. "Physical or biological features" essential to the conservation of a species for which its designated or proposed critical habitat is based include space for individual and population growth and normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and habitats that are protected from disturbance or are representative of the species' historical geographic and ecological distribution.

Critical habitat within the Program Area is only an issue if a project has a federal nexus and may destroy or adversely modify critical habitat (see critical habitat effects analysis process in Appendix E). On May 12, 2014, USFWS and NMFS proposed the following regulatory definition to address the relevant case law and to formalize their guidance: "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the conservation value of critical habitat for listed species. Such alterations may include, but are not limited to, effects that preclude or significantly delay the development of the physical or biological features that support the life history needs of the species for recovery." See Federal Register Notice 79 FR 27060; May 12, 2014.

As noted above, a summary of the critical habitat units designated for federally listed vernal pool crustaceans and plants is provided in Federal Register Notice 71 FR 7118; February 10, 2006. Other critical habitat units located within the Study Area are summarized for California tiger salamander (CTS; Federal Register Notice 70 FR 49380; August 23, 2005) and California Central Valley steelhead (Federal Register Notice 70 FR 52488, September 2, 2005).

Wetlands (including Vernal Pools) and Other Waters

As described above, the easternmost terraces of the Study Area support vernal pool grasslands, and marshlands are common in the lower valley floor portions of the Study Area. Reservoirs, rivers, creeks, and canals are also present within the Study Area. The Stanislaus and Tuolumne Rivers are in and adjacent to the Program Area. MID uses surface water from the Tuolumne River, Oakdale Irrigation District (OID) operational outflows, and groundwater as well as an extensive conveyance system of constructed canals and other infrastructure for conveyance of water. Wetlands and other waters in the Study Area represent both known and potential jurisdictional waters. Determination of jurisdiction must be made in coordination with both state and federal agencies.

TABLE 1

MODESTO IRRIGATION DISTRICT PROJECTS THAT MAY AFFECT DESIGNATED CRITICAL HABITAT UNITS

Project[8]	FLOC[1]	COGR[2]	GRTU[3]	HOSP[4]	CCVS[5]
Canal Automation & Flow Measurement Improvements					
Lateral W-3 Headworks – SCADA[6]		Unit 4D	Unit 6D		
Lateral W-A Headworks - SCADA		Unit 4D	Unit 6D	Unit 4	
Miller Lake Pumps and Structure					SJVF 5535[7]
Canal Rebuilding/Lining and Table Topping Dead-end Facilities					
La Grange Upper Main Canal Tunnel Downstream Portal Tiebacks		Unit 4D	Unit 6D	Unit 4	
Lateral W-3 Long-crested Weir at W-3B Diversion		Unit 4D	Unit 6D		
Lower Dominici Fill		Unit 4D	Unit 6D	Unit 4	
Lower Waterford Main at Head of W-3		Unit 4D	Unit 6D		

TABLE 1

MODESTO IRRIGATION DISTRICT PROJECTS
THAT MAY AFFECT DESIGNATED CRITICAL HABITAT UNITS

Project[8]	FLOC[1]	COGR[2]	GRTU[3]	HOSP[4]	CCVS[5]
MID Upper Main Canal Tunnel Improvements		Unit 4D	Unit 6D	Unit 4	
Morton Fill		Unit 4D	Unit 6D		
Older Upper Main Canal Rehabilitation		Unit 4D	Unit 6D	Unit 4	SJVF 5535[7]
Rairden Fill Improvements		Unit 4D	Unit 6D	Unit 4	
Salter Fill Improvements	Unit 2A	Unit 4D	Unit 6D	Unit 4	
Upper Dominici Fill Improvements		Unit 4D	Unit 6D	Unit 4	
Upper Main Canal - Emergency Spill at Upper Dominici Weir		Unit 4D	Unit 6D	Unit 4	
Upper Main Canal La Grange Tunnel at Gasburg Creek Crossing					SJVF 5535[7]
Upper Main Canal La Grange Tunnel Drainage Siphon Rehabilitation					SJVF 5535[7]
Waterford Lateral Improvements		Unit 4D	Unit 6D	Unit 4	
Waterford Upper Main Canal Lining	Unit 2A	Unit 4D	Unit 6D	Unit 4	
Waterford Upper Main Canal Tunnel Improvements	Unit 2A	Unit 4D	Unit 6D	Unit 4	

Notes: 1 - FLOC (fleshy owl's-clover/succulent owl's-clover), 2 - COGR (Colusa grass), 3 - GRTU (Greene's tuctoria), 4 - HOSP (Hoover's spurge), 5 - CCVS (California Central Valley Steelhead), 6 - SCADA (supervisory control and data acquisition)

7 - California Central Valley Steelhead SJVF 5535 (San Joaquin Valley Floor Hydrologic Unit 5535

8 - The individual projects in Table 1 reflect the projects under the Proposed Program that fall within a designated critical habitat unit and are known at this time.

PROJECT-SPECIFIC SURVEY RESULTS

The following information on important, sensitive, or special-status biological resources (Table 2) is specific to each of the proposed project sites (i.e., representative project sites) surveyed and is based on the findings of the reconnaissance-level surveys conducted during May 2018 and May 2019.

TABLE 2

BIOLOGICAL CONDITIONS ASSOCIATED WITH REPRESENTATIVE MODESTO IRRIGATION DISTRICT PROJECTS

Project	Onsite and Adjacent Land Cover/Vegetation Types	Known and Potential Sensitive Biological Resources
Regulating Reservoirs		
Lateral 3 and 7 Regulating Reservoir	Onsite cover consists of field crops, while the surrounding cover consists almost entirely of orchard other than to the north where there is a dairy operation and more field crops.	Potential for western pond turtle, nesting birds, and special-status plants
Lateral 4 and 5 Regulating Reservoir	Onsite cover consists of orchard and agricultural buildings, while offsite cover consists of orchard and field crop.	Potential for tricolored blackbird, other nesting birds, and special-status plants
Lateral 6 and 8 Regulating Reservoir	Onsite cover consists of orchard, while offsite cover consists of orchard, Salida Sanitary District facilities, and residential development.	Potential for western pond turtle, nesting birds, and special-status plants
Canal, Lateral, and Tunnel Improvements		
Dry Creek Flume – Emergency Siphon Option	Onsite cover consists of levees, canal banks, and turn-around areas; adjacent cover consists of riparian woodland, orchard, annual grassland, and rural development.	Potential for special-status bumblebees, nesting birds, Swainson's hawk, white-tailed kite, non-listed raptors, northern California legless lizard, tree-roosting bats, non-tree roosting bats, western pond turtle, and special-status plants
Dry Creek Flume – Replacement Option	Onsite cover consists of levees, canal banks, and turn-around areas; adjacent cover consists of riparian woodland, orchard,	Potential for special-status bumblebees, nesting birds, Swainson's hawk, white-tailed kite, non-listed raptors, northern California legless lizard, tree-roosting

TABLE 2

BIOLOGICAL CONDITIONS ASSOCIATED WITH REPRESENTATIVE MODESTO IRRIGATION DISTRICT PROJECTS

Project	Onsite and Adjacent Land Cover/Vegetation Types	Known and Potential Sensitive Biological Resources
	annual grassland, and rural development.	bats, non-tree roosting bats, western pond turtle, and special-status plants
Lateral 1 Spill Relocation	Onsite cover consists of river bank, riparian woodland, and ruderal vegetation; adjacent offsite cover includes riparian woodland, orchard, and ruderal vegetation.	Potential for nesting birds, Swainson's hawk, white-tailed kite, tree-roosting bats, western pond turtle, and special-status plants
Old Upper Main Canal Rehabilitation	Onsite cover consists of levees, canal banks, and turn-around areas; adjacent cover consists of blue oak woodland, annual grassland, and riparian woodland.	Potential for nesting birds, burrowing owl, Swainson's hawk, white-tailed kite, American badger, Merced kangaroo rat, tree-roosting bats, non-tree-roosting bats, western pond turtle, CTS, western spadefoot, special-status bumblebees, and special-status plants.
Rairden Fill Improvements	Onsite cover consists of annual grassland, but the adjacent cover includes valley oak savannah, willow riparian/blackberry bramble, ephemeral stream, seasonal pond, and stock tank.	Potential for nesting birds, non-listed raptors, yellow-breasted chat, CTS, western spadefoot, and special-status plant
Spenker Spill Flow Measurement and Lining	Onsite cover consists of levees, canal banks, and turn-around areas, linear riparian scrub parallel to canal; surrounded by field crop, orchard, and rural and suburban development.	Potential for nesting birds, tricolored blackbird, Swainson's hawk, non-listed raptors, western pond turtle, northern California legless lizard, and special-status plants
Upper Main Canal La Grange Tunnel: Drainage Siphon Rehabilitation	Onsite cover consists of levees, canal banks, and turn-around areas; adjacent cover consists of blue oak woodland, riparian woodland, annual grassland, and rural development.	Potential for nesting birds, burrowing owl, Swainson's hawk, white-tailed kite, non-listed raptors, American badger, Merced kangaroo rat, tree-roosting bats, non-tree-roosting bats, western pond turtle, CTS, western spadefoot, special-status bumblebees, and special-status plants

TABLE 2

BIOLOGICAL CONDITIONS ASSOCIATED WITH REPRESENTATIVE MODESTO IRRIGATION DISTRICT PROJECTS

Project	Onsite and Adjacent Land Cover/Vegetation Types	Known and Potential Sensitive Biological Resources
Waterford Upper Main Canal Lining	Onsite cover consists of levees, canal banks, and turn-around areas; adjacent cover consists of blue oak woodland, annual grassland, vernal pool grassland, vernal pools and swales, and riparian woodland.	Potential for nesting birds, burrowing owl, Swainson's hawk, white-tailed kite, American badger, Merced kangaroo rat, tree-roosting bats, non-tree-roosting bats, western pond turtle, CTS, western spadefoot, special-status bumblebees, and special-status plants
Flow Control		
Lateral 4 Check Structure Modification – Hart Road	Onsite cover is mostly road crossing, weir, and access road, but is surrounded by orchard, irrigated pasture, and low-density residential.	Potential for nesting birds and burrowing owl
Lateral 4 Check Structure Modification – Russell Road	Onsite cover is mostly road crossing, weir, and access road, but is surrounded by orchard and disked land.	Potential for nesting birds and burrowing owl
Lateral W-9 Long-crested Weir at Timbell Road Crossing	Onsite cover consists of annual grassland and ruderal vegetation (including large trees not associated with orchard); the surrounding land supports extensive orchard and a couple of ranchettes.	Potential for nesting birds, western pond turtle, special-status bumblebees, and special-status plants
Miller Lake Pumps and Structure	Onsite cover consists mainly of mature riparian woodland surrounded by field crops; adjacent cover is similar to the onsite cover.	Potential for nesting birds, Swainson's hawk, white-tailed kite, non-listed raptors, tree-roosting bats; western pond turtle, valley elderberry longhorn beetle, and special-status plants
Schafer Drop (Drop 12 on MLM) Long-crested Weir	Onsite cover is mostly barren canal bank and road, but the surrounding cover is almost entirely orchard with scattered large valley oaks.	Potential for burrowing owl, nesting birds, non-listed raptors, tree-roosting bats, and special-status plants

TABLE 2

BIOLOGICAL CONDITIONS ASSOCIATED WITH REPRESENTATIVE MODESTO IRRIGATION DISTRICT PROJECTS

Project	Onsite and Adjacent Land Cover/Vegetation Types	Known and Potential Sensitive Biological Resources
Upper Main Canal – Emergency Spill at Upper Dominici Weir	Onsite cover consists of riparian woodland, canal levee and bank, and ruderal vegetation; adjacent cover included the Salida Sanitation District facilities, orchard, and field crop (rice?).	Potential for nesting birds, Swainson's hawk, white-tailed kite, non-listed raptors, tree-roosting bats, western pond turtle, valley elderberry longhorn beetle, and special-status plants
Measurement and Automation		
OID Cavil Spill – SCADA Integration	Onsite cover consists of levees, canal banks, and turn-around areas; adjacent cover consists of riparian woodland, field and row crops, and rural development.	Potential for nesting birds, Swainson's hawk, white-tailed kite, non-listed raptors, tree-roosting bats, western pond turtle, and special-status plants
OID Spill at Pelton Weir – SCADA	Onsite cover consists of canal bank and access road surrounded by rural development with scattered large trees; blackberry stands, mulberry trees, and weeping willow are immediately offsite.	Potential for nesting birds, non-listed raptors, Swainson's hawk, white-tailed kite, burrowing owl, tricolored blackbird, and special-status plants
Scow Drop Measuring Weir	Onsite cover is mostly barren canal bank and road, but the surrounding cover is entirely orchard apart from a large stock pond to the north and the Tuolumne River to the south.	Potential for burrowing owl, nesting birds, non-listed raptors, tree-roosting bats, and special-status plants
Trash Rack Improvements - Lateral 8 - Other Highway 99 crossings	Onsite cover consists of barren ground surrounded by urban development immediately east of State Route 99.	Potential for nesting birds

Notes: 1 - The projects in Table 2 reflect only those project sites that were visited and evaluated for their biological resources. In addition, these projects were selected given that they are representative of the types and geographic distribution of projects under the Proposed Program.

CONCLUSIONS AND RECOMMENDATIONS

Given that the May 2018 and May 2019 reconnaissance-level surveys were not focused surveys for specific special-status species, the following process is recommended to determine if such species are likely to be adversely affected by projects included in the Proposed Program:

1) Conduct geographic information system (GIS) analysis to determine if any special-status species occurrences in the CNDDB have been documented within the potential area of effect for the project.

2) Conduct preconstruction survey to determine if suitable habitat is present and warrants any species-specific focused surveys (note that the reconnaissance-level survey may be required a year or more in advance of the project to ensure compliance with timing requirements of some protocol surveys).

3) If necessary, conduct focused protocol surveys consistent with the protocols identified in Table 3 or with the most current agency-approved protocol for a given species.

4) Implement recommended mitigation measures (as identified) for all special-status species that would be potentially affected by construction and maintenance of each project associated with the Proposed Program.

5) Consult with CDFW and/or USFWS if evidence of state- or federally listed species is found in the potential area of effect, and implement mitigation measures recommended by the agencies to avoid "take" of individuals and "destruction or adverse modification" of designated critical habitat.

TABLE 3

RECOMMENDED SPECIAL-STATUS SPECIES SURVEYS FOR PROJECTS ASSOCIATED WITH THE PROPOSED PROGRAM

Survey Type	Survey Notes
Focused survey for special-status plants	Survey conducted consistent with Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW 2018) within all project sites (and out to 100 feet) where potentially suitable habitat is present.
Focused survey for special-status vernal pool invertebrates (e.g., vernal pool fairy shrimp)	Survey conducted consistent with Survey Guidelines for the Listed Large Branchiopods (USFWS 2015) where suitable habitat is present onsite or within 250 feet of project.

TABLE 3

RECOMMENDED SPECIAL-STATUS SPECIES SURVEYS FOR PROJECTS ASSOCIATED WITH THE PROPOSED PROGRAM

Survey Type	Survey Notes
Focused survey for valley elderberry longhorn beetle	Survey conducted consistent with Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) (USFWS 2017).
Focused survey for Molestan and Moestan blister beetles	Survey conducted as a minimum of two visits with one visit no less than 14 days prior to construction (at least 30 days between visits during April 1 to July 15) where suitable habitat is present
Focused survey for obscure, Crotch, western, and Morrison bumble bees	Survey for nests of species will be conducted by a qualified biologist as a minimum of two visits during June 15 to September 15 (i.e., peak active season of the species) with at least 30 days between visits.
Focused survey for special-status vernal pool amphibians (e.g., CTS and western spadefoot)	Survey conducted consistent with Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander (USFWS and CDFG 2003) where suitable habitat is present.
Focused survey for western pond turtle	Survey conducted during any dewatering or dredging of a water feature that is potentially suitable habitat for western pond turtle.
Focused survey for Blainville's horned lizard	Survey conducted concurrently with surveys for special-status bumble bees, burrowing owl, and American badger given overlap in suitable habitat with the horned lizard and compatible survey strategies for each of these species – survey conducted during the activity period of the horned lizard (April 1 to October 15).
Focused survey for nesting birds	Survey conducted as a minimum of two visits during 14 days prior to construction (at least 1 week between visits) if project commences between February 1 and August 15 (at and within 100 feet of project except for non-listed raptors where a threshold of 400 feet applies).
Focused survey for large wader colonial nest sites (great blue heron and great egret)	Survey conducted as a single visit prior to "leaf out" (i.e., prior to March 1) to locate colonial nest sites followed by a second visit to confirm previously found sites are active (April 1 to June 1)
Focused survey for nesting Swainson's hawk and white-tailed kite	Survey conducted consistent with Staff Report Regarding Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California (CDFG 1994) along the Planada Canal within and up to 0.25 mile from project site.

TABLE 3

RECOMMENDED SPECIAL-STATUS SPECIES SURVEYS FOR PROJECTS ASSOCIATED WITH THE PROPOSED PROGRAM

Survey Type	Survey Notes
Focused survey for burrowing owl	Survey conducted consistent with Staff Report on Burrowing Owl Mitigation (CDFG 2012) along all roads and levees and within all other non-agricultural, low, sparse vegetation types within the project site (and out to 250 feet) where suitable habitat is present.
Focused survey for nesting tricolored blackbird colonies	Survey conducted as a minimum of two visits at and within 250 feet of project at least 14 days prior to construction (at least 30 days between visits) if project commences during breeding season (i.e., between February 15 and July 15).
Focused survey for non-tree roosting bats	Survey conducted to find roosting bats or evidence of roosting bats (i.e., guano, urine stains, etc.) within structures proposed for demolition or refurbishing during 14 days prior to construction.
Focused survey for tree roosting bats (e.g., western red bat and hoary bat)	Survey conducted to find evidence of tree roosting bats in trees proposed for removal or where other trees are within 120 feet of trees proposed for removal – detection will be conducted through the use of appropriate acoustic equipment to record calls of the target species and will be conducted for 2 consecutive nights during 7 days prior to construction.

The following mitigation measures are recommended for the species described in Table 1 of Appendix A that are considered to have some potential to occur within or immediately adjacent to a proposed project site (i.e., within the potential area of effect).

Sanford's Arrowhead

Adverse effects to Sanford's arrowhead (*Sagittaria sanfordii*) will be mitigated as follows:

- No less than 25 percent of the potentially affected plugs (1 foot by 1 foot by 1 foot), with no fewer than three individual Sanford's arrowhead plants per plug, will be transplanted to an unlined portion of the occupied canal(s) located immediately downstream from the project boundaries. The plug source locations shall be selected randomly to assure the greatest potential genetic diversity of the plants.
- The transplantation program shall not be bound by any survivorship monitoring standards because it is expected that some of the source population will be unaffected by the project. However, the applicant will monitor the transplanted Sanford's arrowhead to evaluate the efficacy of such transplantation as it relates to future mitigation efforts for this species.

Monitoring shall occur for 3 consecutive years after transplantation, and a final report shall be submitted to CDFW by October of the final year of monitoring.

Other Special-status Plants

Adverse effects to other special-status plants will be mitigated consistent with the Policy on Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants (CNPS 1998) and will be accomplished through conference and coordination with CNPS. CNPS endorses the following measures:

- avoiding the impact altogether by not taking a certain action;
- minimizing the impact by limiting the degree or magnitude of the action;
- rectifying the impact by repairing, rehabilitating or restoring the impacted environment;
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of the project; and
- compensating for the impact by replacing or providing substitute resources or environments elsewhere.

Multiple measures may be necessary to effectively mitigate adverse effects to a given plant species but will always be at the discretion of MID if the measures can be reasonably expected to avoid, minimize, or compensate for the anticipated effects.

Vernal Pool Crustaceans

Adverse effects to federally listed and other special-status vernal pool crustaceans will be mitigated through formal consultation with USFWS with the likely consulting federal agency being the U.S. Army Corps of Engineers (USACOE). USACOE's guidelines for formal consultation include the following. (Note: This assumes the Proposed Program will have some form of federal nexus. If that is not the case, mitigation will be required through Section 10 of the ESA).

- The precise location of the project site clearly delineated on either an original or high-quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5-minute, 1 inch = 24,000 inches). The map should include quad name(s); county name; project name; type of project by category (development or other [specify]); and townships(s), ranges(s), section(s) in which the project is located.
- Detailed map(s) of proposed project site. The map should include potential habitat of listed vernal pool plants and invertebrates (i.e. vernal pools, swales, and other areas that pond water in winter-spring) onsite and on adjacent property where vernal pool complexes cross property boundary; other special-status species locations/habitats; location(s) of any proposed onsite reserves; location(s) of all proposed project features (buildings, roads, parking lots, bike trails, hiking paths, fences, irrigated and non-native landscaped areas, detention basins, recreation fields, parks, and any other open spaces, etc.; location(s) of

existing infrastructure within proposed reserves such as power lines, easements, pipelines or any other underground structures for which access and maintenance privileges exist; spatial buffers between the project features and avoided vernal pool resources; and watershed boundaries of wetlands, both avoided and affected to assist in evaluation of indirect effects.

- Area (in acres) directly and indirectly affected by the proposed project, including: total area of the project; estimated area of listed vernal pool species habitat filled/destroyed, including effects of interrelated and interdependent actions; estimated area of habitat of listed vernal pool crustaceans indirectly affected; estimated size of buffer between the project features and adjacent avoided or preserved area(s); land use of properties adjacent to both affected area(s) and avoided or preserved area(s); and map or discussion describing hydrological relationships of both affected and avoided wetlands with adjacent properties.
- Any conservation plan and/or conservation measures that the applicant proposes. To expedite consultation, such plans and measures should be developed during the informal consultation process with USFWS, prior to initiation of formal consultation, and should include the following: specific provisions for endowments for future management, maintenance, and ownership of any vernal pool reserves included in the conservation proposal; specific locations and construction methods for any compensatory wetlands; and monitoring protocols, success criteria, and remediation protocols for any compensatory wetlands.
- A survey is required for any listed vernal pool plants if the proposed project is within the range of such species. If presence of listed invertebrates is not assumed and the proposed project occurs in an area where USFWS does not assume presence of listed invertebrates in the watershed, protocol surveys are necessary.
- In coordination with the requirements of any formal consultation regarding federally listed vernal pool crustaceans, MID will implement measures consistent with the formal consultation and Draft Vernal Pool Mitigation and Monitoring Guidelines for U.S. Army Corps of Engineers South Pacific Division (USACOE 2016) for compensatory mitigation projects involving vernal pool habitats as required for processing of Department of the Army (DA) permits under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act.

Valley Elderberry Longhorn Beetle

Adverse effects to valley elderberry longhorn beetle will be mitigated consistent with the Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) (USFWS 2017). The framework provides specific detail and guidance for the implementation of mitigation. Mitigation measures in the framework include the following:

- Avoidance and minimization measures

- Transplanting of elderberries
- Monitoring
- Compensatory mitigation measures

Molestan and Moestan Blister Beetles

Adverse effects to Molestan or Moestan blister beetle will be mitigated as follows:

- If individuals of Molestan or Moestan blister beetle (poorly understood species) are found during the preconstruction survey, pertinent data regarding the associated habitat (e.g., vegetation communities, soils, associated invertebrate species, etc.) shall be collected to better understand the ecology of the species.
- All pertinent data collected during the preconstruction survey shall be included in the information submitted to CNDDB along with the new occurrence records.
- Construction involving ground disturbance (i.e., grading or excavation) within 50 feet of a documented occurrence will not start until after July 31 to minimize adverse effects to the species during its activity season.

Crotch, Morrison, Western, and Obscure Bumble Bees

Adverse effects to special-status bumble bees will be mitigated as follows:

- A survey for nests of special-status bumble bee species will be conducted by a qualified biologist as a minimum of two visits during June 15 to September 15 (i.e., peak active season of the species) with at least 30 days between visits. If bumble bee nests are found, they will be demarcated with exclusion fencing within 10 feet of the nest such that direct and indirect effects to the nest can be avoided until the end of the flight season (i.e., after November 15). If a nest is found in an area where it cannot be avoided while achieving the objectives of the project, it may be removed (particularly if it becomes an issue of health and safety). However, to the extent feasible, no known nest will be removed until after November 15 to minimize adverse effects to the species during its active season.

California Tiger Salamander and Western Spadefoot

Adverse effects to CTS (*Ambystoma californiense*) will be mitigated as follows:

- Concentrations of small mammal burrows and other suitable refugia that may support CTS will be avoided to the extent feasible. Prior to ground disturbance, linear routes will be mapped, marked in the field, and surveyed for burrows. Burrows within a vehicle access route that cannot be avoided and are susceptible to being crushed will be temporarily reinforced with PVC pipe or by other measures as deemed effective by a qualified biologist prior to allowing vehicle access (dry season only). Any reinforcing materials will be removed immediately after access is completed.

- Prior to any work within a project site with suitable CTS habitat or within 1 mile of suitable CTS habitat (or within 1 miles of known CTS occurrences where there is contiguous suitable habitat between the project and occurrence), a one-way exclusion fence will be established prior to the winter (i.e., prior to October 15) of the planned year of construction around the project site and will remain in place for the duration of the project. A qualified biologist will survey and delineate the fence route and be present during fence installation. Exit funnels or other appropriate exit structures for CTS will be provided no more than 60 feet apart along the entire fence alignment. The exclusion fence will be routinely inspected for repair for the duration of construction. Any damage, such as holes or gaps, will be repaired immediately.
- CTS found within a project site will be captured by hand, contained in a 2-gallon plastic bucket with lid, and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, otherwise under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation).
- Prior to any disturbance of potentially suitable aquatic CTS breeding habitat, a qualified biologist will conduct presence/absence surveys within the habitat in concurrence with the Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander October (USFWS and CDFG 2003).
- Prior to the start of work each morning within the CTS exclusion fence, a qualified biologist will check for CTS under equipment and materials that are to be moved that day. The qualified biologist will also check all excavated steep-walled holes or trenches for CTS. CTS will be removed by the qualified biologists and relocated immediately to the outside of the nearest portion of the exclusion fence (in a ground squirrel burrow if available, otherwise under a 2-foot by 2-foot piece of plywood covered with styrofoam insulation).
- A 10-mile-per-hour speed limit will be enforced at all project sites, except on roads with a posted speed limit. On roads with posted speed limits, construction traffic will be limited to the minimum safe speed.
- If dead or injured CTS are found, the qualified biologist will consult with USFWS and CDFW to determine which, if any, additional protection measures will be implemented. These measures may include, but are not limited to, lower traffic threshold, more intensive monitoring, or controlled arrival and departures of construction traffic.
- Implementation of the above measures that address CTS also apply to western spadefoot (*Spea hammondii*) and will also mitigate/compensate for potential adverse effects to this species within and adjacent to project sites.

Western Pond Turtle

Adverse effects to western pond turtle (*Actinemys marmorata*) will be mitigated as follows:

- During dewatering or dredging of any canal that is potentially suitable for western pond turtle, the applicant shall retain a qualified biologist to monitor the water-related activity and salvage any stranded western pond turtles that are observed. Salvage shall be conducted by net, and all individuals will be relocated to a downstream portion of the associated canal at least 500 feet downstream of the nearest boundary of the project site that has at least 300 linear feet of continuous aquatic habitat. Any non-native turtles (e.g., red-eared slider [*Trachemys scripta elegans*]) that are salvaged will not be released to the wild. The applicant will consult with CDFW regarding the disposition of these latter individuals.
- When removing the top 12 inches of soil from any relatively undisturbed edge habitat on or near the project site (i.e., ungraded road shoulders and field edges that could provide potential egg-laying sites), the applicant will use a qualified biologist as a "spotter" whose responsibility is to watch for western pond turtle eggs or neonates that are overturned during earthmoving. If eggs or neonates are found, all earthmoving activities within 30 feet of the eggs or neonates will be temporarily halted until the eggs or neonates can be salvaged. The eggs or neonates will then be delivered to a nearby qualified wildlife rescue and rehabilitation facility that has been approved by CDFW. The eggs or neonates will be held by the wildlife rescue and rehabilitation facility until they are ready for release into downstream portions of the associated canals (i.e., at least 500 feet downstream from the nearest project boundary). Once the top 12 inches of soil have been removed, no further monitoring for western pond turtle eggs or neonates is required given that western pond turtle nests are shallow (i.e., less than 6 inches in depth).

Northern California Legless Lizard

Adverse effects to northern California legless lizard (*Anniella pulchra*) will be mitigated as follows:

- A preconstruction survey to identify suitable habitat for northern California legless lizard will be conducted no more than 30 days prior to initial ground-disturbing activities at a project site.
- When removing the top 12 inches of soil from any construction activity area that has previously been identified as potentially suitable habitat for northern California legless lizard, the applicant will use a qualified biologist as a "spotter" whose responsibility is to watch for individuals of the species that are overturned during earthmoving. If neonates or adults are found, all earthmoving activities within 30 feet of the legless lizards will be temporarily halted until the individuals can be salvaged. The individuals will then be delivered to a nearby qualified wildlife rescue and rehabilitation facility that has been

approved by CDFW. The individuals will be held by the wildlife rescue and rehabilitation facility until they are ready for release back to the project site (i.e., upon completion of remediation activities). Once the top 12 inches of soil has been removed, no further monitoring for northern California legless lizard individuals is required. Where suitable habitat for northern California legless lizards and egg-laying by western pond turtles overlap, both surveys can be conducted concurrently.

Blainville's Horned Lizard

Adverse effects to Blainville's horned lizard (*Phrynosoma blainvillii*) will be mitigated as follows:

- Preconstruction visual surveys for horned lizards will be conducted weekly beginning 30 days prior to initial ground-disturbing activities at any project site where prior evidence of the species has been obtained. All horned lizards found within and out to 50 feet from the project footprint will be captured and released into designated relocation areas approved by a qualified biologist.
- "Coverboards" will also be used to capture horned lizards. Coverboards will consist of untreated plywood at least 4 feet by 4 feet. Coverboards will be placed flat on the ground at least 30 days prior to construction and checked once a week. Captured horned lizards will be placed immediately into 5-gallon buckets containing sand and kept at a constant cool temperature. Horned lizards will be released in designated relocation areas no more than 1 hour after capture.
- During all initial grading activities (i.e., first 12 inches of soil), a qualified biologist will be present as a "spotter" to salvage any horned lizard that may be excavated or unearthed with native material. If the individuals are in good health, they will be immediately relocated to the designated relocation area. If they are injured, the individuals will be held by a local wildlife rescue and rehabilitation facility until they are ready for release back to the project site (i.e., upon completion of all construction and related activities).

Nesting Birds

The following measures are recommended to avoid adverse effects to nesting birds including Nuttall's woodpecker (*Dryobates nuttallii*), yellow-billed magpie (*Pica nutalli*), oak titmouse (*Baeolophus inornatus*), loggerhead shrike (*Lanius ludovicianus*), song sparrow (*Melospiza melodia*), and California horned lark (*Eremophila alpestris actia*), but not including Swainson's hawk (*Buteo swainsoni*), burrowing owl (*Athene cunicularia*), or other special-status raptor species that nest within or immediately adjacent to the project site:

- If construction occurs during the bird nesting season (generally February 1 through August 31), preconstruction nesting bird surveys (two visits at least 1 week apart) will be conducted by a qualified biologist within the 14 days prior to construction to detect the presence of any nesting birds within or adjacent to the proposed project (within 400 feet for non-special status raptors and within 100 feet for all other non-special-status birds). If

construction occurs outside of the bird nesting season (September 1 through January 31), preconstruction surveys are not required.

- If the preconstruction nesting bird surveys detect actively nesting birds, the results of the surveys shall be submitted to CDFW within 3 days of completing the surveys. If any active non-special-status bird nests are found onsite, the applicant shall avoid initiating any construction activities within the standard buffers described above (i.e., 400 and 100 feet as appropriate). The applicant will then develop and implement a plan for the protection and monitoring of these nests, to be approved by CDFW, in a timely manner. The results of any protective measures instituted as a part of the protection and monitoring plan shall be provided to CDFW in electronic format within 1 week of implementation.

Great Blue Heron and Great Egret

The following measures are recommended to avoid adverse effects to nesting colonies of great blue heron (*Ardea herodias*) and great egret (*Ardea alba*):

- Active nesting colonies of great blue heron or great egret will be avoided with a 400-foot buffer between the colony and active construction that uses heavy equipment or that involves tree removal.
- Minor modification activities may occur if they are short term in duration (3 days or less), do not use heavy machinery, do not remove more than 900 square feet of vegetation, and avoid all activities within a 250-foot buffer between an active colony and construction activities.
- If construction is initiated during the non-nesting season (September 1 through January 31), construction activities may occur within 100 feet of the nearest portion of the nest colony site. However, no woody vegetation (particularly large trees) within 200 feet of the nest colony site may be removed.

Swainson's Hawk and White-tailed Kite

Adverse effects to nesting Swainson's hawks (*Buteo swainsoni*) and white-tailed kites (*Elanus leucurus*) will be mitigated as follows:

- If active Swainson's hawk or white-tailed kite nests are detected during preconstruction surveys, a no-disturbance buffer zone of 500 feet will be implemented during the nesting season (March 1 through September 15) or until August 15 if Management Authorization is provided by CDFW (SHTAC 2000). Furthermore, a nest monitoring plan will be developed and implemented for all active nests. If monitoring demonstrates that nesting individuals are being adversely affected, the no-disturbance zone will be increased in 100-foot increments until all adverse effects are eliminated.
- Compensation for loss of suitable Swainson's hawk foraging habitat (mostly with reservoir construction) will be conducted as follows: habitat acquisition (through fee title or

conservation easement) at a 1:1 ratio for nest sites within 1 mile; 0.75:1 for nest sites within 5 miles, 0.5:1 for nest sites within 10 miles. Habitat acquisition can be "stacked" with mitigation for loss of agricultural land if the acquired land is planted in a suitable crop for Swainson's hawk foraging in 3 out of every 5 years. Compensation for loss of suitable white-tailed kite foraging habitat will be conducted concurrently with compensation for loss of suitable Swainson's hawk habitat.

Burrowing Owl

Adverse effects to burrowing owls (*Athene cunicularia*) will be mitigated as follows:

- The results of preconstruction surveys for burrowing owl, including negative findings, will be submitted to CDFW within 3 days of survey conclusion. If burrowing owls are found during the nesting season (i.e., February 15 through August 31), no ground disturbance will occur within 250 feet of occupied burrows until a qualified biologist determines that fledging has occurred (i.e., the juveniles are no longer dependent on the nest burrows). If burrowing owls are found during the non-nesting season (i.e., September 1 through February 14), no ground disturbance will occur within 160 feet of occupied burrows.
- Alternatively, the applicant may retain a qualified biologist to conduct passive relocation of individuals from occupied burrows using one-way doors for a minimum of 3 consecutive days (only during the non-nesting season). Once the occupied burrows have been cleared, the applicant may backfill the burrows. If passive relocation is used, the applicant will also provide alternate natural or artificial burrows that are beyond 160 feet from the impact area and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair of relocated burrowing owls. One alternate natural or artificial burrow will be provided for each burrow that will be excavated within the project site. Artificial burrow creation, if used, will follow the guidelines in Trulio (1995) and the Staff Report on Burrowing Owl Mitigation (CDFG 2012). The applicant will be responsible for reporting all observations of burrowing owl to CNDDB within 10 days of the sighting.

Tricolored Blackbird

Adverse effects to nesting tricolored blackbird (*Agelaius tricolor*) colonies will be mitigated as follows:

- MID will prepare a habitat management plan (HMP) and incidental take permit application for submittal to and approval by CDFW prior to any loss of suitable nesting habitat for tricolored blackbird on a project site. The HMP will, at a minimum, include the below provisions.
    a) To avoid and minimize impacts to nesting tricolored blackbird, MID will not initiate grubbing, grading, or other soil/vegetation disturbance within 250 feet of project boundaries during the nesting season (March 15 through July 30). All

project soil/vegetation disturbance will occur between August 1 and March 14 to the extent feasible.

b) Alternatively, if MID initiates project soil/vegetation disturbance between March 15 and July 30, surveys will be conducted for prospecting or nesting tricolored blackbird colonies in all potentially suitable nesting habitats that are within and out to 250 feet from the project boundaries. The surveys will be conducted by a qualified biologist during the season immediately preceding initiation of the project. The surveys will be conducted according to the following schedule: a total of two visits during early March 15 to July 30 with at least 1 month between survey visits.

c) If nesting colonies are found prior to initiation of project soil/vegetation disturbance in the year of the survey, a no work exclusion zone will be established within 250 feet of each active nesting colony until a qualified biologist determines that the young-of-the-year are no longer reliant upon the nest site.

d) Alternatively, MID may retain a qualified biologist to conduct daily monitoring of any active nesting colonies that are within 250 feet or less from project soil/vegetation disturbance to determine if the individuals are exhibiting any behaviors that would suggest that nest failure could occur. If the qualified biologist determines that disturbance is enough to cause nest failure, all activities within 250 feet of the nesting colony will be terminated until the young-of-the-year are no longer reliant on the nest.

e) To compensate for the loss of known nesting habitat for tricolored blackbird on a project site, MID will plant and manage Himalayan blackberry (*Rubus armeniacus*) or California blackberry (*R. ursinus*) at a minimum 2:1 compensation ratio. The compensation stands of blackberry will be sited on the nearest suitable land controlled by MID or on nearby alternative land on which MID has acquired a conservation easement acceptable to CDFW. Compensation sites will be chosen to avoid any loss of existing natural wetland communities. Annual monitoring of the compensation stands will be conducted to determine if tricolored blackbirds are using the compensation habitat. If no evidence of use has been found after 5 years of monitoring, MID will be required to plant additional blackberry at a minimum 1:1 compensation ratio on other lands under MID control within Stanislaus County where there is no active episodic human disturbance that would preclude tricolored blackbirds from settling and nesting in the compensation habitat.

Tree-roosting Bats

Adverse effects to tree-roosting bats (i.e., western red bat [*Lasiurus blossevillii*] and hoary bat [*Lasiurus cinereus = Aeorestes cinereus*]) will be mitigated as follows:

- A qualified biologist will conduct a survey for tree-roosting bats at all suitable roosting habitat within 120 feet of the project boundaries. The survey will consist of the following: (1) daytime visual searches for individuals roosting in the foliage of onsite or adjacent large trees; and (2) evening Anabat or similar bioacoustics equipment surveys to show presence of foraging individuals. The surveys will be conducted on 2 consecutive days/nights during the 7 days prior to construction during months when these species may be present in the project area (i.e., March 1 to October 15).
- If the survey determines that individuals are present in onsite or adjacent roosting habitat (i.e., riparian woodland, orchards, or other nearby mature trees), no construction activities that result in fugitive noise, vibration, light, or dust shall occur within 120 feet of the roost site while it is occupied.
- Ongoing evening surveys will be continued until 2 consecutive nights without any nearby detections have occurred (other than during the pupping season) and will then be terminated. Construction must then start within the next 2 days.
- No additional evening surveys will be required at occupied sites and their 120-foot setback that are found during the pupping season (May 15 to July 15). Construction activities at such sites will be avoided until after mid-July. Construction must then start within the next 2 days.
- All project night-lighting shall be shielded and directed away from suitable roosting habitat.

Non-tree-roosting Bats

Adverse effects to non-tree-roosting bats will be mitigated as follows:

- A qualified biologist will conduct a survey for evidence of non-tree-roosting bats at any human structures onsite or within 100 feet of project boundaries (including bridges).
- Onsite day roosts will be avoided while the bat colony is present. A qualified biologist will assess when such roosts have been abandoned for the winter (typically early September to late-March). Removal, demolition, or reconstruction of structures can then proceed once cleared by the biologist.
- Work is not to occur within 100 feet of an active roost. Airspace access to and from the occupied structure should remain unchanged. Combustion equipment, such as generators, pumps, and vehicles, are not to be parked nor operated under or adjacent to the structure. Personnel are not to be present near the colony, especially during the evening exodus.

- Where work must occur in the area of a seasonal colony, bats are to be excluded from directly affected work areas prior to April 15 of the construction year. Exclusion is to be done selectively, and only to the extent necessary, to prevent morbidity or mortality to the colony. Expandable foam or other acceptable methods are to be used for exclusion. Exclusionary devices are to be removed between August 31 and April 15, once construction is complete. Airspace access to and from the bridge is not to be eliminated. Colony ventilation and protection is to remain the same. Clearing and grubbing is to be minimal, whenever possible. Combustion equipment, such as generators, pumps, and vehicles, are not be parked nor operated under or adjacent to the structure unless they are required to be in contact with the structure. The presence of personnel directly adjacent to the colony is to be minimized.
- Where work must occur in the area of a seasonal colony and the work requires either permanent demolition or substantial change of the structure, MID will consult with CDFW (for all bats) and USFWS (for federally listed species) in regards to construction, placement, and operation of temporary or permanent replacement habitat and monitoring. Such replacement habitat and monitoring will be consistent with the guidelines in California Bat Mitigation Techniques, Solutions and Effectiveness (Caltrans 2004).

American Badger

Adverse effects to American badger (*Taxidea taxus*) will be mitigated as follows:

- A preconstruction survey to identify suitable habitat for American badger will be conducted no more than 30 days prior to initial ground-disturbing activities at a project site.
- If the preconstruction survey determines that the project site supports potentially suitable habitat for American badger, the applicant will conduct preconstruction surveys for dens, burrows, or other subterranean structures (i.e., potential dens) that could be occupied by the species. The preconstruction surveys will be conducted within no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities. Appropriate exclusion zones around potentially occupied subterranean habitat will then be observed where feasible as follows until there is evidence of no continued use:

    a) Potential den - 50 feet

    b) Atypical den - 50 feet

    c) Known den - 100 feet

    d) Natal/pupping den - 200 feet

    Where infeasible to use an exclusion zone, limited destruction of potential dens will be conducted. Destruction of potential dens will be accomplished by careful excavation until it is certain that no American badgers are inside. The potential dens will be fully excavated,

filled with dirt, and compacted to ensure that individuals cannot re-enter or use the den during the construction period. If at any point during excavation an individual is discovered inside the den, the excavation activities will cease immediately; and monitoring of the den will be conducted. Destruction of the den will be completed when, in the judgment of the biologist, the individual has escaped, without further disturbance, from the partially destroyed den. Destruction of any known or natal/pupping den requires authorization from CDFW.

- Other applicable mitigation measures that address potential adverse effects to American badger include the following:

    a) Project-related vehicles will observe a daytime speed limit of 20 miles per hour throughout the site in all project areas, except on county roads and state and federal highways. Night-time construction will be minimized to the extent possible. However, if it does occur, the speed limit will be reduced to 10 miles per hour. Off-road traffic outside of designated project areas will be prohibited.

    b) To prevent inadvertent entrapment of American badgers or other animals during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen fill or wooden planks will be installed. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If at any time a trapped or injured American badger is discovered, CDFW will be immediately contacted.

    c) All food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in securely closed containers and removed at least once a week from the project site.

    d) No firearms will be allowed on the project site.

    e) No pets, such as dogs or cats, will be permitted on the project site to prevent the harassment or mortality of American badgers, or destruction of their dens.

    f) Use of rodenticides and herbicides in project areas will be restricted. This is necessary to prevent primary or secondary poisoning of individuals and the depletion of prey populations on which they depend. All uses of such compounds will observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation, as well as additional project-related restrictions deemed necessary by CDFW and USFWS. If rodent control must be conducted, zinc phosphide will be used because of its proven lower risk to American badger.

g) In the case of trapped animals, escape ramps or structures will be installed immediately to allow the animal(s) to escape, or CDFW and USFWS will be contacted for guidance.

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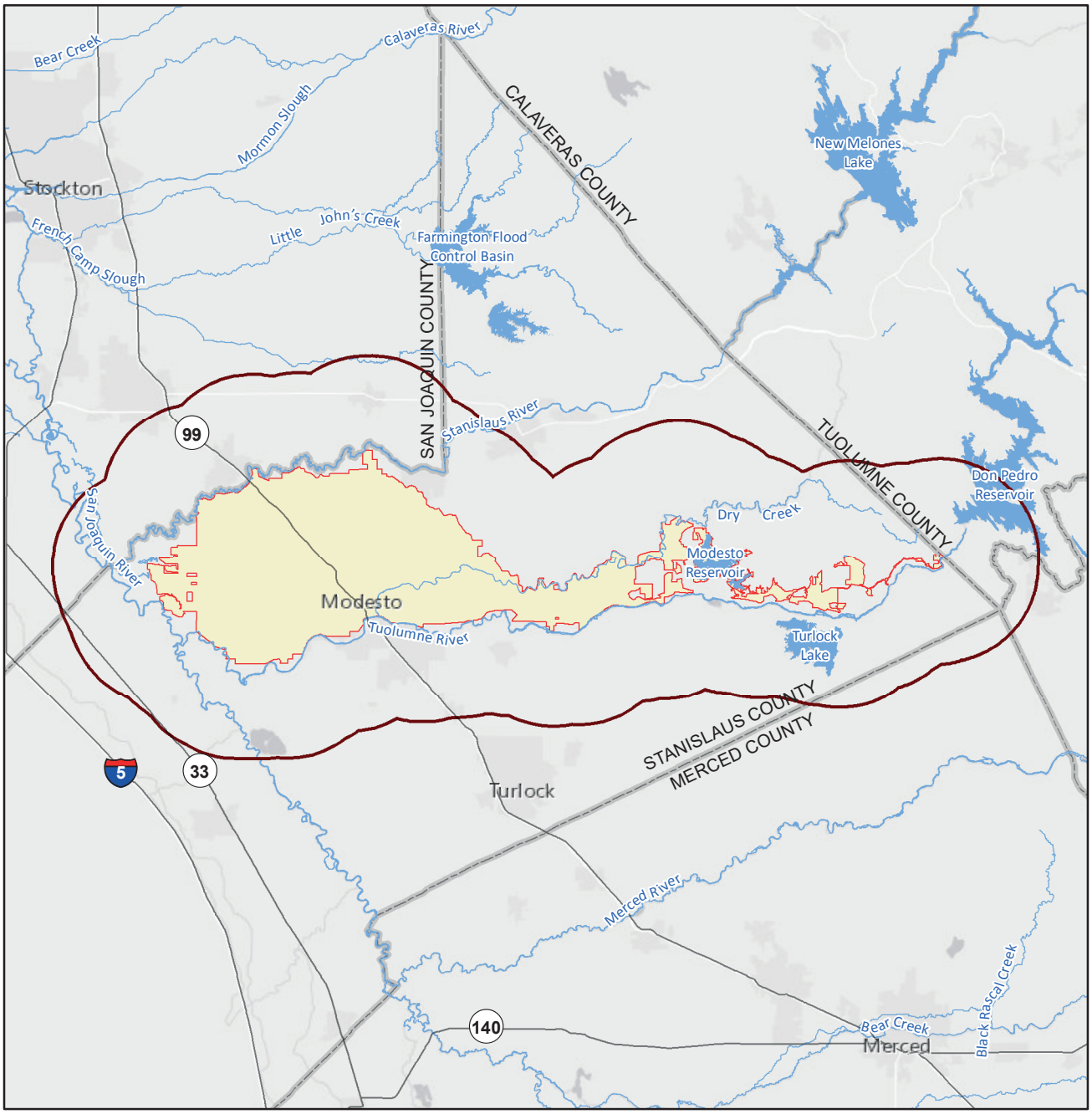
Figures



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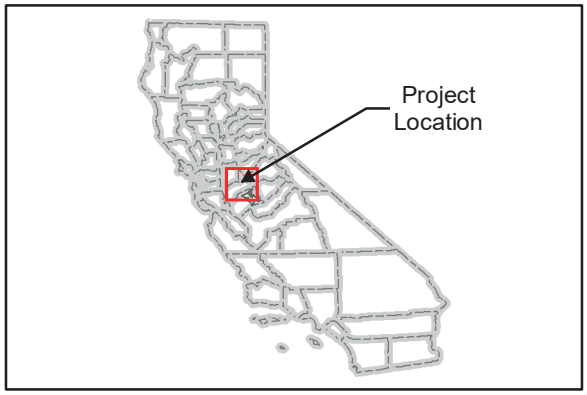


LEGEND

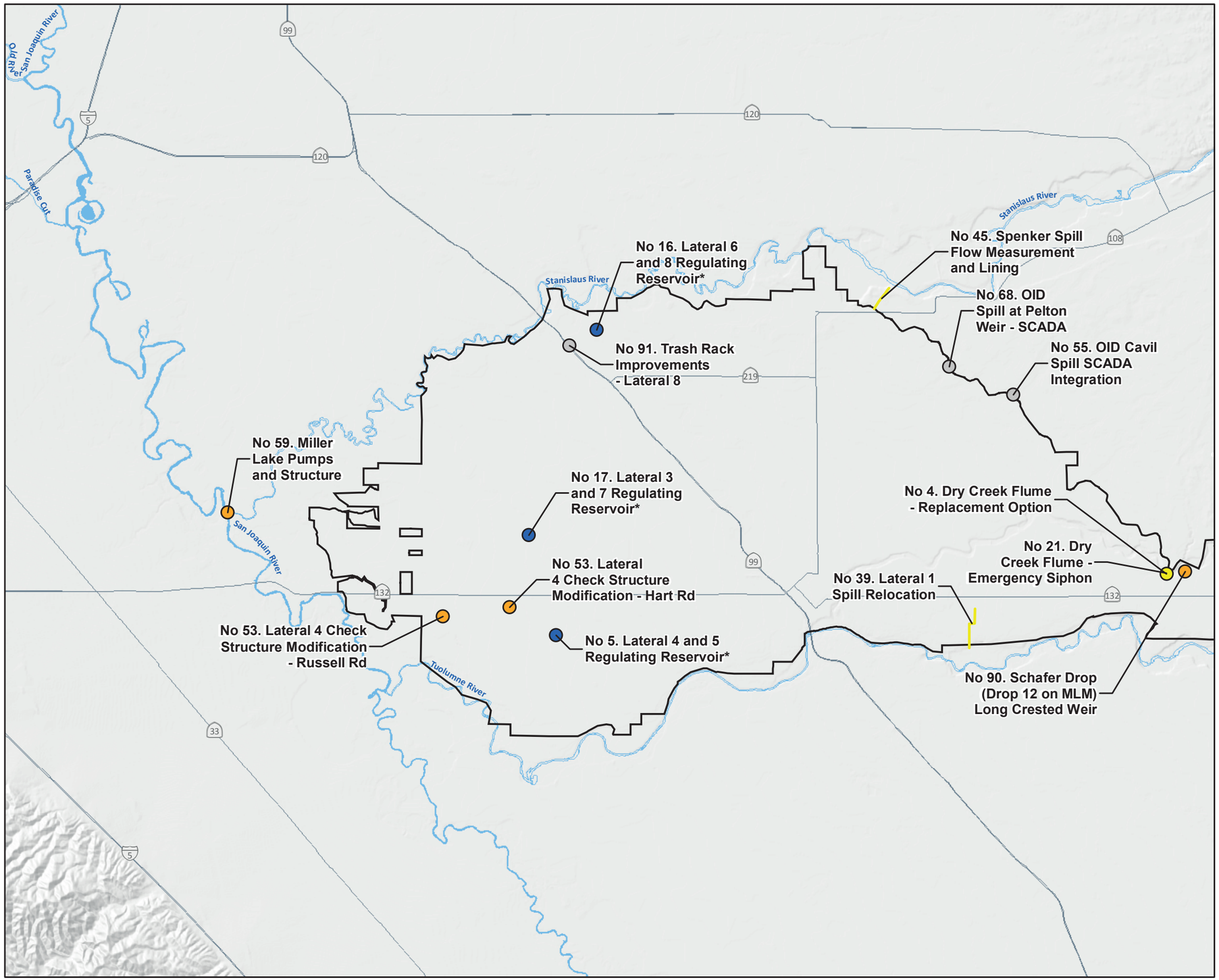
- Modesto Irrigation District Service Area
- 5-mile Buffer
- County
- Water Body
- River, Creek, Canal

N

0 3.5 7 14

Miles

FIGURE 1
Biological Resources Study Area
Modesto Irrigation District
Stanislaus County, California



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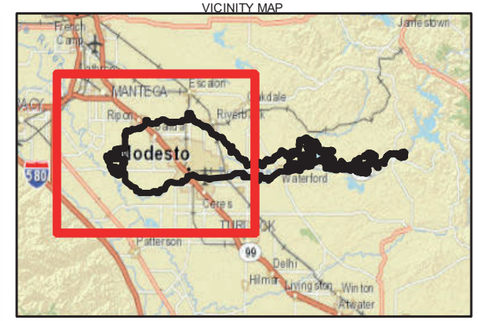


LEGEND

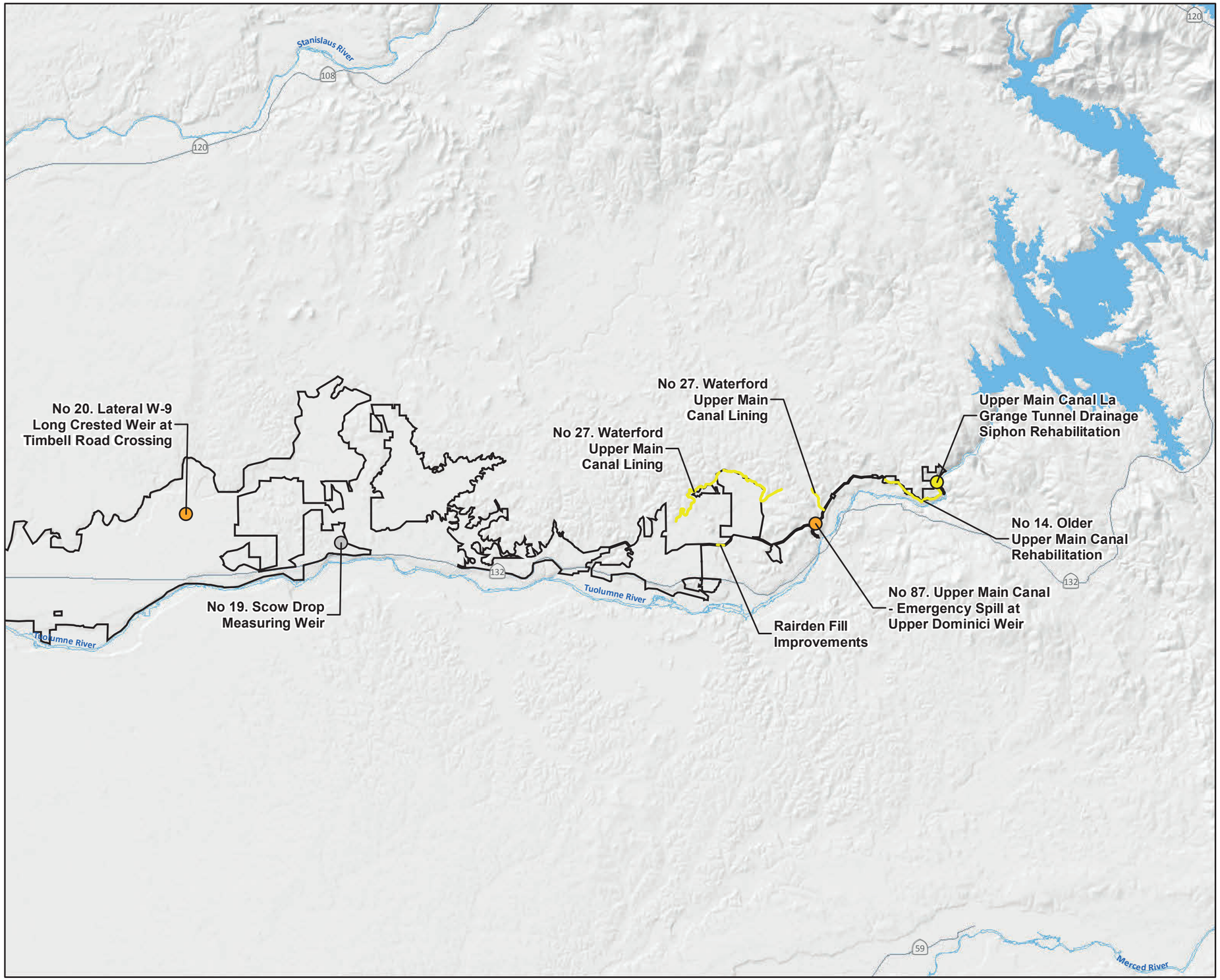
- Modesto Irrigation District Service Area
- Canal, Lateral, and Tunnel Improvements
- Flow Control
- Measurement and Automation
- Regulating Reservoirs*
- Canal, Lateral, and Tunnel Improvements

Note
*Representative locations only. Exact location of the regulating reservoirs could occur anywhere within the proposed locations shown on Figure 2-1 in the PEIR.

N

0 2 4
Miles

FIGURE 2a
Locations of Representative Projects Surveyed
Modesto Irrigation District
Stanislaus County, California



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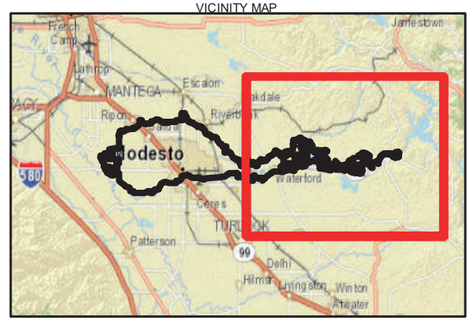

LEGEND

- Modesto Irrigation District Service Area
- Canal, Lateral, and Tunnel Improvements
- Flow Control
- Measurement and Automation
- Canal, Lateral, and Tunnel Improvements

N

0 2 4
Miles

FIGURE 2b
Locations of Representative Projects Surveyed
Modesto Irrigation District
Stanislaus County, California

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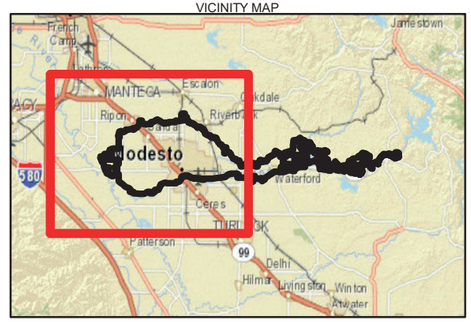
VICINITY MAP



LEGEND

- 5-mile Buffer
- Modesto Irrigation District Service Area
- California alkali grass
- Delta button-celery
- Greene's tuctoria
- big tarplant
- lesser saltscale
- prairie wedge grass
- slough thistle

Source: CNDDB, California Department of Fish and Wildlife, Sept 2018

N

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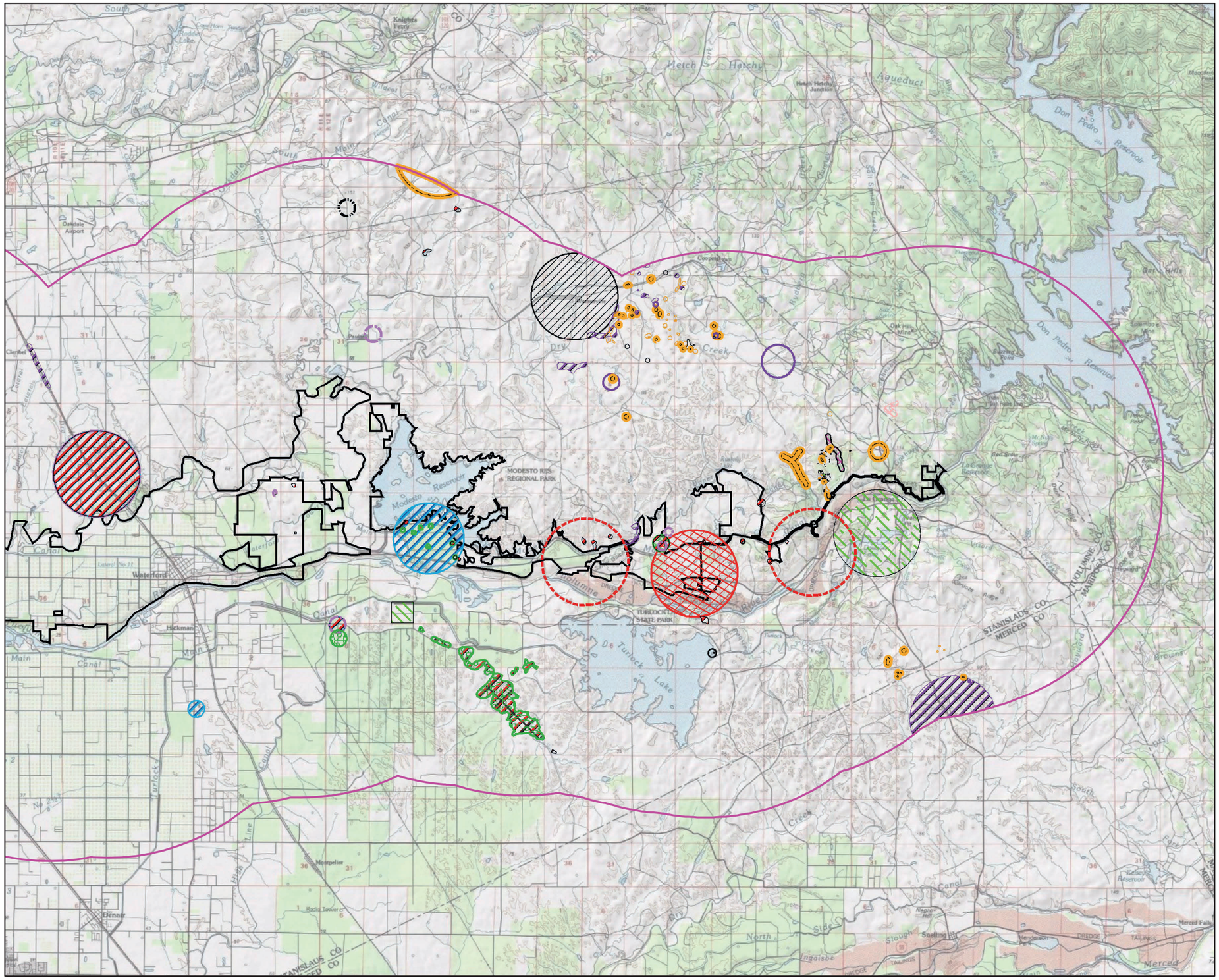
Miles

FIGURE 3a
Special-status Plants
Modesto Irrigation District
Stanislaus County, California

ch2m:



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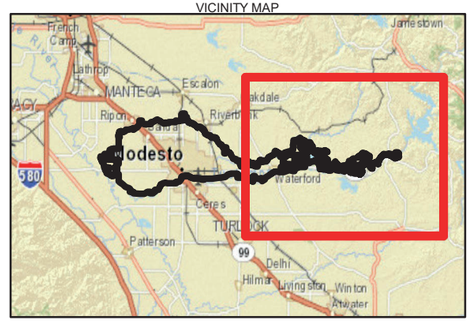


LEGEND

- 5-mile Buffer
- Modesto Irrigation District Service Area
- Colusa grass
- Delta button-celery
- Greene's tuctoria
- Hartweg's golden sunburst
- Hoover's calycadenia
- Hoover's cryptantha
- Hoover's spurge
- Mariposa cryptantha
- Merced monardella
- San Joaquin Valley Orcutt grass
- beaked clarkia
- dwarf downingia
- forked hare-leaf
- hairy Orcutt grass
- spiny-sepaled button-celery
- stinkbells
- succulent owl's-clover

Source: CNDDB, California Department of Fish and Wildlife, Sept 2018

N

0 2 4
Miles

FIGURE 3b
Special-status Plants
Modesto Irrigation District
Stanislaus County, California

ch2m

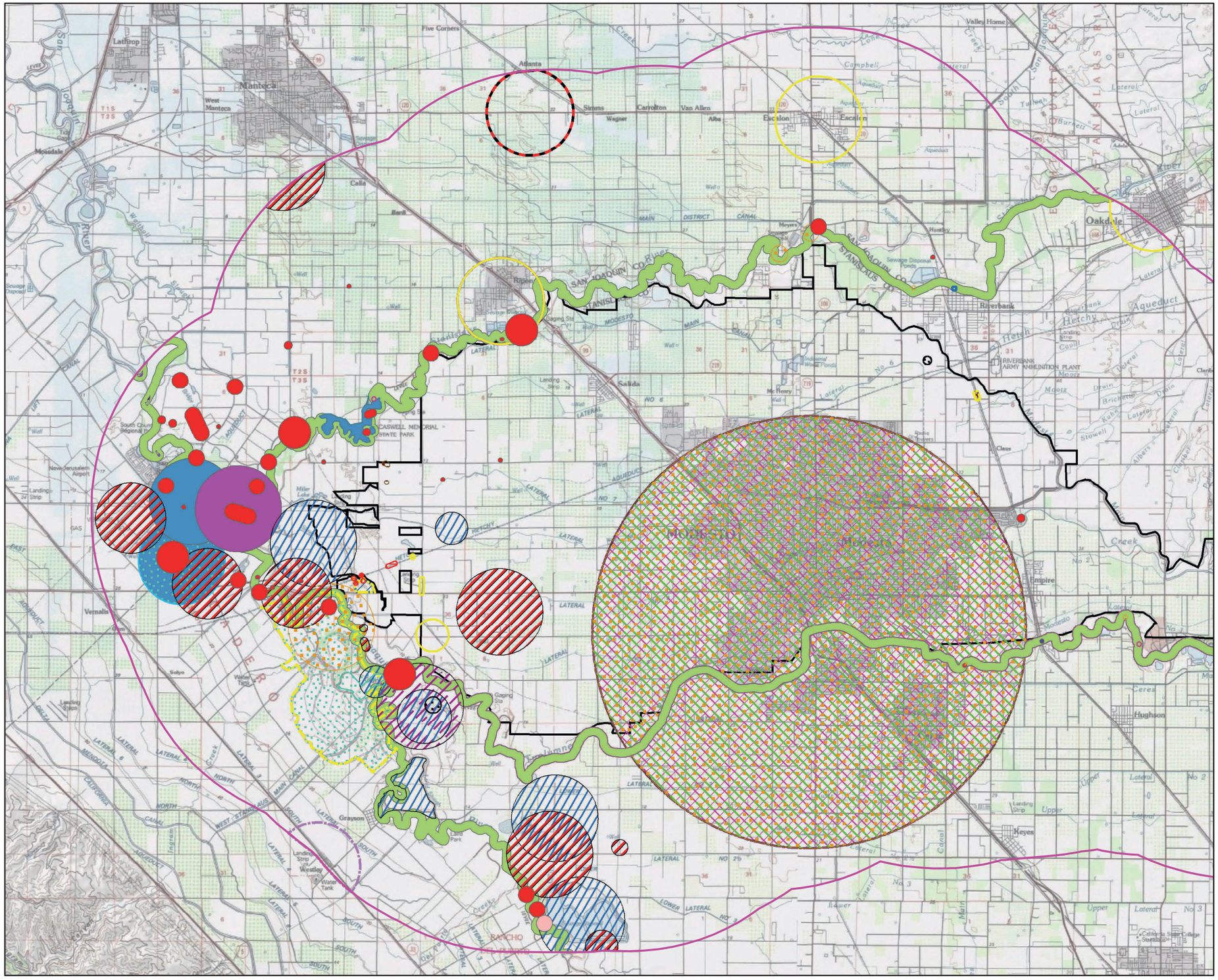
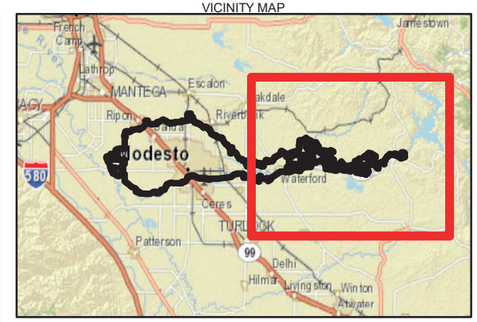


FIGURE 4a
Special-status Animals
Modesto Irrigation District
Stanislaus County, California

ch2m

VICINITY MAP



LEGEND

- Modesto Irrigation District Service Area
- 5-mile Buffer
- American badger
- California horned lark
- California linderiella
- California tiger salamander
- Merced kangaroo rat
- Morrison bumble bee
- San Joaquin kit fox
- Swainson's hawk
- Townsend's big-eared bat
- bald eagle
- hardhead
- least Bell's vireo
- mountain plover
- steelhead - Central Valley DPS
- tricolored blackbird
- valley elderberry longhorn beetle
- vernal pool fairy shrimp
- vernal pool tadpole shrimp
- western spadefoot

Source: CNDDB, California Department of Fish and Wildlife, Sept 2018

N

0 2 4
Miles

FIGURE 4b
Special-status Animals
Modesto Irrigation District
Stanislaus County, California

ch2m:

APPENDIX A

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

(provided only upon request due to number of pages)

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
		PLANTS		
Agrostis hendersonii	Henderson's bent grass	none/none/CNPS list 3.2	This species occurs in vernal pools and mesic areas of valley and foothill grassland in Calaveras, Merced, Shasta, and Tehama counties. It blooms from April to May.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and mesic areas of valley and foothill grassland) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Astragalus tener var. *tener*	alkali milk-vetch	none/none/CNPS list 1B.2	This milkvetch occurs in alkali playa, valley and foothill grassland, and vernal pools of the southern Sacramento Valley, northern San Joaquin Valley, and San Francisco Bay-Delta. It flowers from March to June.	**Potential to Occur**. No individuals of this taxon were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and mesic areas of valley and foothill grassland) does occur within the CIP area. Therefore, the taxon has some potential to occur within or adjacent to CIP project sites.
Atriplex cordulata var. *cordulata*	heartscale	none/none/CNPS list 1B.2	This annual saltbush occurs in chenopod scrub, valley and foothill grassland, and vernal pools (typically on alkaline soils and frequently in scalded areas). It is known from Alameda, Contra Costa, Butte, Fresno, Glenn, Kings, Kern, Madera, Merced,	**Potential to Occur**. No individuals of this taxon were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., chenopod scrub, valley and foothill grassland, and vernal pools) does occur within the CIP area. Therefore,

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			San Joaquin, Solano, Stanislaus, Tulare, and Yolo counties. It blooms from April to October.	the taxon has some potential to occur within or adjacent to CIP project sites.
Atriplex depressa	brittlescale	none/none/CNPS list 1B.2	This annual saltbush occurs in valley and foothill grassland, chenopod scrub, meadows, and playas (usually in alkali scalds, alkali clay meadows, or annual grassland). It is known from Alameda, Contra Costa, Butte, Fresno, Glenn, Kings, Kern, Madera, Merced, San Joaquin, Solano, Stanislaus, Tulare, and Yolo counties. The species blooms during May to October.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., chenopod scrub, valley and foothill grassland, and playas) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Atriplex minuscula	lesser saltscale	none/none/CNPS list 1B.1	This annual saltbush grows in sandy alkaline areas in chenopod scrub, playas, and valley and foothill grassland. It blooms from May to October. It is known from locations in Alameda, Butte, Fresno, Kern, Madera, Merced, Stanislaus, and Tulare counties.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., chenopod scrub, valley and foothill grassland, and playas) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Atriplex persistens	vernal pool smallscale	none/none/CNPS list 1B.2	This annual saltbush occurs in alkaline vernal pools. It has been recorded from Glenn, Merced, Solano, Stanislaus, and Tulare counties. It blooms from July to October.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., alkaline vernal pools) does occur within the CIP area. Therefore,

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
				the species has some potential to occur within or adjacent to CIP project sites.
Atriplex subtilis	subtle orache	none/none/CNPS list 1B.2	This annual saltbush is known from approximately 20 extant occurrences in Butte, Fresno, Kings, Kern, Madera, Merced, Stanislaus, and Tulare counties. It grows on alkaline soils in valley and foothill grassland and blooms during June to October.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., valley and foothill grassland) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Blepharizonia plumosa	big tarplant	none/none/CNPS list 1B.1	This annual herb blooms from July to October and is found in valley and foothill grassland (usually on clay). It has been recorded in Alameda, Contra Costa, San Joaquin, Solano, and Stanislaus counties.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., foothill grassland) does occur within the CIP area. Furthermore, the species is known from locations outside, but near the far western portion of the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
California macrophylla	round-leaved filaree	none/none/CNPS list 1B.2	This species occurs on clay soils in cismontane woodland and valley and foothill grassland from San Diego County north through the Coast Ranges to Lake County and in the valley and foothills of the San Joaquin and Sacramento valleys. It has also been	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., valley and foothill grassland) does occur within the CIP area.

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			recorded in Lassen County. It blooms from March to May.	Therefore, the species has some potential to occur within CIP project sites.
Calycadenia hooveri	Hoover's calycadenia	none/none/CNPS list 1B.3	An annual herb that blooms from July-September. It occurs in valley and foothill grassland (particularly in rocky soils). It has been recorded in Calaveras, Madera, Merced, Mariposa, and Stanislaus counties.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., valley and foothill grassland) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Castilleja campestris ssp. *succulenta*	succulent owl's-clover	FT/SE/CNPS list 1B.2	This subspecies is currently known from sites in eastern Merced, southeastern Stanislaus, Madera, San Joaquin and northern Fresno counties where it occurs on the margins of vernal pools, swales, and some seasonal wetlands (often on acidic soils). It blooms in May.	**Potential to Occur**. No individuals of this subspecies were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools, swales, and some seasonal wetlands) does occur within the CIP area. Therefore, the subspecies has some potential to occur within CIP project sites.
Chamaesyce hooveri	Hoover's spurge	none/none/CNPS list 1B.2	This annual herb occurs in vernal pools in valley and foothill grassland and blooms mostly during July, but flowering may persist as late as October if there is sufficient moisture. It has been recorded in Butte, Colusa, Glenn, Merced, Stanislaus, Tehama, and Tulare counties.	**Potential to Occur**. No individuals of this species were observed within or near the project site. However, suitable habitat (sandy soils in valley and foothill grassland) does occur within the CIP area and the species has been recorded in eastern Stanislaus County. Therefore, the species

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
				is considered to have some potential to occur within CIP project sites.
Cirsium crassicaule	slough thistle	none/none/CNPS list 1B.1	This annual to perennial herb blooms during May to August. It has been found in chenopod scrub, marshes and swamps (sloughs), and riparian scrub. Counties it has been recorded in include Kings, Kern, and San Joaquin.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat (marshes, chenopod scrub, and riparian scrub) does occur within the CIP area, the species has not been recorded within the CIP area. The nearest CNDDB occurrence is at least 4 miles west of the western-most portion of the CIP area. Therefore, the species is considered to have no potential to occur within CIP project sites.
Clarkia rostrata	beaked clarkia	FT/none/CNPS list 1B.3	The species is an annual that blooms from April to May and occurs in valley and foothill grassland and cismontane woodland. It has been recorded in Merced, Mariposa, Stanislaus, and Tuolumne counties.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., valley and foothill grassland) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Cryptantha hooveri	Hoover's cryptantha	none/none/CNPS list 1A	This annual species has been recorded on inland dunes and sandy soils in valley and foothill grassland. Occurrences have been recorded in Contra Costa, Kern, Madera, and	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat (sandy soils in valley and

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			Stanislaus counties. However, it is currently believed to be extinct since it has not been found since 1939. Blooming occurs during April to May.	foothill grassland) does occur within the CIP area, the species has not been recorded since 1939 and is considered extinct. Therefore, the species is considered to have no potential to occur within CIP project sites.
Cryptantha mariposae	Mariposa cryptantha	none/none/CNPS list 1B.3	This annual herb occurs in chaparral on rocky or serpentinite soils. It blooms from April to June and has been found in Calaveras, Mariposa, Stanislaus, and Tuolumne counties.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., chaparral on rocky soils) does occur within the CIP area. Furthermore, there are records just outside the CIP area near La Grange. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Downingia pusilla	dwarf downingia	none/none/CNPS list 2.2	This annual herb blooms from March to May and is known from Merced, Mariposa, Napa, Placer, Sacramento, Solano, Sonoma, Stanislaus, Tehama, and Yuba counties. It occurs in vernal pools and mesic grasslands.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and mesic valley and foothill grassland) does occur within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Eryngium racemosum	Delta button-celery	none/SE/CNPS list 1B.1	This annual and perennial species occurs in wet riparian areas and freshwater wetlands (typically on	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			seasonally inundated clay). Known occurrences have been documented in the northern San Joaquin Valley (Merced to Calaveras counties) and in Contra Costa, Marin, and Sonoma counties. Blooming occurs during June to September.	project sites within the CIP area. However, suitable habitat (i.e., wet riparian areas and freshwater wetlands) does occur within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Eryngium spinosepalum	spiny-sepaled button-celery	none/none/CNPS list 1B.2	This perennial species occurs in wet valley and foothill grassland and vernal pools. Known occurrences have been found in the San Joaquin Valley (Kern to Stanislaus counties), Contra Costa County, and along the Central Coast (Monterey and San Luis Obispo counties). Blooming occurs during April to May.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and mesic valley and foothill grassland) does occur within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Etriplex joaquiniana	San Joaquin spearscale	none/none/CNPS list 1B.2	This annual saltbush occurs in chenopod scrub, valley and foothill grassland, and alkali meadows (typically in seasonal alkali wetlands or alkali sink scrub). It is found in the Sacramento Valley, northern San Joaquin Valley, San Francisco Bay-Delta, and central Coast Ranges. It blooms from April to September.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., chenopod scrub, valley and foothill grassland, and alkali wetlands) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Fritillaria agrestis	stinkbells	none/none/CNPS list 4.2	This perennial bulbiferous herb occurs on clay, sometimes serpentinite, in chaparral, cismontane woodland,	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			pinyon and juniper woodland, and valley and foothill grassland. It blooms from March to June and has been found in Alameda, Contra Costa, Fresno, Kern, Mendocino, Merced, Monterey, Mariposa, Placer, Sacramento, Santa Barbara, San Benito, Santa Clara, Santa Cruz, San Luis Obispo, San Mateo, Stanislaus, Tuolumne, Ventura, and Yuba counties.	project sites within the CIP area. However, suitable habitat (i.e., cismontane woodland and foothill grassland) does occur within the CIP area. Furthermore, the species is known from locations near Turlock Lake. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Gratiola heterosepala	Boggs Lake hedge-hyssop	none/SE/CNPS list 1B.2	This annual species is found on clay soils of vernal pools, lake margins, and marshes in Fresno, Lake, Lassen, Madera, Merced, Modoc, Placer, Sacramento, Siskiyou, Shasta, San Joaquin, Solano, and Tehama counties. It blooms from April to August.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools, lake margins, and marshes) does occur within the CIP area. Therefore, the species is considered to have some potential to occur within or adjacent to CIP project sites.

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
Lagophylla dichotoma	forked hare-leaf	none/none/CNPS list 1B.1	The species is an annual that blooms from April to September and occurs in valley and foothill grassland and cismontane woodland (often on clay). It has been recorded in Butte, Calaveras, Fresno, Merced, Monterey, San Benito and Stanislaus counties.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., valley and foothill grassland) does occur within the CIP area and the species has some potential to occur in CIP project sites.
Legenere limosa	legenere	none/none/CNPS list 1B.1	This annual species is primarily located in vernal pools in the lower Sacramento Valley, but is also found in the north Coast Ranges, northern San Joaquin Valley, and Santa Cruz Mountains in Alameda, Lake, Monterey, Napa, Placer, Sacramento, Santa Clara, Shasta, San Joaquin, San Mateo, Solano, Sonoma, Stanislaus, Tehama, and Yuba counties. It is considered to be extirpated from Stanislaus County. It flowers from April to June.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Suitable habitat (i.e., valley and foothill grassland) does occur within the CIP area, but the species is believed to be extirpated from Stanislaus County and therefore has no potential to occur in CIP project sites.
Monardella leucocephala	Merced monardella	none/none/CNPS list 1A	This annual species is associated with wet, sandy valley and foothill grassland. It has been recorded in Kern, Mariposa, Merced, and Stanislaus counties, but is currently believed to be extinct. It blooms from May to August.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat (i.e., wet, sandy valley and foothill grassland) occurs within the CIP area, the species has only been recorded in

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
				Stanislaus County at two locations: [1] 9 miles east of Waterford, 1 mile north of Turlock Lake State Park and [2] 10 to 12 miles east of Waterford near an oil well). Nor has it been seen at these previously known locations since 1941. Therefore, the species is considered to have no potential to occur within CIP project sites.
Navarretia myersii ssp. *myersii*	pincushion navarretia	none/none/CNPS list 1B.1	This annual herb is known from fewer than 20 occurrences in Amador, Lake, Merced, and Sacramento counties. It blooms from April to May and occurs in vernal pools (sometimes on acidic soils).	**Potential to Occur**. No individuals of this subspecies were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools) does occur within the CIP area. Furthermore, occurrences have been documented in adjacent counties both north and south of Stanislaus County. Therefore, the subspecies has some potential to occur within or adjacent to CIP project sites.
Navarretia nigelliformis ssp. *radians*	shining navarretia	none/none/CNPS list 1B.2	The subspecies is an annual herb that occurs in vernal pools in valley and foothill grassland and cismontane woodland, but no further north than Merced County in the eastern San Joaquin Valley. It blooms from March to July and has been found in Fresno, Merced, Monterey, San Benito, and San Luis Obispo counties.	**No Potential to Occur**. No individuals of this subspecies were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though, suitable habitat (i.e., vernal pools in valley and foothill grassland, sometimes on clay) does occur within the CIP area, it has not been documented north of Merced County

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
				and therefore has no potential to occur within or adjacent to CIP project sites.
Navarettia prostrata	prostrate navarretia	none/none/CNPS list 1B.1	This species occurs on alkaline soils or in vernal pools in valley and foothill grassland and coastal scrub. It has been recorded in Merced, Alameda, and Monterey counties as well as southern coastal California (Los Angeles, San Bernardino, Orange, and San Diego counties). The species blooms from April to May.	**No Potential to Occur**. No individuals of this subspecies were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though, suitable habitat (i.e., vernal pools in valley and foothill grassland) does occur within the CIP area, it has never been documented north of Merced County and is considered to have no potential to occur within or adjacent to CIP project sites.
Neostapfia colusana	Colusa grass	FT/SE/CNPS list 1B.1	This grass occurs in vernal pools (typically larger or more persistent pools) and some manmade wetlands (e.g., stock ponds) within valley and foothill grassland. It is distributed primarily along the eastern margin of the San Joaquin Valley in Stanislaus and Merced counties, but also occurs in Solano and Yolo counties. It flowers from May to July.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools in valley and foothill grassland) does occur within the CIP area. Furthermore, two of six previous known occurrences in the CIP area are presumed extant. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Orcuttia pilosa	hairy orcutt grass	FE/SE/CNPS list 1B.1	This grass occurs in vernal pools (typically larger or more persistent pools) within valley and foothill grassland. It is distributed along the eastern margin of the Sacramento and	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat (i.e., persistent vernal

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Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			San Joaquin valleys from Tehama County south to Stanislaus, Merced, and Madera counties. It flowers from May to September.	pools) do occur within the CIP area, the two previously known occurrence within the CIP area are now extirpated. The previous occurrences were located 12 miles and 4-5 miles east of Waterford, but the species has not been found at either of these locations since at least 1978. Therefore, the species is considered to have no potential to occur within or adjacent to CIP project sites.
Orcuttia inaequalis	San Joaquin Valley orcutt grass	FT/SE/CNPS list 1B.2	This grass occurs in vernal pools (typically larger or more persistent pools) within valley and foothill grassland. The remaining populations of this species occur mostly in the southeastern San Joaquin Valley (Fresno, Merced, and Madera counties). Historically, the species also occurred in Stanislaus County. It flowers from April to September.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat (i.e., large persistent vernal pools) does occur within the CIP area, all previously known occurrences are now extirpated. Therefore, the species is considered to have no potential to occur within or adjacent to CIP project sites.
Phacelia ciliata var. *opaca*	Merced phacelia	none/none/CNPS list 1B.2	This taxon occurs in valley and foothill grassland (typically on clay soils, sometimes on alkaline soils). It blooms from February to May and is known from fewer than 10 extant occurrences in Merced and Kings counties.	**No Potential to Occur**. No individuals of this taxon were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat (i.e., valley and foothill grassland) does occur within the CIP area, the taxon has never been recorded in Stanislaus County and is considered to have

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Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
				no potential to occur within CIP project sites.
Potamogeton zosteriformis	eel-grass pondweed	none/none/CNPS list 2B.2	This annual aquatic herb occurs in assorted freshwater marshes and swamps. It blooms in June and July and has been found in Contra Costa, Lake, Lassen, Merced, Mono, Modoc, and Shasta counties.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat (i.e., freshwater marshes) does occur within the CIP area, the nearest occurrence (only occurrence in the eastern San Joaquin Valley) has been recorded from downstream of the Merced River Falls in Merced County. Hence, the species is considered to have no potential to occur within CIP project sites.
Pseudobahia bahiifolia	Hartweg's golden sunburst	FE/SE/CNPS list 1B.1	The species occurs in cismontane woodland and valley and foothill grassland (almost always on shallow, well-drained, fine-textured soils on the north or northeast facing side of Mima mounds). It has been recorded in Fresno, Madera, Tulare, and Stanislaus counties. Blooming occurs during March to April.	**Potential to Occur**. No individuals of this species were observed within or near the project site, though, suitable habitat (i.e., mimi mound topography) may occur within the CIP area (particularly the eastern-most portions of the CIP). Therefore, the species is considered to have some potential to occur at CIP project sites.
Puccinellia simplex	California alkali grass	none/none/CNPS list 1B.2	This annual herb occurs in alkaline, vernally mesic; sinks, flats, and lake margins in chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools. It has	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., alkaline, vernally

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			been recorded in Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, King, Kern, Lake, Los Angeles, Madera, Merced, Napa, San Bernardino, Santa Clara, Santa Cruz, San Luis Obispo, Solano, Stanislaus, Tulare, and Yolo counties. It blooms from March to May.	mesic; sinks, flats, and lake margins in chenopod scrub, meadows and seeps, valley and foothill grassland, and vernal pools) does occur within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Sagittaria sanfordii	Sanford's arrowhead	none/none/CNPS list 1B.2	This perennial species occurs in shallow, standing, fresh water and slow-moving waterways (e.g., marshes, ponds, vernal pools, lakes, reservoirs, sloughs, ditches, unlined canals, streams, and rivers) at elevations below 2000 feet. Though not found in Stanislaus County, occurrences have been documented from Shasta County to Tulare County on the valley floor and surrounding foothills. It blooms from late May to August.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., marshes, ponds, vernal pools, lakes, reservoirs, sloughs, ditches, unlined canals, streams, and rivers) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Sidalcea keckii	Keck's checkerbloom	FE/none/CNPS list 1B.1	This species is an annual that occurs on serpentine-derived clay soils in valley and foothill grassland and cismontane woodland. It blooms from April to June and has been recorded in Colusa, Fresno, Merced, Napa, Solano, Tulare, and Yolo counties, but is currently	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. In addition, suitable habitat (i.e., serpentinite soils in valley and foothill grassland) do not occur within the CIP area. In addition, only a single occurrence of the species has been

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			known from only Fresno and Tulare counties near Pine Flat Reservoir.	documented north of Fresno. Therefore, the species is considered to have no potential to occur within CIP project sites.
Tuctoria greenei	Greene's tuctoria	FE/CR/CNPS list 1B.1	This grass occurs in the dry bottoms of vernal pools in valley and foothill grassland. It is known to occur in Butte, Glenn, Merced, Shasta, and Tehama counties. Historically, it also occurred in Fresno, Madera, Stanislaus, San Joaquin, and Tulare counties. No known occurrences are now extant in Stanislaus County. It flowers from May through July.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat (i.e., vernal pools in valley and foothill grassland) does occur within the CIP area, four of the five known occurrences have been extirpated and no individuals have been found at the location of the fifth occurrence since 1974. Therefore, the species is considered to have no potential to occur within CIP project sites.
Verbena californica	Red Hills vervain	FE/SE/CNPS list 1B.1	This perennial herb occurs in mesic, usually serpentinite seeps or creeks in cismontane woodland or valley and foothill grassland. It is known only from the Red Hills in Tuolumne County. It blooms from May to September.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Furthermore, it is only known from the Red Hills in Tuolumne County. Therefore, the species is considered to have no potential to occur within or near CIP project site.
INVERTEBRATES				

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
Branchinecta conservatio	Conservancy fairy shrimp	FE/none/none	This species occurs in very large turbid vernal pools and playa pools underlain by clay substrates. There are relatively few occurrences of this species, but it is known from Tehama, Glenn, Solano, Stanislaus, and Merced counties with the only known occurrence in Stanislaus County (which is possibly extirpated) on the Mapes Ranch northeast of the intersection of Highway 132 and Mapes Ranch Road.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though, suitable habitat (i.e., large playa pools) does occur within the CIP area, no projects would be constructed in or adjacent to such features. Therefore, the species is considered to have no potential to be adversely affected at CIP project sites.
Branchinecta longiantenna	longhorn fairy shrimp	FE/none/none	This species has been found in clear water vernal pools in sandstone outcrops as well as clear to turbid clay- and grass-bottomed vernal pools. It is distributed along the eastern interface of the central Coast Ranges with the San Joaquin Valley (from Contra Costa and Alameda counties south to San Luis Obispo County), but also occurs on the valley floor in Merced NWR.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and similar seasonal wetlands) does occur within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Branchinecta lynchii	vernal pool fairy shrimp	FT/none/none	Occurs primarily in vernal pools (sandstone depression, grass swale, earth slump, or basalt-flow depression pools) in grassland and oak savannah of the Central Valley. However, the species also occurs at a few locations	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and similar seasonal wetlands) does occur

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			in the central Coast Ranges from Monterey County south to Santa Barbara County and in the South Coast Mountains in Riverside County.	within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Branchinecta mesovallensis	midvalley fairy shrimp	none/SA/none	This species occurs in small vernal pools and intermound pools within valley and foothill grassland (i.e., the smallest and most ephemeral vernal pools). It has been recorded from the central portion of the Central Valley from Sacramento and Solano counties south to Madera and Fresno counties.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and similar seasonal wetlands) does occur within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Lepidurus packardi	vernal pool tadpole shrimp	FE/none/none	Inhabits clear to turbid vernal pools and swales, stock ponds, and other seasonal wetlands in the Sacramento Valley and northern San Joaquin Valley (from Shasta County south to Merced and Tulare counties). It has also been recorded in three pools at the San Francisco Bay National Wildlife Refuge in Alameda County.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and similar seasonal wetlands) does occur within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Linderiella occidentalis	California fairy shrimp	none/SA/none	Occurs primarily in vernal pools and other seasonal wetlands in grassland and oak savannah of the Central Valley. However, the species has also been recorded at scattered locations in	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and similar seasonal wetlands) does occur

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			the Coast Ranges from Mendocino County south to Ventura County.	within the CIP area. Therefore, the species has some potential to occur within or adjacent to CIP project sites.
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	FT/none/none	The subspecies occurs at scattered locations in the Central Valley and adjacent foothills of the Sierra Nevada and Coast Ranges from Shasta to Fresno counties. The subspecies is entirely dependent upon its host plant (elderberry spp.), typically in riparian vegetation associations, but occasionally in single, isolated shrubs or stands of the plant.	**Potential to Occur**. No individuals of this subspecies were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., valley elderberry shrubs) does occur within the CIP area and near a small number of the surveyed CIP project sites. Given known CNDDB occurrences in the CIP area and the number of projects in or adjacent to riparian habitat that may contain elderberry shrubs, it is considered to have potential to occur within some CIP project sites.
Anthicus sacramento	Sacramento anthicid beetle	none/SA/none	This species has been found on sparsely vegetated fine-grained riverine sand deposits such as sand dunes, sand bars, riverine shorelines, and sandy dredge spoils. It is known from only a few sites in Butte, Glenn, Tehama, San Joaquin, Sacramento, Solano, and Yolo counties.	**No Potential to Occur.** There is no sand dune or similar habitat within or adjacent to the CIP area for this species. Furthermore, the nearest records (4 of the 13 known occurrences in the state) are all downstream on or near the San Joaquin River in San Joaquin County. Therefore, the species is considered to have no potential to occur within CIP project sites.
Lytta moesta	Moestan blister beetle	none/SA/none	Occurs primarily in valley and foothill grassland and oak savannah, including dried vernal pools, of the Central	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			Valley and adjacent Sierra Nevada foothills in Kern, Tulare, Fresno, Madera, Santa Cruz, and Stanislaus counties (April to July). The biology of the species is not well known.	project sites within the CIP area. However, suitable habitat (i.e., valley and foothill grassland with vernal pools) does occur within the CIP area. It has typically been found in association with its host species (i.e., the species' larvae feed on the pollen stores that ground-nesting solitary bees have provided for their own larvae). Therefore, the species has some potential to occur within CIP project sites.
Lytta molesta	Molestan blister beetle	none/SA/none	Occurs primarily in scattered vernal pools and other seasonal wetlands in valley and foothill grassland and oak savannah of the Central Valley (April to July). However, the species has also been recorded at scattered locations in the Coast Ranges from Mendocino County south to Ventura County.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., vernal pools and other seasonal wetlands in valley and foothill grassland) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.
Bombus caliginosus	obscure bumble bee	none/SA/none	This species occurs mostly in relatively humid (often foggy) parts of coastal California (including the Coast Ranges) north of Santa Barbara County. Colonies dissolve in late October and only the new queens survive through the winter. Queens emerge in late January followed by workers (early March) and males (late	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. In addition, the species is not expected in or east of the Central Valley and the occurrence near Modesto may have been misidentified. Out of 181 CNDDB occurrences in the state, only 7 are widely

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Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			April). Nests are often located underground in abandoned rodent nests, or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees.	scattered on the west side of the Central Valley or in the Sierra Nevada. Therefore, the species is considered to have no potential to occur within CIP project sites.
Bombus morrisoni	Morrison bumble bee	none/SA/none	This species occurs mostly from the Sierra Nevada-Cascade crest east to throughout the intermountain west (only occurring at higher elevations west of the crest). It occurs at relatively dry sites in open scrub habitats. Colonies are annual and only the new, mated queens overwinter. Nests are often located underground in abandoned rodent nests, or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. In addition, the species is not expected at lower elevations on the west side of the Sierra Nevada and the occurrence near La Grange may have been misidentified. Out of 85 CNDDB occurrences in the state, only 2 are below 1,000 feet on the west side of the Sierra Nevada. Therefore, the species is considered to have no potential to occur within CIP project sites.
Bombus crotchii	Crotch bumble bee	none/SA/none	This species occurs from coastal California east to the Sierra Nevada-Cascade crest. It occurs at relatively warm and dry sites in open grassland and scrub habitats. Colonies are annual and only the new, mated queens overwinter. Nests are often located underground in abandoned rodent nests, or above ground in tufts of grass,	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., warm and dry sites in open grassland or scrub) does occur within the CIP area. Therefore, the species has some potential to occur within CIP project sites.

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			old bird nests, rock piles, or cavities in dead trees.	
Bombus occidentalis	western bumble bee	none/SA/none	This species is broadly distributed in California (at least historically) along the coast, Coastal Ranges, Sierra Nevada, and Cascades. Central Valley occurrences are extremely rare. Populations north of central California and west of the Sierra Nevada-Cascade crest have declined sharply since the late 1990s. Colonies are annual and only the new, mated queens overwinter. Nests are typically found in underground cavities or animal nests that open to west to southwest slopes bordered by trees. A few nests have been reported from above-ground locations such as in logs.	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. In addition, the species is not expected within the Central Valley and the 2 nearest occurrences (in San Joaquin County) may have been misidentified as the species is highly polychromatic. Out of 282 CNDDB occurrences in the state, only 4 are from the valley floor and surrounding Sierra Nevada foothills. Therefore, the species is considered to have no potential to occur within CIP project sites.
		FISHES		
Entosphenus hubbsi	Kern brook lamprey	none/CSC/none	This species is found on the east side of the San Joaquin Valley, in the lower portions of the Merced, Kaweah, Kings, and San Joaquin rivers. It inhabits silty backwaters of rivers and spawns in gravel riffles. Both the larval and adult stages of this species	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Furthermore, the nearest known occurrence is associated with the lower Merced River (below the Crocker-Huffman diversion

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			were originally collected from the Friant-Kern Canal, which is 85% concrete lined.	dam). All other known locations are south of the Merced River. Therefore, the species is considered to have no potential to be adversely affected at CIP project sites.
Lampetra tridentata	Pacific lamprey	none/CSC/none	Pacific lamprey have diverse life histories that are dependent on many variables. Adult spawning migration typically occurs between early March and late June. They require cold, clear water for spawning and incubation, often in low-gradient riffles. Occurrences are known from most of the major rivers north of and including the lower reaches of the San Joaquin, Tuolumne, and Stanislaus rivers.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat does occur within the CIP area and the species has been documented in the major rivers in eastern Stanislaus County. Therefore, the species is considered to have some potential to be adversely affected at CIP project sites.
Lampetra ayresii	river lamprey	none/CSC/none	In California, the species has been recorded from the Sacramento and San Joaquin River Delta (e.g., San Francisco Estuary, Napa River, Sonoma Creek, and Alameda Creek), as well as tributaries to the Sacramento and San Joaquin rivers (e.g., Tuolumne River, Stanislaus River, and Cache Creek). Presumably, like other lampreys, adults need clean, gravelly riffles in permanent streams for spawning, while ammocoetes require sandy to silty backwaters or stream	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat does occur within the CIP area and the species has been documented in the major rivers in eastern Stanislaus County. Therefore, the species is considered to have some potential to be adversely affected at CIP project sites.

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 25°C.	
Pogonichthys macrolepidotus	Sacramento splittail	none/CSC/none	This species is endemic to the Central Valley, but is now largely confined to the Delta, Suisun Bay, Suisun Marsh, Napa River, Petaluma River, and other parts of the San Francisco Estuary. The species is occasionally found in the lower Tuolumne and Stanislaus rivers. Spawning occurs in tidal freshwater and euryhaline habitats on terrestrial vegetation and floodplain debris that is inundated by spring high flows. Larvae remain in shallow, weedy areas close to the spawning sites, but may disperse throughout the lower freshwater reaches of their natal watershed.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat does occur within the CIP area and the species has been documented in the lower Tuolumne and Stanislaus rivers. Therefore, the species is considered to have some potential to be adversely affected at CIP project sites.
Mylopharodon conocephalus	hardhead	none/CSC/none	This species' distribution is limited to the Sacramento-San Joaquin River system and Russian River system. It inhabits deep, rocky and sandy pools of small to large rivers where spawning substrate includes sand, gravel, and decomposed granite. Spawning occurs as early as May and June in the valley,	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, it has been recorded in the Tuolumne River as far upstream as the La Grange Dam. Therefore, the species is considered to have

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Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			but extends to August in the foothill regions of the upper San Joaquin River (e.g., Tuolumne River downstream of the La Grange Dam).	some potential to be adversely affected at CIP project sites.
Oncorhynchus tshawytscha	Chinook salmon Central Valley fall and late-fall run ESU	none/CSC/none	This ESU includes all naturally spawned fall-run Chinook salmon in the San Joaquin and Sacramento Basins, east of Carquinez Strait. Fall-run juveniles spend 3 to 6 months rearing in freshwater, while late-fall run individuals spend about one year, before migrating to the sea in the spring. Fall-run individuals return to freshwater in September-October, and late-fall run individuals in December or January.	**Potential to Occur**. No individuals of this ESU were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, it has been recorded in the Tuolumne River as far upstream as the La Grange Dam and in the Stanislaus River as far upstream as Goodwin Dam. Therefore, the ESU is considered to have some potential to be adversely affected at CIP project sites.
Oncorhynchus mykiss irideus	Steelhead - Central Valley DPS	FT/none/none	This distinct population segment (DPS) of steelhead includes all naturally spawned populations of steelhead (and their progeny) in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco Bay and San Pablo Bays and their tributaries. Small runs typically occur on the Tuolumne River, while the DPS is rare in the Stanislaus River. Peak spawning occurs from December through April in small	**Potential to Occur**. No individuals of this DPS were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, it has been recorded in both the Tuolumne and Stanislaus rivers. Therefore, the DPS is considered to have some potential to be adversely affected at CIP project sites.

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			streams and tributaries with cool, well-oxygenated water. Fry usually emerge from the gravel 4 to 6 weeks after hatching, but factors such as redd depth, gravel size, siltation, and temperature can speed or retard this time. The newly-emerged fry move to the shallow, protected areas associated with the stream margin (mainly in riffles), but they can use a variety of other habitat types.	
AMPHIBIANS				
Spea hammondii	western spadefoot	none/CSC/none	Found in dry habitats (e.g., annual grassland, oak savannah and woodland, and coastal sage scrub) adjacent to vernal pools, stock ponds, and overflow channels of low-gradient drainages within the Central Valley and coastal California from Monterey County to San Diego County.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., annual grassland with seasonal wetlands) does occur within the CIP area and near some of the surveyed CIP project sites. The species is also known from a number of CNDDB occurrences in and near the CIP area. Therefore, it is considered to have potential to occur within CIP project sites.

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
Rana boylii	foothill yellow-legged frog	none/CSE/none	The species was historically distributed throughout the foothill portions of the Sierra Nevada and Coast Ranges drainages from the Oregon border to the San Gabriel River (Los Angeles County). The species requires shallow, small to moderate streams (typically with some cobble-sized substrate and riffle habitat).	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. Though suitable habitat for the species (i.e., small to moderate streams (typically with some cobble-sized substrate and riffle habitat) occurs within the CIP area, no known occurrences have been documented within the CIP area. Therefore, the species is considered to have no potential to occur within CIP project sites.
REPTILES				
Anniella pulchra	northern California legless lizard	none/CSC/none	This species occurs as a fossorial species in sand, sandy loam, or leaf-mold substrates in the San Joaquin Valley and coastal California from Contra Costa County south to San Diego County. It can be found in a variety of habitats that include coastal beach, chaparral, pine-oak woodland, and riparian habitats. Soil moisture is essential. It appears to be active mostly during the morning and evening, just beneath the surface of sunlight-warmed substrate. It may also be active on the surface at night when	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. In addition, there are no known CNDDB occurrences within the CIP area. However, the species has been recorded from immediately north of the CIP area in the community of Riverbank. Therefore, the species is considered to have some potential to occur within CIP project sites.

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			substrate temperatures remain warm for extended intervals. It should be noted that recent mitochondrial and nuclear DNA work has resulted in the species being split into five distinct species with the local species (*A. pulchra*) occurring only along the coast and in the Coastal Ranges as far south as northwestern Ventura County.	
Actinemys marmorata	western pond turtle	none/CSC/none	The species historically occurred throughout most of the Pacific-slope drainages in California (below approximately 4,000 feet). The species now occurs at scattered locations throughout its former range (primarily in the central Sierra Nevada foothills, Central Valley, San Francisco Bay area, and north-central coast and Coast Ranges. It occurs in and adjacent to ponds, reservoirs, or other slow-moving perennial aquatic habitats (e.g., sloughs, streams, and rivers).	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. In addition, there are no known CNDDB occurrences within the CIP area. However, the species occurs elsewhere along the eastern portion of the San Joaquin Valley and suitable habitat is present. Therefore, the species is considered to have some potential to occur within or near CIP project sites.
Phrynosoma blainvillii	Blainville's horned lizard	none/CSC/none	Found at scattered locations throughout coastal California from the San Francisco Bay area to Ventura and northern Los Angeles counties. Also occurs along the Sierra Nevada foothills in the Sacramento Valley and	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. In addition, there are no CNDDB occurrences within the CIP area. However, the species

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			throughout the San Joaquin Valley. Requires open natural vegetation communities for basking, loose soils for burial, and ants as a prey base.	occurs elsewhere along the eastern portion of the San Joaquin Valley (north and south of the CIP area and suitable habitat is present. Therefore, the species is considered to have some potential to occur within or near CIP project sites.
Thamnophis gigas	giant garter snake	FT/ST/none	Found in low gradient streams, marshes, and adjacent ricelands where there is abundant vegetative cover. Furthermore, the habitat is supported by perennial fresh water. The species is limited to the floor of the Central Valley where it occurs in fragmented populations.	**No Potential to Occur**. No individuals of this species were observed within or near the project site. Though suitable habitat for the species (i.e., low gradient streams, marshes, and canals) occurs within the CIP area, there are no known extant occurrences from Stanislaus County. Therefore, the species is considered to have no potential to occur within CIP project sites.
BIRDS				

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
Branta hutchinsii leucopareia	Aleutian cackling goose (wintering)	none/SA/none	This subspecies of cackling goose winters in California (mostly in a small number of locations in the northern San Joaquin Valley, but with smaller numbers along the north coast near and north of Humboldt Bay). The entire California population nests on the Near Island and Rat Island groups in the Aleutian Islands. Most wintering habitat provides substantial grazing opportunity. Small wintering groups are occasionally observed in other areas (e.g., San Francisco Bay Area).	**No Potential to Occur.** No individuals of this subspecies were observed within or near the project site. However, the subspecies has been documented wintering in the far western portion of the CIP area (near the Mapes Ranch). Therefore, the subspecies is considered to have some potential to occur within or near CIP project sites.
Ardea alba	great egret (nesting)	none/SA/none	This species is fairly common throughout most of California where there are shallow estuaries, or freshwater or saltwater emergent wetlands. However, it is less common above the foothills in the mountains and in desert regions. Rookeries are typically active from March to as late as July and occur in the tops of secluded large snags or live trees. Rookeries are sometime shared with great blue heron or other large wading birds.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable nesting habitat (i.e., secluded large snags or live trees) does occur within the CIP area. Therefore, the species has some potential to nest within or near CIP project sites.
Ardea herodias	great blue heron (nesting)	none/SA/none	This species is fairly common throughout most of California where	**Potential to Occur**. No individuals of this species were observed during the

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Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			there are shallow estuaries, or freshwater or saltwater emergent wetlands. However, it is less common along riverine and rocky coastal shores and above the foothills in the mountains. Rookeries are typically active from February to as late as July and occur in the tops of secluded large snags or live trees. Rookeries are sometime shared with great egret or other large wading birds.	reconnaissance-level surveys of specific project sites within the CIP area. However, suitable nesting habitat (i.e., secluded large snags or live trees) does occur within the CIP area. Therefore, the species has some potential to nest within or near CIP project sites.
Egretta thula	Snowy egret (nesting)	none/SA/none	This species is widespread throughout most of California where there are shallow estuaries, freshwater or saltwater emergent wetlands, ponds, slow-moving rivers, irrigation ditches, or wet fields. However, it is less common above the foothills in the mountains and in desert regions. Rookeries are typically active from late March to as late as August and occur in dense marshes or low in secluded snags or live trees. Rookeries are sometime shared with the great blue heron or other large wading birds.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable nesting habitat (i.e., secluded large snags or live trees) does occur within the CIP area. Therefore, the species has some potential to nest within or near CIP project sites.
Nycticorax nycticorax	Black-crowned night heron (nesting)	none/SA/none	The species is a fairly common, year-long resident in lowlands and foothills throughout most of California where it	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			feeds along the margins of lakes and ponds, large rivers, and fresh and saline emergent habitats. It is common locally in large nesting colonies. It nests and roosts in undisturbed, dense-foliaged trees and dense emergent wetlands.	project sites within the CIP area. However, suitable nesting habitat (i.e., dense-foliaged trees and dense emergent wetlands) does occur within the CIP area. Therefore, the species has some potential to nest within or near CIP project sites.
Buteo swainsoni	Swainson's hawk (nesting)	none/ST/none	Occurs in California as a breeding resident in the Central Valley (primarily in the southern Sacramento and northern San Joaquin valleys), Klamath Basin, and Modoc Plateau. However, nesting pairs are also occasionally found in the Mojave Desert, Lanfair Valley (San Bernardino County), Antelope Valley (Los Angeles County), and eastern San Luis Obispo County. In the Central Valley the species typically nests in riparian woodland or forest stands, or oak savannah. Nest territories are located adjacent to suitable foraging habitat (e.g., grassland, suitable grain and row crop fields, alfalfa, and pastures).	**Potential to Occur**. Multiple individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, no nesting was confirmed, but was assumed given the number of individuals, their distribution, and time of year (i.e., middle of nesting season). Given the number of known CNDDB occurrences and distribution in the CIP area, it is considered to have potential to nest within or near CIP project sites with suitable nesting and hunting habitat.
Buteo regalis	ferruginous hawk (wintering)	none/none/BCC	The species is a winter resident of the Modoc Plateau, Central Valley, and Coast Ranges. It forages in large, open	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However,

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			tracts of grasslands, sparse scrubland, and deserts.	suitable habitat (i.e., large, open tracts of grasslands, sparse scrubland, and even fallow agricultural land) does occur within the CIP area and near a small number of the surveyed CIP project sites. Given the number of known eBird occurrences in the CIP area (particularly the eastern-most portion of the CIP area, it is considered to have potential to occur within or near some CIP project sites when wintering.
Circus hudsonius	northern harrier (nesting)	none/CSC/none	The species is found as a resident and wintering species throughout the lower elevation portions of California in annual grasslands, oak savannah, and valley and coastal marshes. Nesting in the Central Valley typically occurs in emergent wetlands; tall, dense grasslands; or grain fields.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., large, open tracts of grasslands and oak savannah) does occur within the CIP area and near a small number of the surveyed CIP project sites. There are no records of the species in the CNDDB, but the species is typically under-documented as a nesting species in the CNDDB. Given the large number of known eBird occurrences (during the nesting season) and distribution in the CIP area it is considered to have potential to nest within or near CIP project sites.
Elanus leucurus	white-tailed kite (nesting)	none/CFP/none	Found as a resident species throughout the lower elevation portions of	**Potential to Occur**. No individuals of this species were observed during the

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			California in low rolling grasslands with scattered oaks and river bottomlands or marshes adjacent to deciduous woodland. Requires grasslands, meadows, or marshes (for foraging) located near dense-topped trees (for nesting and roosting).	reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., dense-topped trees near grasslands, meadows, or marshes) does occur within the CIP area and near a small number of the surveyed CIP project sites. Given the number of known eBird occurrences (during the nesting season) and distribution in the CIP area it is considered to have potential to nest within or near CIP project sites.
Haliaeetus leucocephalus	bald eagle	none/SE/BCC	The species winters throughout much of California at lakes, reservoirs, rivers, and some rangelands and coastal wetlands. Nesting occurs mainly in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers. Most current nest territories are in northern California, but the species also nests in scattered locations in the central and southern Sierra Nevada mountains and foothills, in several locations in the central Coast Ranges, inland southern California, and on Santa Catalina Island. In most of California, the nesting season lasts from January through July or August.	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, known eBird occurrences are scattered within the CIP area (i.e., during the both the nesting and wintering seasons). Therefore, the species cannot be discounted from occurring at or near some CIP project sites (particularly near Turlock Lake).

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
Falco columbarius	merlin (wintering)	none/SA/none	This species winters in California from September to May. It occurs in a variety of low elevation, relative flat habitats that include wooded areas, coastlines, open grasslands, savannah, and the periphery of lakes. It is less often found in open desert. It typically requires dense stands of trees for cover and roosting. It is most often found where there are substantial populations of small birds (the primary prey item).	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (relative flat habitats that include wooded areas, open grasslands, savannah, and even fallow agricultural lands) and occur within the CIP Area. In addition, there are a large number of known eBird occurrences in the CIP area. Therefore, the species has some potential to winter within or near CIP project sites.
Pandion haliaetus	osprey	none/CSC/none	The species nests in northern California from the Cascade Ranges south through the Sierra Nevada, and along the coast south to Marin County. Nesting occurs from March to September with nests being sited at the top of large snags or dead-topped trees on cliffs, or on manmade structures (e.g., telephone or power poles).	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, eBird occurrences are scattered within the CIP area (during the nesting and wintering seasons – typically at water features). Therefore, the species cannot be discounted from occurring at or near some CIP project sites.
Charadrius montanus	mountain plover (wintering)	none/CSC/BCC	The species occurs in California only as a wintering species where it is found on low, sparse grasslands or disced agricultural fields that are remote from	**No Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area.

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			urban development or disturbances. Mountain plovers are most frequently reported from two areas: (1) in the San Joaquin Valley south of Sacramento County; and (2) in the Imperial Valley.	Furthermore, the most recent of the few known eBird occurrences in Stanislaus County are from near Turlock Reservoir in 2003. Therefore, the species is considered to have no potential to occur at or near CIP project sites.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	FT/SE/BCC	An estimated 40 to 50 pairs of this subspecies (as of 2013) occur at scattered locations within the state (i.e., Sacramento River between Red Bluff and Colusa (Tehama and Colusa counties), along the Feather River south of Marysville (Sutter and Yuba counties), Butte Sink (Sutter and Butte counties), South Kern River Preserve (Kern County), Prado Basin Preserve along the Santa Ana River (Riverside County), and a few locations in Inyo and San Bernardino counties) near the Colorado River. Suitable habitat generally consists of large stands of old-growth cottonwood-willow riparian forest (larger than 40 acres). The last recorded nesting occurrence in the San Joaquin Valley was in 1974 on Lewis Creek near Lindsey, Tulare County.	**No Potential to Occur.** There is no suitable habitat for this subspecies (i.e., large stands of old-growth cottonwood-willow riparian forest) at or immediately adjacent to the CIP area. In addition, the last known nesting occurrence in the San Joaquin Valley was in 1974. Therefore, the subspecies is considered to have no potential to occur at or near CIP project sites.
Athene cunicularia	burrowing owl (burrow sites)	none/CSC/none	The species is found throughout the Central Valley, in the San Francisco	**Potential to Occur**. No individuals of this species were observed during the

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Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			Bay Area, at scattered locations along the coast, and in portions of the desert regions. It is a year-round resident in annual and perennial grasslands or other vegetation communities that support sparse or non-existent tree or shrub canopies.	reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., annual grassland or other vegetation communities that support sparse or non-existent tree or shrub canopies) does occur within the CIP area (mostly the far eastern portions of the area) and near a small number of the surveyed CIP project sites. Furthermore, the species can often occur very close to human habitation or operations. Therefore, it is considered to have potential to occur within or near CIP project sites.
Dryobates nuttallii	Nuttall's woodpecker (nesting)	none/SA/none	The species occurs as a resident of low-elevation riparian deciduous and oak habitats (cismontane woodland) throughout much of California with the exception of the deserts, high Sierra Nevada, and redwood belt.	**Potential to Occur.** There is suitable cismontane woodland for the species (i.e., mixed oak-riparian woodland) associated with the CIP area. Furthermore, there are many records for the species in the eBird data base for the CIP area. Therefore, the species is considered to have potential to occur within or near CIP project sites.
Pica nuttalli	yellow-billed magpie (nesting and communal roosts)	none/SA/none	Found as resident and wintering species throughout the lower elevation portions of California in grasslands, saltbush scrub, chaparral, oak savannah, and other open woodland types near water (generally where there	**Potential to Occur.** There is suitable nesting/roosting habitat for the species (i.e., large trees associated with various woody vegetation communities - especially oaks) within and immediately adjacent to the project site. Furthermore, there are many records for the species in the eBird data

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			are large trees with dense cover for nesting and roosts).	base for the CIP area. Therefore, the species is considered to have potential to occur within or near CIP project sites.
Baeolophus inornatus	oak titmouse (nesting)	none/SA/none	Occurs as a common resident throughout much of California other than the deserts, high Sierra Nevada, and redwood belt. It is generally found in cismontane woodland (particularly oak or riparian woodlands) where it nests in the cavities created by woodpeckers.	**Potential to Occur.** There is suitable nesting/roosting habitat for the species (i.e., large trees associated with various woody vegetation communities - especially oaks) within and immediately adjacent to the project site. Furthermore, there are many records for the species in the eBird data base for the CIP area. Therefore, the species is considered to have potential to occur within or near CIP project sites.
Eremophila alpestris actia	California horned lark (nesting)	none/SA/none	The taxon nests in the San Joaquin Valley, adjacent Sierra Nevada foothills, and coastal California from Sonoma County south to San Diego County. Preferred nesting habitat for the taxon is generally provided by level or gently rolling low, sparse grassland; mountain meadows; open coastal plains; fallow grain fields, bald hills; and alkali flats.	**Potential to Occur**. No individuals of this taxon were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, known eBird occurrences are scattered within the CIP area (primarily in the larger tracts of valley and foothill grasslands such as near Turlock Lake and Modesto Reservoir). Therefore, the taxon cannot be discounted from occurring at or near some CIP project sites.
Vireo bellii pusillus	least Bell's vireo (nesting)	FE/SE/none	Found as a summer resident (late March to late August) in coastal valleys from Monterey County south through coastal southern California to	**No Potential to Occur.** There is suitable nesting habitat for this subspecies (i.e., dense willow riparian scrub) within or immediately adjacent to some project sites

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Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			San Diego County. Also occurs at scattered locations along the western border of the deserts. There have been recent records from the Sacramento Valley given its recovery in southern California. It typically nests in dense willow riparian communities, but is also occasionally found in live oak stands adjacent to drainages.	in the CIP area. However, the subspecies had been extirpated from the Central Valley and only recently has been found sporadically again in the valley (i.e., two nesting season records from the Stanislaus River NWR in 2007 and 2012). Therefore, the subspecies is considered to have no potential to occur within CIP project sites.
Icteria virens	yellow-breasted chat (nesting)	none/CSC/none	This species is found as a summer resident mostly in low to mid-elevation coastal, valley, foothill, and desert riparian habitats (up to 4,800 feet in foothill riparian and 6,500 feet east of the Sierra Nevada). Nesting typically occurs in dense vegetation adjacent to streams.	**No Potential to Occur.** There are small patches of suitable nesting habitat for this species (i.e., dense willow riparian scrub) within or immediately adjacent to some project sites in the CIP area. However, the size of the existing stands is likely not large enough to support nesting by the species. Furthermore, there are no eBird records that extend past spring migration in the CIP area that suggest nesting. Therefore, the species is considered to have no potential to nest within or near CIP project sites.
Lanius ludovicianus	loggerhead shrike (nesting)	none/CSC/none	Found as a resident and wintering species throughout the lower elevation portions of California in grasslands, saltbush scrub, chaparral, oak savannah, and other open woodland types (generally where there are trees with dense cover for nesting).	**Potential to Occur**. No individuals of this species were observed during the reconnaissance-level surveys of specific project sites within the CIP area. However, suitable habitat (i.e., annual grassland or other open vegetation communities with adjacent dense tree or shrub canopies) does

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Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
				occur within the CIP area and near a small number of the surveyed CIP project sites. Furthermore, the species can often occur close to human habitation or operations. Given the number of known eBird occurrences (during the nesting season) and distribution in the CIP area it is considered to have potential to occur within or near CIP project sites.
Melospiza melodia mailliardi	Song sparrow ("Modesto" population)	none/CSC/none	This taxon is endemic to California, residing only in the north-central portion of the Central Valley from Colusa County in the Sacramento Valley south through the Delta (exclusive of Suisun Marsh) to the northern San Joaquin Valley of Stanislaus County. The ecological requirements of the taxon are largely undescribed, but it has an affinity for emergent freshwater marshes dominated by tules and cattails as well as riparian willow thickets. It has also been found nesting in riparian forests of valley oak with a sufficient understory of blackberry, along vegetated irrigation canals and levees, and in recently planted valley oak restoration sites.	**Potential to Occur.** There is suitable habitat for this taxon (i.e., emergent freshwater marsh, willow thickets, dense understory of Himalayan blackberry, etc.) within the CIP area – particularly along riparian corridors on the valley floor. Therefore, the taxon is considered to have some potential to occur within or near CIP project sites.

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SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
Agelaius tricolor	tricolored blackbird (nesting)	none/ST/none	Found as a resident species in annual grassland, oak savannah, and fresh water marsh within the Central Valley and coastal California from Sonoma to San Diego County. Nesting typically occurs in emergent freshwater marsh, but also occurs in dense stands of willow, blackberry, thistle, nettles, or grasses. Grasslands or rangeland providing abundant food (e.g., butterfly larvae or grasshoppers) often are within at least three miles of colonies, but the species can forage up to eight miles from their nesting colony.	**Potential to Occur.** Suitable nesting habitat for this species occurs within the CIP area (mostly in cattails and/or bulrushes). Furthermore, small to moderate-sized flocks of the species have been recorded during the nesting season in various areas during past years (particularly near Turlock Lake). Therefore, the species is considered to have some potential to nest within or near CIP project sites.
MAMMALS				
Sylvilagus bachmani riparius	riparian brush rabbit	FE/SE/none	Historically, the riparian brush rabbit is believed, based on the presence of suitable habitat, to have been associated with riparian forests along portions of the San Joaquin River and its tributaries on the valley floor, from at least Stanislaus County to the Sacramento-San Joaquin River Delta. By the mid-1980s, the riparian forest within the former range of the subspecies had been reduced to a few small and widely scattered fragments,	**No Potential to Occur.** There are small patches of suitable riparian habitat for this subspecies within or immediately adjacent to some project sites in the CIP area. However, the size of the existing stands is likely not large enough to support the subspecies. Furthermore, there have been extensive surveys for the subspecies in the remaining suitable riparian habitat on the valley floor with no additional occurrences being found. Therefore, the subspecies is

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			totaling about 5,189 acres. At 258.2 acres, Caswell Memorial State Park, on the Stanislaus River in southern San Joaquin County, is the largest remaining fragment of suitable riparian forest and home to the only known extant population of riparian brush rabbit. Suitable habitat consists of dense, brushy areas of valley riparian forest, marked by extensive thickets of wild rose, blackberries, and willows.	considered to have no potential to occur within or near CIP project sites.
Perognathus inornatus	San Joaquin pocket mouse	none/SA/none	This taxon typically occurs on fine-textured sandy soils on ridge tops and hillsides supporting grasslands or blue oak savannah. The species *P. inornatus* is distributed within the Central Valley from Yolo and Sutter counties to the southern-most portions of the San Joaquin Valley and within and near the dry interior valleys of the Coast Range (e.g., Salinas and Cuyama valleys, and Carrizo Plain).	**No Potential to Occur.** There is suitable habitat for the species within the CIP area (i.e., fine-textured sandy soils on ridge tops and hillsides supporting grasslands or blue oak savannah). However, there is only one known CNDDB occurrence from Stanislaus County (west of the Delta Mendota Canal near Newman). Therefore, the species is considered to have no potential to occur within or near CIP project sites.
Dipodomys heermanni dixoni	Merced kangaroo rat	none/SA/none	The subspecies has been documented in valley and foothill grassland and oak savannah (typically on sandy soils in areas denuded of vegetation) in eastern Merced County, southeastern	**No Potential to Occur.** There is suitable habitat for the subspecies within the CIP area (i.e., deep, well-drained, sandy soils supporting grassland or blue oak savannah). However, only one occurrence is reported in the CNDDB for Stanislaus County

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			Stanislaus County, and southwestern Mariposa County.	(within the CIP area near La Grange). Furthermore, this single occurrence was last reported in 1915. Therefore, the subspecies is considered to have no potential to occur within or near some CIP project sites.
Neotoma fuscipes riparia	riparian woodrat	FE/CSC/none	Historical localities for the riparian woodrat are distributed along the San Joaquin, Stanislaus, and Tuolumne rivers, and in Corral Hollow in San Joaquin, Stanislaus, and Merced counties. This range is similar to the presumed historical range for the riparian brush rabbit. Thus, prior to the statewide reduction of riparian communities by nearly 90 percent, the riparian brush rabbit and riparian woodrat probably occurred throughout the extensive riparian forests along the major streams flowing onto the floor of the northern San Joaquin Valley. Currently the only known extant population of the riparian woodrat occurs in, and immediately adjacent to, Caswell Memorial State Park in San Joaquin County. Suitable habitat consists of dense shrub cover with an overstory of deciduous oaks.	**No Potential to Occur.** There are small patches of suitable riparian habitat for this subspecies within or immediately adjacent to some project sites in the CIP area. However, the size of the existing stands is likely not large enough to support the subspecies. Furthermore, there have been extensive surveys for the subspecies in the remaining suitable riparian habitat on the valley floor with no additional occurrences being found. Therefore, the subspecies is considered to have no potential to occur within or near CIP project sites.

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
Vulpes macrotis mutica	San Joaquin kit fox	FE/ST/none	The taxon is found in the San Joaquin Valley from Contra Costa County south to Kern County. It is also found in the dry interior valleys of the Coast Ranges (e.g., Salinas and Santa Clara valleys). It occurs in open, sparsely vegetated areas of low relief (typically in native or non-native grassland or alkali sink scrub).	**No Potential to Occur.** There is suitable denning habitat for the subspecies within the CIP area (mostly along canals and unplowed field edges as well as some ranch lands). However, the subspecies is known from only one CNDDB occurrence in eastern Stanislaus County where it is considered a vagrant. Therefore, the subspecies is considered to have no potential to occur within or near CIP project sites.
Taxidea taxus	American badger	none/CSC/none	This species is found as a resident species at scattered localities throughout California (except in the coastal redwood region). It generally occurs in extensive, open habitats in the vicinity of abundant rodent populations.	**Potential to Occur.** There is suitable habitat for the species within the CIP area (i.e., extensive dry open habitat), most of which occurs in the eastern portion of the CIP area on the extensive ranch lands. However, known occurrences have also been documented elsewhere in the CIP area. Therefore, the species is considered to have some potential to occur within or near some CIP project sites.
Antrozous pallidus	pallid bat	none/CSC/none	The species is found as a resident in all desert, grassland, shrub, woodland, and forest habitats from sea level to approximately 6,000 feet. Day roosts are typically found in buildings, bridges, rocky outcrops, mines, caves,	**Potential to Occur.** No roosts for the species have been recorded within the CIP area. However, suitable day or night roosts (caves, crevices, cliff faces, bridges, mines, and occasionally hollow trees or buildings) do occur at or adjacent to some of the CIP project sites. There are also CNDDB

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			and trees. Night roosts are generally provided by bridges, mines, and caves.	records just outside of the CIP area (near Knights Ferry and other portions of the Stanislaus River). Therefore, the species cannot be discounted from occurring at or near some CIP project sites.
Corynorhinus townsendii	Townsend's big-eared bat	none/CSC/none	This species is distributed throughout much of California in a wide variety of habitats from sea level to the high mountains. It appears to be constrained mainly by availability of suitable roost sites and degree of human disturbance at roosts. Roosting habitat is limited to caves, mines, tunnels, and other features that mimic caves, such as large tree hollows, abandoned buildings with cave-like attics, water diversion tunnels, and internal spaces in bridges.	**Potential to Occur.** No roosts for the species have been recorded within the CIP area. However, suitable day or night roosts (i.e., large cavities – both natural and manmade) may occur at or adjacent to CIP project sites. In addition, there is a single CNDDB record for the CIP area (vicinity of La Grange, about 1.9 mile north-northeast of Dawson Lake Dam). Given that the species is likely under-represented in the CNDDB, the species cannot be discounted from occurring at or near some CIP project sites.
Eumops perotis californicus	western mastiff bat	none/CSC/none	The taxon is found as an uncommon resident in southern California, but also occurs along the lower west slope of the Sierra Nevada and in the interior Coast Ranges as far north as the Tumey Hills (eastern San Benito County). Roosts are typically found in crevices in cliff faces, cracks in boulders, or occasionally in buildings	**Potential to Occur.** No roosts for the species have been recorded within the CIP area. However, suitable day or night roosts could occur at or adjacent to some of the CIP project sites. In addition, there are three CNDDB records of the species just outside of the CIP area (in the vicinity of Knights Ferry). Therefore, the species cannot be discounted from occurring at or near some CIP project sites.

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			(particularly where the roost allows for a large vertical drop).	
Lasiurus blossevillii	western red bat	none/CSC/none	The species occurs at scattered locations throughout the lowland portions of California west of the Sierra Nevada crest and desert regions (typically in riparian forest or orchards). It is less abundant at low and middle elevations in coniferous forest. Roosting sites are found in tree or shrub foliage between 2 and 40 feet above ground (typically in large cottonwoods, sycamores, walnuts, and willows).	**Potential to Occur.** No roosts for the species have been recorded within the CIP area. However, suitable day or night roosts (trees or shrubs with dense foliage) do occur at or adjacent to some of the CIP project sites. There are also CNDDB records just outside of the CIP area (near Knights Ferry and other portions of the Stanislaus River). Therefore, the species cannot be discounted from occurring at or near some CIP project sites.
Lasiurus cinereus = *Aeorestes cinereus*	hoary bat	none/SA/none	The species occurs in a wide variety of habitats throughout California from sea level to the high mountains. It is typically found in small numbers roosting in the dense foliage of medium to large trees near water in forest or woodland habitats.	**Potential to Occur.** No roosts for the species have been recorded within the CIP area. However, suitable day or night roosts (trees or shrubs with dense foliage) do occur at or adjacent to some of the CIP project sites. There are also CNDDB records just outside of the CIP area (near Knights Ferry and other portions of the Stanislaus River). Therefore, the species cannot be discounted from occurring at or near some CIP project sites.
Myotis yumanensis	Yuma myotis	none/SA/none	Found in a variety of habitats with nearby sources of water over which the species forages. Day roosts are found	**Potential to Occur.** No roosts for the species have been recorded within the CIP area. However, suitable day or night roosts

TABLE A-1

SPECIAL-STATUS SPECIES RECORDED OR POTENTIALLY OCCURRING WITHIN THE VICINITY OF PROJECTS ADDRESSED BY THE MODESTO IRRIGATION DISTRICT CAPITAL IMPROVEMENT PLAN STANISLAUS COUNTY, CALIFORNIA

Genus/Species	Common Name	Status Federal/CA/Other	Habitats and Seasonal Distribution in California	Likelihood of Occurrence within Project Site
			in caves, mines, buildings, or crevices. Night roosts are typically associated with bridges, buildings, and other man-made structures.	(caves, mines, buildings or crevices) do occur at or adjacent to some of the CIP project sites. There are also CNDDB records just outside of the CIP area (near Knights Ferry and other portions of the Stanislaus River). Therefore, the species cannot be discounted from occurring at or near some CIP project sites.

FEDERAL

FE	Federally listed as Endangered
FT	Federally listed as Threatened
FPE	Federally proposed as Endangered
FPT	Federally proposed as Threatened
FC	Federal Candidate Species (former Category 1 candidates)
BCC	U.S. Fish and Wildlife Service designated "Birds of Conservation Concern" 2008

STATE

SE	State listed as Endangered
ST	State listed as Threatened
SR	State listed as Rare
CFP	California Department of Fish and Wildlife designated "Fully Protected"
CSC	California Department of Fish and Wildlife designated "Species of Special Concern"
SA	California Department of Fish and Wildlife designated "Special Animal"

OTHER

CNPS List 1A	Plants presumed extinct in California
CNPS List 1B	Plants that are rare, threatened, or endangered in California and elsewhere
CNPS List 2	Plants that are rare, threatened, or endangered in California, but are more common elsewhere
CNPS List 3	Plants about which we need more information – a review list
CNPS List 4	Plants of limited distribution – a watch list
CNPS Threat Rank 0.1	Seriously threatened in California (high degree/immediacy of threat)
CNPS Threat Rank 0.2	Fairly threatened in California (moderate degree/immediacy of threat)
CNPS Threat Rank 0.3	Not very threatened in California (low degree/immediacy of threats or no current threats known)

APPENDIX B

CNDDB/RAREFIND 5 REPORT AND USFWS AND NMFS SPECIES LISTS FOR THE MODESTO IRRIGATION DISTRICT COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN STUDY AREA

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Paulsell (3712066) OR Cooperstown (3712065) OR La Grange (3712064) OR Avena (3712171) OR Escalon (3712078) OR Ripon (3712162) OR Salida (3712161) OR Riverbank (3712068) OR Waterford (3712067) OR Westley (3712152) OR Brush Lake (3712151) OR Ceres (3712058) OR Denair (3712057))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
American badger *Taxidea taxus*	AMAJF04010	None	None	G5	S3	SSC
bald eagle *Haliaeetus leucocephalus*	ABNKC10010	Delisted	Endangered	G5	S3	FP
burrowing owl *Athene cunicularia*	ABNSB10010	None	None	G4	S3	SSC
cackling (=Aleutian Canada) goose *Branta hutchinsii leucopareia*	ABNJB05035	Delisted	None	G5T3	S3	WL
California horned lark *Eremophila alpestris actia*	ABPAT02011	None	None	G5T4Q	S4	WL
California linderiella *Linderiella occidentalis*	ICBRA06010	None	None	G2G3	S2S3	
California tiger salamander *Ambystoma californiense*	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Conservancy fairy shrimp *Branchinecta conservatio*	ICBRA03010	Endangered	None	G2	S2	
Crotch bumble bee *Bombus crotchii*	IIHYM24480	None	None	G3G4	S1S2	
great blue heron *Ardea herodias*	ABNGA04010	None	None	G5	S4	
hardhead *Mylopharodon conocephalus*	AFCJB25010	None	None	G3	S3	SSC
hoary bat *Lasiurus cinereus*	AMACC05030	None	None	G5	S4	
least Bell's vireo *Vireo bellii pusillus*	ABPBW01114	Endangered	Endangered	G5T2	S2	
Merced kangaroo rat *Dipodomys heermanni dixoni*	AMAFD03062	None	None	G3G4T2T3	S2S3	
merlin *Falco columbarius*	ABNKD06030	None	None	G5	S3S4	WL
moestan blister beetle *Lytta moesta*	IICOL4C020	None	None	G2	S2	
Morrison bumble bee *Bombus morrisoni*	IIHYM24460	None	None	G4G5	S1S2	

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
northern California legless lizard *Anniella pulchra*	ARACC01020	None	None	G3	S3	SSC
obscure bumble bee *Bombus caliginosus*	IIHYM24380	None	None	G4?	S1S2	
riparian (=San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	AMAFF08081	Endangered	None	G5T1Q	S1	SSC
riparian brush rabbit *Sylvilagus bachmani riparius*	AMAEB01021	Endangered	Endangered	G5T1	S1	
San Joaquin kit fox *Vulpes macrotis mutica*	AMAJA03041	Endangered	Threatened	G4T2	S2	
snowy egret *Egretta thula*	ABNGA06030	None	None	G5	S4	
song sparrow ("Modesto" population) *Melospiza melodia*	ABPBXA3010	None	None	G5	S3?	SSC
steelhead - Central Valley DPS *Oncorhynchus mykiss irideus pop. 11*	AFCHA0209K	Threatened	None	G5T2Q	S2	
Swainson's hawk *Buteo swainsoni*	ABNKC19070	None	Threatened	G5	S3	
Townsend's big-eared bat *Corynorhinus townsendii*	AMACC08010	None	None	G3G4	S2	SSC
tricolored blackbird *Agelaius tricolor*	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	IICOL48011	Threatened	None	G3T2	S2	
vernal pool fairy shrimp *Branchinecta lynchi*	ICBRA03030	Threatened	None	G3	S3	
vernal pool tadpole shrimp *Lepidurus packardi*	ICBRA10010	Endangered	None	G4	S3S4	
western bumble bee *Bombus occidentalis*	IIHYM24250	None	None	G2G3	S1	
western mastiff bat *Eumops perotis californicus*	AMACD02011	None	None	G5T4	S3S4	SSC
western spadefoot *Spea hammondii*	AAABF02020	None	None	G3	S3	SSC
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	ABNRB02022	Threatened	Endangered	G5T2T3	S1	

Record Count: 35

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Paulsell (3712066) OR Cooperstown (3712065) OR La Grange (3712064) OR Avena (3712171) OR Escalon (3712078) OR Ripon (3712162) OR Salida (3712161) OR Riverbank (3712068) OR Waterford (3712067) OR Westley (3712152) OR Brush Lake (3712151) OR Ceres (3712058) OR Denair (3712057))
 AND Taxonomic Group IS (Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Atriplex cordulata var. cordulata heartscale	PDCHE040B0	None	None	G3T2	S2	1B.2
Atriplex minuscula lesser saltscale	PDCHE042M0	None	None	G2	S2	1B.1
Atriplex subtilis subtle orache	PDCHE042T0	None	None	G1	S1	1B.2
Blepharizonia plumosa big tarplant	PDAST1C011	None	None	G1G2	S1S2	1B.1
Calycadenia hooveri Hoover's calycadenia	PDAST1P040	None	None	G2	S2	1B.3
Castilleja campestris var. succulenta succulent owl's-clover	PDSCR0D3Z1	Threatened	Endangered	G4?T2T3	S2S3	1B.2
Caulanthus lemmonii Lemmon's jewelflower	PDBRA0M0E0	None	None	G3	S3	1B.2
Clarkia rostrata beaked clarkia	PDONA050Y0	None	None	G2G3	S2S3	1B.3
Cryptantha hooveri Hoover's cryptantha	PDBOR0A190	None	None	GH	SH	1A
Cryptantha mariposae Mariposa cryptantha	PDBOR0A1Q0	None	None	G2G3	S2S3	1B.3
Downingia pusilla dwarf downingia	PDCAM060C0	None	None	GU	S2	2B.2
Eryngium racemosum Delta button-celery	PDAPI0Z0S0	None	Endangered	G1	S1	1B.1
Eryngium spinosepalum spiny-sepaled button-celery	PDAPI0Z0Y0	None	None	G2	S2	1B.2
Eschscholzia rhombipetala diamond-petaled California poppy	PDPAP0A0D0	None	None	G1	S1	1B.1
Euphorbia hooveri Hoover's spurge	PDEUP0D150	Threatened	None	G1	S1	1B.2
Lagophylla dichotoma forked hare-leaf	PDAST5J070	None	None	G2	S2	1B.1
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Monardella leucocephala Merced monardella	PDLAM180C0	None	None	GH	SH	1A
Neostapfia colusana Colusa grass	PMPOA4C010	Threatened	Endangered	G1	S1	1B.1
Orcuttia inaequalis San Joaquin Valley Orcutt grass	PMPOA4G060	Threatened	Endangered	G1	S1	1B.1
Orcuttia pilosa hairy Orcutt grass	PMPOA4G040	Endangered	Endangered	G1	S1	1B.1
Pseudobahia bahiifolia Hartweg's golden sunburst	PDAST7P010	Endangered	Endangered	G2	S2	1B.1
Puccinellia simplex California alkali grass	PMPOA53110	None	None	G3	S2	1B.2
Sphenopholis obtusata prairie wedge grass	PMPOA5T030	None	None	G5	S2	2B.2
Tuctoria greenei Greene's tuctoria	PMPOA6N010	Endangered	Rare	G1	S1	1B.1

Record Count: 25

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To:
Consultation Code: 08ESMF00-2019-SLI-2658
Event Code: 08ESMF00-2019-E-08489
Project Name: Modesto Irrigation District PEIR

August 02, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

Project Summary

Consultation Code: 08ESMF00-2019-SLI-2658

Event Code: 08ESMF00-2019-E-08489

Project Name: Modesto Irrigation District PEIR

Project Type: ** OTHER **

Project Description: Pursuant to the California Environmental Quality Act (CEQA), the Modesto Irrigation District (District or MID) is preparing this programmatic environmental impact report (PEIR) to disclose the anticipated environmental impacts associated with implementation of the Comprehensive Water Resources Management Plan (Proposed Program).

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.672659845566564N120.82384906717121W

Counties: Mariposa, CA | Merced, CA | San Joaquin, CA | Stanislaus, CA | Tuolumne, CA

Endangered Species Act Species

There is a total of 21 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Riparian Brush Rabbit *Sylvilagus bachmani riparius* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6189	Endangered
Riparian Woodrat (=san Joaquin Valley) *Neotoma fuscipes riparia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6191	Endangered
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
Least Bell's Vireo *Vireo bellii pusillus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850 Habitat assessment guidelines: https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Colusa Grass *Neostapfia colusana* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5690	Threatened
Fleshy Owl's-clover *Castilleja campestris ssp. succulenta* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8095	Threatened
Greene's Tuctoria *Tuctoria greenei* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1573	Endangered
Hairy Orcutt Grass *Orcuttia pilosa* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2262	Endangered
Hartweg's Golden Sunburst *Pseudobahia bahiifolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1704	Endangered
Hoover's Spurge *Chamaesyce hooveri* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3019	Threatened
Red Hills Vervain *Verbena californica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7344	Threatened
San Joaquin Orcutt Grass *Orcuttia inaequalis* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5506	Threatened

Critical habitats

There are 10 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
California Tiger Salamander *Ambystoma californiense* https://ecos.fws.gov/ecp/species/2076#crithab	Final
Colusa Grass *Neostapfia colusana* https://ecos.fws.gov/ecp/species/5690#crithab	Final
Conservancy Fairy Shrimp *Branchinecta conservatio* https://ecos.fws.gov/ecp/species/8246#crithab	Final
Delta Smelt *Hypomesus transpacificus* https://ecos.fws.gov/ecp/species/321#crithab	Final
Fleshy Owl's-clover *Castilleja campestris ssp. succulenta* https://ecos.fws.gov/ecp/species/8095#crithab	Final
Greene's Tuctoria *Tuctoria greenei* https://ecos.fws.gov/ecp/species/1573#crithab	Final
Hairy Orcutt Grass *Orcuttia pilosa* https://ecos.fws.gov/ecp/species/2262#crithab	Final
Hoover's Spurge *Chamaesyce hooveri* https://ecos.fws.gov/ecp/species/3019#crithab	Final
Vernal Pool Fairy Shrimp *Branchinecta lynchi* https://ecos.fws.gov/ecp/species/498#crithab	Final
Vernal Pool Tadpole Shrimp *Lepidurus packardi* https://ecos.fws.gov/ecp/species/2246#crithab	Final

United States Department of the Interior

FISH AND WILDLIFE SERVICE
San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
Phone: (916) 930-5603 Fax: (916) 930-5654
http://kim_squires@fws.gov

In Reply Refer To:
Consultation Code: 08FBDT00-2019-SLI-0273
Event Code: 08FBDT00-2019-E-00611
Project Name: Modesto Irrigation District PEIR

August 02, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08FBDT00-2019-SLI-0273

Event Code: 08FBDT00-2019-E-00611

Project Name: Modesto Irrigation District PEIR

Project Type: ** OTHER **

Project Description: Pursuant to the California Environmental Quality Act (CEQA), the Modesto Irrigation District (District or MID) is preparing this programmatic environmental impact report (PEIR) to disclose the anticipated environmental impacts associated with implementation of the Comprehensive Water Resources Management Plan (Proposed Program).

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.672659845566564N120.82384906717121W

Counties: Mariposa, CA | Merced, CA | San Joaquin, CA | Stanislaus, CA | Tuolumne, CA

Endangered Species Act Species

There is a total of 14 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
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Riparian Woodrat (=san Joaquin Valley) *Neotoma fuscipes riparia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6191	Endangered
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
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Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
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Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Large-flowered Fiddleneck *Amsinckia grandiflora* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5558	Endangered

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* https://ecos.fws.gov/ecp/species/321#crithab	Final

Species List - Intersection of USGS Topographic Quadrangles with NOAA Fisheries ESA Listed Species, Critical Habitat, Essential Fish Habitat, and MMPA Species Data

November 2016

X = Present on the Quadrangle		ESA ANADROMOUS FISH (E) = Endangered, (T) = Threatened											
		COHO		CHINOOK			STEELHEAD					Eulachon (T)	Southern DPS Green Sturgeon (T)
Quad Name	Quad Number	SONCC (T)	CCC (E)	CC (T)	CVSR (T)	SRWR (E)	NC (T)	CCC (T)	SCCC (T)	SC (E)	CCV (T)		
Avena	37121-G1										X		
Brush Lake	37121-E1										X		
Ceres	37120-E8										X		
Cooperstown	37120-F5										X		
Denair	37120-E7										X		
Escalon	37120-G8										X		
La Grange	37120-F4										X		
Paulsell	37120-F6										X		
Ripon	37121-F2										X		X
Riverbank	37120-F8										X		
Salida	37121-F1										X		
Waterford	37120-F7										X		
Westley	37121-E2										X		

Species List - Intersection of USGS Top

November 2016

X = Present on the Quadrangle	ESA ANADROMOUS FISH CRITICAL HABITAT											
	COHO		CHINOOK			STEELHEAD					Eulachon	Southern DPS Green Sturgeon
Quad Name	SONCC	CCC	CC	CVSR	SRWR	NC	CCC	SCCC	SC	CCV		
Avena										X		
Brush Lake										X		
Ceres										X		
Cooperstown										X		
Denair										X		
Escalon										X		
La Grange										X		
Paulsell										X		
Ripon										X		X
Riverbank										X		
Salida										X		
Waterford										X		
Westley										X		

Species List - Intersection of USGS Top

November 2016

X = Present on the Quadrangle	ESA MARINE INVERTEBRATES		ESA MARINE INVERT. CRITICAL HABITAT	ESA SEA TURTLES				ESA WHALES	ESA PINNIPEDS
Quad Name	Black Abalone (E)	White Abalone (E)	Black Abalone	East Pacific Green Sea Turtle (T)	Olive Ridley Sea Turtle (T/E)	Leatherback Sea Turtle (E)	North Pacific Loggerhead Sea Turtle (E)	Whales (see list below)	Guadalupe Fur Seal (T)
Avena									
Brush Lake									
Ceres									
Cooperstown									
Denair									
Escalon									
La Grange									
Paulsell									
Ripon									
Riverbank									
Salida									
Waterford									
Westley									

Blue Whale (E)

Fin Whale (E)

Humpback Whale (E)

Southern Resident Killer Whale (E)

North Pacific Right Whale (E)

Sei Whale (E)

Sperm Whale (E)

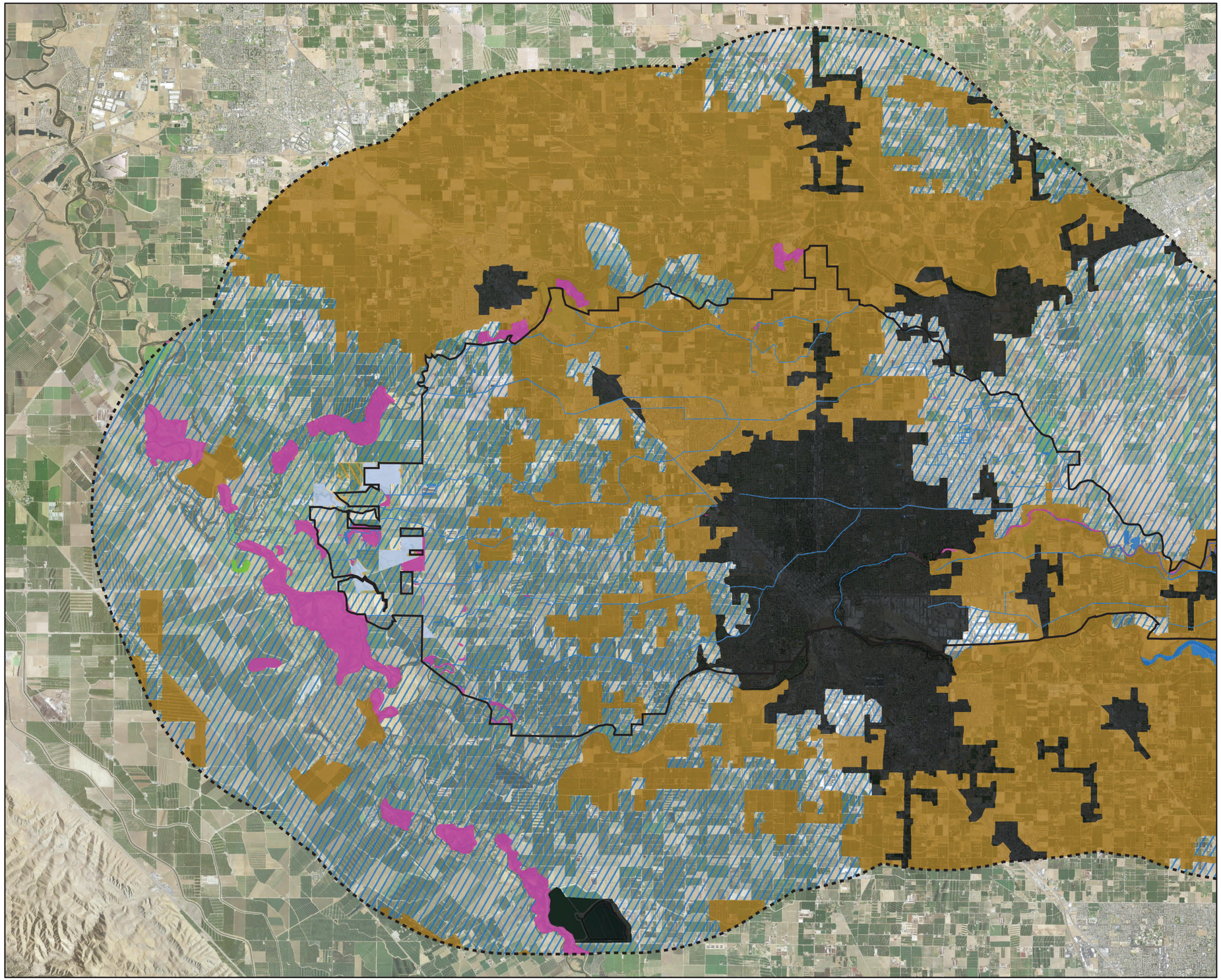
Species List - Intersection of USGS Top

November 2016

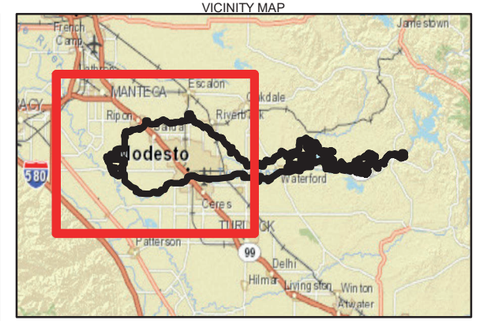
X = Present on the Quadrangle	ESA PINNIPEDS CRITICAL HABITAT	ESSENTIAL FISH HABITAT				MMPA SPECIES	
		SALMON					
Quad Name	Steller Sea Lion	Coho	Chinook	Groundfish	Coastal Pelagic	Highly Migratory Species	MMPA Cetaceans (see "MMPA Species" tab for list)	MMPA Pinnipeds (see "MMPA Species" tab for list)
Avena			X					
Brush Lake			X					
Ceres			X					
Cooperstown			X					
Denair			X					
Escalon			X					
La Grange			X					
Paulsell			X					
Ripon			X					
Riverbank			X					
Salida			X					
Waterford			X					
Westley			X					

APPENDIX C

LAND COVER TYPES IN MODESTO IRRIGATION DISTRICT COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN STUDY AREA



VICINITY MAP



LEGEND

- Modesto Irrigation District Service Area
- 5-mile Buffer

Land Cover Type

- Annual Grassland
- Blue Oak Woodland
- Irrigated Pastures, Row Crops, and Field Crops
- Open-Water Aquatic Habitats
- Orchard and Vineyard
- Urban
- Valley Oak Woodland
- Vernal Pool Area
- Wetlands

-Open-Water Aquatic Habitat includes Freshwater Pond, Lacustrine, Lake and Riverine habitat types.
-Wetlands includes Freshwater Emergent Wetland, Freshwater Forested/Shrub Wetland, and Wet Meadow habitat types.

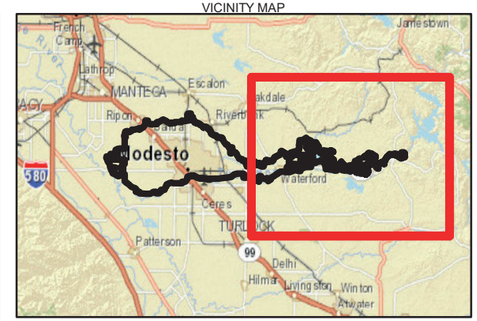
Source: GAP, http://www.biogeog.ucsb.edu/projects/gap/gap_data_reg.html, Sept 2017; NWI, https://www.fws.gov, May 2017; Vernal Pool Area, vernalpools.org 2012

N

0 2 4
Miles

FIGURE C-1
Land Cover Types in the Program Area
Modesto Irrigation District
Stanislaus County, California

VICINITY MAP



LEGEND

- Modesto Irrigation District Service Area
- 5-mile Buffer

Land Cover Type

- Annual Grassland
- Blue Oak Woodland
- Irrigated Pastures, Row Crops, and Field Crops
- Open-Water Aquatic Habitats
- Orchard and Vineyard
- Urban
- Valley Oak Woodland
- Vernal Pool Area
- Wetlands

-Open-Water Aquatic Habitat includes Freshwater Pond, Lacustrine, Lake and Riverine habitat types.
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Source: GAP, http://www.biogeog.ucsb.edu/projects/gap/gap_data_reg.html, Sept 2017; NWI, https://www.fws.gov, May 2017; Vernal Pool Area, vernalpools.org 2012

N

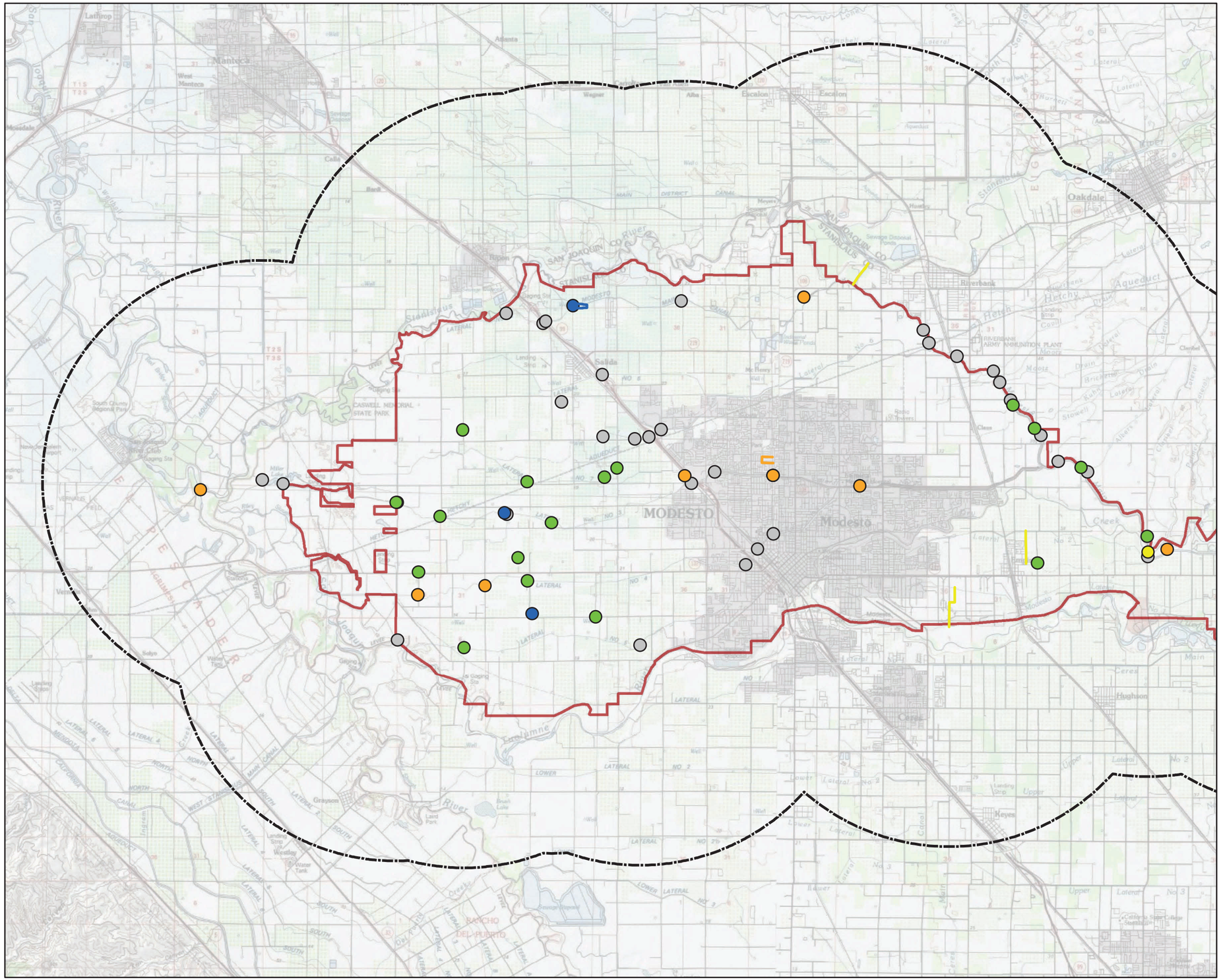
0 2 4
Miles

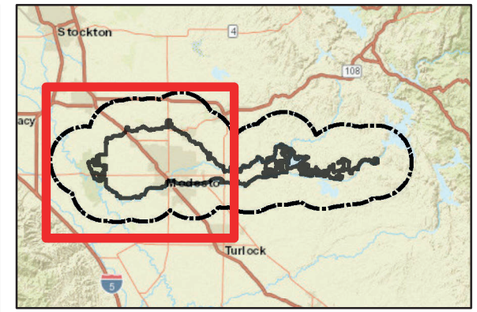
FIGURE C-2
Land Cover Types in the Program Area
Modesto Irrigation District
Stanislaus County, California

ch2m:

APPENDIX D

DESIGNATED CRITICAL HABITAT UNITS AND PROPOSED PROJECTS IN THE MODESTO IRRIGATION DISTRICT COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN STUDY AREA





- MID Boundary
- 5-mile Buffer
- Canal, Laterals, and Tunnels Improvements
- Flow Control
- Regulating Reservoirs and Infrastructure*
- Canal, Laterals, and Tunnels Improvements
- Flow Control
- Groundwater Management
- Measurement and Automation
- Regulating Reservoirs and Infrastructure*

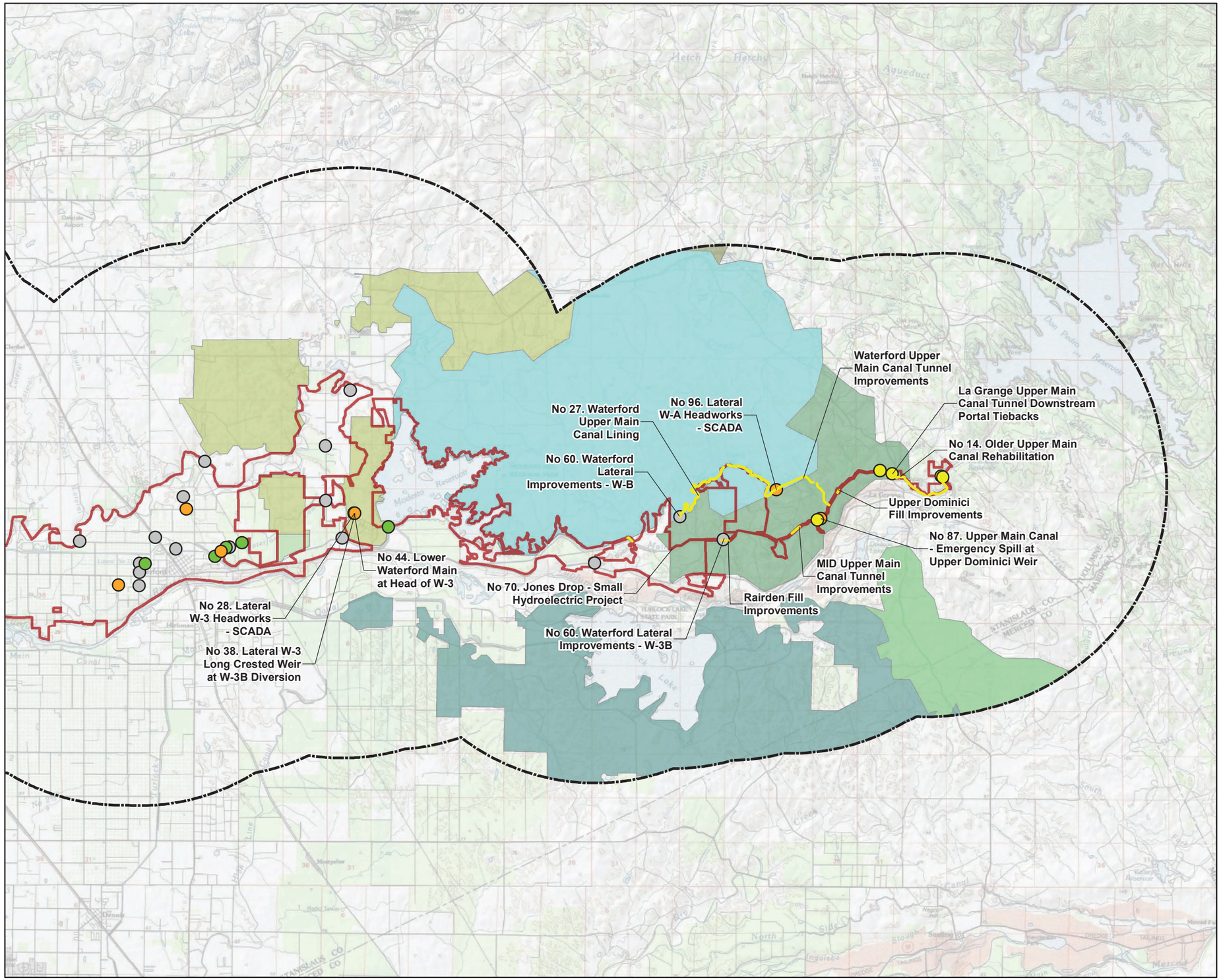
Note
*Representative locations only. Exact location of the regulating reservoirs could occur anywhere within the proposed locations shown on Figure 2-1 in the PEIR.

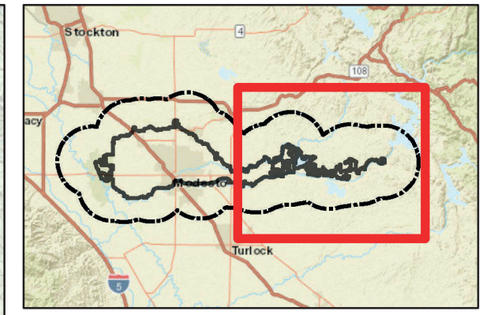
N

0 6,000 12,000 24,000
Feet

Source: Critical Habitat, California Department of Fish and Wildlife, Sept 2017

FIGURE D-1
Designated Critical Habitat Units (Plants)
Modesto Irrigation District
Stanislaus County, California





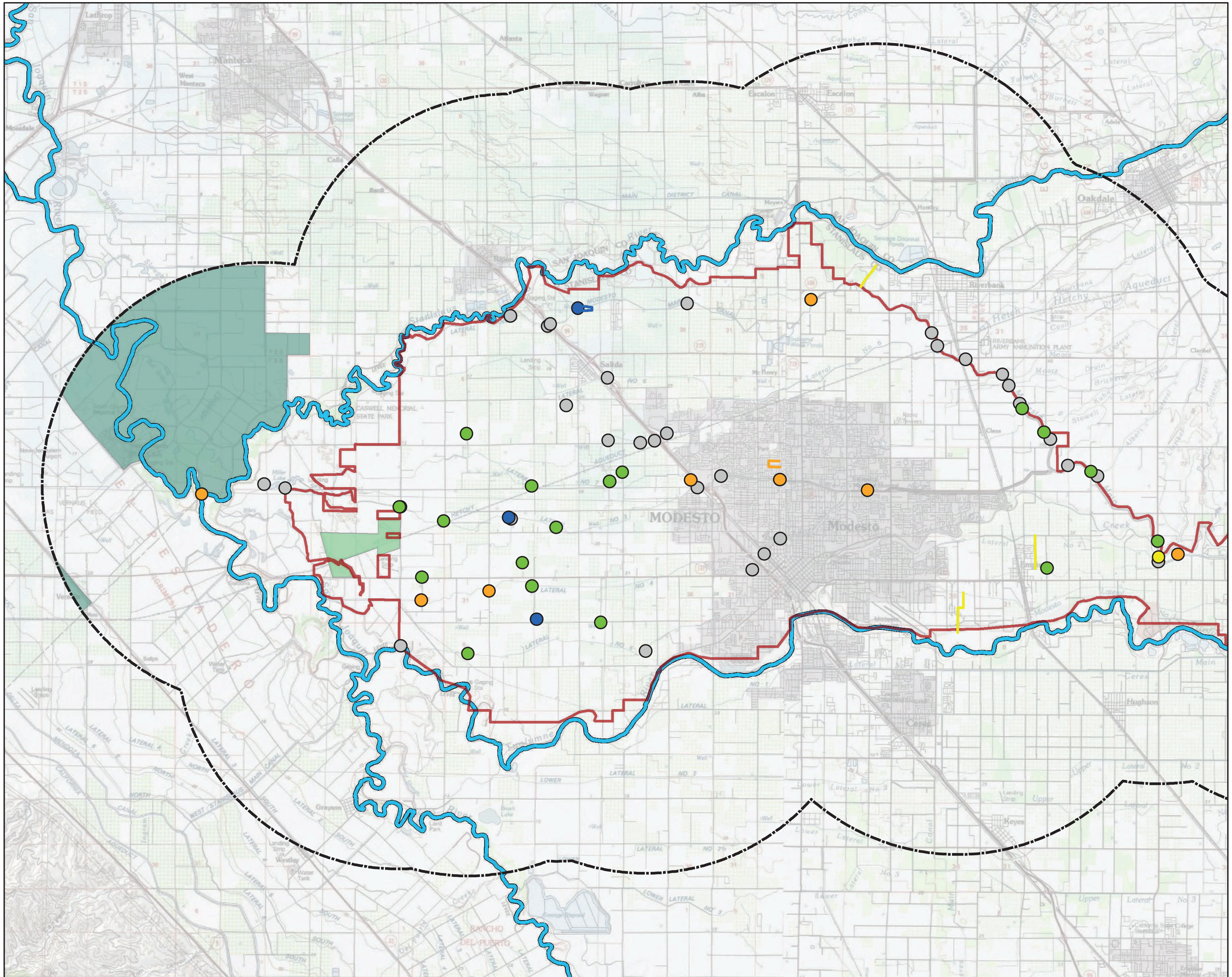
- MID Boundary
- 5-mile Buffer
- Canal, Laterals, and Tunnels Improvements
- Canal, Laterals, and Tunnels Improvements
- Flow Control
- Groundwater Management
- Measurement and Automation
- Regulating Reservoirs and Infrastructure
- Colusa Grass, Greene's Tuctoria, Hoover's Spurge, and Succulent Owl's-Clover
- Colusa Grass, Greene's Tuctoria, and Hoover's Spurge
- Colusa Grass, Hairy Orcutt Grass, and Hoover's Spurge
- Colusa Grass and Greene's Tuctoria
- Greene's Tuctoria and Succulent Owl's-Clover
- Greene's Tuctoria
- Hairy Orcutt Grass

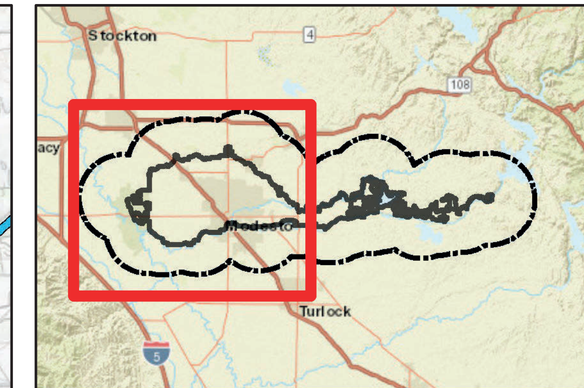
N

0 6,000 12,000 24,000
Feet

Source: Critical Habitat, California Department of Fish and Wildlife, Sept 2017

FIGURE D-2
Designated Critical Habitat Units (Plants)
Modesto Irrigation District
Stanislaus County, California





MID Boundary
5-mile Buffer
Canal, Laterals, and Tunnels Improvements
Flow Control
Regulating Reservoirs and Infrastructure*
Canal, Laterals, and Tunnels Improvements
Flow Control
Groundwater Management
Measurement and Automation
Regulating Reservoirs and Infrastructure*

Critical Habitat Animals

California Central Valley Steelhead
Conservancy Fairy Shrimp
Delta Smelt

Note
*Representative locations only. Exact location of the regulating reservoirs could occur anywhere within the proposed locations shown on Figure 2-1 in the PEIR.

0 6,000 12,000 24,000
Feet

Source: Critical Habitat, California Department of Fish and Wildlife, Sept 2017

FIGURE D-3
Designated Critical Habitat Units (Animals)
Modesto Irrigation District
Stanislaus County, California

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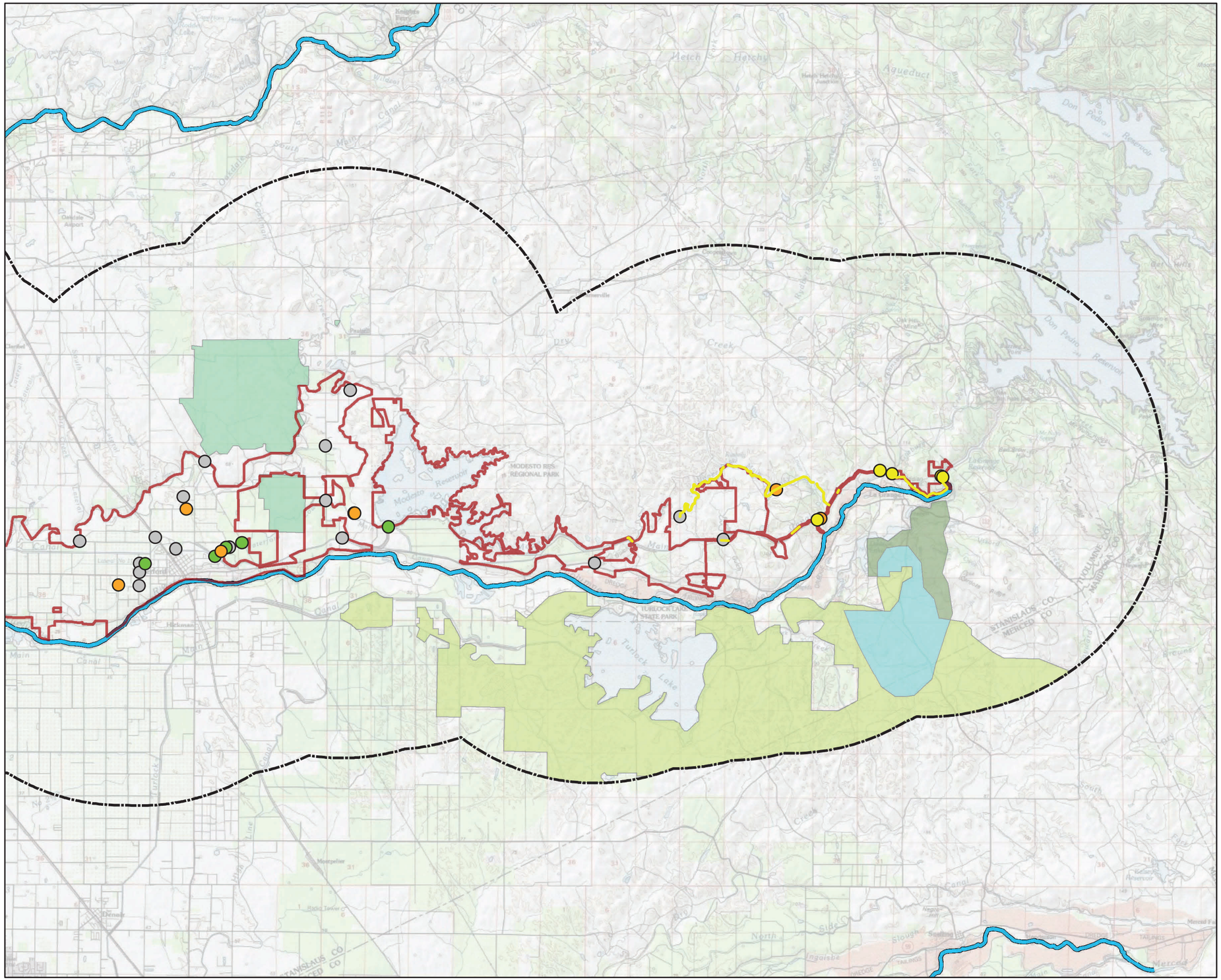

Source: Critical Habitat, California Department of Fish and Wildlife, Sept 2017

FIGURE D-4
Designated Critical Habitat Units (Animals)
Modesto Irrigation District
Stanislaus County, California

APPENDIX E

CRITICAL HABITAT DETERMINATIONS AND EFFECTS ANALYSIS

The effect determinations for critical habitat may be no effect, not likely to adversely affect, or likely to adversely affect. The not likely to adversely affect determination can refer to either insignificant and discountable adverse effects or anticipated beneficial effects. A likely to adversely affect determination for designated critical habitat requires formal consultation.

The rationale upon which the critical habitat effect determination is made should reference the "physical or biological features" (formerly "primary constituent elements") that were the basis for determining the habitat to be critical and why they may or may not be adversely affected (50 CFR 402.02). If the critical habitat contains six "physical or biological features "and only three may be affected by the project, then the effects of the action on each of the three "physical or biological features" should be clearly stated in the rationale. For a no effect determination, none of the "physical or biological features" would be negatively affected by the project. Projects affecting one or more "physical or biological features" will receive a determination of not likely to adversely affect, or likely to adversely affect critical habitat. Projects with likely to adversely affect impacts on at least one "physical or biological feature" will result in a likely to adversely affect determination for critical habitat (see attached decision tree).

A likely to adversely affect determination for critical habitat may or may not merit an adverse modification call by USFWS or NMFS. The adverse modification is comparable to a jeopardy call for a listed species. An adverse modification is defined as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those "physical or biological features" that were the basis for determining the habitat to be critical. An adverse modification call is made for a species' critical habitat as a whole. Adverse modification of critical habitat is not allowed under the ESA and occurs when the habitat characteristics or the necessary habitat elements are changed to such an extent that the habitat no longer functions as critical habitat. A project determined by the NMFS or USFWS to adversely modify designated critical habitat cannot be constructed without modifications in accordance with a reasonable and prudent alternative (RPA).

ACTION AGENCY DETERMINATIONS