Draft Initial Study/ Mitigated Negative Declaration

La Grange Sluice and Tailrace Channel Improvement Project

Stanislaus County, California

August 2020

Prepared for:
Turlock Irrigation District

Prepared by:
HDR

This page is intentionally blank.

Contents

Appendices

Tables

Figures

1 Introduction

1.1 Project Background

The Turlock Irrigation District (TID) La Grange diversion tunnel is a 600-foot-long partially concrete-lined tunnel located on the Tuolumne River near the town of La Grange in Stanislaus County, California. The tunnel conveys water from the La Grange Headpond through the left abutment of the La Grange Diversion Dam to the La Grange Forebay (forebay) and headworks of TID's Upper Main Canal. Water that is not conveyed to the Upper Main Canal flows into the Tuolumne River through either a drain gate, two sluice gates, or two penstocks[1] to the La Grange Powerhouse (powerhouse). The powerhouse has a generation capacity of 4.7 megawatts and average generation of approximately 17,800 kilowatt hours per year.

Under normal (non-emergency) operations, while the powerhouse is in operation, there is a minimum continuous flow of approximately 5 cubic feet per second (cfs) from the forebay into the sluice channel at all times, flowing through the 18-inch-diameter drain gate. When the powerhouse is not in operation, one or both of the 5-foot by 4-foot forebay sluice gates may be open to pass flows downstream that are not needed to meet irrigation demand. The sluice gates are also capable of remote operation, and open immediately upon unscheduled powerhouse outages to provide the safe passage of downstream flows. The channel below the sluice gates is a 300-foot man-made conveyance that extends from below the sluice gates to the powerhouse tailrace channel; continuous flow into this channel prevents the development of isolated pools along the conveyance. During normal operations, water flows into the penstocks for power generation and discharges into the tailrace channel at the exit from the powerhouse, which then converges approximately 500 feet downstream with the Tuolumne River.

During dewatering of the diversion tunnel, which is required periodically for tunnel and forebay safety inspections, water may be passed into the Tuolumne River through Modesto Irrigation District (MID) facilities directly through the La Grange Diversion Dam (MID Portal Gate 1) or just downstream at the right abutment area (MID Hillside outlet gates) (Figure 1). During this manner of passing flows downstream during TID's tunnel outages, the TID sluice channel and the tailrace channel may become isolated from the flow in the main river channel. As a result, absent special precautions, fish could potentially be stranded in both the sluice and tailrace channels during tunnel dewatering.

The reach of the Tuolumne River from its confluence with the San Joaquin River upstream to the La Grange Diversion Dam is designated as critical habitat for California Central Valley (CCV) steelhead (*Oncorhyncus mykiss irideus*), which is listed as threatened under the federal Endangered Species Act. The numbers of steelhead in the Tuolumne River are likely extremely low as there is no empirical evidence of a self-sustaining population of steelhead in the lower river[2][3]. Historically, *O. mykiss* have been observed in the tailrace channel; therefore, under the conditions described above,

[1] pipes connecting the La Grange Forebay to the La Grange Powerhouse

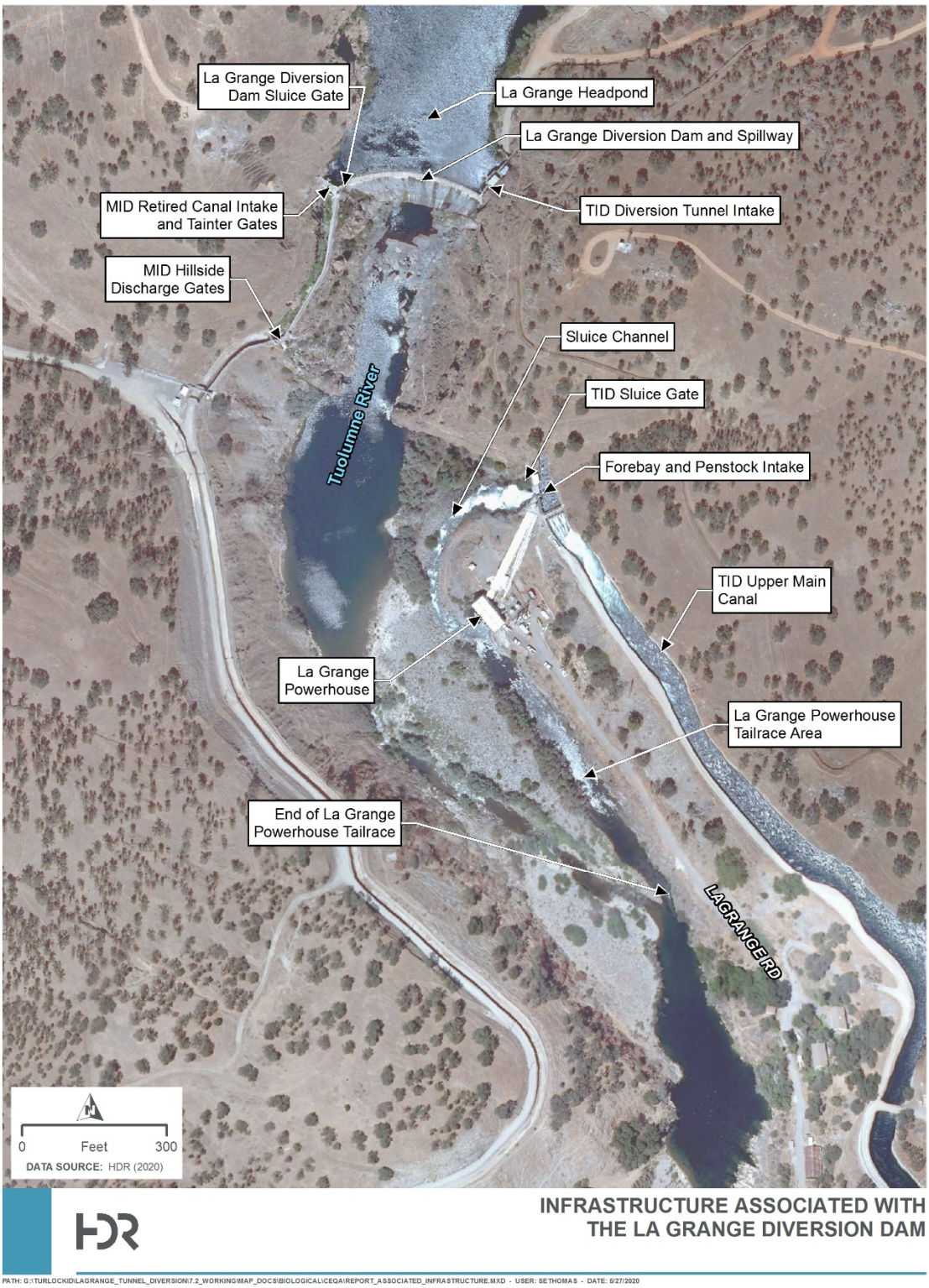
[2] Turlock Irrigation District and Modesto Irrigation District. 2013. Salmonid Population Information Integration and Synthesis Study Report (W&AR-05). Prepared by Stillwater Sciences. January 2013.

[3] California Department of Fish and Wildlife. 2017. California Department of Fish and Wildlife, Central Region's Comments on the Draft License Application for the La Grange Hydroelectric Project, Federal Energy Regulatory Commission Project No. P-14581, Tuolumne River, California. August 2017

there is the potential that fish residing in the tailrace of lower sluice channel, including *O. mykiss*, may become isolated during scheduled tunnel dewatering events.

As a result, TID's La Grange Sluice and Tailrace Channel Improvement Project (Proposed Project or Project) is intended to avoid the development of isolated pools in the sluice channel and prevent tailrace dewatering and the associated potential for stranding fish during the periodic scheduled dewatering and inspection of the diversion tunnel and forebay. The Proposed Project's objective is to minimize the chance of fish stranding in the sluice and tailrace channels during such inspections.

Figure 1. Infrastructure associated with the La Grange Diversion Dam



1.2 Project Location and Proposed Project Area

The La Grange Diversion Dam and La Grange Powerhouse are located on the Tuolumne River at approximately river mile 52.2 and 51.9, respectively, one mile east of the town of La Grange in Stanislaus County, California (Figure 2). The downstream end of the La Grange tailrace where it reenters the main channel is located at river mile 51.7.

The Proposed Project area encompasses 4.5 acres and includes all Project components, staging areas, dewatered areas, equipment access, and other temporary disturbance that may result from the Proposed Project (Figure 3). The Proposed Project area is associated with Stanislaus County Assessor Parcel Number 008-043-008-000, which is entirely owned by TID. The Proposed Project area is accessed by California State Route 132/Yosemite Boulevard and La Grange Dam Road. Public access to La Grange Dam Road is restricted by a locked gate near its intersection with California State Route 132/Yosemite Boulevard.

1.3 Project Description

The purpose of the Proposed Project is to minimize fish isolation and stranding. The two primary components of the Proposed Project are (1) surfacing the sluice channel and (2) installing a diversion structure that would connect the upstream portion of the tailrace channel to the main river channel. In combination, these components were chosen to meet the project goal of minimizing the potential for fish isolation and stranding and to provide TID facilities with durability and lower maintenance requirements during operations. A site plan showing the various Project components and Proposed Project area is provided in Figure 3. A plan set is included as Appendix A. Details regarding the Proposed Project components are provided in the following sections.

Sluice Channel Surfacing

The existing sluice channel was excavated to connect flow from the forebay sluice gates to the powerhouse tailrace. The upper extent of the excavated sluice channel generally consists of bedrock with a very steep grade, including several vertical drop-offs and cascading pools. The lower portion of the sluice channel is armored with riprap and lined with angular rock and cobble. TID is proposing to place a concrete-based finishing material (that is, shotcrete or equivalent, referred to here as shotcrete) over an approximately 300-foot-long portion of the sluice channel. The shotcrete would be applied to the existing sluice channel to create a smooth, continuous surface lacking pools or cover. The purpose of the surfacing would be to smooth out the contour and slope of the sluice channel and eliminate any small, localized pool areas, thereby eliminating the potential for the formation of small, localized isolated pools of water that could trap fish under low or no-flow conditions.

The sluice channel would be surfaced with shotcrete, starting about 100 feet downstream of the forebay sluice gates and ending where the sluice channel converges with the tailrace channel near the powerhouse (Figure 3). The uppermost 100-foot section of the sluice channel directly below the sluice gate would not be subject to surfacing because this area is characterized by multiple near-vertical elevation changes that act as existing barriers to fish movement.

Figure 2. Project location

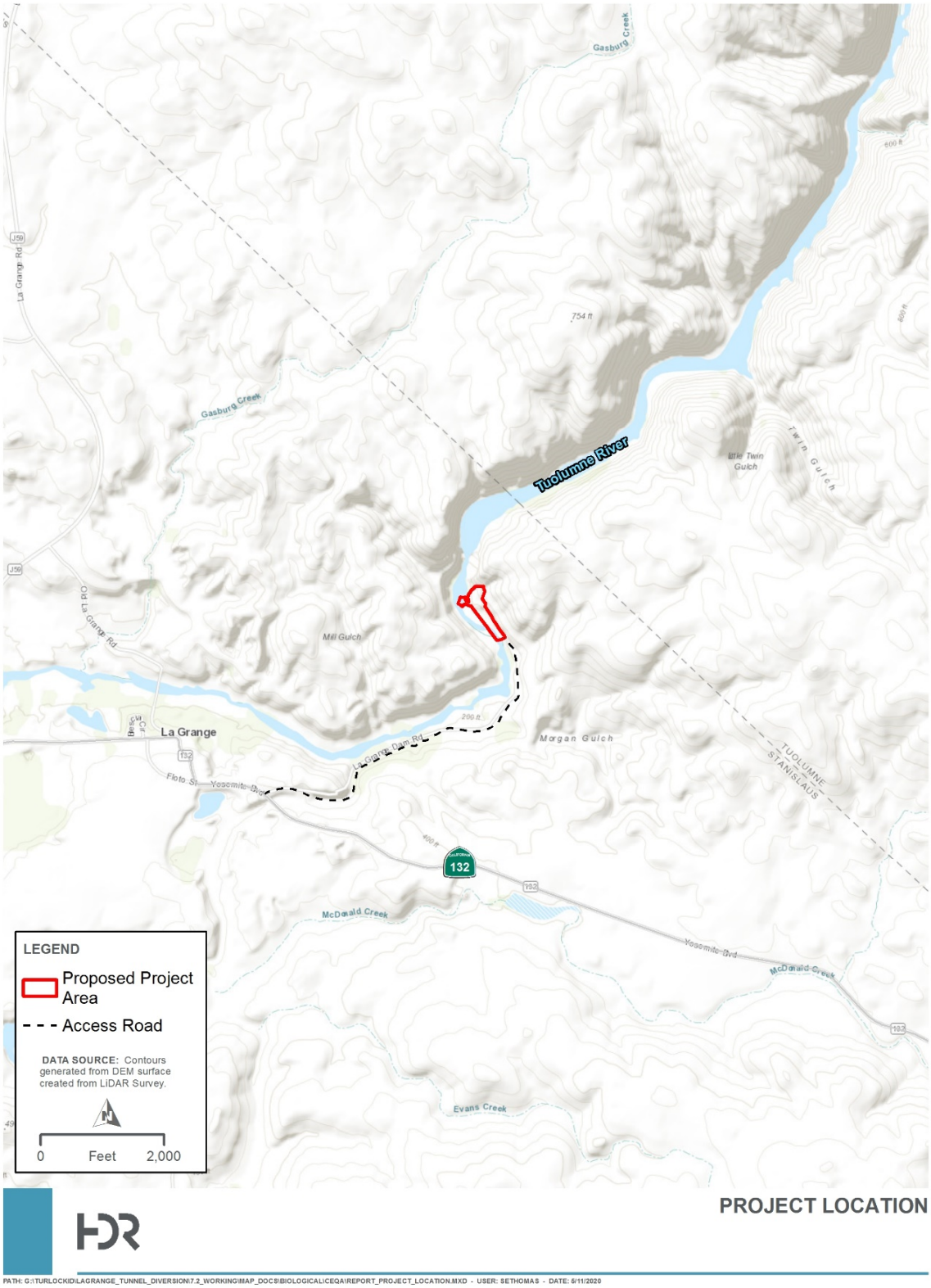
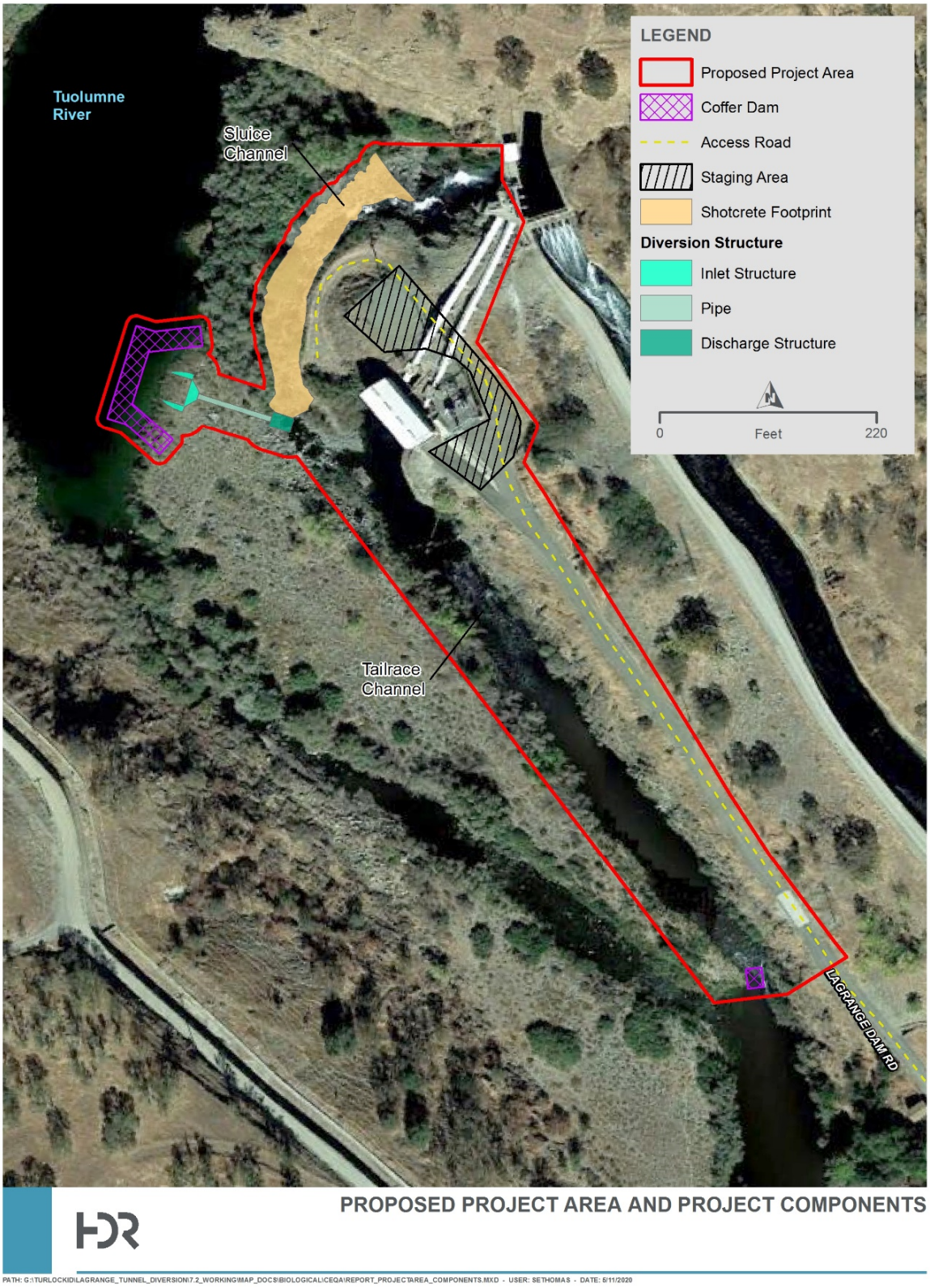


Figure 3. Proposed Project area and Project components



Shotcrete application would be preceded by a slow, step-wise dewatering and a fish rescue operation, as described below in the *Water Management* and *Fish Rescue and Salvage* sections. The dewatering process would include shutting down the powerhouse for the duration of the Proposed Project. Grid reliability would not be affected because other TID facilities have the capacity to cover the small amount of power lost during the outage. Therefore, the Proposed Project would not result in a reduction in TID's total energy generation during or after construction.

Where necessary, preparation of the sluice channel would occur prior to application. The surface preparation would consist of removing loose material such as large rocks and boulders, and vegetation, either by manual labor or mechanically, with a small- to medium-sized excavator. Once this is completed, bulldozers would form the sluice channel to reflect the new channel profile shown in Figure 3. To further smooth out the profile of the channel prior to placing shotcrete, excavators would transport sand to the channel, and low spots would be manually filled using shovels. Wire mesh would then be placed to act as reinforcement for the shotcrete.

The sluice channel area that would receive the shotcrete is approximately 300 feet in length and ranges from 20 to 60 feet wide. The thickness of shotcrete that would be applied to the sluice channel would vary, with a minimum thickness of 6 inches. In areas where the average thickness of shotcrete would exceed 6 inches, a slurry backfill would be applied as a base layer. Additional shotcrete would be applied to the side slopes to form the banks of the sluice channel. Along the banks, the shotcrete would be applied to a height of at least 2 feet above the water elevation associated with of the maximum sluice gate flow of 700 cfs. At the base of the proposed shotcrete footprint, a 1-foot-wide, 3-foot-deep concrete footing would be constructed to prevent head cutting as flow passes over the downstream edges of the shotcrete and into the earthen tailrace channel. The shotcrete would be applied using spray nozzles attached to the hopper by hoses. A profile of the sluice channel and proposed shotcrete application is shown in Appendix A. Figure 4 through Figure 6 provide views of the sluice channel and the area that would receive shotcrete treatment.

To resist uplift from water pressure below the shotcrete, the edge of the shotcrete lining would either be anchored into the existing rock using drilled and epoxied rebar or be keyed into locations of earthen backfill, should it be encountered. The proposed lined channel has been designed to pass 700 cfs, which is the combined maximum flow rate from the two sluice gates.

Shotcrete would be brought to the Project area on mixing trucks and delivered into a hopper that would be staged on site. All raw materials would be obtained from local suppliers within a 40-mile radius of the Proposed Project area. At this stage of Project development, it is anticipated that the shotcrete and concrete would be sourced from Allied Concrete in Modesto, California, and the sand and slurry would be sourced from 7/11 Materials in Waterford, California. Estimated quantities of materials to be excavated and added during the proposed construction are detailed in Table 1.

Table 1. Estimated quantities of material to be excavated or added during construction

Activity	Material type	Quantity removed (cubic yards)	Quantity added (cubic yards)
Sluice channel			
Sluice channel preparation	Bedrock and loose rock	43	—
Fill in bottom of sluice channel	Slurry	—	108
Finish material in sluice channel	Shotcrete or similar	—	600
Diversion structure			
Temporary access pad across sluice channel	Sandbag	—	40
Temporary river cofferdam	Sandbag	—	2
Temporary tailrace cofferdam	Sandbag	—	8
Excavate for diversion pipe trench	Cobble	152	152
Excavate diversion pipe structures	Cobble	233	233
Diversion pipe	Rubber gasketed reinforced concrete pipe	—	47
Backfill at diversion pipe	Slurry	—	84
Diversion inlet structure	Concrete	—	25
Diversion outlet structure	Concrete	—	25
	Total	**428**	**1,324**

Figure 4. Sluice channel proposed shotcrete boundary

Figure 5. Upper extent of proposed shotcrete boundary

Figure 6. Sluice channel from above with proposed shotcrete boundary

Tailrace Channel Diversion Structure

The existing tailrace channel is isolated from the Tuolumne River's main channel by a gravel bar, which creates a topographic highpoint of separation between the two channels until river flows exceed about 2,500 cfs. The tailrace channel enters the Tuolumne River approximately 500 feet downstream from the powerhouse. Until river flows exceed 2,500 cfs, the tailrace channel flows are currently limited to water flowing down the sluice channel or out of the powerhouse. TID is proposing to place a gated diversion structure through the topographic highpoint between the river channel and the tailrace to convey water from the main river channel to the upper tailrace channel during tunnel dewatering and maintenance events (see Figure 7). In addition to the pipe, the diversion structure would include an inlet structure (river end) and discharge structure (tailrace end) (Appendix A). The purpose of this connection would be to maintain adequate flows in the tailrace channel during times of tunnel dewatering and maintenance to sustain full connectivity with the Tuolumne River downstream, thereby minimizing the chance for fish stranding in the tailrace.

The rubber gasketed reinforced concrete pipe would be approximately 80 linear feet in length. The pipe diameter would be 54 inches and sized to deliver a flow of at least 50 cfs to the tailrace channel over the duration of a scheduled tunnel outage[4]. The pipe would be placed on a 0.7 percent slope to convey water flow from the Tuolumne River to the tailrace channel. A concrete pipe was selected rather than plastic for the added weight so as to resist pipe uplift, both during installation and over long-term operations.

As noted in the discussion of the proposed sluice channel surfacing, the pipe installation would be preceded by dewatering and fish rescue in the sluice and tailrace channels. Cofferdams would be placed at both the upstream river and downstream tailrace extents of the work area, allowing for the entire work area to be isolated and dewatered. Once isolated, cobble and sediment would be excavated to shape the pipe trench and to prepare the foundation for the structure. The trench dimensions would be approximately 6 feet deep by 6.5 feet wide, and 80 feet long. A 6-inch layer of sand slurry would be placed in the trench first to bed the pipe. The pipe would be placed over the bedding slurry and a final encasing slurry coat would be placed around the pipe. Native material would be placed over the top of the slurry to bring the surface elevation back to conditions similar to existing conditions.

Following pipe placement, rebar and wood for forming the concrete inlet and discharge structures would be loaded into the excavator and delivered to both the upstream inlet (river) and downstream discharge (tailrace) locations. The rebar and forms would be set manually; concrete would either be manually hauled into place or be applied by hoses from the staging area. This would create the inlet and discharge structures at either end of the pipe.

The resulting upstream river inlet structure would consist of a reinforced concrete headwall approximately 1 foot thick, 40 feet long, and with an average 12-foot height;[5] the slide gate and gate actuator would be installed at the headwall. It is anticipated that this structure would be completely submerged at river channel flows in excess of 2,500 cfs (high flows), but portions of the structure may be visible during periods of normal and low flow. The headwall would have a winged shape to divert water from the river channel into the pipe. The inlet structure sluice gate is provided to allow flow into the tailrace when needed by TID. This gate would be closed during normal operations, but

[4] Tunnel outages would be schedule to avoid spawning season of fall-run chinook and *O. mykiss,* as possible.

[5] Approximately 4 feet of this wall height would be buried and act as a foundation, leaving the remaining 8 feet of wall exposed.

would be manually opened during times of tunnel dewatering and maintenance. The pipe ends would not be screened to avoid debris build up and impingement of fish. Fish would be allowed to travel through the pipe and into the tailrace channel unimpeded when the sluice gate is open.

The downstream tailrace concrete headwall at the discharge structure would be smaller and rectangular; approximately 1 foot thick, 14 feet long, and with an average 12-foot height.[6] This structure would be ungated.

Figure 7. Upstream topographic high between river and tailrace channel

Site Access and Mobilization

All access to the Proposed Project area would be via La Grange Dam Road, a well-maintained paved road that currently provides access to the powerhouse. A locked gate is located at the entrance to La Grange Dam Road, approximately 400 feet from the intersection with California State Route 132/Yosemite Boulevard. The gate restricts public access year-round; therefore, use of the road would be restricted to construction traffic during the length of the Project. It is anticipated that La Grange Dam Road is wide enough to accommodate all truck and equipment traffic for the Proposed Project. No road widening or improvements would be required along the length of road. In addition, no off-roading or damage to roadside vegetation or overhanging trees would result from the construction traffic.

The paved portion of La Grange Dam Road provides direct access to the powerhouse. From there, a length of maintained gravel road extends past the powerhouse and beneath the penstocks, ending in a gravel parking area directly north of the powerhouse (Figure 3). From the gravel parking area, an

[6] Approximately 4 feet of this wall height would be buried and act as a foundation, leaving the remaining 8 feet of wall exposed.

unmaintained gravel road extends north and down the slope, curving west and south toward the confluence of the sluice and tailrace channels. This would function as the channel entrance point for all large Project equipment.

Mobilization would consist of delivery of earthmoving equipment and construction materials. It is anticipated that delivery of fill would occur as needed through the construction period; this would eliminate the need for large quantities of fill to be stored on site.

Staging and Site Preparation

All equipment and materials would be staged on TID property in the gravel lot north of the powerhouse and west of the penstocks. In addition, the paved areas south of the penstocks and east of the powerhouse could be used for additional staging, as needed. These staging areas are directly connected to the tailrace channel by the existing unmaintained gravel road adjacent to the sluice channel.

Construction site preparation would include vegetation clearing, primarily the clearing of dense, scrubby willows currently separating the unmaintained gravel access road from the tailrace channel, Tuolumne River, and lower reaches of the sluice channel. Specifically, vegetation would be cleared in the area bounding the tailrace channel between the sluice channel and the powerhouse to allow equipment access for installation of the diversion structure. Some additional trimming of overhanging vegetation may occur along the edge of the sluice channel to allow access for shotcrete application.

Vegetation clearing would be accomplished using gas-powered chainsaws and weed eaters. Removal of downed vegetation would be done manually or by using an excavator, if necessary. When possible, willows would be trimmed to ground level, leaving the base and roots intact to facilitate regrowth post-Project while still allowing for temporary access during construction. It is assumed that equipment would be able to drive over the cobble in the topographic high area around the proposed diversion structure and no grading or temporary fill placement would be required. However, a temporary work pad may be needed to allow equipment to cross the lower sluice channel to access the diversion structure area. It is anticipated that all work in the sluice channel could be conducted from the existing gravel road paralleling the channel and no additional temporary access improvements would be required.

Water Management

Following mobilization and staging area development in mid-May, construction of the Proposed Project components is scheduled to occur between mid-May and September 30. River flows at the La Grange Diversion Dam are controlled by the upstream Don Pedro Project (FERC Project No. 2299). In below-normal water years, the Don Pedro Project is required to provide a minimum flow of 50 to 75 cfs in the Tuolumne River during the mid-May through September 30 construction period as measured at the USGS La Grange gaging station located just downstream of the Proposed Project. In normal to above-normal water years, a minimum flow of 250 cfs in the Tuolumne River is required during this time period. Since these required river flows are not able to be diverted for irrigation purposes at the La Grange Diversion Dam, the flows are passed downstream normally through the La Grange Powerhouse. As described above, the proposed work area—including the sluice channel, upper tailrace channel, and river (inlet) end of the diversion structure—would need to be isolated and dewatered prior to the start of in-channel work, thereby requiring the powerhouse to be taken off line and the required river flows to be passed through the

MID Hillside gates once the TID facilities are shut off. The powerhouse would be out of service for the duration of construction.

As noted in the descriptions of the two Project components above, construction of the diversion structure would be preceded by installation of cofferdams to avoid fish stranding that could result from halted flows during the scheduled powerhouse and sluice gate outage. Dewatering of the sluice channel would be accomplished by closing the TID forebay sluice gate and drain gate to suspend water flow, allowing the remaining water to freely drain into the Tuolumne River. Any remaining pockets of river water that have pooled in low areas along the channel length would be pumped out and discharged back into the river. Stop logs would be inserted into the intakes of TID powerhouse penstocks at the forebay to halt any flow through the powerhouse into the tailrace channel.

The temporary cofferdam systems that are proposed for dewatering of the tailrace channel and Tuolumne River Project area would be installed using inflatable bags. Sand bags will be used to help create a seal between the cobble riverbed and the inflatable cofferdam. One cofferdam would be placed at the downstream end of the tailrace channel above the confluence with the Tuolumne River and the other cofferdam would be placed upstream at the inlet end of the proposed diversion structure in the main river channel. During the mid-May through September 30 construction period, the main river and tailrace channel are typically hydrologically isolated from each other by the high gravel bar between them. Following installation of the cofferdams, dewatering of wetted Project areas in the tailrace channel and Tuolumne River would be accomplished using pumps. This would result in the two work areas being isolated and dewatered separately. Fish rescue operations would precede complete dewatering.

Ultimately, the cofferdam system would be selected by the contractor prior to mobilization; however, it is anticipated that the installation would require the following steps:

- Suspension of water flow by closing the TID forebay sluice gates and drain gate and installing the penstock stop logs;
- Fish rescue beginning immediately, moving upstream to downstream in the sluice and tailrace channels;
- Isolation of a temporary workspace to create an exclusionary barrier to fish, which may require turbidity curtains and/or block nets;
- Installation of a cofferdam in the lower tailrace channel;
- Continuation of fish rescue in the sluice and tailrace channel, once isolated;
- Dewatering of the sluice and tailrace channel;
- Installation of a cofferdam at the inlet side of proposed diversion structure in the Tuolumne River;
- Fish rescue in the cofferdam inlet area;
- Dewatering of the inlet area;
- Construction of a diversion structure and sluice channel lining;
- Removal of all temporary construction equipment, materials, and facilities;
- Removal of cofferdams; and
- Removal of the exclusionary barriers.

A plan outlining the cofferdam installation, water management process, and equipment to be used would be finalized and submitted to the U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), and National Marine Fisheries Service (NMFS) for review at least 30 days prior to mobilization and in-water work.

Fish Rescue and Salvage

Dewatering of the sluice channel, tailrace channel, and the Project area within the main river channel may result in stranding of fish, including CCV steelhead. A qualified fisheries biologist would design and conduct a fish rescue and salvage effort for fish in the Project areas to be isolated for construction, which would involve the capture and relocation of fish and aquatic-dependent species to suitable habitat in the Tuolumne River. In addition, a fisheries biologist would provide observation during initial dewatering activities in the temporary isolation areas to minimize the potential for stranding as water recedes. A detailed Fish Rescue and Salvage Plan would be prepared and submitted to NMFS for review at least 30 days prior to isolation of the temporary in-water work areas.

The Fish Rescue and Salvage Plan would feature three work phases: (1) clearing the general work area of fish prior to isolation, (2) clearing the isolation area of remaining fish, and (3) dewatering of the isolation area and final fish salvage. All phases of the Fish Rescue and Salvage Plan would be implemented by a fish rescue team consisting of several qualified fisheries biologists and/or technicians, each with experience in fish capture and handling.

Phase I: Clear the Work Area

To sample the entire water column depth, biologists would sweep the work areas in the tailrace and main river channel prior to any in-water work by stacking block nets top-to-bottom and end-on-end, as needed, to push local fishes and aquatic species outside of the work area. Fish would not be handled or removed during this process to reduce the chance of added stress. In addition, potential warm water conditions would be mitigated by nudging fish and not handling them. The goal would be to clear aquatic inhabitants from the area before any equipment enters the isolation areas. While the exact length of the block nets may vary based on conditions (for example, depth, velocity, aquatic vegetation) and professional judgment, the following characteristics would be consistent for all potential nets employed:

- individually 6 to 8 feet deep
- 5/8-inch mesh
- floats 1 foot apart on top
- 4-ounce lead weights 1 foot apart on bottom

Exclusionary barriers used to create the temporary isolation areas may vary depending on the means of project implementation.

Phase II: Clear the Isolation Areas

The second phase of the Fish Rescue and Salvage Plan would take place when the primary in-water work areas have been isolated. As noted above, isolation may be achieved using turbidity curtains and/or block nets, depending on the required implementation approach. The exclusionary barrier would be installed, leaving only a small section of the barrier open to the live channel. The in-water

work areas would be isolated between mid-May and September 30, which is within the NMFS-designated work window. Once the work areas have largely been isolated, seines and/or block nets would be used to push fish from the isolation areas without handling.

Deployment of the seines and/or block nets (collectively nets) to move fish from the isolation areas may be conducted through a variety of approaches, including the use of a raft/boat or by walking, depending on flow conditions and depth. Typically, net deployment would begin with a raft being paddled out perpendicular to the shore. One person in the raft would navigate the vessel while a second person would hold the net. An additional person would feed the net out from the shore. The nets would be deployed at the end of the isolated area opposite the opening. The nets would be deployed such that they are in contact with the exclusionary barrier on one side and the shore on the other, and would be carefully pulled from the top of the isolated area toward the opening, with the lead weights at the base of the net moving along the bottom. It is crucial to make sure during this process that there are no twists in the net and that the bag appears open, because if the net is twisted the lead line is not in contact with the bottom. The movement of the net from the end of the isolation area to where the barrier is open to the live channel would push fish outside of the isolation area and into the open channel.

After the areas have been swept with the nets several times, the exclusionary barriers would be closed on the river/downstream sides and the isolation areas would be sealed. In the event that block nets and/or seines are used for initial exclusion, the cofferdams may be installed inside the existing exclusion barriers. Turbidity curtains or block nets would be removed after the cofferdam encompasses the existing barriers. Portable pumps would be used to dewater the area enclosed by the cofferdams. The dewatering pumps, equipped with screens, would be used to reduce water depths within the cofferdam to a depth of approximately 1.5 to 2 feet to allow for a final fish rescue.

Phase III: Fish Rescue

The third phase of the Fish Rescue and Salvage Plan would take place after the areas have been dewatered to the desired depth, usually the day after Phase II. This phase would be conducted in the early morning hours—to take advantage of the coolest temperatures—using a combination of seines and dip nets. Immediately after collection, all collected fish, including native and nonnative fish, would be placed in 5-gallon buckets and/or coolers filled with river water, identified, measured, and counted, and transported to a location outside of the cofferdams for release back into the Tuolumne River. Salmonids would be processed before any other fish. In the event that water temperatures become stressful (>21° Celsius) or are elevated upon arrival (19° to 20° Celsius), a biologist would be assigned to rapidly transport fish from the work area to the release area as they are sampled without counting or identification to expedite the rescue. The biologist(s) would remain on site during the entire process of dewatering. The rescue would end when few or no fish are rescued after multiple seine pass attempts.

Demobilization

Demobilization of in-water work is scheduled to occur prior to September 30. Demobilization would begin with the removal of both cofferdams. Following cofferdam removal, both the sluice channel and tailrace diversion structures would be tested. After documenting test results and confirming that the structures function as intended, remaining demobilization activities could continue. The contractor would remove all construction vehicles and equipment, any stockpiled excess material, and all erosion and sediment control facilities at the completion of the earthwork and following completion of all work. Any disturbed natural areas would be returned to preconstruction conditions and revegetated as appropriate.

Construction Equipment

Anticipated types and number of construction equipment and vehicles are listed in Table 2.

Table 2. Anticipated construction equipment and intended use

Equipment	Size/Capacity	Units	Estimated trips	Activity
Excavator	CAT 320	2	1	Excavation, movement, and removal of existing and imported fill material, to occur during all stages of construction
Bulldozer	CAT D6	2	1	Sluice channel excavation
Dump truck	10 cubic yards	1	5	Dredge removal
Concrete delivery truck	Standard	1	5	Upstream and downstream diversion structure concrete
Shotcrete delivery truck	Standard	1	60	Sluice channel shotcrete placement
Slurry delivery truck	Standard	1	22	Diversion structure and sluice channel slurry placement
Shotcrete machine with hopper	Standard	1	Not applicable	Sluice channel shotcrete placement
Work truck with compressor	Standard	1	Not applicable	Sluice channel shotcrete placement
Pump	4 inch	1	Not applicable	Dewatering activities
Pump	3 inch	1	Not applicable	Sluice channel shotcrete placement
Pump	2 inch	2	Not applicable	Dewatering activities
Personnel vehicles	Pickup/two-axle	6	Daily	Transport of personnel for duration of construction

Construction Schedule

To avoid any in-water work in the wet season, Proposed Project construction would be limited to a single dry season, between mid-May and September 30, 2021. It is estimated that implementation of the Proposed Project, including fish rescue, would take 9 weeks (Table 3).

Table 3. Construction schedule

Project Activity	Duration	1	2	3	4	5	6	7	8	9	Weeks
Mobilization	1 day										
Dewatering	5 days										
Diversion construction	27 days										
Sluice channel construction	19 days										
Demobilization	3 days										
Total duration	**45 days**										

The construction labor force is not expected to exceed 12 personnel on site daily. Construction is expected to occur Monday through Friday during 12-hour shifts between 6 a.m. and 6 p.m. No nighttime work is anticipated.

Operations and Maintenance

Operation of the diversion structure would be limited to exercising the gate operator according to manufacturer recommendations during each of these dewatering events. This is typically on an annual or semi-annual basis depending on operational needs. The gated diversion inlet structure would be installed in an area of the riverbed that is inundated under flood conditions. It is anticipated, based on current conditions, that regrading of the areas upstream of the inlet structure and downstream of the discharge structure would be required about every 20 years to restore flow capacity following extreme flood events.

No ongoing maintenance is anticipated for the surfaced sluice channel. It is assumed the sluice channel would not require major maintenance or improvement for at least 20 years. Both the diversion structure and sluice channel would be inspected for degradation on a periodic basis. Future maintenance activities requiring ground disturbance would be permitted separately.

2 Environmental Checklist Form

1. **Project Title:** La Grange Sluice and Tailrace Channel Improvement Project
2. **Lead Agency name and address:** Turlock Irrigation District
3. **Contact person and phone number:** Tim Payne, (209) 883-8384
4. **Project location:** One mile northeast of the city of La Grange, California
5. **General Plan zoning designation:** Agriculture (Stanislaus County 2016b)
6. **Description of project:** The purpose of the Proposed Project is to minimize fish isolation and stranding. The two primary components of the Proposed Project are (1) surfacing the sluice channel and (2) installing a diversion structure that would connect the upstream portion of the tailrace channel to the main river channel. In combination, these components were chosen to meet the project goal of minimizing the potential for fish isolation and stranding and to provide TID facilities with durability and lower maintenance requirements during operations.
7. **Surrounding land uses and setting:** The Proposed Project is located along the Tuolumne River channel in a rocky ravine surrounded by areas of barren dirt and some natural vegetation.
8. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement):**

Issuing Agency	Permit/Approval
Central Valley Water Resources Control Board	Section 401 Water Quality Certification
U.S. Army Corps of Engineers	Section 404 Permit
California Department of Fish and Wildlife	California Fish and Game Code 1602 Lake and Streambed Alteration Agreement
California State Water Quality Control Board	Enrollment under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Disturbance Activities (Construction General Permit)
National Marine Fisheries Service	Endangered Species Act Section 7 Consultation

9. **Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?** In compliance with Assembly Bill 52, TID will notify tribes who have expressed interest regarding the Proposed Project.

Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology/Soils	☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials
☐ Hydrology / Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☐ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities/Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance

Determination (To be Completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the project would not have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project may have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project may have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

8/26/2020
Date:

Evaluation of Environmental Impacts

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors, as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).
5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    a. Earlier Analysis Used. Identify and state where they are available for review.
    b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a Project's environmental effects in whatever format is selected.

9. The explanation of each issue should identify:
    a. The significance criteria or threshold, if any, used to evaluate each question; and
    b. The mitigation measure identified, if any, to reduce the impact to less than significance.

2.1 Aesthetics

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Except as provided in Public Resources Code Section 21099, would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?	☐	☐	☐	☒
c) In non-urbanized areas, 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 points). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Environmental Setting

The topography around the Proposed Project is characterized as rural with rolling hills and the Tuolumne River flowing through a steep-sided canyon (TID and MID 2017). One officially designated state scenic highway is in Stanislaus County. This state scenic highway encompasses a large stretch of Interstate 5 from mile marker 0 to mile marker 28.1, running from the Merced County line to the San Joaquin County line. The route was established on October 25, 1968, and holds the official designation number 8 (California Department of Transportation [Caltrans] 2020). This state scenic highway does not cross the Proposed Project area or intersect with any Project access roads. The nearest scenic vista is the Lake Don Pedro Vista Point, located roughly 12 miles north of the Proposed Project area (Visit Tuolumne County 2019).

The Proposed Project is gated and restricts public access. Visual elements of the Proposed Project area would be visible only to workers on site and recreating individuals either wading or boating upstream from public access points in the town of La Grange, roughly 2 miles downstream (TID and MID 2017). The powerhouse, substation, and forebay of the TID main canal and associated drain gate, sluice gates, penstocks, irrigation canals, and access roads are currently part of the visual elements contributing to the area's overall aesthetics. The closest sensitive receptor to the Project area is located at 31619 Yosemite Boulevard, approximately 1 mile southeast of the Project area.

Impact Analysis

a) Have a substantial adverse effect on a scenic vista?

Impact: No impact.

All of the land surrounding the Proposed Project area is designated agricultural. Proposed Project activities would not be visible from vantage points surrounding the Project area because views would be screened by the powerhouse and steep riverbank. Sensitive receptors located 1 mile southeast of the Project area would not have views of the Proposed Project or construction because they would be obscured by topography and trees. The surrounding lands are mainly private, and access roads are gated, thereby restricting public access to the Project area. No scenic vistas exist within the Proposed Project area. Therefore, the proposed sluice channel improvements and installation of the diversion structure would have no impact on a scenic vista and no mitigation is required.

Mitigation Measures: None required.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?

Impact: No impact.

Only the portion of Interstate 5 within Stanislaus County is officially designated as a state scenic highway (Caltrans 2020). The portion of Interstate 5 that is officially designated as a state scenic highway is located in western Stanislaus County, whereas the Proposed Project area is located at the eastern edge of the county. Therefore, the Proposed Project would have no impact on scenic resources within a state scenic highway and no mitigation is required.

Mitigation Measures: None required.

c) In non-urbanized areas, 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 points). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Impact: No impact.

TID owns 53 acres of land used for hydropower production. All areas around the powerhouse, including the access road (La Grange Dam Road) up to California State Route 132/Yosemite Boulevard that would be used during construction, and all proposed staging areas, are on property owned by TID. All roads leading to the Proposed Project area are gated and public access is restricted. The public could potentially see the Proposed Project by way of unauthorized access or by traveling upstream (approximately 2 miles). Travel up the river and views from the river would provide the only publicly accessible vantage points. The limited number of people who might experience visual effects from the Proposed Project would see construction-related visual impacts in the immediate area of the Proposed Project related to the use of heavy equipment and cofferdams over approximately 45 days. Once construction is complete, construction-related visual intrusions would be removed. The Proposed Project would result in adding new and visible (above water level) artificial elements into the area. These visible new elements include the proposed upstream inlet structure (that is, concrete headwall and culvert) and the downstream tailrace concrete headwall. These new elements would be located immediately west and south of the powerhouse. Based on flow elevations, the proposed 12-foot-high concrete walls would be most visible during low-flow conditions. However, sluice channel improvements and diversion structure construction changes are

consistent with the existing setting and would not substantially degrade the area's visual character. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Impact: No impact.

No new lighting or materials that would result in substantial glare are proposed. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

References

California Department of Transportation (Caltrans). 2020. "State Scenic Highways Program – List of Eligible and Officially Designated State Scenic Highways." Last updated 2020. Accessed April 15, 2020. https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Sacramento, California.

Stanislaus County. 2015. "Stanislaus County General Plan." Stanislaus Board of Supervisors. Last updated 2015. Accessed March 24, 2020. http://www.stancounty.com/planning/pl/gp/current/gp-introduction.pdf.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2017. *La Grange Hydroelectric Project FERC No. 14581, Final License Application Exhibit E – Environmental Report*. September.

Visit Tuolumne County. 2019. "7 Scenic Vistas of Tuolumne County." Last updated August 12, 2019. Accessed April 15, 2020. https://www.visittuolumne.com/7-scenic-vistas-of-tuolumne-county. Sonora, California.

2.2 Agriculture and Forestry Resources

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.				
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Environmental Setting

The Proposed Project is located on the Tuolumne River, approximately 1 mile east of the town of La Grange in Stanislaus County, California. The Proposed Project is located on lands owned entirely by TID and encompasses approximately 53 acres of land used for hydropower production (Stanislaus County 2006). All areas around the powerhouse, including the access road (La Grange Dam Road) and proposed staging footprints, are owned by TID and public access is restricted.

A large majority of the land surrounding the Proposed Project area is considered grazing land, with a small portion designated nonagricultural and natural vegetation (California Department of Conservation [DOC] 2018a). No lands are designated as prime farmland, unique farmland, or

farmland of statewide importance. The Project area does not include forested lands or land that would be considered for timber harvest.

Impact Analysis

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

d) Result in the loss of forest land or conversion of forest land to non-forest use?

Impact: No impact.

The Proposed Project area is located within a rural area along the Tuolumne River near the community of La Grange. The surrounding community is mainly zoned for agriculture, residential, and historical land use (Stanislaus County 2016b). None of the lands within the Project area are listed under an existing Williamson Act contract (DOC 2018b). The area where proposed construction would occur is mainly within the Tuolumne River channel and is not designated as farmland by the California Resources Agency. The Proposed Project would not convert land designated as prime farmland, unique farmland, or farmland of statewide importance (farmland) in the Farmland Mapping and Monitoring Program. The Proposed Project area does not contain land zoned for forest land, timberland, or timberland production (Stanislaus County 2016b). Therefore, the Proposed Project would have no impact on converting farmland, conflicting with Williamson Act contracts, conflicting with forest land zoning, or resulting in the loss of forest land. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Impact: No impact.

See responses to items a, b, c, and d above. Project construction activities would be limited to existing facilities and their immediate vicinity. Implementation of the Proposed Project construction activities would not result in the conversion of farmland to non-agricultural use or forest land to non-forest use. No other changes in the existing environment as a result of the Proposed Project would lead to the conversion of farmland or forest land. Therefore, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

References

California Department of Conservation (DOC). 2018a. “California Important Farmland Finder.” Accessed March 4, 2020. https://maps.conservation.ca.gov/DLRP/CIFF.

———. 2018b. “Santa Cruz County Williamson Act FY 2015–2016.” Accessed April 2, 2019. fftp://ftp.consrv.ca.gov/pub/dlrp/wa/SantaCruz_15_16_WA.pdf.

Stanislaus County. 2006. Stanislaus County – Geographic Information Systems, Parcel Inquiry Map. Last updated 2006. Accessed March 13, 2020.

———. 2016a. “Stanislaus County General Plan.” Stanislaus Board of Supervisors. Last updated 2015. Accessed March 4, 2020. http://www.stancounty.com/planning/pl/gp/current/gp-introduction.pdf.

———. 2016b. “La Grange Community Plan.” Stanislaus County General Plan – Appendix I47. Last updated June 23, 1987. Accessed March 4, 2020. http://www.stancounty.com/planning/pl/documents/gp/i-a-7-la-grange-cp.pdf.

2.3 Air Quality

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations.				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people?	☐	☐	☐	☒

As described previously, the Proposed Project's two primary components are surfacing the sluice channel and installing a diversion structure that would connect the tailrace channel to the main river channel. Air emissions would result primarily from off-road diesel equipment. Heavy diesel trucks would be used to mobilize and demobilize the off-road equipment; to deliver fill, gunite, and cement; and to haul away loose material dredged from the sluice channel. Daily commute vehicles would also contribute to air emissions.

Environmental Setting

The Proposed Project is located in Stanislaus County, east of Modesto, California, in the San Joaquin Valley Air Pollution Control District (SJVAPCD). Table 4 lists the state and federal ambient air quality attainment status for the San Joaquin Valley Air Basin.

Table 4. Ambient air quality attainment status setting

	Federal standards[a]	State standards[b]
Ozone - 1-hour	No federal standard[f]	Nonattainment/severe
Ozone - 8-hour	Nonattainment/extreme[e]	Nonattainment
Particulate matter (PM_{10})	Attainment/maintenance[c]	Nonattainment
Particulate matter ($PM_{2.5}$)	Nonattainment[d]	Nonattainment
Carbon monoxide (CO)	Attainment/unclassified	Attainment/unclassified
Nitrogen dioxide	Attainment/unclassified	Attainment
Sulfur dioxide	Attainment/unclassified	Attainment
Lead (particulate)	No designation/classification	Attainment
Hydrogen sulfide	No federal standard	Unclassified
Sulfates	No federal standard	Attainment
Visibility reducing particles	No federal standard	Unclassified
Vinyl chloride	No federal standard	Attainment

[a] 40 Code of Federal Regulations Part 81

[b] California Code of Regulations Title 17, Sections 60200–60210

[c] On September 25, 2008, the U.S. Environmental Protection Agency (EPA) redesignated the San Joaquin Valley to attainment for the PM_{10} National Ambient Air Quality Standard (NAAQS) and approved the PM_{10} Maintenance Plan.

[d] The Valley is designated nonattainment for the 1997 $PM_{2.5}$ NAAQS. EPA designated the Valley as nonattainment for the 2006 $PM_{2.5}$ NAAQS on November 13, 2009 (effective December 14, 2009).

[e] Although the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the *Federal Register* on May 5, 2010 (effective June 4, 2010).

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

Thresholds of Significance for Air Quality

SJVAPCD has published California Environmental Quality Act (CEQA) guidance for assessing and mitigating air quality impacts (SJVAPCD 2015). Table 5 presents the thresholds of significance for criteria pollutant emissions.

Table 5. SJVAPCD thresholds of significance

	NOx (tpy)	ROG (tpy)	CO (tpy)	SOx (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Construction phase	10	10	100	27	15	15
Operational phase	10	10	100	27	15	15

Source: SJVAPCD Air Quality Thresholds of Significance – Criteria Pollutants, March 19, 2015
http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf
Notes: NOx = nitrogen oxide, ROG = reactive organic gas, SOx = sulfur oxide, tpy = tons per year

Estimated Project Emissions

Air emissions from the Proposed Project were estimated using the California Air Resources Board's (CARB's) CalEEMod emission model, version 2016.3.2. For this emission estimate, the Proposed Project was divided into five overlapping phases:

- Phase 1 – Mobilization and Dewatering
- Phase 2 – Sluice Channel Dredging
- Phase 3 – Sluice Channel Resurfacing
- Phase 4 – Diversion Tunnel Construction
- Phase 5 – Demobilization

Approximately 75 percent of the estimated air emissions associated with the Proposed Project are projected to be emitted from off-road diesel construction equipment. Approximately 24 percent of the emissions are projected to be emitted from on-road heavy duty trucks hauling gunite, concrete, slurry, forms, rebar, cofferdam sections, etc. The remaining 1 percent is projected to be emitted from on-road worker commuter vehicles. Table 6 lists the major equipment expected to be required for the Proposed Project.

Table 6. Off-road construction equipment

Phase	Off-Road Equipment	Size/Capacity	Units	Horsepower
2, 3, 4	Excavator	CAT 320	2	162
2, 3, 4	Bulldozer	CAT D6	2	251
1	Pump	4-inch	1	50
3	Pump	3-inch	1	25
1	Pump	2-inch	2	10
3	Gunite machine with hopper	standard	1	20
2, 3, 4	Compressor (on work truck)	—	1	78

Table 7 presents the estimate of emissions from the Proposed Project. Dust control measures required by SJVAPCD Rule 8021 would be implemented, but are not listed as mitigation measures in this document because they are standard requirements.

Table 7. Estimated emissions from Proposed Project (tons per year)

Emission source	ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$
Mobilization and dewatering						
Fugitive dust	—	—	—	—	0.00020	0.00002
Off-road equipment	0.0056	0.0338	0.0324	0.0001	0.00153	0.00153
On-road transport	0.0001	0.0031	0.0005	0.0000	0.00028	0.00009
Worker commute	0.0006	0.0004	0.0043	0.0000	0.00134	0.00036
Sluice channel dredging						
Fugitive dust	—	—	—	—	0.00106	0.00011
Off-road equipment	0.0046	0.0473	0.0421	0.0001	0.00208	0.00193
On-road transport	0.0001	0.0018	0.0003	0.0000	0.00013	0.00004
Worker commute	0.0005	0.0003	0.0036	0.0000	0.00112	0.00030
Sluice channel resurfacing						
Off-road equipment	0.0191	0.1682	0.1402	0.0003	0.00758	0.00716
On-road transport	0.0037	0.1150	0.0188	0.0004	0.01030	0.00313
Worker commute	0.0013	0.0010	0.0100	0.0000	0.00313	0.00084
Diversion tunnel construction						
Off-road equipment	0.0248	0.2553	0.2275	0.0005	0.01120	0.01050
On-road transport	0.0008	0.0256	0.0040	0.0001	0.00206	0.00063
Worker commute	0.0025	0.0019	0.0194	0.0001	0.00603	0.00163
Demobilization						
Off-road equipment	—	—	—	—	—	—
On-road transport	0.0001	0.0031	0.0005	0.0000	0.00028	0.00009
Worker commute	0.0003	0.0002	0.0022	0.0000	0.00067	0.00018
Total 9-week construction emissions	**0.064**	**0.660**	**0.510**	**0.0015**	**0.049**	**0.029**
Significance thresholds	10	10	100	27	15	15
Below construction threshold?	Yes	Yes	Yes	Yes	Yes	Yes

Impact Analysis

a) Conflict with or obstruct implementation of the applicable air quality plan?

Impact: Less than significant impact.

SJVAPCD has prepared a CEQA guidance manual that sets forth significance thresholds, below which a Project may be safely assumed to conform to the relevant air quality plan for this area. The Proposed Project would not create a permanent stationary source of air contaminants, include a land

use that would generate a substantial number of trips from mobile sources, or involve the use of high-ROG architectural coatings or solvents. As shown in Table 7, the annual construction emissions associated with the Proposed Project would be below the established significance thresholds. This is attributable to the relatively small scale of construction activities. The Proposed Project would, therefore, not conflict with or obstruct implementation of the relevant air quality plans. The Proposed Project would have a less than significant impact and no mitigation is required.

Mitigation Measures: None required.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Impact: Less than significant impact.

As mentioned above in item a, SJVAPCD has developed thresholds of significance that focus on quantifying and reducing emissions from both construction Projects and long-term operational emissions, specifically mobiles sources. For the purposes of this element, net increases of criteria pollutants would be deemed cumulatively considerable if they were to exceed the thresholds developed by the air pollution control district.

Criteria pollutant emissions associated with the Proposed Project would be well below the defined thresholds of significance. Therefore, the Proposed Project's incremental contribution to criteria pollutant emissions is not cumulatively considerable. The Proposed Project would have a less than significant impact and no mitigation is required.

Mitigation Measures: None required.

c) Expose sensitive receptors to substantial pollutant concentrations?

Impact: No impact.

Certain population groups are considered more sensitive to air pollution and odors than others—in particular, children, elderly, and acutely ill and chronically ill persons, especially those with cardiorespiratory diseases such as asthma and bronchitis. Sensitive receptors (land uses) indicate locations where such individuals are typically found, namely schools, daycare centers, hospitals, convalescent homes, residences of sensitive persons, and parks with active recreational uses, such as youth sports. The closest sensitive receptor to the Project area is located at 31619 Yosemite Boulevard, approximately 1 mile southeast of the Project area. Given the remote location of the work site and distance to the nearest sensitive receptor, there are no characteristic sensitive receptors that would be affected by construction activities. Furthermore, since all construction activities would be short-term (days) compared with long-term exposure (years), no significant exposures to diesel engine exhaust or fugitive dust would occur. The Proposed Project would result in no impact related to exposure of sensitive receptors to substantial pollutant concentrations.

Mitigation Measures: None required.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Impact: No impact.

The Proposed Project does not include any land uses (for example, livestock operations, refineries, wastewater treatment plants, landfills) that would generate any substantial amounts of long-term, odorous emissions. Short-term construction activities would generate odors during diesel equipment

operation. However, given the remoteness of the Proposed Project location, the short construction duration, and the minimal pieces of equipment used, combined with existing diesel fuel standards that limit the amount of sulfur in fuel to 15 parts per million, no significant odors are anticipated from construction activities that would adversely affect any local residents or temporary visitors. The Proposed Project would have no impact related to other emissions that could adversely affect a substantial number of people.

Mitigation Measures: None required.

References

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2015. "Guidance for Assessing and Mitigating Air Quality Impacts." Adopted March 19, 2015. Accessed February 29, 2020. http://www.valleyair.org/transportation/GAMAQI-2015/FINAL-DRAFT-GAMAQI.PDF.

2.4 Biological Resources

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Environmental Setting

This section describes the regional and local environmental setting with regard to biological resources.

Methodology

The following data reviews and analyses were performed to characterize the environmental setting of the Proposed Project area and to determine the potential effects Project-related activities could have on biological resources.

Literature Review

The following sources were used to characterize the environmental setting in the Proposed Project area. Project-related documentation was reviewed for site-specific data regarding special-status species habitat suitability. Secondly, preliminary searches of the following databases were performed to identify special-status species and their habitats, as well as aquatic resources, with the potential to occur in the Proposed Project area:

- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation System (2019a)
- USFWS Critical Habitat Portal (2019b)
- NMFS, West Coast Region, California Species List Tools (2019)
- CDFW California Natural Diversity Database (CNDDB) QuickView Tool in BIOS 5 (2019)
- California Native Plant Society (CNPS) Inventory of Rare, Threatened, and Endangered Plants of California (2019)
- La Grange Hydroelectric Project FERC No. 14581 Final License Application Exhibit E – Environmental Report (TID and MID 2017)
- Google Earth aerial imagery (2019)

The USFWS databases were queried to identify federally protected species and critical habitats with the potential to occur in the Proposed Project area. The NMFS Species List Tool was also queried in the La Grange, California, USGS 7.5-minute quadrangle, which overlaps with the Proposed Project area, to identify species and critical habitat under its jurisdiction. A query of the CNDDB provided a list of processed and unprocessed special-status species occurrences in the Chinese Camp, Cooperstown, Keystone, La Grange, Merced Falls, Moccasin, Penon Blanco Peak, Snelling and Turlock Lake, California, USGS quadrangles. In addition, the CNPS database was queried to identify special-status plant species with the potential to occur in the aforementioned USGS quadrangles. Raw data from the database queries are provided in Appendix B. Lastly, a review of TID and MID's La Grange Hydroelectric Project FERC No. 14581 Final License Application Exhibit E – Environmental Report was conducted to incorporate additional existing conditions information and special status species that were included as part of the La Grange Hydroelectric Project.

Field Investigation

A reconnaissance-level habitat assessment was conducted by HDR biologists Leslie Parker, Michael Carbiener, and Ian Cain on October 29, 2019, to determine the potential for special-status species to be found in the Proposed Project area. In addition to the habitat assessment, land covers were characterized and mapped in the field on an aerial photograph. Where land cover types overlapped, such as where a tree canopy extends over water or roads, the area was mapped according to the uppermost land cover type. A minimum mapping unit of 0.1 acre was used when differentiating land cover. For each land cover observed in the field, species composition and percent cover were recorded on a vegetation mapping form. Nomenclature of land cover generally follows that of *A Manual of California Vegetation*, 2nd Edition (Sawyer et al. 2009). When a land cover was recorded that did not easily conform to a described land cover, a new name was created conforming to the format of *A Manual of California Vegetation*, 2nd Edition.

Aquatic Resources Delineation

An aquatic resources delineation was conducted by HDR biologists on October 29, 2019. The delineation used the Corps' Routine Determination Method as described in Part IV, Section D, of the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region*, Version 2.0 (Environmental Laboratory 2008), and the Corps' regulatory guidance letter regarding Ordinary High Water Mark Identification (Corps 2005). Corps on-site aquatic resource determinations were made based on observed vegetation, soil, and hydrologic parameters in accordance with the standard Corps methodologies.

The ordinary high water mark of the sluice channel, tailrace channel, and Tuolumne River were mapped based on the presence of drift lines, sediment deposits, and bed and bank. All delineation findings are preliminary until the delineation has been verified by the Corps.

Local Setting

The impact analysis was based on the Proposed Project description, the environmental setting, and federal, state, and local regulatory requirements regarding impacts on biological resources. In addition, the impact analysis used data collected from the literature review, field investigations, and land cover mapping. When information about the presence of a particular special-status species was unknown, but suitable habitat was present, the impact analysis took a conservative approach by inferring the presence of special-status species within the Proposed Project area until preconstruction or protocol-level surveys determine otherwise. Impacts on specific biological resources are identified and appropriate avoidance, minimization, and/or mitigation measures are discussed further in the *Impact Analysis* section.

Topography, Hydrology, and Soils

The Proposed Project area is located along the upper Tuolumne River near the base of the La Grange Dam. The topography of the surrounding area is heavily sloped. Elevation in the Proposed Project area ranges from a high of approximately 255 feet above mean sea level along the eastern edge of the Proposed Project area to a low of approximately 180 feet above mean sea level at the Tuolumne River.

The Proposed Project area falls within the Upper Tuolumne (Hydrologic Unit Code 180400091401) watershed. The existing surface drainage network consists of the Tuolumne River and the adjacent sluice channel that flows into the Tuolumne River. The river flows westward, draining into the San Joaquin River approximately 54.3 river miles west of the Proposed Project area. The tailrace channel is mapped as part of the Tuolumne River, as the topographic highpoint between the tailrace channel and main river channel is inundated during high-flow events and is considered part of the active channel. The hydrology of the tailrace channel is driven by a combination of water being discharged from the powerhouse and down the sluice channel, as well as overflow and subsurface flow from the main channel of the Tuolumne River. The hydrology of the sluice channel is completely dependent on flow management associated with the dam infrastructure. Typically, there is a minimum continuous release of 5 cubic feet per second (cfs) from the La Grange forebay into the sluice channel.

Soil types in the Proposed Project area include Gopheridge-Loafercreek Complex and the Whiterock rocky silt loam. These soils are neither saline nor hydric and have a pH range of 6.0 to 6.8 (Natural Resources Conservation Service [NRCS] 2019).

Land Cover

Land covers in the Proposed Project area were documented during the field investigation and are primarily characterized using descriptions obtained from *A Manual of California Vegetation* (Sawyer et al. 2009). Unvegetated areas were characterized and described based on the ground cover type. Land cover types include grasslands, wooded habitats, herbaceous fields, and unvegetated areas including open water, sluice channel, developed land, and bare ground. Land cover types in the Proposed Project area are shown on Figure 8 and are described below.

ANNUAL BROME GRASSLAND – MIXED HERB FIELD

This land cover type occurs adjacent to areas of development and is co-dominated by ripgut grass (*Bromus diandrus*) and Italian thistle (*Carduus pycnocephalus*) along with occurrences of woolly mullein (*Verbascum thapsus*), Himalayan blackberry (*Rubus armeniacus*), and shortpod mustard (*Hirschfeldia incana*).

BARE GROUND AND EXPOSED ROCK

This land cover does not contain vascular plants, but may contain occurrences of lichens or algae, and is primarily found on the unvegetated steep banks of the Tuolumne River. Additionally, bare ground and exposed rock was noted on the north side of the sluice channel during the field investigation.

BLUE OAK WOODLAND

Blue oak (*Quercus douglasii*) woodland is the dominant land cover beyond the banks of the Tuolumne River, and was noted on the west-facing slopes both south and east of the powerhouse. This land cover type is dominated by blue oak in the tree layer with occurrences of interior live oak (*Quercus wislizeni* var. *frutescens*) and toyon (*Heteromeles arbutifolia*) in the shrub layer. The herb layer is dominated by the same species found in the annual brome grassland – mixed herb field land cover with the addition of oat (*Avena* sp.).

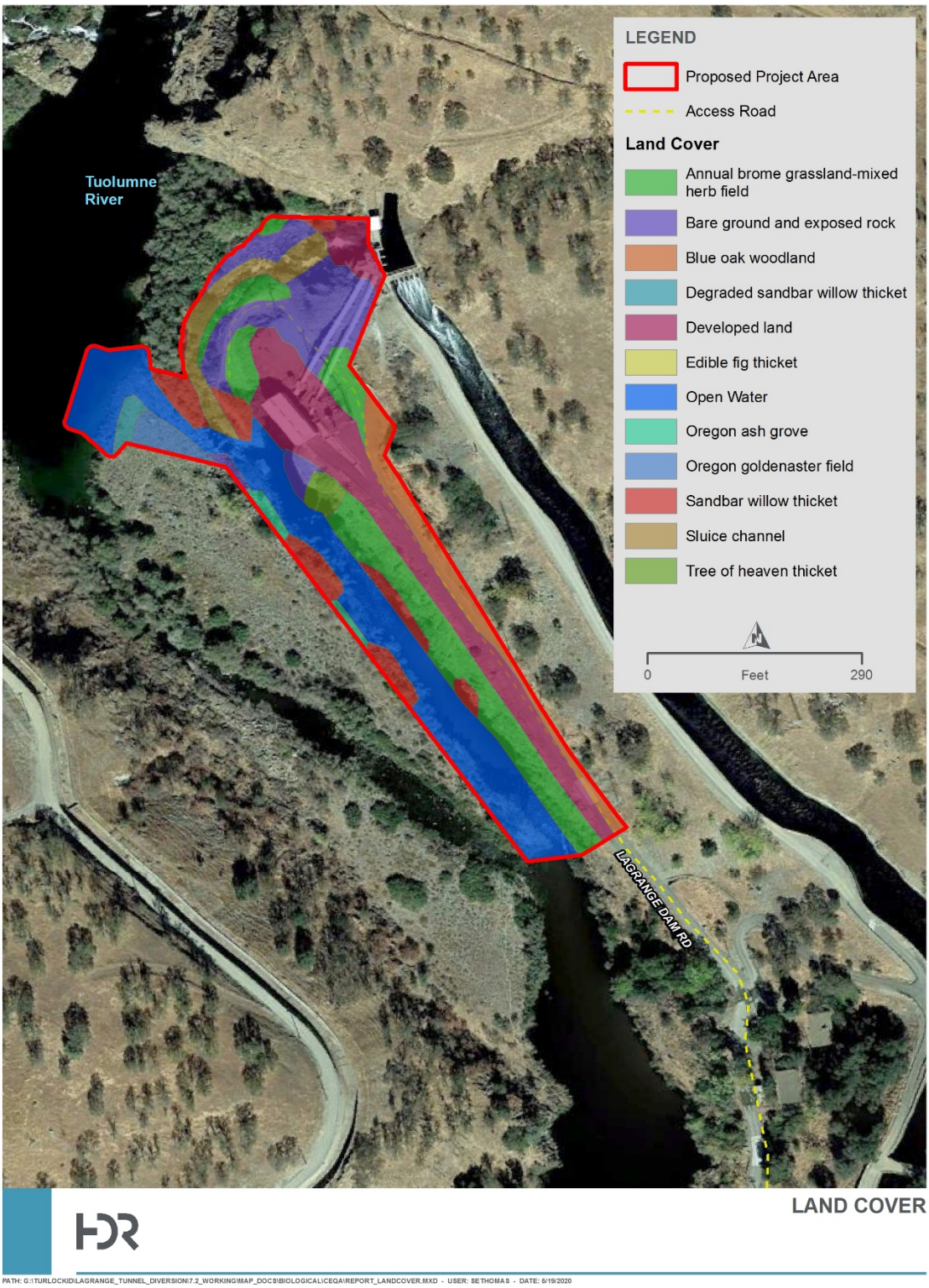
DEVELOPED LAND

Developed land is defined as any area that is graded and covered by a structure or hardscape surface like a road. In the Project area, this land cover occurs at the powerhouse and the paved road leading to the powerhouse.

EDIBLE FIG THICKET

Edible fig thicket occurs near the northern edge of the Project area and is dominated exclusively by edible fig (*Ficus carica*) in the tree layer with some cover in the herb layer similar to that of the annual brome grassland – mixed herb field land cover type.

Figure 8. Land cover



OPEN WATER

Open water habitat in the Proposed Project area includes the tailrace channel and the Tuolumne River. The portion of the Tuolumne River that runs through the Project area includes the tailrace channel of the powerhouse and covers the majority of the western half of the Proposed Project area. n below-normal water years, the Don Pedro Project is required to provide a minimum flow of 50 to 75 cfs in the Tuolumne River during the mid-May through September 30 construction period as measured at the USGS La Grange gaging station located just downstream of the Proposed Project. In normal to above-normal water years, a minimum flow of 250 cfs in the Tuolumne River is required during this time period. A review of aerial imagery showed that the in-river island, at the west end of the Proposed Project area, is periodically submerged during high-flow events in the Tuolumne River (Google Earth 2019).

OREGON ASH GROVE

An Oregon ash (*Fraxinus latifolia*) grove occurs at the southwestern edge of the Project area. The tree layer is dominated by Oregon ash, with compact Oregon goldenaster (*Heterotheca oregana* var. *compacta*) in the herb layer. Although the area was above water and covered with vegetation at the time of the field investigation, a review of historical aerial imagery showed that this area is frequently inundated, and is considered part of the active channel of the Tuolumne River (Google Earth 2019).

OREGON GOLDENASTER FIELD

Oregon goldenaster field is dominated by compact Oregon goldenaster in the herb layer and is co-dominated with knotroot bristle grass (*Setaria parviflora*) and dallis grass (*Paspalum dilatatum*). Although the area was above water and covered with vegetation at the time of the survey, a review of historical aerial imagery showed that this area is frequently inundated, and is considered part of the active channel of the Tuolumne River (Google Earth 2019).

SANDBAR WILLOW THICKET

A sandbar willow thicket was documented in the northern portion of the Proposed Project area and in patches along the island in the Tuolumne River. This land cover type is dominated by Hinds' willow (*Salix exigua* var. *hindsiana*) in the tree layer with occasional occurrences of arroyo willow (*Salix lasiolepis*). A shrub layer is absent and the herb layer is either absent or has sparse cover of knotroot bristle grass. Although the area was above water and covered with vegetation at the time of the survey, a review of historical aerial imagery showed that the patch of sandbar willow thicket on the in-river island is frequently inundated and is considered part of the active channel of the Tuolumne River (Google Earth 2019).

SLUICE CHANNEL

The sluice channel is a man-made feature that leads from the La Grange Forebay to the Tuolumne River. The sluice channel was created as means to bypass surge water within the forebay caused during a hydropower generation unit trip (for example, unit emergency closure). The upper portion of the channel is extremely steep and consists of bedrock with cascading pools, while the lower portion of the channel is armored with riprap and lined with angular rock. When running, the sluice channel maintains a minimum flow into the powerhouse tailrace, with a minimum flow of 5 cfs. The hydrology of the sluice channel is driven solely by the flows coming out of the La Grange Forebay.

TREE OF HEAVEN THICKET

Tree of heaven (*Ailanthus altissima*) thicket is dominated by this species in the tree layer and includes an herbaceous layer similar to that of the annual brome grassland – mixed herb field land cover type.

Special-status Natural Communities and Aquatic Resources

Sensitive habitats included are those that are of special concern to resource agencies or those that are protected under CEQA, Sections 1600 to 1603 of the California Fish and Game Code (FGC), and/or Sections 401 and 404 of the Clean Water Act. Sensitive habitats typically either contain special-status species, their associated habitat, or are sufficiently rare themselves to warrant protection as ranked by the NatureServe Heritage Program Status Rank (Faber-Langendoen et al. 2012).

The habitat assessment identified two special-status natural communities based on heritage ranking: Oregon ash grove and Oregon goldenaster field. These natural communities have a rank of S3: Vulnerable and at moderate risk of extinction or elimination due to a restricted range, relatively few populations or occurrences, recent and widespread declines, or other factors. Both of these communities occur on the island in the Tuolumne River, near the southwestern edge of the Proposed Project area. This area is frequently inundated, as shown by a review of aerial imagery and a review of USGS flow data (Station 11289650) (Google Earth 2019; USGS 2020). Areas mapped as sandbar willow thicket are also considered sensitive riparian areas that would likely be subject to CDFW jurisdiction.

Aquatic resources provide a variety of functions for plants and wildlife including habitat, foraging opportunities, cover, migration, and movement corridors for both special-status and common species. A delineation of aquatic resources, subject to verification by the Corps, identified two aquatic resources in the Proposed Project area: the Tuolumne River (includes the tailrace channel) and the sluice channel (Figure 9).

Special-status Species

Candidate, sensitive, or special-status species are commonly characterized as species that are at potential risk or actual risk to their persistence in a given area, or across their native habitat. These species have been identified and assigned a status ranking by governmental agencies such as CDFW, USFWS, NMFS, and private organizations such as CNPS. The degree to which a species is at risk of extinction is the determining factor in assigning a status ranking. Some common threats to a species' or population's persistence include habitat loss, degradation, and fragmentation, as well as human conflict and intrusion. For this biological review, special-status species are defined by the following codes:

- listed, proposed, or candidates for listing under the federal Endangered Species Act (50 CFR 17.11 – listed; 61 *Federal Register* 7591, February 28, 1996 – candidates)
- listed or proposed for listing under the California Endangered Species Act (FGC 1992 Section 2050 et seq.; 14 CCR Section 670.1 et seq.)
- designated Species of Special Concern by CDFW
- designated Fully Protected by CDFW (FGC Sections 3511, 4700, 5050, and 5515)
- species that meet the definition of rare or endangered under CEQA (14 CCR Section 15380), including California Rare Plant Rank 1B and 2B

The results of the USFWS, CDFW, NMFS, and CNPS database queries identified several special-status species with the potential to be affected by Project-related activities. Appendix C summarizes all special-status species identified in the database results and describes the habitat requirements for each species, providing conclusions regarding the potential for each species to be affected by Project components. In cases where a determination was made that no potential for a given species is present in the Proposed Project area (Appendix C), that species is not analyzed further in this document.

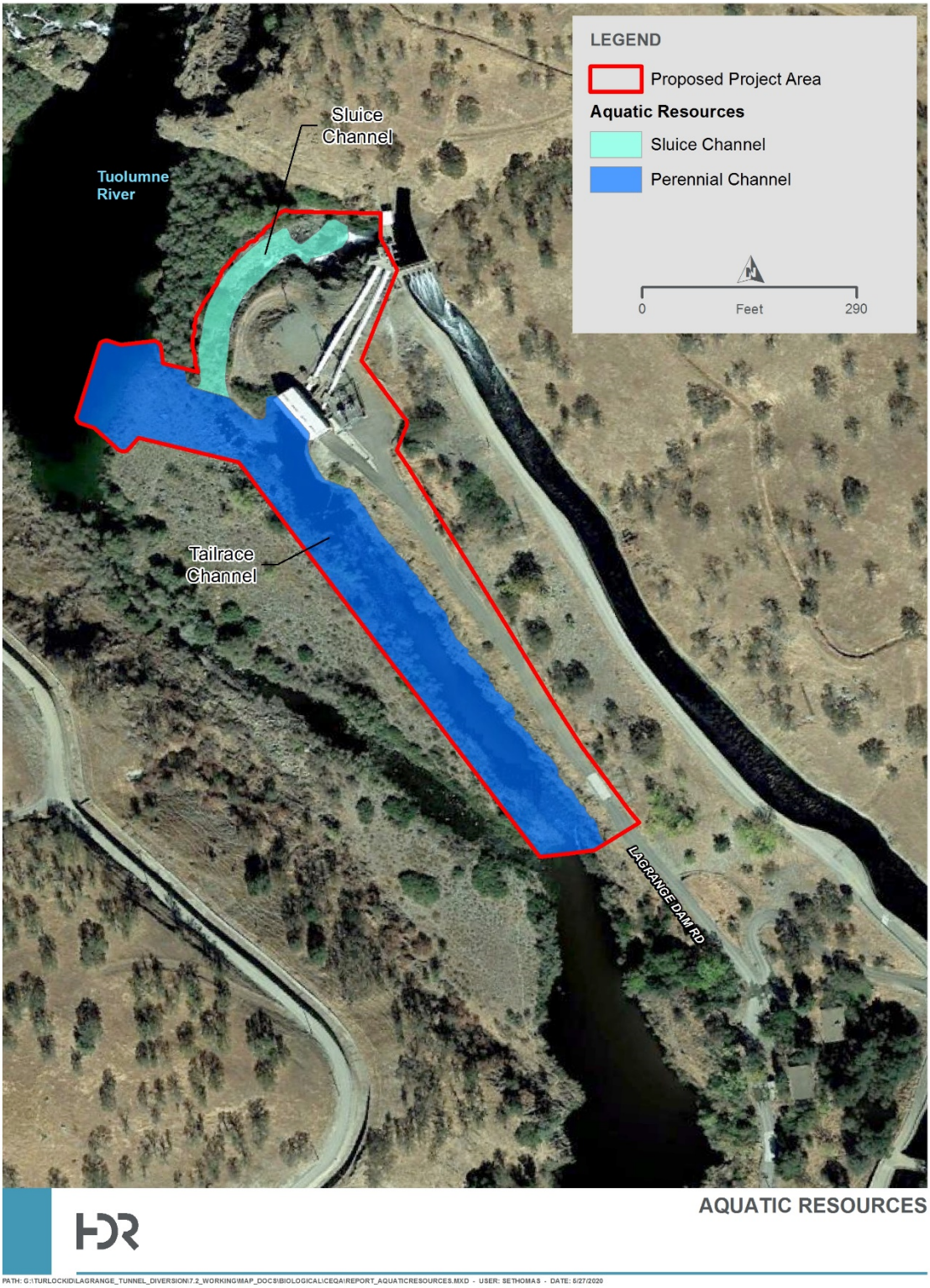
Wildlife Movement Corridors

Wildlife corridors refer to established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Corridors are present in a variety of habitats and link otherwise fragmented acres of undisturbed area. Maintaining the continuity of established wildlife corridors is important to (1) sustain species with specific foraging requirements, (2) preserve a species' distribution potential, and (3) retain diversity among many wildlife populations. Therefore, resource agencies consider wildlife corridors to be a sensitive resource.

Available data on wildlife corridors and linkages was accessed through the CDFW BIOS 5 Viewer (2019). Data reviewed included the following BIOS layers: Wildlife Linkages – San Joaquin Valley (ds417), Wildlife Corridors – San Joaquin Valley (ds423), Essential Connectivity Areas (ds620), Natural Landscape Blocks (ds621), Missing Linkages in California (ds420), California Fish Passage Assessment Database (ds69), and Fish Passage Priorities (ds2817). The Proposed Project area contains an Essential Connectivity Area (Tuolumne River) and is adjacent to a Natural Landscape Block. The Tuolumne River is identified as the Lower San Joaquin River Missing Link (ds420) for riparian brush rabbit (*Sylvilagus bachmani riparius*), wood rat (*Neotoma* sp.), western yellow-billed cuckoo (*Coccyzus americanus*), neotropical migratory birds, and ringtail (*Bassariscus astutus*). None of the aforementioned species, with the exception of neotropical migratory birds, are expected to occur in the Proposed Project area (Appendix C).

No barriers to fish movement occur on the Tuolumne River downstream of the Proposed Project area; however, the La Grange Dam just upstream of the Proposed Project area is a barrier to fish movement. Currently, fish move through the Proposed Project area unimpeded. One adult chinook was observed attempting to travel up the sluice channel during the site visit; however, fish are unable to make it past a vertical portion in the upper reaches of the sluice channel. Terrestrial species likely move through the Proposed Project area; however, the steep canyon walls and presence of water barriers such as the Tuolumne River and canal on the upper rim of the river canyon likely limit regional movement of species.

Figure 9. Aquatic resources



Impact Analysis

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Impact: Potentially significant unless mitigation incorporated.

Based on the results of the literature review and habitat assessment, 15 special-status wildlife species have the potential to be affected by Project-related activities. Habitat for one special-status plant, Hoover's calycadenia (*Calaycadenia hooveri*), was determined to be present in the Proposed Project area; however, this species is not expected to occur in areas that will be affected by Project-related activities and was ruled out from further analysis; see Appendix C for the rationale. The species or species groups identified below were determined to have the potential to be adversely affected by Project-related activities, either directly through habitat modifications or indirectly through effects that could occur postconstruction. Mitigation measures are presented to avoid, minimize, and/or mitigate for potential impacts, as necessary.

Special-status Fishes

Seven special-status fishes have the potential to occur in the Proposed Project area: riffle sculpin (*Collus gulosus*), Pacific lamprey (*Entosphenus tridentatus*), Sacramento hitch (*Lavinia exilicauda exilicauda*), San Joaquin roach (*Lavinia symmetricus*), hardhead (*Mylopharodon conocephalus*), Central Valley steelhead (*Oncorhynchus mykiss irideus*), and Central Valley fall/late-fall run Chinook salmon (*Oncorhynchus tshawytscha*). In addition, the segment of the Tuolumne River that runs through the Proposed Project area is considered essential fish habitat for fall-run Chinook salmon and critical habitat for steelhead.

The man-made sluice channel generally consists of bedrock with some loose cobble and boulders, and has the look of a natural feature characterized by steep cascades plunging into pools over bedrock. Shotcrete would be applied to the existing sluice channel to create a smooth, continuous surface. The purpose of the surfacing would be to smooth out the contour and slope of the sluice channel and eliminate the small, interstitial spaces, thereby eliminating the potential for the formation of small, localized isolated pools of water that could hold fish under low or no-flow conditions.

The existing tailrace channel is isolated from the Tuolumne River's main channel by a gravel bar, which creates a topographic highpoint of separation between the two channels during all but the highest flow events. The tailrace channel drains into the Tuolumne River approximately 500 feet downstream from the powerhouse, but is mostly fed by water flowing down the sluice channel or out of the powerhouse. TID is proposing to place a gated diversion structure in the topographic highpoint to convey water from the main river channel to the upper tailrace channel during dewatering and maintenance. The purpose of this connection would be to maintain adequate flows in the tailrace channel to sustain full connectivity with the Tuolumne River downstream, thereby minimizing the chance for fish stranding.

The purpose of the Proposed Project is to have a beneficial effect on fish by reducing the potential for fish stranding; however, Project implementation may result in impacts on fish during construction. The installation of shotcrete along the sluice channel, as well as installation of the diversion structure, would require in-water work; therefore, the Project has the potential to result in direct impacts on individuals as a result of construction and dewatering activities. Cofferdams would be installed at the inlet end of the proposed diversion structure along the edge of the Tuolumne River,

as well as at the southern end of the tailrace channel. This area is just above the confluence with the Tuolumne River and is the narrowest portion of the tailrace channel. This cofferdam location was chosen so that the entire tailrace channel could be dewatered, thereby avoiding the potential for fish stranding in the tailrace during construction. All dewatering would be preceded by a fish rescue and salvage. Other direct effects on fish could occur during construction as a result of sedimentation and construction noise, which would be considered a significant impact on special-status fishes. Implementation of the following avoidance and minimization measures would be required.

Mitigation Measures

MM BIO-1: Minimize Footprint. To the greatest extent feasible, the work areas would be reduced to the smallest possible footprint throughout the duration of Project activities. All sensitive areas to be avoided during construction activities would be fenced and/or flagged as close to construction limits as feasible.

MM BIO-2: Biological Monitoring and Worker Environmental Awareness Training. At Project-appropriate intervals, a qualified biologist(s) would monitor construction activities that could potentially cause significant impacts on sensitive biological resources. The amount and duration of monitoring would depend on the activity and would be determined by the qualified biologist. The duties of the qualified biologist shall comply with all agency conditions outlined in Project-related permits, but could include activities such as clearance surveys, flagging or fencing off environmentally sensitive areas for avoidance, and construction monitoring.

In addition, a qualified biologist would be retained to conduct mandatory contractor/worker environmental awareness training for any personnel required to enter a Project site. The awareness training would be provided to all personnel required to enter a Project site to inform them on the locations of sensitive biological resources, the need to avoid impacts on biological resources (for example, wildlife and aquatic resources), and to brief them on the penalties for not complying with biological mitigation requirements. If new construction personnel are added to the Project, the contractor would require them to receive the mandatory training prior to starting work.

MM BIO-3: Restoration of Temporarily Disturbed Areas. All exposed and/or disturbed areas resulting from construction activities would be returned to their original contour and grade, and would be restored using locally native grass and forb seeds, plugs, or a mix of the two. Areas would be seeded with species appropriate to their topographical and hydrological character. Seeded areas would be covered with broadcast straw and/or jute netted.

MM BIO-4: In-water Work Window. All in-water work associated with the Project would be conducted between May 15 and September 30.

MM BIO-5: Dewatering and Fish Exclusion. Prior to in-water work, a water diversion would be installed in the Tuolumne River and tailrace channel to enclose the construction area, reduce sedimentation during work in the channel, and exclude fish from the work area while allowing for rescue of fish in the enclosed area before construction starts. Dewatering the work area would minimize the potential for water quality impacts (that is, siltation) and direct impacts on individual salmonids by Project construction activities (that is, no work conducted in flowing water). Excavation and the operation of heavy equipment would be avoided, where practicable, in the portion of the stream where flowing water is present.

MM BIO-6: Fish Relocation Plan. Prior to Project implementation, a fish relocation plan would be developed. This plan would describe methods for isolating the work area and removing fish located in the work area with minimal impacts, and would identify the point of release for any captured fish.

The plan would be submitted to NMFS 30 days prior to start of in-water work for review and approval.

MM BIO-7: Construction Hours. All construction would be conducted during daylight hours to allow for an extended period of inactivity (that is, night time) for salmonids, if present, to migrate undisturbed through the Project area.

MM BIO-8: In-water Work Best Management Practices (BMPs). No fueling of construction equipment would occur within 50 feet of the Tuolumne River. Daily inspection and cleaning of equipment entering the water shall be conducted such that fuel, oil, grease, and deleterious amounts of soil are removed from the portion of equipment to be submerged. If an equipment leak occurs in the dewatered area, proper BMPs would be installed immediately and the equipment would be removed from the area. Additionally, BMPs would be employed on site to prevent degradation to on- and off-site aquatic resources. Methods would include the use of appropriate measures to intercept and capture sediment prior to entering aquatic resources, as well as erosion control measures along the perimeter of all work areas to prevent the displacement of fill material. All BMPs would be in place prior to initiation of any construction activities and would remain until construction activities are completed. All erosion control methods would be maintained until all on-site soils are stabilized. Mitigation as required in regulatory permits issued through CDFW and the RWQCB may be applied to satisfy this measure.

MM BIO-9: Water Management. Turbid water pumped out of dewatered areas will be subject to some form of settlement or treatment process before being discharged back into the Tuolumne River. This could include placing water into a settling tank, running water through a filtration vessel, or some other form of management in order to minimize sedimentation associated with dewatering activities. Measures as required in regulatory permits issued through the RWQCB may be applied to satisfy this measure.

Implementation of MM BIO-1 through MM BIO-9 would minimize potential direct and indirect effects on special-status fishes through minimization, education, monitoring, and avoidance. In addition, the Project would be beneficial to fish in the long run because its purpose is to reduce the potential for fish stranding. As shown, implementation of the aforementioned mitigation measures would reduce impacts from a significant level to a less than significant level.

Special-status and Migratory Birds and Raptors

The Proposed Project area provides nesting and/or foraging habitat for several special-status bird and raptor species, including golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), olive-sided flycatcher (*Contopus cooperi*), Peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), yellow-breasted chat (*Icteria virens*), loggerhead shrike (*Lanius ludovicianus*), and yellow warbler (*Setophaga petechia*), as well as nesting, wintering, and/or foraging habitat for other migratory birds and raptors not identified in Appendix C. All native breeding birds (except game birds during the hunting season), regardless of their listing status, are protected under California FGC 3503. Ground disturbance and vegetation and tree clearing during the nesting season could result in direct impacts on nesting birds should they be present in construction or operations and maintenance disturbance areas. Furthermore, noise and other human activity could result in nest abandonment if nesting birds are present within 200 feet (500 feet for raptors) of Project-related activities. Any direct or indirect effect would be considered a significant impact on migratory and special-status bird species. Implementation of the following avoidance and minimization measures would be required along with those previously mentioned.

Mitigation Measures

MM BIO-10: Migratory Bird and Raptor Surveys. If clearing and/or construction activities would occur during the nesting season (March 1 to August 31), then preconstruction surveys to identify active migratory bird and/or raptor nests would be conducted by a qualified biologist within 7 days of construction initiation. Focused surveys must be performed by a qualified biologist for the purposes of determining the presence or absence of active nest sites within 200 feet (500 feet for raptors) of the Proposed Project area, where feasible.

MM BIO-11: Nest Avoidance. If active nest sites are identified within 200 feet (500 feet for raptors) of Project work areas, a no-disturbance buffer should be established for all active nest sites prior to commencement of any Project-related activities to avoid disturbances to nesting activities. A no-disturbance buffer constitutes a zone in which Project-related activities such as vegetation removal, earth moving, and construction cannot occur. The size of no-disturbance buffers would be determined by a qualified biologist based on the species, activities in the vicinity of the nest, and topographic and other visual barriers.

Implementation of MM BIO-1, MM BIO-2, MM BIO-10, and MM BIO-11 would minimize impacts on migratory birds and raptors through minimization, education, monitoring, and avoidance. As shown, implementation of the aforementioned mitigation measures would reduce impacts on these species from a significant to a less than significant level.

Special-status Bats

Bats roost in a wide variety of habitats, including buildings, mines, under bridges, rock crevices, caves, under tree bark, and in snags. The pallid bat (*Antrozus pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), western mastiff bat (*Eumops perotis californicus*), and western red bat (*Lasiurus blossevillii*) are all considered California species of special concern. These species may use a variety of habitats and structures throughout the Proposed Project area for roosting and foraging. Specifically, these bats could roost in rock crevices on the steep canyon walls and in the powerhouse or other hydropower infrastructure. Project-related activities are not anticipated to result in impacts on habitat elements that could be used by special-status bats for roosting. All potential roosting habitat would be avoided, including rocky areas and the powerhouse. Increased noise and disturbance from construction activities could result in minor effects on special-status bat roosts, should they be present in the vicinity. However, construction activities would occur only during the day time and are not expected to be significantly more disruptive than ongoing dam and powerhouse operations. These impacts on special-status bat species would be considered less than significant and no additional mitigation is proposed.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Impact: Potentially significant unless mitigation incorporated.

Oregon ash grove, Oregon goldenaster field, sandbar willow thicket areas, and all aquatic resources would be considered sensitive natural communities in the Proposed Project area.

Impacts on sensitive communities resulting from Project-related activities have not been quantified; however, the Proposed Project would be designed to avoid impacts on these resources, where feasible. Despite this, the Proposed Project would permanently and temporarily affect riparian willow areas that would need to be cleared for access. In addition, most ground disturbance associated

with the Proposed Project would occur in aquatic resources. Temporary effects on aquatic resources would include cofferdam installation and the associated dewatering, construction of temporary access areas for equipment, and excavation areas near the diversion structure. Permanent effects on aquatic resources include shotcrete areas and the diversion structure. Native cobbles would be placed over the diversion pipe; however, the headwalls associated with the inlet and discharge structures would be left exposed. Any direct or indirect impacts on sensitive communities or aquatic resources would be considered a significant impact; therefore, MM BIO-12 is proposed.

Mitigation Measures

MM BIO-12: No Net Loss of Sensitive Communities and Aquatic Resources. No net loss of sensitive communities and aquatic resources will be achieved through impact avoidance, minimization, and/or compensatory mitigation. Mitigation for permanent impacts on sensitive communities and/or aquatic resources shall be provided at a minimum 1:1 ratio. Mitigation can include on-site restoration, in-lieu fee payment, or purchase of mitigation credits at a Corps-, RWQCB-, and/or CDFW-approved mitigation bank. Mitigation as required in regulatory permits issued through CDFW, Corps, USFWS, and/or the RWQCB may be applied to satisfy this measure.

Implementation of MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-5, MM BIO-8, and MM BIO-9 would minimize impacts on sensitive communities and aquatic resources through avoidance and minimization of siltation through dewatering, restoration, and BMPs. In addition, implementation of MM BIO-12 would compensate for direct loss of sensitive communities and aquatic resources through mitigation, and reduce impacts to a less than significant level.

c) Have a substantial adverse effect on federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Impact: Potentially significant unless mitigation incorporated.

An aquatic resources delineation has not been verified by the Corps to date; however, aquatic resources would be affected by the Project. Direct effects on federally protected waters as a result of Project implementation could include sedimentation, pollution, installation of the diversion structure, and shotcrete application. All of these components would be considered significant impacts. Implementation of MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-5, MM BIO-8, and MM BIO-9 would minimize impacts on aquatic resources through avoidance and minimization of siltation through dewatering, restoration, and BMPs. In addition, implementation of MM BIO-12 would compensate for direct loss of aquatic resources through mitigation, and reduce impacts to a less than significant level.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Impact: Less than significant.

The Project would be limited to resurfacing the sluice channel, installing a diversion structure between the main stem Tuolumne River and the tailrace channel, and constructing temporary access improvements. These components do not include any improvements that would change the permeability of the Tuolumne River or associated riparian corridor. The bottom of the sluice channel would become smooth once the shotcrete is applied, which allows for any fish that move into the channel to slide easily back out when flows into the channel are reduced. In addition, there is no connectivity for fish passage beyond the sluice channel, which functions as a dead end.

The Project would require dewatering in the Tuolumne River, tailrace channel, and sluice channel, which may temporarily affect fish movement in these areas. Only a small portion of the Tuolumne River edge would need to be dewatered as part of the Project, leaving the majority of the main channel open to fish movement. A large portion of the tailrace channel and the entire sluice channel would be dewatered; however, these areas would not affect fish movement because there is no upstream connectivity for fish. No permanent impacts on fish or wildlife movement or corridors would result from the Proposed Project. Thus, impacts on fish and wildlife movement and native wildlife nursery sites would be less than significant.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Impact: No impact.

The Conservation/Open Space Element of the Stanislaus County General Plan emphasizes the conservation and management of natural resources and the preservation of open space lands. The Project would be consistent with the Stanislaus County General Plan. All impacts on special-status species and their habitats would be mitigated. No conflict with any local policies would occur and no impact is anticipated.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Impact: No impact.

Because there are no adopted conservation plans that cover the Proposed Project area, the Project would not conflict with the provisions of an adopted Natural Community Conservation Plan, Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan; therefore, no impact is anticipated.

References

California Department of Fish and Wildlife (CDFW). 2019. “California Natural Diversity Database BIOS 5 Viewer.” Accessed November 11, 2019. https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data.

California Native Plant Society (CNPS). 2019. “Inventory of Rare and Endangered Plants” (online edition, v8-03). Accessed November 11, 2019. http://www.rareplants.cnps.org/.

Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

———. 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West* (Version 2.0). Technical Report TR-08-28. U.S. Army Corps of Engineers Engineer Research and Development Center, Vicksburg, Mississippi.

Faber-Langendoen, D., L. Master, J. Nichols, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, and B. Young. 2012. “NatureServe Conservation Status Assessments: Methodology for Assigning Ranks” (Revised Edition). June. Arlington, Virginia: NatureServe. https://www.natureserve.org/biodiversity-science/publications/natureserve-conservation-status-assessments-methodology-assigning.

Google Earth. 2019. Imagery date range 1993–2018.

HDR. 2018. *Tunnel Bypass Flow Alternatives*. Drafted for the Turlock Irrigation District.

Jepson Flora Project. 2019. "Jepson eFlora" (Revision 7). Last updated December 20, 2019. University of California, Berkeley. http://ucjeps.berkeley.edu/IJM.html.

National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), West Coast Region. 2019. "California Species List Tool." Accessed November 11, 2019. https://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evans. 2009. *A Manual of California Vegetation* (Second Edition). Sacramento, California: CNPS.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2017. *La Grange Hydroelectric Project, FERC No. 14581, Final License Application*, Exhibit E – Environmental Report, Attachment C-14.0, Cultural Resources Study Report. Prepared by HDR, Inc. Filed with FERC as Privileged Information. February.

U.S. Army Corps of Engineers (Corps). 2005. *Ordinary High Water Mark Identification*.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2019. "Web Soil Survey." Accessed March 9, 2020. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

U.S. Fish and Wildlife Service (USFWS). 2019a. "Information for Planning and Consultation System" (online edition). Accessed November 11, 2019. https://ecos.fws.gov/ipac/.

———. 2019b. "Critical Habitat Portal." Accessed November 11, 2019. https://ecos.fws.gov/ecp/report/table/critical-habitat.html.

U.S. Geological Survey (USGS). 2020. "National Water Information System." Data for Station 11289650. https://waterdata.usgs.gov/ca/nwis/uv?site_no=11289650.

2.5 Cultural Resources

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

Environmental Setting

CEQA requires that state and local agencies identify and consider the significant environmental impacts of their proposed projects, including impacts on historical resources,[7] unique archaeological sites,[8] and tribal cultural resources (TCRs). This section considers potential impacts on cultural resources that are identified as historical resources or unique archaeological sites, while Section 2.18 considers potential impacts on TCRs from the Proposed Project. In accordance with CEQA guidelines, cultural resources investigations are necessary to identify whether there are historical resources and unique archaeological resources that may have significant impacts as a result of implementation of a project [14 CCR Part 15064.5(c)]. The following steps are routinely implemented in a cultural resources investigation for CEQA compliance:

1. Identify cultural resources in the proposed project area;
2. Evaluate against the CEQA criteria of significance as listed below;
3. Evaluate the impacts of the proposed project on *all* resources; and
4. Develop and implement measures to mitigate proposed project impacts on historical resources.

For the purposes of this Initial Study (IS)/Mitigated Negative Declaration (MND), identification of cultural resources in the Proposed Project area relied on a cultural resources study completed in support of licensing the La Grange Hydroelectric Project with the Federal Energy Regulatory

[7] Historical resources are defined as resources listed, or determined to be eligible by the State Historical Resources Commission for listing, in the California Register of Historical Resources (CRHR) (California Public Resources Code [PRC] 5024.1; CCR Title 14, Section 4850 et seq.) or local registers of historical resources [PRC 5020.1(k)], or that are any object, building, structure, site, area, place, record, or manuscript determined by a lead agency to be historically significant or significant within any part of California history.

[8] "Unique archaeological resource" is a category of archaeological resources created by the CEQA statutes [CEQA Section 21083.2(g)]. An archaeological resource is a unique archaeological resource if it meets any of one of three criteria: (1) contains information needed to answer important scientific research questions (and there is a demonstrable public interest in that information); (2) has a special and particular quality, such as being the oldest of its type or the best available example of its type; or (3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

Commission (FERC) (TID and MID 2017).[9] This cultural resources study included archival research and results of comprehensive and intensive field survey (transects 15 to 20 meters apart) in accordance with the Secretary of Interior's Standards and Guidelines for Identification (U.S. Department of the Interior 1983) and the Bureau of Land Management's Class III/intensive standards, according to the Bureau of Land Management's 8100 manual series. In addition, outreach to potentially affected Native American tribes and individuals was conducted to inquire about possible traditional cultural properties in the licensing area of potential effects (APE)[10] and vicinity. Gathered archival information was used to prepare a historic context, which was then used in conjunction with the data collected during the field survey and tribal outreach to evaluate the National Register of Historic Places (NRHP) eligibility of those resources identified within the APE, where possible, and to produce California Department of Parks and Recreation (DPR) inventory forms for all resources documented.

The results of the FERC licensing cultural resources study are used here with the objectives to (1) identify historical resources and unique archaeological resources, and (2) assess whether implementation of the Proposed Project would have significant impacts on historical resources or unique archaeological sites within the Proposed Project area. The La Grange Diversion Dam and La Grange Powerhouse are located on the Tuolumne River at approximately river miles 52.2 and 51.9, respectively. The downstream end of the La Grange tailrace where it reenters the main channel is located at river mile 51.7. The Proposed Project area was created by buffering 10 to 25 feet off the footprint of the Project components, staging areas, and dewatered areas to account for equipment access and other temporary disturbance that may result from Project-related activities (see Figure 3). The Proposed Project area is associated with Stanislaus County Assessor Parcel Number 008-043-008-000, which is entirely owned by TID and encompasses approximately 53 acres of land. The Proposed Project area is accessed via California State Route 132/Yosemite Boulevard and La Grange Dam Road. Public access to La Grange Dam Road is restricted by a locked gate near its intersection with California State Route 132/Yosemite Boulevard. Cultural resources identified during the FERC licensing cultural resources study that occur within the Proposed Project area are discussed below.

Under the CEQA Guidelines, even if a resource is not included on any local, state, or federal register, or identified in a qualifying historical resources survey, a lead agency may still determine that a resource is an historical resource for the purposes of CEQA if there is substantial evidence supporting such a determination [CEQA Guidelines Section 15064.5(a)]. A lead agency must consider a resource to be historically significant if it finds that the resource meets the criteria for listing in the CRHR. The methods used to determine whether resources are eligible for the CRHR are provided below.

[9] Licensing of the La Grange Hydroelectric Project by FERC is considered to be a federal undertaking, subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations at 36 CFR Part 800. Section 106 requires federal agencies to take into account the effects of their undertakings on historic properties. Historic properties are any prehistoric or historic district, site, building, structure, object, or traditional cultural property included in or eligible for inclusion in the NRHP [36 CFR 800.16(1)].

[10] Under 36 CFR Part 800.16(d), the APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist."

A resource may be eligible for inclusion in the CRHR if it:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (Criterion 1);
- Is associated with the lives of persons important in our past (Criterion 2);
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values (Criterion 3); or
- Has yielded, or may be likely to yield, information important in prehistory or history (Criterion 4).

According to CEQA, a project may have a significant impact on the environment if it could cause a substantial adverse change in the significance of a historical resource [14 CCR 15064.5(b)]. CEQA further states that a substantial adverse change in the significance of a historical resource means the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings, therefore affecting the physical characteristics of historical resources that convey their historical significance and qualify them for inclusion in the CRHR or in a local register that meet the requirements of California Public Resources Code (PRC) 5020.01(k) and 5024.1(g).

Cultural Setting

The cultural setting of the Proposed Project vicinity is provided in Appendix D and is organized into three parts: (1) the prehistoric and archaeological background, (2) the ethnohistory, and (3) the general historical themes of the Project vicinity. This information in Appendix D is taken directly from the FERC licensing cultural resources study (TID and MID 2017).

Background Research

In support of the FERC licensing, TID conducted a records search in 2014 at the Central California Information Center (CCIC) of the California Historical Resources Information System at California State University, Stanislaus in Turlock to identify previous cultural investigations and recorded archaeological and historic period properties within or immediately adjacent to the La Grange Hydroelectric Project licensing APE and an additional 0.25-mile buffer. This research also served to obtain background information pertinent to understanding the archaeology, history, and ethnohistory of the Project vicinity. The purpose of the additional 0.25-mile buffer was to provide flexibility for Project planning, if needed. The records search included review of cultural resources records, previously conducted cultural resources investigations, historic maps, the NRHP, the CRHR, *California State Historic Landmarks* (California DPR 1996), *California Inventory of Historic Resources* (California DPR 1976), the California Points of Historic Interest listing (http://ohp.parks.ca.gov/listedresources/), the Directory of Properties in the Historic Property Data File (OHP current computer list dated 3-20-2014), and the Archaeological Determinations of Eligibility (OHP current computer list dated 4-04-2012), the *Survey of Surveys* (California DPR 1989), and other pertinent historic data available at the CCIC for Stanislaus and Tuolumne Counties.

HDR cultural resources staff Leesa Gratreak and Kamil Rochon performed additional background research, including interviews with TID and MID staff and review of existing historical drawings, plans, maps, correspondence, proposals, construction drawings, and specifications at the TID archives in the Turlock headquarters to prepare the appropriate historical context for the built environment resources (that is, the buildings and structures) that needed to be documented as part

of the FERC licensing cultural resources study. Ms. Gratreak also used information from the Stanislaus County Historical Society McHenry Museum Archives, the Stanislaus County Library, the Turlock Historical Society Museum and archives, the Tuolumne County Library, and the Carlo M. De Ferrari Archives in Tuolumne County to write the regional context and gather additional information about the history of irrigation and irrigation districts in California.

In March 2020, an additional records search request was submitted to the CCIC to gather any new cultural resources data that might have been obtained by the CCIC since 2014. The CCIC responded to the request in a letter dated March 12, 2020, stating that there was no new information in its files. The following summarizes the data collected from the CCIC in 2014 and from the licensing study report as they relate to the Proposed Project area and a 0.25-mile buffer around the Project area. The resources identified during the FERC licensing cultural resources study that are within the Proposed Project area are described further in the *Field Investigations and Results* section.

In total, six cultural resource investigations have been conducted to date within the Proposed Project area and the 0.25-mile buffer area (Table 8); two of the previously conducted cultural resource investigations intersect directly with the Proposed Project area. All six of these investigations were prepared in support of TID's main canal replacement and improvements or transmission line Projects.

Table 8. Previous cultural resources investigations within the Proposed Project area and a 0.25-mile buffer

Count	Author and year	CCIC report #/ Other ID	Report name and description	Within Proposed Project area? (yes/no)	Within 0.25-mile buffer of Proposed Project area? (yes/no)
1	Carpenter, K. (2005)	ST-05859	*Letter Report Regarding Turlock Irrigation District Archaeological Survey; TID Upper Main Canal.* Records search and pedestrian survey (15–30 meter transects) conducted prior to proposed replacement and rebuilding of a canal; eight previously recorded resources identified, and eight new resources were identified, although only one was within the survey area.	Yes	Yes
2	Jensen, P. (2004)	ST-05483 NADB-R-1365367	*Archaeological Inventory Survey, M.I.D–T.I.D. Transmission Line Disconnect Project, Four Locations Crossing the Tuolumne River Near La Grange, Stanislaus County, California.* Class III-level archaeological survey conducted prior to disconnect of existing transmission line segments; no cultural resources were identified.	Yes	Yes

Table 8. Previous cultural resources investigations within the Proposed Project area and a 0.25-mile buffer

Count	Author and year	CCIC report #/ Other ID	Report name and description	Within Proposed Project area? (yes/no)	Within 0.25-mile buffer of Proposed Project area? (yes/no)
3	Jensen, S. (2004)	ST-05458 NADB-R-1365341	*Archaeological Inventory Survey: MID's Three New Transmission Lines Project, c. 3.5 Miles of Linear Corridor Interconnecting Existing Transmission Facilities, Stanislaus County, California.* Class III-level archaeological survey conducted prior to proposed construction of linear transmission line corridor segments; no cultural resources were identified.	No	Yes
4	JRP Historical Consulting (2005)	ST-07441 NADB-R-1367806	*Historical Resources Inventory and Evaluation Report, Turlock Irrigation District, Upper Main Canal, Stanislaus County, CA.* Resource inventory and evaluation of irrigation canal prior to canal improvements/retrofitting.	No	Yes
5	Napton, L. K., and Greathouse, E. A. (1979)	ST-00881 NADB-R-1361724	*Cultural Resource Reconnaissance of the Turlock Main Canal, Turlock Irrigation District, Stanislaus County, California.* Pedestrian survey conducted prior to construction of proposed canal improvements; three archaeological resources were identified.	No	Yes
6	TID and MID (2017)	—	*Cultural Resources Study Report, La Grange Hydroelectric Project, FERC No. 14581.* Resource inventory and evaluation in support of licensing efforts.	Yes	Yes

Previously Recorded Cultural Resources

Neither the 2014 or 2020 records searches identified previously recorded cultural resources within the Proposed Project area; however, six cultural resources were found to have been recorded within the 0.25-mile buffer of the Proposed Project area (Table 9). Of these six previously documented resources, two are prehistoric archaeological sites of Native American occupation and burial sites, and the remaining four resources are historic built resources consisting of the Snake Ravine/TID Upper Main Canal, the La Grange Diversion Dam, the La Grange MID Old Canal Segment, and the La Grange Ditch.

Table 9. Previous cultural resources within the Proposed Project area and a 0.25 mile buffer

Count	Site number (Primary no.)	Associated authors and year	Description	CRHR eligibility	Within Proposed Project area? (yes/no)
1	P-50-115/ CA-STA-29	Hewes and Hassey 1939	Prehistoric Archaeological Site. Native American occupation and burial site.	Unevaluated	No
2	P-50-1890/ CA-STA-417H	Larson and Johnson 2003	Historic Built Resource. Snake Ravine/TID Upper Main Canal.	Unevaluated[a]	No
3	P-50-258/ CA-STA-173	Heizer and Heizer 1949	Prehistoric Archaeological Site. Native American occupation and burial site.	Unevaluated	No
4	P-50-550	Hata 1979	Historic Built Resource. La Grange Diversion Dam, designated State Point of Historical Interest #STA-003.	Unevaluated[b]	No
5	P-50-2002	TID and MID 2017	Historic Built Resource. La Grange MID Old Canal Segment.	Unevaluated[c]	No
6	P-50-2207/ P-55-8888	TID and MID 2017	Historic Built Resource. La Grange Ditch	Unevaluated[b]	No

[a] This resource was previously evaluated for inclusion on the NRHP and recommended ineligible. It is unknown whether the California State Historic Preservation Officer (SHPO) concurred with this evaluation. All associated correspondence with SHPO is provided in Appendix E.

[b] These resources were evaluated for the licensing project, as identified below, and were determined to be eligible for the NRHP; SHPO provided concurrence in a letter dated September 18, 2017. (See Appendix E)

[c] This resource was evaluated for the licensing project, as identified below, and was determined to be ineligible for the NRHP; SHPO provided concurrence in a letter dated September 18, 2017. (See Appendix E)

Historic Sites and Features Identified on Historic Maps

Historic-period USGS topographic maps and General Land Office plats were reviewed during the 2014 and 2020 record searches to identify locations of potential historic-era sites and features within the Proposed Project area and the 0.25-mile buffer area (Table 10). This resulted in the identification of more than 10 locations where unrecorded historic-era sites or features may be present within this area.

Historic-period maps often provide a general idea of where resources may be located, but are not necessarily translatable to today's maps and mapping standards. Because of the disparity between historic-period maps and modern maps, it is not known whether physical attributes associated with the potential sites and features listed in Table 10 are accessible (that is, whether they occur on a steep inaccessible slope, under water, buried, and/or beneath thick vegetation), or whether the remains are actually within the Proposed Project area (that is, they may have been mis-mapped). In addition, the presence of cultural features on a historic map does not confirm that the features still exist. Many historic features, such as town sites, mines, and roads, often have continued use into present times that may obliterate any historic-era remains. Further, historic features can disappear over time through natural erosion or other weathering processes. Based on review of the inventory of previously recorded cultural resources within the Proposed Project area and 0.25-mile buffer, it appears that some of the features identified on the historic maps have not been formally recorded as archaeological sites.

Table 10. Potential historic-period sites within the Proposed Project area and 0.25-mile buffer

Map	Map date	Features within Proposed Project area (Note: the same features are referenced on multiple maps)	Features within 0.25 mile of Proposed Project area
La Grange, CA, 7.5' USGS Quadrangle	1962	Powerhouse (P-50-2204), transmission line[a]	Transmission line, three structures, two gaging stations, La Grange Diversion Dam, La Grange Dam Road, and five unimproved roads
Merced Falls, CA, 15' USGS Quadrangle	1962	Powerhouse, transmission line	Transmission line, three structures, two gaging stations, La Grange Diversion Dam, La Grange Dam Road, and four unimproved roads
Sonora, CA, 30' USGS Quadrangle	1897	No features	La Grange Diversion Dam and one unimproved road
County Map of Stanislaus, CA	1906	No features	No features
County Map of Tuolumne, CA	1907	No features	La Grange Diversion Dam

[a] The transmission line connecting the La Grange Powerhouse to the grid (the TID Non-FERC Jurisdictional Transmission Line). This transmission line originates at the 4.16/69 kilovolt transformer in the substation located on the east side of the powerhouse and connects to both TID's Tuolumne Line No. 1 and its Hawkins Line, both located to the east of the Project. In the event that the powerhouse is decommissioned in the future, this transmission line would need to be retained to provide power to operate the gates associated with the irrigation canal systems. Therefore, under FERC's transmission line jurisdictional criteria, the transmission line currently serves as part of the existing distribution/transmission grid and is, therefore, not under FERC jurisdiction.

Field Investigations and Results

The field investigation conducted to support the FERC licensing cultural resources study in 2016 examined all accessible lands within the licensing APE to identify and record previously unknown cultural resources, to verify locations of any previously recorded cultural resources, and to assess the current condition of all resources encountered (TID and MID 2017). The field survey was completed by HDR Archaeological Field Supervisor and Principal Investigator Danielle Risse, MA; HDR Architectural Historian Leesa Gratreak, MA; HDR Field Technician, Kamil Rochon, BS; Tuolumne Band of Me-Wuk Indians Tribal Monitor Ray Bernido; and Southern Sierra Miwuk Nation Tribal Monitor Richard Leard. The results of the field investigation as they relate to the resources that occur within or immediately adjacent to the Proposed Project area are presented here. All cultural resources were documented to current professional standards on the appropriate California DPR inventory forms. The sites have been photographed using a digital format, and their locations plotted on the appropriate USGS topographic 7.5-minute quadrangle by hand and with a Global Positioning System unit with sub-meter accuracy. Site sketch maps were prepared for each archaeological site, depicting site boundaries and features.

Based on findings of the archival research and fieldwork, there are 8 resources within the Proposed Project area and 11 resources within the 0.25-mile buffer of the Proposed Project area (Table 11). Of the 8 resources within the Proposed Project area, 2 are isolated archaeological finds, 1 is a historic archaeological site, and 5 are built environment resources. All but 2 of the total 19 resources within the Proposed Project and buffer area were found to be ineligible for inclusion in the NRHP during FERC licensing efforts and are similarly recommended ineligible for listing in the CRHR. The

remaining 2 resources are located within the 0.25-mile buffer of the Proposed Project area and were determined eligible for inclusion in the NRHP and are thus assumed eligible for inclusion in the CRHR[11]—the La Grange Diversion Dam (P-50-0550) and the La Grange Ditch (P-50-2207/P-55-8888). The La Grange Ditch was previously determined eligible and SHPO concurred with this determination in a letter dated December 12, 2014 (TID and MID 2015). The La Grange Diversion Dam was determined eligible and SHPO concurred with this determination in a letter dated September 18, 2017. See Appendix E for copies of consultation correspondence with SHPO.

Table 11. Cultural resources within the Proposed Project area and within 0.25 mile of the Proposed Project area

Primary number/ trinomial	Resource type	Age	Description	CRHR eligibility	Within the Proposed Project area? (yes/no)
P-50-0550	Built environment resource	Historic	La Grange Diversion Dam, designated State Point of Historical Interest #STA-003. Built in 1893, stone and concrete construction, designed by Luther Wagoner (MID).	Eligible	No
P-50-2002	Built environment resource	Historic	La Grange MID Old Canal Segment. Built in 1904, stone, earth, and concrete construction. Designed by MID.	Ineligible	No
P-50-2190	Isolated find	Historic	Two pieces of 8-foot-long rebar, and a segment of railroad rail.	Ineligible	Yes
P-50-2191	Isolated find	Historic	One chain link connected by an eye bolt that is anchored into a boulder.	Ineligible	Yes
P-50-2192/ CA-STA-439H	Archaeological site	Historic	Remnants of a residential building with five features consisting of three rock retaining walls, concrete curbing (likely modern), and a water pipe.	Ineligible	No
P-50-2193/ CA-STA-440	Archaeological site	Prehistoric	Single bedrock milling station with 31 mortar cups.	Ineligible	No
P-50-2194/ CA-STA-441H	Archaeological site	Historic	Remnants of a residential location and powerhouse support facilities with one artifact concentration, six features, and various rock walls.	Ineligible	Yes
P-50-2195	Built environment resource	Historic	Garage on La Grange Powerhouse Access Road. Built circa 1930, wood-framed construction, unknown designer.	Ineligible	No
P-50-2197	Built environment resource	Historic	La Grange Forebay Bypass Spillway. Built in 1910, concrete, designed by TID.	Ineligible	Yes

[11] According to PRC 5024.1.d.1, California properties formally determined eligible for, or listed on, the NRHP are automatically included on the CRHR.

Table 11. Cultural resources within the Proposed Project area and within 0.25 mile of the Proposed Project area

Primary number/ trinomial	Resource type	Age	Description	CRHR eligibility	Within the Proposed Project area? (yes/no)
P-50-2198	Built environment resource	Historic	La Grange Irrigation Canal Forebay. Built in 1910, concrete, designed by TID.	Ineligible	No
P-50-2199	Built environment resource	Historic	La Grange MID Old Canal Discharge Structure. Built in 1910, concrete/metal, designed by MID.	Ineligible	No
P-50-2200	Built environment resource	Historic	La Grange MID Old Canal Discharge Structure. Built in 1910, concrete and metal construction, designed by MID.	Ineligible	No
P-50-2201	Built environment resource	Historic	La Grange Powerhouse Access Road. Built circa 1922, asphalt and earthen construction, designed by TID.	Ineligible	Yes
P-50-2202	Built environment resource	Historic	La Grange Powerhouse penstocks. Built in 1924, steel and concrete construction, designed by TID.	Ineligible	Yes
P-50-2203	Built environment resource	Historic	La Grange Powerhouse tailrace. Built in 1924, concrete and earthen construction, designed by TID.	Ineligible	Yes
P-50-2204	Built environment resource	Historic	La Grange Powerhouse. Built in 1924, steel and concrete construction, designed by TID.	Ineligible	Yes
P-50-2205	Built environment resource	Historic	La Grange TID Diversion Tunnel Intake Structure. Built in 1910, concrete construction, designed by TID.	Ineligible	No
P-50-2206/ P-55-9498	Built environment resource	Historic	La Grange pool. Built 1893.	Ineligible	No
P-50-2207/ P-55-8888	Built environment resource	Historic	La Grange Ditch. Built circa 1871 to 1921, constructed for hydraulic mining efforts on the Tuolumne River.	Eligible	No

Cultural Resource Evaluations for the CRHR

As discussed above, all eight cultural resources identified within the Proposed Project area were recommended ineligible for listing on the NRHP during FERC licensing efforts, and the SHPO agreed with these eligibility determinations in a letter dated September 18, 2017 (TID and MID 2017). As such, none of the eight resources within the Proposed Project area would qualify as

historical resources or unique archaeological resources. These resources are recommended ineligible for inclusion on the CRHR.[12]

Impact Analysis

Although the Proposed Project area has been surveyed for cultural resources and no historical resources or unique archaeological resources have been identified, there is still the potential for the existence of previously unrecorded, recently exposed, or buried archaeological materials within the Proposed Project area. CEQA requires that lead agencies consider both known and unknown cultural resources; therefore, mitigation is recommended to ensure that previously unidentified (if present) cultural resources are protected on the Proposed Project site during construction activities. Potential impacts on cultural resources are discussed below. The mitigation measures described below would reduce impacts on cultural resources to a less-than-significant level.

a) Cause a substantial adverse change in the significance of a historical resource as pursuant to §15064.5?

Impact: Potentially significant unless mitigation incorporated.

As discussed above, the eight cultural resources documented in the Proposed Project area have been determined to be ineligible for the CRHR. Accordingly, none of these eight resources are considered to be historical resources and, thus, the Proposed Project would not cause a substantial adverse change in the physical characteristics of any historical resources and would result in no impact on known historical resources. However, the La Grange Diversion Dam (P-50-0550) and the La Grange Ditch (P-50-2207/P-55-8888) are assumed eligible for inclusion in the CRHR because they have been determined eligible for inclusion in the NRHP; therefore, they are considered historical resources. Although these two resources are not within the Proposed Project area and would not be physically affected, they are within the 0.25-mile buffer of the Proposed Project area and the viewshed of the Proposed Project area, and vice versa. The Proposed Project would have minimal impacts on the area's viewshed because the construction work would be temporary and disturbed areas would be returned to pre-Project or better conditions. Visual changes that would result from the Project would be the new shotcrete that is applied to the lower portion of the La Grange Forebay Bypass Spillway and the addition of the tailrace channel diversion structure. The application of the shotcrete would be consistent with the concrete material that is already used for surrounding facilities and would not greatly affect the area's viewscape. Similarly, the installation of the tailrace channel diversion structure would, upon completion, be mostly underground and underwater with little visual impact on the area. The only portions of the tailrace channel diversion that would be readily visible would be at the inlet structure (river end), discharge structure (tailrace end), and a cutoff wall for stability (center of pipe). All of these features would be only minimally visible and are also consistent with other concrete features within and around the Proposed Project area. Further, both the bypass spillway shotcrete area and the tailrace channel diversion structure would be almost entirely obscured from the upstream La Grange Diversion Dam by vegetation and the bend in the river at this location. The Proposed Project would, therefore, result in a less-than-significant level of impact for these two resources.

As well, additional buried or previously unidentified cultural resources could exist within the Proposed Project area. While much of the natural topography in the vicinity of the Proposed Project

[12] Information from the licensing cultural resources study (TID and MID 2017) has been used to illustrate the eligibility recommendations for the CRHR for all eight cultural resources identified within the Proposed Project area and is provided in Appendix G.

has been altered, prehistoric and historic-period archaeological sites could occur in buried contexts. Thus, the potential exists that buried resources could be discovered during construction. Implementation of MM CULT-01 outlined below would reduce potential Project impacts related to unknown historical resources to a less-than-significant level.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Impact: Potentially significant unless mitigation incorporated.

As described above, archaeological resources identified within the Proposed Project area include two isolated archaeological finds and one archaeological resource. Although implementation of the Proposed Project could affect these resources, none are considered unique archaeological resources that are significant, so affecting them would not cause a substantial adverse change in their significance. Nonetheless, additional buried or previously unidentified archaeological resources could exist within the Proposed Project area. While much of the natural topography in the vicinity of the Proposed Project has been altered, prehistoric and historic-period archaeological sites could occur in buried contexts. Thus, the potential exists that buried resources could be discovered during construction. Implementation of MM CULT-01 outlined below would reduce potential Project impacts related to unknown archaeological resources to a less-than-significant level if archaeological resources are revealed during the Proposed Project.

c) Disturb any human remains, including those interred outside of formal cemeteries?

Impact: Potentially significant unless mitigation incorporated.

There are no known human burials or remains within the Proposed Project area. However, there are two previously recorded archaeological sites within the 0.25-mile buffer of the Proposed Project area that consist of Native American occupation and burial sites, site P-50-115 (CA-STA-29) and site P-50-258 (CA-STA-173). These sites are currently unevaluated for the CRHR. Therefore, the possibility for encountering human remains during implementation of the Proposed Project does exist. MM CULT-02 would be applied if human remains were found during Project implementation to reduce impacts to a less-than-significant level.

Mitigation Measures

MM-CULT-01: Inadvertent Discovery of Historical and Archaeological Resources. In the event that buried cultural deposits (prehistoric stone tools, grinding stones, historic glass, bottles, foundations, cellars, privy pits, etc.) are encountered during implementation of the Proposed Project, work must stop immediately at the discovery site until a qualified professional archaeologist meeting the Professional Qualification Standards of the Secretary of the Interior for archaeology can determine the nature of the resources and, as appropriate, assist in helping Proposed Project personnel avoid the resources or implement management measures to evaluate the significance and potential eligibility of the resources for listing on the CRHR, or any local registers, as appropriate.

MM-CULT-01 Implementation:

- **Responsible Party:** TID and a qualified professional archaeologist will ensure the appropriate management for any discovery of prehistoric or historic resources during construction.
- **Timing:** During all Proposed Project implementation activities.
- **Monitoring and Reporting Program:** Any unexpected discovery will be avoided. If it cannot be avoided, it will be evaluated for potential listing on the CRHR. If there is a Native American

component to the unexpected discovery, consultation with Native American tribes will be incorporated to determine the eligibility. If the find is determined to be eligible, representatives of TID and a qualified, professional archaeologist will meet to determine the appropriate mitigation measures to be implemented, as appropriate. All significant cultural materials recovered shall be subject to scientific analysis, professional curation, and a report prepared by the qualified professional archaeologist according to current professional standards. A report will be kept on file at TID. A copy of the report will be distributed to tribes and to federal and state agencies, as appropriate.

- **Standards of Success:** The proper recording, evaluation, consultation, and management of any newly identified cultural resources.

MM-CULT-02: Inadvertent Discovery of Human Remains. In accordance with the California Health and Safety Code, Section 7050.5 and PRC 5097.98, regarding the discovery of human remains, if any such finds are encountered during implementation of the Proposed Project, all work within the vicinity of the find shall cease immediately and a 100-foot-wide buffer surrounding the discovery shall be established. TID, or its agent, shall be immediately notified. The Stanislaus County coroner shall be contacted immediately to examine and evaluate the find. If the coroner determines that the remains are not recent and are of Native American descent, the coroner will contact the Native American Heritage Commission (NAHC) in accordance with California Health and Safety Code Section 7050.5 and PRC 5097.98. TID will work with the most likely descendant, as determined by the NAHC, to determine the most appropriate means of treating the remains. All Proposed Project personnel should be instructed that any human remains encountered are to be treated with sensitivity and respect, and that their discovery and location are to be kept confidential. Proposed Project personnel should be briefed prior to implementation activities regarding procedures to follow in the event buried human remains are encountered.

MM-CULT-02 Implementation:

- **Responsible Party:** TID will ensure all appropriate parties are contacted to ensure proper treatment and disposition of human remains.
- **Timing:** During all Proposed Project implementation activities.
- **Monitoring and Reporting Program:** The recordation and disposition of any newly identified human remains will be conducted by a qualified professional archaeologist in consultation with the most likely descendent, or landowner (TID) in the absence of an identified most likely descendant, and a report will be kept on file at TID. A copy of the report will be distributed to tribes and to federal and state agencies, as appropriate.
- **Standards of Success:** The proper recording, evaluation, consultation, and treatment of any newly identified human remains.

References

California Department of Parks and Recreation (California DPR). 1976. *California Inventory of Historic Resources*. Department of Parks and Recreation, Sacramento, CA.

_____. 1989. *Survey of Surveys: A Summary of California's Historical and Architectural Resources Surveys*. Department of Parks and Recreations, Sacramento, CA

_____. 1996. *California Historical Landmarks*. California Department of Parks and Recreation, Sacramento, CA.

Carpenter, K. 2005. *Letter Report Regarding Turlock Irrigation District Archaeological Survey; TID Upper Main Canal.* Davis, California.

Chadwick, Wallace L., and Eric B. Kollgaard, eds. 1988. *Development of Dam Engineering in the United States*. Elmsford (NY): Pergamon Press.

Hohenthal, Helen Alma. 1972. *Streams in a Thirsty Land*. City of Turlock.

Jensen, P. 2004. *Archaeological Inventory Survey, M.I.D—T.I.D. Transmission Line Disconnect Project, Four Locations Crossing the Tuolumne River Near La Grange, Stanislaus County, California.* Chico, California.

Jensen, S. 2004. *Archaeological Inventory Survey: MID's Three New Transmission Lines Project, c. 3.5 Miles of Linear Corridor Interconnecting Existing Transmission Facilities, Stanislaus County, California*. Chico, California.

JRP Historical Consulting Services. 2005. *Historical Resources Inventory and Evaluation Report, Turlock Irrigation District, Upper Main Canal, Stanislaus County, CA*. Resource inventory and evaluation of irrigation canal prior to canal improvements/retrofitting.

Napton, L.K. and E.A. Greathouse. 1979. *Cultural Resource Reconnaissance of the Turlock Main Canal, Turlock Irrigation District, Stanislaus County, California.* San Francisco, California.

Schultz, E., A. Vanderslice, Carey & Co. 2007. *Primary Record for the Modesto Main Canal (P-50-002002)*. Information Center Report Numbers SJ-07527, ST-07527, TO-07527.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2015. *Historic Properties Study: Volumes I-III, Study Report, Don Pedro Project, FERC No. 2299*. Prepared by HDR Engineering, Inc., and Far Western Anthropological Research Group, Inc., with contributions from Foothill Research, LTD, and Applied EarthWorks, Inc. May.

———. 2017. *Cultural Resources Study Report, La Grange Hydroelectric Project, FERC No. 14581*. Prepared by HDR, Inc. Filed with FERC as Privileged.

U.S. Department of the Interior. 1983. *Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines in the Federal Register, September 29, 1983 (48FR44716)*. Department of the Interior, Washington, D.C.

2.6 Energy

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☐	☒
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

Environmental Setting

Stanislaus County is serviced by three major energy and utility companies: Pacific Gas and Electric, MID, and TID. In its 2016 General Plan, Stanislaus County describes policies for conserving natural resources and energy resources, but mainly pertaining to new housing development and conservation. Goal 11 of the Conservation/Open Space Element is to "Conserve resources through promotion of waste reduction, reuse, recycling, composting, ride-share programs, and alternative energy sources such as mini-hydroelectric plants, gas and oil exploration, and transformational facilities such as waste-to-energy plants."

Impact Analysis

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Impact: No impact.

Proposed Project construction activities would result in the temporary consumption of energy from fuel use needed to operate equipment. The two primary components that make up the Proposed Project include surfacing the sluice channel and installing a diversion structure that would connect the tailrace channel to the main river channel. Proposed Project construction activities that would involve short-term consumption of energy resources would be generally limited to the hauling of shotcrete to the Project site, use of generators during dewatering, and use of general construction equipment for the installation of the diversion structure and coffer dam. Furthermore, existing tiered emissions standards for off-road and construction equipment have been established by EPA and by CARB that would be adhered to by the Project.

Energy consumption for Proposed Project operations would not change from current energy use conditions.

Therefore, the Proposed Project would have no impact on the environment from inefficient use of energy given the temporary nature of energy consumed during construction and no change in operational conditions, so that no inefficient, wasteful, or unnecessary consumption of energy resources would be associated with the Project. As a result, no impact would occur and no mitigation is required.

Mitigation: None required.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Impact: No impact.

The State of California's Clean Energy and Pollution Reduction Act (Ch. 547, Stats. 2015) establishes California's greenhouse gas (GHG) emissions reduction target of 40 percent below 1990 levels by 2030, and 80 percent by 2050. Additionally, California's 100 Percent Clean Energy Act (Ch. 312, Stats. 2018) establishes a State policy that eligible renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers by December 31, 2045.

The Proposed Project does not involve the construction of any new or decommissioning of any existing power generating facilities. In addition, the Proposed Project would not result in a reduction in energy generation from existing TID hydroelectric facilities during or after construction activities. Therefore, the Proposed Project would not result in an increase in fossil fuel use and would not affect existing availability of renewable energy sources. In addition, operations following implementation of the Project would not change the power generation capacity of the existing TID powerhouse. Therefore, the Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. As a result, no impact would occur and no mitigation is required.

Mitigation: None required.

2.7 Geology and Soils

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:				
i. 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?	☐	☐	☐	☒
ii. Strong seismic ground shaking?	☐	☐	☐	☒
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv. Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial direct or indirect risk to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒

Environmental Setting

The Proposed Project is located in Stanislaus County in the Sierra Nevada foothills and Sierra Nevada geomorphic province. The Sierra Nevada geomorphic province is made up of volcanic and sedimentary formations, with rivers running down the western slopes (Stanislaus County 2016). The Proposed Project is made up of undivided Mesozoic metavolcanic rocks, including andesite and rhyolite flow rocks, greenstone, breccia, pyroclastic rocks, and the Franciscan Complex: basaltic pillow lava, diabase, greenstone, and minor pyroclastic rocks (DOC 2010).

Soils in the Project area consist of the Gopheridge-Loafercreek Complex and the Whiterock rocky silt loam. Slopes range from 30 to 90 percent (NRCS 2019). The Project is located along the Tuolumne River, which is characterized as running though low-elevation meadows and gorges with rocky outcrops as the river flows out of the Sierra Nevada Range and through the Central Valley toward the Pacific Ocean (National Wild and Scenic Rivers System 2020). Construction methods would include measures for stabilizing impacted soils, such as soil binders and vegetative stabilization.

Impact Analysis

a-i) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving: 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?

Impact: No impact.

The Proposed Project is located in eastern Stanislaus County. The only active fault with Alquist-Priolo Earthquake Fault Zoning Maps that exists in the county is the Ortigalita fault located in southwestern Stanislaus County, which is approximately 55 miles southwest of the Project area. There are no other active faults or Fault Zoning Maps in the county (Stanislaus County 2016) near the Proposed Project area. Therefore, no impact would occur from the rupture of a known fault. As a result, no mitigation is required.

Mitigation Measures: None required.

a-ii) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving: strong seismic ground shaking?

Impact: No impact.

The Proposed Project is located in areas with low levels of potential for seismic shaking (California Geological Survey [CGS] 2016). Therefore, the Proposed Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

a-iii) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving: seismic-related ground failure, including liquefaction?

Impact: No impact.

Liquefaction can occur when earthquake motion turns loosely packed, water-saturated soil to liquid, which causes a loss in support for structures. The Proposed Project is located in an area that has not been evaluated for liquefaction (CGS 2019). Further, the Proposed Project is not located in an earthquake hazard zone (CGS 2019). Therefore, the Proposed Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

a-iv) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving: landslides?

Impact: Less than significant impact.

The Proposed Project is located in an area that has not been evaluated for landslides (CGS 2019). The Proposed Project would involve the surfacing of the sluice channel and construction of a diversion structure in areas with steep slopes along the Tuolumne River. The Proposed Project would include dewatering in work areas so that work is not done in saturated soil. Slopes of the sluice channel and diversion structure are mostly less than 30 degrees, with several areas up to 60 degrees in rocky areas along the tailrace channel. Further, staging areas would be located above and away from any steep slopes to reduce the potential for loss of equipment or harm to workers from landslides. Any surface disturbance of greater than 1 acre would be managed by the Project Stormwater Pollution Prevention Plan (SWPPP) to reduce the potential for erosion and landslides on steep slopes. However, given the rocky nature of the work area (NRCS 2019), and, particularly, the steep drop-offs at the sluice tailrace channels, landslides are unlikely to occur. Therefore, the Proposed Project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides. As a result, no mitigation is required.

Mitigation Measures: None required.

b) Result in substantial soil erosion or the loss of topsoil?

Impact: Less than significant impact.

There is the potential that construction activities for the Proposed Project could contribute to accelerated erosion along and adjacent to river banks were construction is occurring. During construction, clearing, grubbing, and grading activities would remove ground cover and expose and disturb soil on slopes. Exposed and disturbed soil would be vulnerable to erosion from runoff during construction, with soil particles becoming entrained in the runoff. Where there is construction that could cause soil erosion or sedimentation, erosion control methods would be implemented as part of the Project SWPPP during all construction and following, to control post-construction runoff according to requirements in Section XIII.A of the California NPDES Construction General Permit (State Water Resources Control Board [SWRCB] 2012). Further, any newly exposed soils within the work area would be restabilized following the completion of earthmoving activities.

The Proposed Project would convert approximately 10,000 square feet of existing topsoil and rock to impervious surfaces through the shotcreting of the sluice channel. However, this soil conversion would be limited in scope and would ultimately prevent erosion around dam facilities.

Therefore, the Proposed Project would not result in substantial soil erosion or loss of top soil. As a result, the impact would be less than significant and no mitigation is required.

Mitigation Measures: None required.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

Impact: Less than significant impact.

The Proposed Project is made up of undivided metavolcanic rocks. These rocks are lithified and do not contain unstable, unconsolidated sediments. Soils in the Project area are gravely and rocky and have a low depth to bedrock, making these soil units stable for construction activities and structures.

The Proposed Project would include minor grading work and construction activity associated with surfacing of the sluice channel and installation of a diversion structure. As mentioned above under item a and item b, steep slopes susceptible to landslides do exist in the Proposed Project area. However, the majority of construction and staging activities would take place in generally flat areas and would not take place on slopes that could potentially be unstable. Therefore, with construction methods and the siting of staging locations, the Proposed Project would not result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. As a result, impacts would be less than significant and no mitigation is required.

Mitigation Measures: None required.

d) Be located on expansive soil, as defined in Table 18-1B of the Uniform Building Code (1994), creating substantial direct or indirect risk to life or property?

Impact: No impact.

The Proposed Project would not include the construction of any new buildings or structure that would be susceptible to expansive soils and potentially cause risk to life or property. Therefore, the Proposed Project would not create a substantial direct or indirect risk to life or property due to expansive soils. As a result, there is no impact and no mitigation is required.

Mitigation Measures: None required.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Impact: No impact.

No changes to the need for disposal of wastewater during construction or operations would result from implementation of the proposed Project. As a result, the Proposed Project would not require the installation of septic tanks or use of any other additional wastewater systems or sewers. Therefore, because the Proposed Project would not require septic tanks or alternative wastewater disposal systems, no impact would occur as a result of soils providing inadequate support to wastewater systems and no mitigation is required.

Mitigation Measures: None required.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Impact: No impact.

Rock formations in the Proposed Project area include volcanic and sedimentary rocks. Volcanic rocks would have no potential to contain fossils because any fossils in the original rock will have melted when the rock melted to form magma. Sedimentary rock formations are also found in the Proposed Project area; these formations have the potential to contain marine invertebrate fossils. However, due to the ubiquitous nature of these types of fossils, they would not be considered a unique paleontological resource or geologic feature. Further, surfacing of the sluice channel and work to install the diversion structure would consist of surface grading and would not disturb bedrock layers. Therefore, the Proposed Project would have no impact on unique paleontological resources or geologic features and no mitigation would be required.

Mitigation Measures: None required.

References

California Department of Conservation (DOC). 2010. "Geologic Map of California." Accessed May 15, 2020. https://maps.conservation.ca.gov/cgs/gmc/.

California Geologic Survey (CGS). 2016. "Earthquake Shaking Potential for California." Accessed March 9, 2020. https://www.conservation.ca.gov/cgs/Documents/MS_048.pdf.

———. 2019. "Earthquake Zones of Required Investigation." Updated April 4, 2019. Accessed March 9, 2020. https://maps.conservation.ca.gov/cgs/EQZApp/.

National Wild and Scenic Rivers System. 2020. "Tuolumne River, California." Accessed April 13, 2020. https://www.rivers.gov/rivers/tuolumne.php.

Stanislaus County. 2016. "Stanislaus County General Plan and Airport Land Use Compatibility Plan Update Final Program Environmental Impact Report." Accessed March 4, 2020. http://www.stancounty.com/bos/agenda/2016/20160823/PH910_Attach2_ExD_Part1.pdf.

State Water Resources Control Board (SWRCB). 2012. "National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities. Order No. 2009-0009-DWQ. NPDES No. CAS000002." Accessed March 9, 2020. https://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

U.S. Department of Agriculture, Natural Recourses Conservation Service (NRCS). 2019. "Web Soil Survey." Accessed March 9, 2020. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

2.8 Greenhouse Gas Emissions

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Environmental Setting

California's efforts devoted to GHG emissions reduction and climate change research and policy have increased dramatically in recent years. These efforts are primarily concerned with the emissions of GHGs related to human activity that include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_4). CARB issued *California's Climate Change Scoping Plan* in 2017. This is a comprehensive climate action plan that details steps California can take to reduce its contribution to climate change (CARB 2017).

On December 17, 2009, the SJVAPCD adopted "Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA and the Policy: District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency" (SJVAPCD 2009).

The guidance and policy rely on the use of performance-based standards, otherwise known as Best Performance Standards (BPSs), to assess the significance of Project-specific GHG emissions on global climate change during the environmental review process, as required by CEQA. However, this guidance is geared toward land use development Projects rather than improvements at hydroelectric dams. The BPSs suggested in the "Final Staff Report, Appendix J: GHG Emission Reduction Measures – Development Projects" involve measures such as trip reduction, bike lanes and racks, public transit, high-density housing, and vehicle charging stations. Such BPSs are not applicable to the Proposed Project.

Therefore, for the purposes of the Proposed Project, an alternative significance criterion was sought. The "SJVAPCD 230 metric tonne Zero Equivalency Policy" was issued on March 24, 2010, and was revised on January 24, 2012. The Zero Equivalency Policy is intended to apply to stationary source Authority to Construct applications as a *de minimis* level of GHG emissions. Potential increases less than 230 metric tons per year are considered to be zero for SJVAPCD permitting purposes. This Zero Equivalency Policy was designed to apply to permanent stationary sources with ongoing annual emissions. It was not originally intended to apply to unpermitted, temporary construction projects such as the Proposed Project. However, the policy is now also used to set a threshold by which to assess impacts from temporary construction projects. Typically, when stationary source

criteria are applied to temporary construction projects, the construction project emissions are amortized over the expected life of the facility being constructed (for example, 20 years or more).

Estimated Project Greenhouse Gas Emissions

GHG emissions generated by the Proposed Project would be primarily in the form of CO_2 and CH_4 from construction equipment and haul and commute vehicle exhaust. Emissions were calculated using CalEEMod Version: CalEEMod.2016.3.2 (see Appendix F).

Table 12 presents the estimate of GHG emissions from the Proposed Project. Note that GHG emissions are reported in metric tonnes (1,000 kilograms) rather than in tons (2,000 pounds). Total GHG emissions are calculated by combining the mass of different emittants while weighting each chemical according to its global warming equivalent to express the total in terms of carbon dioxide equivalent tonnes (CO_2e).

Table 12. Total greenhouse gas emissions associated with the proposed project

Emissions source	CO_2 (tonne/year)	CH_4 (tonne/year)	CO_2e (tonne/year)
Construction activities			
Off-road equipment	75.19	0.02	75.70
On-road transport	50.42	0.00	50.46
Worker commute	10.68	0.00	10.69
Total emissions	136.28	0.02	136.85[a]
Significance thresholds	—	—	230
Below threshold	—	—	Yes

[a] A more appropriate comparison of estimated GHG emissions to the Zero Equivalency Policy threshold might be to amortize construction emissions over the expected life of the facilities being constructed. That is, if the sluice channel surface and diversion tunnel are expected to last 20 years, 1/20 of estimated emissions, or 6.8 tonnne/year would be compared to the 230 ton/year Zero Equivalency Policy.

Impact Analysis

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Impact: Less than significant impact.

For the purposes of this environmental review, the impacts of a project's direct or indirect GHG emissions would be considered significant if they would prevent implementation or attainment of existing GHG reduction strategies or air quality goals.

Construction-related GHG emissions would be associated with engine exhaust from construction equipment and haul trucks and with worker commute trips. However, construction activities would be relatively limited in scope and would be temporary in nature and, as noted above, no specific thresholds applicable to construction GHG emissions have been set in this air district.

As shown in Table 12, GHG emissions associated with the Proposed Project, even when viewed as if it were an annually recurring action, are well below the Zero Equivalency threshold set by SJVAPCD. Therefore, the Proposed Project would be consistent with the applicable GHG emission reduction strategies identified by the State's Climate Action Plan and the Climate Action Team, including near-zero emissions and investing in renewable energy for communities. As a result, the Proposed Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and the Proposed Project would not conflict with the California Climate Action Plan. The impact would be less than significant and no mitigation is required.

Mitigation Measures: None required.

References

California Air Resources Board (CARB). 2017. "California's 2017 Climate Change Scoping Plan." Accessed May 21, 2020. https://www.c2es.org/document/climate-action-plans/.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2009. "Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA and the Policy: District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency." December. Accessed February 29, 2020. www.valleyair.org/Programs/CCAP/12-17-09/3%20CCAP%20-%20FINAL%20LU%20Guidance%20-%20Dec%2017%202009.pdf http://www.valleyair.org/Programs/CCAP/ghg/ghg_idx.htm.

———. 2010. "Zero Equivalency Policy." Issued on March 24 2010 and revised on January 24, 2012. Accessed February 29, 2020. http://www.valleyair.org/policies_per/policies/apr2015.pdf.

2.9 Hazards and Hazardous Materials

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☒	☐

Environmental Setting

Hazards are defined as natural and man-made agents or conditions that shall be respected if life and property are to be protected, particularly during periods of growth and development. These hazards include seismic and other geologic hazards, as well as fire and flooding, which can occur naturally or as a result of human structures or activities. Hazardous materials are characterized as biological, chemical, radiological, and/or physical, which have the potential to inflict harm on humans, animals, or the environment, either alone or through the interaction with other factors.

Database Review

According to the California Environmental Protection Agency, the provisions in Government Code Section 65962.5, which detail the information required from the Department of Toxic Substances Control, are commonly referred to as the "Cortese List." The list, or a site's presence on the list, has bearing on the local permitting process as well as on compliance with CEQA. The Cortese List, which includes the resources listed below, was reviewed for references to the Proposed Project area:

- list of Hazardous Waste and Substances sites from the Department of Toxic Substances Control EnviroStor database;
- list of Leaking Underground Storage Tank Sites from the SWRCB GeoTracker database;
- list of solid waste disposal sites identified by SWRCB with waste constituents above hazardous waste levels outside the waste management unit;
- list of "active" Cease and Desist Orders and Cleanup and Abatement Orders from SWRCB; and
- list of hazardous waste facilities subject to corrective action identified by the Department of Toxic Substances Control. Results are discussed in question d) below.

Impact Analysis

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Impact: Less than significant.

The Proposed Project would involve use of common construction materials, such as fuel, oil, grease, and surfactants. Additionally, gunite would be placed within the sluice channel as part of the Proposed Project. Gunite would be brought to the Project area on mixing trucks and delivered into a hopper that would be staged on site. At the base of the proposed gunite footprint, a 1-foot-wide by 3-foot-deep concrete footing would be constructed to prevent head cutting. Raw materials would be obtained from local suppliers within a 40-mile radius of the Proposed Project area. Specifically, the gunite and concrete would likely be sourced from Allied Concrete in Modesto, California, and the sand and slurry would likely be sourced from 7/11 Materials in Waterford, California.

Gunite is typically a mixture of sand, cement, and water. This mixture may include the admixtures that can include, but are not limited to: air-entraining agents, water reducers, water-reducing retarders, and accelerators. Depending on their composition, these admixtures may be hazardous to the environment. Construction activities would incorporate BMPs to minimize hazards resulting from routine transport, use, or disposal of hazardous materials. If a hazardous material or substance were encountered, it would be disposed of at approved facilities, in accordance with applicable state and federal regulations. Furthermore, the Proposed Project would implement a SWPPP that would help prevent and mitigate hazardous materials from entering the environment. Therefore, the Project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. As a result, the potential effects are less than significant and no mitigation is required.

Mitigation Measures: None required.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?

Impact: Less than significant.

The Proposed Project would use materials that may be hazardous to the environment during construction activities and operations of the facilities. However, only short-term storage of these materials would occur on site. Further, construction activities would incorporate BMPs and SWPPP requirements that would minimize hazards resulting from the routine transport, use, or disposal of hazardous materials, as discussed in item a. No other actions associated with future operations or maintenance of the sluice channel or tailrace structure would cause a release of hazardous materials into the environment.

Therefore, the Proposed Project is not anticipated to create a hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; impacts would be less than significant and no mitigation is required.

Mitigation Measures: None required.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Impact: No impact.

No schools exist within 1 mile of the Proposed Project area. Therefore, no impact would occur, and no mitigation would be required.

Mitigation Measures: None required.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Impact: No impact.

The Proposed Project is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and would not create a significant hazard to the public or the environment. Therefore, no impact would occur and no mitigation would be required.

Mitigation Measures: None required.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

Impact: No impact.

There are no airports or private airports located within 2 miles of the Project area. Therefore, the Proposed Project would have no impacts from excessive noise on residents or workers in the Project area resulting from proximity to an airport, and no mitigation would be required.

Mitigation Measures: None required.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Impact: No impact.

The Proposed Project would not impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The Proposed Project is located in a remote area of Stanislaus County, and no materials or vehicles would be staged off site. Further, the number of vehicles arriving/leaving the Project site would not affect traffic flows in the area. Therefore, no impact would occur and no mitigation would be required.

Mitigation Measures: None required.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

Impact: Less than significant.

The Proposed Project area is located adjacent to the Tuolumne River, at approximately river mile 54, and about 1 mile east of La Grange, California. This area is categorized as a moderate fire hazard severity zone (California Department of Forestry and Fire Protection [CAL FIRE] 2007). All areas that would be used during proposed construction, including the access road (La Grange Dam Road) up to California State Route 132/Yosemite Boulevard and all proposed staging areas, are on property owned by TID and public access is restricted. Further, none of the Proposed Project activities are such that they would be anticipated to significantly increase the risk of wildland fires. Work areas are made up or dirt and rock, and any vegetation would be removed prior to construction, which would further reduce the potential or wildfires on site. Finally, TID has developed a *Wildfire Mitigation Plan* (TID 2020) that would be implemented during all construction phases. Therefore, there would be a less than significant impact and no mitigation would be required.

Mitigation Measures: None required.

References

California Department of Forestry and Fire Protection (CAL FIRE). 2007. “Fire Hazard Severity Zones Maps.” Accessed March 25, 2020. https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/.

Google. 2020. “Google Maps.” Accessed March 25, 2020. https://www.google.com/maps.

State of California. 2020. “EnviroStor.” Accessed March 25, 2020. https://www.envirostor.dtsc.ca.gov/public/.

Turlock Irrigation District (TID). 2020. *Wildfire Mitigation Plan*.

2.10 Hydrology and Water Quality

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i. result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☐	☒
iv. impede or redirect flood flows?	☐	☐	☐	☒
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

Environmental Setting

The Proposed Project is located at approximately river mile 54 on the Tuolumne River below the La Grange Dam and Reservoir in the Sierra Foothills. This location is near the upstream end of the section of the Tuolumne River commonly referred to as the Lower Tuolumne River. The Tuolumne River is heavily regulated and hydrologically modified. Multiple hydroelectric developments exist in the watershed and provide power generation, flood protection, and improved water supply reliability. Annual stream flows average in excess of 1.4 million acre-feet. High flows are typically observed in

the late winter through the spring, and coincide with winter storm events and spring snowmelt. From June 1 through September 20, minimum flows of 250 cfs are maintained in wet and above-normal water years. These minimums are often exceeded except for in drier water years. In below-normal and dry years, flows are less than 250 cfs during this time (TID 2017).

Relevant groundwater quality and surface water quality standards are established in the Central Valley Regional Water Quality Control Board (CVRWQCB) Water Quality Control Plan (CVRWQCB 2018), or Basin Plan. The Basin Plan identifies beneficial uses to be protected, water quality objectives to protect those uses, and an implementation program necessary to achieve these objectives. The Basin Plan delineates the Tuolumne River subarea and identifies beneficial uses of: municipal, domestic, agricultural, industrial process, and industrial service supply; water contact and non-water contact recreation; warm and cold freshwater habitat; migration of aquatic organisms; spawning; and wildlife habitat. These beneficial uses are supported by 17 different water quality objectives listed in the Basin Plan, including those for oil and grease, sediment, settleable and suspended material, and turbidity. The Lower Tuolumne River is identified on the Clean Water Act Section 303(d) State Impaired list; impairments include water temperature and toxins from agricultural and resource extraction sources. There are currently no Total Maximum Daily Load plans for the Tuolumne River.

The Tuolumne River is located in the San Joaquin River Hydrologic Region of the San Joaquin Valley Groundwater Basin. The Proposed Project area occurs in the southeastern corner of the Modesto Subbasin and near the boundary with the Turlock Subbasin. The Lower Tuolumne River delineates the boundary between the two subbasins. Combined, the two subbasins encompass 594,000 acres in Stanislaus and Merced Counties. The primary sources of groundwater recharge in both subbasins are from deep percolation of applied irrigation water and from canals and water storage facilities. In addition to the Tuolumne River, the Merced, Stanislaus, and San Joaquin Rivers contribute to groundwater recharge in the two subbasins. The lower to middle stretches of the Lower Tuolumne River is a gaining stream with groundwater discharge supporting flow. Combined natural recharge to the subbasins is estimated at 119,000 acre-feet annually with an additional 405,000 acre-feet of recharge from applied water annually. Estimated combined annual extractions include 146,000 acre-feet for urban use and 532,000 acre-feet for agricultural use between both subbasins. Groundwater quality impairments in both subbasins include pesticides, total dissolved solids, and nitrates, among others. The locations and extent of impairment are variable.

During surfacing of the sluice channel and construction of the diversion structure, temporary rerouting of the river path and temporary dewatering in the Proposed Project area would be required.

Dewatering of the sluice channel for surfacing would be accomplished by closing the TID forebay sluice gate and drain gate to suspend water flow, allowing the remaining water to freely drain into the Tuolumne River. Isolated pockets of river water that have pooled in low areas along the channel length would be pumped out and eventually discharged back into the river. The TID forebay sluice gate and drain gate would also be closed and stop logs would be inserted into the heads of the TID powerhouse penstocks at the forebay to halt flow into the tailrace channel. Dewatering of wetted areas in the tailrace channel and side channel of the Tuolumne River would also be required for construction of the diversion structure and would be accomplished using pumps and cofferdams.

Impact Analysis

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Impact: Less than significant impact.

The Proposed Project would not result in the violation of any water quality standards or waste discharge requirements. For surfacing of the sluice channel, the Proposed Project would require minor excavation and backfilling, either by hand or with a small to medium excavator. For construction of the diversion structure, the Proposed Project would require installation of a temporary cofferdam system and dewatering by pumps. Once the cofferdam is in place and the stream channel is dewatered, the Proposed Project would involve excavation and grading of the surface. To protect water quality and control erosion during the construction period, TID and all Project contractors would implement water quality and sediment and erosion control BMPs during all phases of construction. Water quality standards would be maintained and waste would be disposed of consistent with all applicable permits and approvals. Project waste is anticipated to be trucked off site for disposal. Applicable BMPs would include, but are not limited to: erosion control, sediment control, refueling restrictions, and hazardous materials management BMPs. If ground disturbance is estimated to be greater than 1 acre, a SWPPP would be implemented. Groundwater resources would be protected by refueling and containment procedures outlined in the Project SWPPP.

With the implementation of BMPs during construction, the Proposed Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality during construction or operation. As a result, impacts from implementation of the Proposed Project would be less than significant and no mitigation would be required.

Mitigation Measures: None required.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Impact: No impact.

The Proposed Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge. The Proposed Project would include the surfacing of the sluice channel and construction of a new diversion structure. The existing sluice channel is mostly bedrock with some loose cobble and boulder. The purpose of the surfacing would be to smooth out the contour and slope of the sluice channel and eliminate localized low areas, thereby reducing the potential for the formation of isolated pools of water that could isolate fish under low- or no-flow conditions. Surfacing would result in little to no reduction of groundwater recharge in a relatively small area within the subbasins that has also previously been heavily modified from its natural state. The purpose of the diversion structure is to create a conduit that would equalize the water surface elevations in the river channel and the tailrace channel. For construction of the diversion structure, the Tuolumne River side channel would be temporarily dewatered for construction; however, work would be limited to a small area and would not substantially affect subsurface water flow or groundwater recharge.

Construction and operation of the Proposed Project would not substantially decrease groundwater supplies, interfere substantially with groundwater recharge, nor impede sustainable groundwater management of the basin. As a result, there would be no impact from implementation of the Proposed Project and no mitigation would be required.

Mitigation Measures: None required.

c-i) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: result in substantial erosion or siltation on- or off-site?

c-ii) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

Impact: Less than significant impact.

Surfacing of the sluice channel and construction of the diversion structure would not substantially alter existing surface drainage patterns in the Proposed Project area. After construction, upland and wetted channel crossing areas of the Proposed Project site would be graded to match preconstruction conditions. Alterations in flow attributable to the diversion structure would be minor, and after convergence of the tailrace channel and the main channel immediately downstream of the tailrace channel, would not alter total flows of the Tuolumne River. Construction would result in approximately 11,000 square feet of new impervious surface on the sluice channel; however, this would be a small increase and would not alter the course of the channel or affect the Project area's drainage as a whole. Therefore, construction and operation of the Proposed Project would not substantially alter existing drainage at the Project site and, as a result, would not result in substantial erosion or siltation or induce flooding as a result of increased surface runoff attributable to altered drainage patterns through the alteration of a river course or the addition of impervious surfaces. As a result, impacts from implementation of the Proposed Project would be less than significant and no mitigation would be required.

Mitigation Measures: None required.

c-iii) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Impact: No impact.

Stormwater on site is not managed through constructed drainage systems, but rather infiltrates through the soil or discharges via surface flow to the Tuolumne River. The Project SWPPP would prescribe erosion and sedimentation controls to minimize risk of polluted runoff being released into the river during construction. As discussed above in items c-i and c-ii, the Proposed Project would result in minimal increases in impervious surfaces. There would be no changes in operations after construction that would provide additional sources of runoff. Therefore, the Proposed Project would not create substantial additional runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. There would be no impact from implementation of the Proposed Project and no mitigation would be required.

Mitigation Measures: None required.

c-iv) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: impede or redirect flood flows?

Impact: No impact.

As discussed in items c-i and c-ii above, construction would not substantially alter existing drainage patterns in the Proposed Project area. The Proposed Project includes construction of a diversion structure designed to equalize water surface elevations between the main channel of the Tuolumne River and the tailrace channel to prevent stranding in low-flow conditions. No component of the diversion structure would impede or redirect high flows or flood flows, and diverted waters would flow back into the Tuolumne River below the tailrace channel, as currently occurs. Flows in the Tuolumne River would not be altered by the Proposed Project. Additionally, operation of the Proposed Project would not impede or redirect existing drainage patterns on site. The Proposed Project would not impede or redirect flood flows through alteration of the existing drainage pattern. There would be no impact from implementation of the Proposed Project and no mitigation would be required.

Mitigation Measures: None required.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Impact: Less than significant.

The Proposed Project is not located near an ocean or body of water that would put the Project in tsunami or seiche zones. The Proposed Project work area is located in a flood zone, and there is a risk of the release of pollutants, such as fuel or oil and grease from vehicles, at construction staging and work areas during a flood. However, construction would be temporary, and there would be no change in operations at the facility as a result of Project implementation. Further, with the implementation of measures for materials and equipment storage in the project SWPPP, the risk of a release would be reduced. Therefore, the impacts of the Proposed Project would be less than significant and no mitigation is required.

Mitigation Measures: None required.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Impact: No impact.

The Proposed Project is located in an area regulated by the Basin Plan for the Central Valley Region of California. Construction or operations would not affect beneficial uses of the Tuolumne River and would not otherwise obstruct implementation of the Basin Plan. The Proposed Project is not located within an existing sustainable groundwater management plan. Therefore, the Proposed Project would not obstruct a water quality control plan or sustainable groundwater management plan. As a result, no impacts would occur and no mitigation would be required.

Mitigation Measures: None required.

References

Turlock Irrigation District (TID). 2017. *Draft License Application*.

Central Valley Regional Water Quality Control Board (CVRWQCB). 2018. *Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region Fifth Edition, The Sacramento River Basin and San Joaquin River Basin*.

2.11 Land Use and Planning

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) 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?	☐	☐	☐	☒

Environmental Setting

The Proposed Project is located on the Tuolumne River, approximately 1 mile east of La Grange in Stanislaus County, California. The Proposed Project is located on lands owned entirely by TID and encompasses approximately 53 acres of land. All areas around the powerhouse, including the access road (La Grange Dam Road) and proposed staging footprints, are owned by TID and public access is restricted.

Stanislaus County General Plan and County Zoning Ordinance

Stanislaus County manages land uses in accordance with the 2015 Stanislaus County General Plan, adopted on August 23, 2016 (Stanislaus County 2016a). The plan is a long-term development planning guide that guides the development, conservation, and preservation of areas within the County. The Proposed Project is located on land zoned for Agriculture in the Stanislaus County zoning ordinance (Stanislaus County 2016b).

Impact Analysis

a) Physically divide an established community?

Impact: No impact.

The Proposed Project would be limited to work within the sluice channel, tailrace channel, and existing Project access roads, all occurring on lands owned by TID. The closest established community to the Proposed Project area is approximately 1 mile west. Therefore, the Proposed Project has no potential to divide an established community. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

b) 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?

Impact: No impact.

Construction and operation of the Proposed Project would be consistent with policies established in the Stanislaus County General Plan, as well as the La Grange Community Plan (Stanislaus County 2016a, 2016b). Therefore, the Proposed Project would not conflict with any land use plan, policy, or

regulation adopted for the purpose of avoiding or mitigating an environmental effect. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

References

Stanislaus County. 2016a. “Stanislaus County General Plan.” Stanislaus Board of Supervisors. Last updated 2015. Accessed March 4, 2020. http://www.stancounty.com/planning/pl/gp/current/gp-introduction.pdf.

———. 2016b. “La Grange Community Plan.” Stanislaus County General Plan – Appendix I47. Last updated June 23, 1987. Accessed March 4, 2020. http://www.stancounty.com/planning/pl/documents/gp/i-a-7-la-grange-cp.pdf.

2.12 Mineral Resources

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Environmental Setting

Mineral resources in Stanislaus County include gold, marble and limestone products, and aggregate (that is, sand and gravel), among others. Aggregate mining in Stanislaus County historically occurred within the Tuolumne River active channel, as well as in off-channel sites (TID and MID 2017).

The state legislature adopted the Surface Mining and Reclamation Act in 1975, which designated Mineral Resource Zones (MRZs) for designating areas with varying degrees of mineral potential, as described below (DOC 1993):

- MRZ-1: Areas of no mineral resource significance.
- MRZ-2a: Areas that contain mineral reserves.
- MRZ-2b: Areas where geologic information infers mineral reserves are likely to be present.
- MRZ-3a: Areas with known occurrences of minerals with undetermined resource significance.
- MRZ-3b: Areas where geologic information infers occurrences of minerals with undetermined resource significance.
- MRZ-4: Areas of unknown mineral resource significance.

MRZs are identified in the DOC Division of Mines and Geology's *Mineral Land Classification Report for Stanislaus County*. The report for Stanislaus County shows MRZs 1, 2b, 3a, and 4 for aggregate, industrial minerals located in the vicinity of the Proposed Project (DOC 1993).

Impact Analysis

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Impact: No impact.

Although the Project area is located within a county classified as having inferred and known mineral reserves (MRZs 2b and 3a), the Proposed Project would not result in the loss of availability of these

mineral resources if they were to occur at the site. Further, no active mines are located on or near the site. Project construction would involve the excavation of approximately 428 cubic yards of material to install the diversion pipe and surface the sluice channel. That material would then be backfilled and graded to the original contour of the site. Surfacing of the sluice channel and construction of the diversion structure would occur in areas already used for water conveyance and would not include the removal of any subsurface material. Therefore, there would be no removal of existing mineral resources from the site or loss of existing mines and the Project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

Impact: No impact.

There are no locally important mineral resource recovery sites delineated on a local general plan, specific plan, or other land use plan in the Proposed Project area. Therefore, the Proposed Project would not result in the loss of availability of a locally important mineral resource recovery site delineated on any local land use plans. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

References

California Department of Conservation (DOC). 1993. “Mineral Land Classification of Stanislaus County, California.” Accessed April 16, 2020. https://ia800303.us.archive.org/12/items/minerallandclass173higg_0/minerallandclass173higg_0.pdf.

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2017. *La Grange Hydroelectric Project FERC No. 14581, Final License Application Exhibit E-Environmental Report*. September.

2.13 Noise

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Environmental Setting

The Proposed Project is located in a fairly remote area, approximately 1 mile east of the town of La Grange in Stanislaus County, California, and is surrounded by oak woodlands. The Proposed Project is located on lands owned entirely by TID.

Stanislaus County manages private land uses in accordance with the 2015 Stanislaus County General Plan, adopted on August 23, 2016 (Stanislaus County 2016). Chapter 4 of the Stanislaus County General Plan details the Noise Element, with the stated purpose of limiting the exposure of the community to excessive noise levels (Stanislaus County 2016). The quietest areas of unincorporated Stanislaus County are those which are removed from major transportation-related noise sources and local industrial or other stationary noise sources. According to the Stanislaus County General Plan, the town of La Grange is considered one of these quiet areas. However, since the community is at least 1 mile from the Proposed Project area, distance, topography, and vegetation would substantially reduce the risk of noise exposure from Project activities.

The General Plan also lists noise-sensitive areas to be considered in the Noise Element, including those containing the following noise-sensitive land uses: (1) schools; (2) hospitals; (3) convalescent homes; (4) churches; (5) sensitive wildlife habitat, including the habitat of rare, threatened, or endangered species; and (6) other uses deemed noise sensitive by the local jurisdiction. Of these noise-sensitive areas considered, only one has the potential to apply to the Proposed Project: sensitive wildlife habitat, including the habitat of rare, threatened, or endangered species. Nesting birds and roosting bats are most likely to be affected by excessive noise as a result of the Proposed Project; however, impacts are expected to be less than significant with the implementation of proper mitigation. Section 2.4, *Biological Resources*, contains further information on these resources. Additionally, there are existing sources of noise in the Project area, including environmental factors

(that is, wind and water) and existing electrical and hydroelectric facility operations. Sensitive receptors in the Project area would include Project workers.

Impact Analysis

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Impact: Less than significant impact.

The Project would generate temporary noise from construction activities and transport of construction equipment to the Proposed Project area. For noise sources such as construction activity and vehicle traffic, a conservative estimate based on generally accepted methods of analysis is that the region of influence is typically less than 0.5 mile from the noise source; the closest community is approximately 1 mile from the Proposed Project area. No permanent change to ambient noise levels would occur as a result of Project implementation.

Construction noise, although temporary, can potentially affect nearby sensitive receptors. Received noise levels would fluctuate depending on the construction activity, equipment type, and distance between noise source and receiver. Noise from construction equipment would vary depending on the construction phase and the number and type of equipment at a location at any given time. Increases in noise during construction would be temporary and limited to daylight hours, with the exception of a pump system that would be required 24 hours per day for dewatering of the sluice channel and tailrace channel. However, given the remote nature of the Proposed Project area, sensitive receptors outside of the Proposed Project are unlikely to be effected. Sensitive wildlife species deemed to be potentially present could be temporarily affected by construction noise; mainly nesting birds and roosting bats. The potential for impacts on sensitive wildlife species and their associated habitat occurring in or with the potential to occur in the Proposed Project area is evaluated in Section 2.4, *Biological Resources*. The use of equipment to construct the Proposed Project is not expected to be audible at off-site locations. Therefore, the Project would not generate a substantial 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. As such, the impact would be less than significant and no mitigation is required.

Mitigation Measures: None required

b) Generation of excessive groundborne vibration or groundborne noise levels?

Impact: Less than significant impact.

Groundborne vibrations generally attenuate rapidly with increasing distance from the vibration source. The distances involved depend primarily on the intensity of the vibrations generated by the source, and partly on soil and geologic conditions. Detectable vibrations will travel the greatest distance through solid rock and the least distance through loose, unconsolidated soils or saturated soils, and would not likely carry to upland areas on the opposite bank of the river. For vibration sources such as construction activity and vehicle traffic, a conservative estimate based on generally accepted methods of analysis is that the region of influence is typically less than 1,000 feet from the vibration source.

The Project involves modifying the sluice channel and the tailrace channel in an effort to reduce isolated pooling and potential for fish stranding during periodic dewatering and inspection of the diversion tunnel and forebay for safety purposes. Primary construction activities would include the

possible installation of sheet piles using a vibratory or impact hammer from a barge, dewatering of the temporary workspace via pump, installation of a cofferdam, placement of heavy equipment within the Proposed Project area, and placing gunite along the existing sluice channel. These activities would generate temporary groundborne noise and/or vibration levels, but they would be temporary in nature.

Given the remote nature of the Proposed Project area, the closest sensitive receptor is located approximately 1 mile away, which is beyond the region of influence for vibratory or groundborne noise impacts from the Proposed Project. Sensitive wildlife habitat or species deemed to be potentially present may be temporarily affected by construction vibration or groundborne noise. An assessment of the potential for impacts from groundborne vibration or noise on sensitive wildlife species and their associated habitat occurring in or with the potential to occur in the Proposed Project area is included in Section 2.4, *Biological Resources*.

Further, short-term impacts of groundborne noise or vibration generated would be minimized to the greatest extent possible and would be temporary in nature. There would be no change during operations or maintenance of the facilities. Therefore, the Project would not generate a substantial temporary or permanent generation of excessive groundborne vibration or groundborne noise levels during long-term operations in the vicinity of the Project. As such, the impact would be less than significant and no mitigation is required.

Mitigation Measures: None required.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Impact: No impact.

No airports or private air strips are located within 2 miles of the Proposed Project. Therefore, the Proposed Project would not expose workers, local residents, or recreationists to new sources of noise or excessive noise levels resulting from aircraft noise. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

References

Stanislaus County. 2016. “Stanislaus County General Plan.” Stanislaus Board of Supervisors. Last updated 2015. Accessed March 4, 2020. http://www.stancounty.com/planning/pl/gp/current/gp-introduction.pdf.

2.14 Population and Housing

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Environmental Setting

As a result of environmental conditions (for example, topography, inaccessibility), zoning, and land ownership constraints associated with Stanislaus County, there are very few communities and residences. The Proposed Project area is remote, and the surrounding area is sparsely populated, with the nearest residential home roughly 1 mile away. The closest community to the Proposed Project area is the town of La Grange, also approximately 1 mile away. The population of La Grange, according to the 2010 Census, is 2,460. North of the Proposed Project area, density increases as one approaches Don Pedro Reservoir, with multiple unincorporated towns including Barrett, Hayward, and Granite Springs.

Impact Analysis

a) Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?

Impact: No impact.

The Proposed Project consists of improvements to the sluice channel and installation of a diversion structure. Upon completion of construction activities, operations of the existing Project facilities would return to current conditions. In addition, the Proposed Project would not create any new homes or businesses, or expand existing roads or other infrastructure that could induce unplanned population growth. The Proposed Project would have no impact, either directly or indirectly, on unplanned population growth in the area. Therefore, no impact would occur and no mitigation is required.

Mitigation Measures: None required

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

Impact: No impact.

The Proposed Project would not permanently displace existing residents or require the relocation of existing housing. The Proposed Project area is owned by TID, and occurs approximately 1 mile from the nearest residential property. There would be no impact corresponding to displacement of people or housing, or the necessity for construction of replacement housing as a result of the Proposed Project. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required

2.15 Public Services

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, 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 public services:				
i. Fire Protection?	☐	☐	☐	☒
ii. Police Protection?	☐	☐	☐	☒
iii. Schools?	☐	☐	☐	☒
iv. Parks?	☐	☐	☐	☒
v. Other public facilities?	☐	☐	☐	☒

Environmental Setting

The Stanislaus County Sheriff's office provides law enforcement services related to natural and cultural protection to the Proposed Project area. The California Highway Patrol also provides law enforcement on unincorporated public roads in the area. CAL FIRE is responsible for wildland fire protection and suppression on lands in the Proposed Project area and under their respective jurisdictions. The nearest fire station to the Proposed Project area is Station 35 of the Stanislaus Consolidated Fire Protection District located at 39198 Main Street, La Grange, California. The Fire District has areas of state responsibility and works closely with CAL FIRE. The nearest CAL FIRE station to the Proposed Project area is the CAL FIRE Blanchard Station, located at the intersection of California State Route 132 and Bonds Flat Road near the southern arm of Don Pedro Reservoir. Additionally, emergency procedures and protocols exist under TID's current license, including the TID *Wildfire Mitigation Plan* (TID 2020), and would remain in place under the Proposed Project.

The nearest park to the Proposed Project area is La Grange Regional Park, located in the town of La Grange, roughly 1 mile southwest of the Proposed Project. Additionally, Fleming Meadows Campground is located approximately 3 miles north of the Proposed Project area on the southern edge of Don Pedro Reservoir. No public parks exist in the immediate vicinity or within the Proposed Project areas. All areas around the powerhouse, including the access road (La Grange Dam Road) and proposed staging footprints are owned by TID and public access is restricted.

Impact Analysis

a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, 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 public services:

a-i) Fire Protection?

Impact: No impact.

The County requires Public Facilities Fees, as well as Fire Facility Fees on behalf of the appropriate fire district, to address impacts on public services. However, no new buildings are proposed as part of this Project. The number of workers on site during construction would not exceed 15 and the contractor would have fire protection measures on site. Additionally, Project work would be temporary and limited in nature. Therefore, the Proposed Project would have no impact on service ratios or response times for fire protection in the area and no mitigation is required.

Mitigation Measures: None required.

a-ii) Police Protection?

Impact: No impact.

No new buildings or facilities would be created as a result of the Proposed Project. The number of workers on site during construction would not exceed 15, leaving no need for increased response times or increased need for police protection. Additionally, Project work would be temporary and limited in nature. Therefore, the Proposed Project would have no impact on service ratios or response times for police protection in the area and no mitigation is required.

Mitigation Measures: None required.

a-iii) Schools?

Impact: No impact.

There are no schools in the Proposed Project area and the nearest school (La Grange Elementary) is roughly 1 mile away. Furthermore, no new housing would be created as a result of the Proposed Project. Therefore, the Proposed Project would have no impact on schools in the area and no mitigation is required.

Mitigation Measures: None required.

a-iv) Parks?

Impact: No impact.

There are no parks in the Proposed Project area, and no parks in adjacent communities would be affected by the Proposed Project. The Proposed Project would also not generate an increase in population that would affect parks. Therefore, the Proposed Project would have no impact on service ratios for parks in the area and no mitigation is required.

Mitigation Measures: None required.

a-v) Other public facilities?

Impact: No impact.

No other public facilities would be affected by the Proposed Project because the Project would not construct housing or create general increases in population or service requirements. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required

References

Turlock Irrigation District (TID). 2020. *Wildfire Mitigation Plan*.

2.16 Recreation

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Environmental Setting

The Proposed Project involves upgrades to existing facilities including the sluice channel, tailrace channel, and a Project access road. The Proposed Project area does not include any existing recreational facilities, and the Project does not include construction of new recreational sites. No external existing recreational sites would be affected by proposed construction activities or operation of the Proposed Project. Figure 3 in Section 1.3, *Project Description*, depicts the location of the proposed work along with affected facilities.

Impact Analysis

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Impact: No impact.

The Proposed Project would not create any new housing or public facilities that would draw visitors to the area. Therefore, the Proposed Project would have no impact on use of neighborhood or regional parks and no mitigation is required.

Mitigation Measures: None required

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

Impact: No impact.

The Proposed Project would not create any new or expand existing recreational facilities. Therefore, the Proposed Project would have no impact on the environment attributable to construction or expansion of recreational facilities and no mitigation is required.

Mitigation Measures: None required

2.17 Transportation

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b) Conflict with or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

Environmental Setting

The Circulation Element of the Stanislaus County General Plan uses level of service (LOS) and vehicle miles traveled to evaluate the circulation of the traffic system. California State Route 132/ Yosemite Boulevard would be used for access to privately owned sites and is considered a Principal Arterial (rural and urban) roadway. Principal Arterial roadways have the highest LOS thresholds, ranging from 3,750 to 15,000 vehicles per day per lane for LOS ranging from A through E (Stanislaus County 2016).

The total number of vehicle trips was estimated throughout construction, as shown in Table 13.

Table 13. Total estimated vehicle trips throughout construction

Vehicle	Quantity of vehicles	Estimated trips per day	Total trips (including mobilization and demobilization)
Excavator	2	0	4
Bulldozer	2	0	4
Dump truck	1	As needed	48
Concrete delivery truck	1	As needed	5
Gunite delivery truck	1	As needed	190
Slurry delivery truck	1	As needed	20
Gunite machine with hopper	1	0	2
Work truck with compressor	1	0	2
Pump	1	0	2
Pump	1	0	2
Pump	2	0	2
Personnel vehicles	6	12	540
		Total vehicle trips	**821**

Impact Analysis

a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Impact: No impact.

The Proposed Project is located in a remote area of Stanislaus County that does not have transit, bicycle, or pedestrian facilities. La Grange Dam Road up to California State Route 132/Yosemite Boulevard is used for site access and is owned by TID and is restricted from public access. There would be 14 vehicles on site for 9 weeks. The total estimated vehicle trips over the 9-week construction period would be 821, which is just a fraction of the lower limit of LOS thresholds for Principal Arterial roadways in Stanislaus County. Additionally, construction traffic would be short-term and temporary. The Proposed Project would not increase the numbers of motorists on the road after the conclusion of construction. Therefore, the Proposed Project would have no impacts on the circulation system and no mitigation is required.

Mitigation Measures: None required.

b) Conflict with or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Impact: Less than significant impact.

The Proposed Project would not cause a long-term increase in the amount of vehicle miles traveled. Implementation of the Proposed Project would cause a minor short-term increase in the amount of vehicle miles traveled attributable to labor and material deliveries during construction, which is estimated to last up to 9 weeks. Therefore, the Proposed Project would not conflict with or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b), which sets the criteria for

assessing transportation impacts, and the Proposed Project would have a less-than-significant impact.

Mitigation Measures: None required.

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Impact: No impact.

The Proposed Project would not change geometric design features or require incompatible uses. The temporary construction work would be accessed using existing rural roadways for site access. Therefore, the Proposed Project would not substantially increase public hazards attributable to a change in a geometric design feature or incompatible uses. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

d) Result in inadequate emergency access?

Impact: No impact.

The Proposed Project and temporary construction would not change access routes to or within the Proposed Project area or result in inadequate emergency access. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

References

Stanislaus County. 2016. “Stanislaus County General Plan Chapter II Circulation Element.” Accessed March 13, 2020. http://www.stancounty.com/planning/pl/gp/current/gp-chapter2.pdf.

2.18 Tribal Cultural Resources

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project cause a substantial adverse change in the significance of a tribal cultural resource defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	☐	☒	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☐	☒	☐	☐

Environmental Setting

Regulatory Context

As defined in PRC 21074, a TCR is a site, feature, place, cultural landscape, sacred place, or object that is of cultural value to a California Native American tribe, and is either (1) on or eligible for the CRHR or a local historic register, or (2) the lead agency, at its discretion, chooses to treat the resource as a TCR. CEQA mandates that public agencies determine whether a project will have a significant impact on TCRs that are listed on or eligible for listing on the CRHR (that is, a historical resource) or determined to be significant by the lead agency and to appropriately mitigate any such impacts.

In accordance with CEQA guidelines, cultural resources investigations are necessary to identify TCRs that may have significant impacts as a result of a project [14 CCR Part 15064.5(c). The following steps are routinely implemented in a cultural resources investigation for CEQA compliance:

1. Identify cultural resources in the proposed project area;
2. Evaluate against the CEQA criteria of significance as listed below;
3. Evaluate the impacts of the proposed project on all resources; and
4. Develop and implement measures to mitigate proposed project impacts on historical resources or resources deemed significant by the lead agency.

Additionally, the lead state or local agency (in this case, TID) for CEQA is responsible for consultation under PRC 21080.3.1 regarding the potential for a project to affect TCRs. As described above, a TCR necessarily has value to a California Native American tribe and, therefore,

consultation with local Native American tribes to determine what tribal cultural resources may have value to them is a necessary component of TCR identification efforts. This recognizes that "tribes may have expertise with regard to their tribal history and practices, which concern the tribal cultural resources with which they are traditionally and culturally affiliated" (California State Assembly Bill 52, Gatto 2014). Consultation efforts with California Native American tribes, pursuant to TCR identification efforts, are described below.

As described above in Section 2.5, *Cultural Resources*, a proposed project may induce a significant impact on a historical resource, unique archaeological resource, or a TCR if it causes a substantial adverse change (that is, physical demolition, destruction, relocation, or alteration) to the resource or immediate surroundings [14 CCR 15064.5(b)], thereby demolishing or significantly altering the physical characteristics that qualify it for listing on the CRHR or local registers [PRC 5020.01(k) and 5024.1(g)]. As such, consultation for the Proposed Project has been conducted for all cultural resources investigation efforts for the Proposed Project and is further detailed below.

Under the CEQA Guidelines, even if a resource is not included on any local, state, or federal register, or identified in a qualifying historical resources survey, a lead agency may still determine that any resource is a historical resource for the purposes of CEQA if there is substantial evidence supporting such a determination [CEQA Guidelines Section 15064.5(a)]. A lead agency must consider a resource to be historically significant if it finds that the resource meets the criteria for listing in the CRHR. A resource may be eligible for inclusion in the CRHR if it:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (Criterion 1);
- Is associated with the lives of persons important in our past (Criterion 2);
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values (Criterion 3); or
- Has yielded, or may be likely to yield, information important in prehistory or history (Criterion 4).

According to CEQA, a project may have a significant impact on the environment if it could cause a substantial adverse change in the significance of a TCR (PRC 21084.2). Consultation with California Native American tribes would need to take place to determine whether the significance of a TCR is subject to a substantial adverse change as the result of a project.

Methodology and Consultation

Pursuant to PRC 21080.3.1, consultation efforts with Native American tribal contacts have been incorporated in the cultural resources investigation of the Proposed Project area. In support of consultation under PRC 21080.3.1(c), on behalf of TID, HDR contacted the NAHC on March 10, 2020, to request a list of California Native American tribes and organizations that may have an interest in the Proposed Project, as well as to request a search of the Sacred Lands File that the NAHC maintains. The NAHC responded to HDR on March 19, 2020, providing a list of tribes that have cultural and traditional affiliation to the Proposed Project area. The NAHC also reported that their search of the Sacred Lands File did not identify any sacred lands in or around the Proposed Project area; however, the NAHC also informed HDR that the area is sensitive for cultural resources. It has also been made clear by Native American tribal contacts that the general vicinity of the Proposed Project, along with the Proposed Project area itself, have been used and occupied by Native Americans over a long period and the area is important to Native American groups today.

HDR also reviewed the list of Native American tribes consulted during recent (2017 to 2019) efforts to license the La Grange Hydroelectric Project with FERC, as these efforts focused on lands within and around the Proposed Project area. The tribes, tribal chairpersons, and designated tribal representatives presently included in the list of contacts for consultation efforts for this cultural resources investigation are provided in Table 14. These contacts include those tribes and individuals included on the NAHC list, as well as those consulted during recent FERC licensing efforts. According to PRC 21080.3.1(b), lead agencies shall send notifications of proposed projects to California Native American tribes that have requested in writing to be informed of proposed projects for consultation. To date, no tribes have requested consultation with TID on proposed projects under the PRC; however, the Torres Martinez Desert Cahuilla Indians sent a letter to the Don Pedro Recreation Agency requesting such consultation in 2016. Don Pedro Recreation Agency is a department within TID, and so the Torres Martinez Desert Cahuilla Indians are included in the consultation contact list.

Table 14. Tribal contacts for consultation regarding the Proposed Project

California Native American tribe	Tribal contact(s)
Calaveras Band of Mi-Wuk Indians	Gloria Grimes, Chairperson
California Valley Miwok Tribe	Silvia Burley, Chairperson
California Valley Miwok Tribe, aka Sheep Rancheria of Me-Wuk Indians of California	Chadd Everone, Administrator
Central Sierra Me-Wuk Cultural & Historic	Reba Fuller, Spokesperson
Chicken Ranch Rancheria of Me-Wuk Indians	Melissa Powell, Chairperson Monica Fox, Tribal Administrator
North Fork Rancheria of Mono Indians of California	Elaine Bethel-Fink, Chairperson
North Valley Yokuts Tribe	Katherine Erolinda Perez, Chairperson
Picayune Rancheria of the Chukchansi Indians	Claudia Gonzales, Chairperson Heather Airey, Cultural Resources Director
Southern Sierra Miwuk Nation	William Leonard, Chairperson Jay Johnson, Spiritual Leader Les James, Spiritual Leader Richard Leard, Representative
Torres Martinez Desert Cahuilla Indians	Michael Mirelez, Cultural Resources Coordinator
Tule River Indian Tribe	Neil Peyron, Chairperson
Tuolumne Band of Me-Wuk Indians	Kevin Day, Chairperson Stanley Rob Cox, Cultural Resources Reba Fuller, Spokesperson
Washoe Tribe of Nevada and California	Darrel Cruz, Tribal Historic Preservation Officer

Formal notification and initiating consultation

Consultation to date for the Proposed Project area has included sending formal notification letters via email, followed by phone calls, which included an invitation to consult on the Proposed Project. The letters included a brief Project description and maps of the Proposed Project vicinity and facilities. These letters were emailed and phone calls were placed on June 5, 2020 to the tribal contacts listed above in Table 14 . Darrel Cruz of the Washoe Tribe of Nevada and California

responded to the email notification on June 5, 2020 indicating that the Tribe will not be participating in the Proposed Project. Michael Mirelez of the Torres Martinez Desert Cahuilla Indians indicated on the phone on June 5, 2020 that the Proposed Project is outside of their territorial area and they will not be participating in the Proposed Project. Monica Fox of Chicken Ranch Rancheria of Me-Wuk indicated on June 5, 2020 that the Tribe will not be participating in the Proposed Project. Reba Fuller of the Tuolumne Band of Me-Wuk Indians responded via email on June 17, 2020 advising that they will be participating in the Proposed Project. Additional phone calls were made on July 7, 2020 to contacts that had not yet responded. Heather Airey of the Picayune Rancheria of Chukchansi Indians responded via email on July 7, 2020 advising that they will not be participating in the Proposed Project. Should any additional responses be received, they will be incorporated into this section.

Impact Analysis

a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

Impact: Potentially significant unless mitigation incorporated.

The cultural resources investigation, including consultation to date, has not identified any resources of cultural value to a California Native American tribe within the Proposed Project area that have been listed or are eligible for listing on the CRHR; therefore, there are no TCRs. However, the remote possibility for encountering previously unidentified TCRs during implementation of the Proposed Project does exist. In the case of inadvertent discoveries of cultural resources, including potential TCRs, MM CULT-01 and MM CULT-02 (see Section 2.5, *Cultural Resources*) would be implemented, therefore reducing the impact to a less-than-significant level.

b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Impact: Potentially significant unless mitigation incorporated.

The cultural resources investigation, including consultation to date, has not identified any resources of cultural value to a California Native American tribe within the Proposed Project area that have been listed or determined eligible for listing on the CRHR by the lead agency; therefore, there are no TCRs. However, the remote possibility for encountering previously unidentified TCRs during implementation of the Proposed Project does exist. In the case of inadvertent discoveries of cultural resources, including potential TCRs, MM CULT-01 and MM CULT-02 (see Section 2.5, *Cultural Resources*) would be implemented, therefore reducing the impact to a less-than-significant level.

2.19 Utilities and Service Systems

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

Environmental Setting

The Proposed Project area is served by the public service and utility providers within Stanislaus County. Three primary utility companies serve Stanislaus County: Pacific Gas and Electric Company, MID, and TID. The Proposed Project is located on lands owned entirely by TID and encompasses approximately 53 acres of land used for hydropower production. Additionally, the Project area includes the La Grange Powerhouse and sluice channel, owned and operated by TID, which provides electric power generation to customers.

Impact Analysis

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Impact: No impact.

The Proposed Project would not have an impact on existing utilities because no new buildings or housing would be constructed that would cause a change in occupancy. The Proposed Project

would not include improvements that would require the addition of water and waste facilities. Additionally, the Proposed Project would not require the relocation or construction of any new or existing other water, wastewater treatment or stormwater, electric power, natural gas, or telecommunication facilities.

The La Grange Dam has a 4.7-megawatt generation capacity and an average generation of approximately 17,800 kilowatt hours per year. No change in total energy production is expected nor would this change negatively affect end users. This change would not require that new energy generation facilities be constructed at other locations. Therefore, implementation of the Proposed Project would have no impact on the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Impact: No impact.

The Project would not use any municipal water sources. Water used in construction or operations would be trucked in from off site or extracted from the Tuolumne River under existing water rights. The quantity of water needed for the construction would not be enough to significantly reduce the amount available within the river. Additionally, no new wells would be developed as a result of the Proposed Project.

Current and new operations would not alter the current need for water supply at Project facilities from existing conditions, including in normal, dry, or multiple dry years. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Impact: No impact.

The Proposed Project would not contribute wastewater to any external treatment providers. Sanitary waste disposal needs for Proposed Project activities would be served by temporary portable toilets, which would be periodically pumped, with the sewage transported to an appropriate facility for disposal. These would be temporary in nature and removed after Project completion. Therefore, the Project would have no impact on the wastewater treatment facility's capacity to serve the Project or existing commitments, and no mitigation is required.

Mitigation Measures: None required.

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Impact: No impact.

The Proposed Project would generate materials during construction that would require disposal. During Proposed Project activities, usable excess construction materials such as lumber, tarp, cofferdam materials, barrier fencing, etc. would be supplied by the contractor and then removed upon completion of construction. Construction debris and material requiring disposal in a landfill would be hauled off site to a suitable facility. Solid waste would be transported off site by the contractor for disposal at a landfill where capacity exists to serve the Proposed Project's construction waste. Operation of the Proposed Project would not generate a need for solid waste collection services. All proposed construction activities would comply with applicable solid waste disposal laws and policies and TID would recycle waste when possible. Any hazardous waste generated by Proposed Project activities would be properly disposed of at a facility that can accept the waste, as stated in Section 2.9, *Hazards and Hazardous Materials*. Therefore, the Project would not generate solid waste in excess of state and local standards, or in excess of the capacity of local landfills, or otherwise impair the attainment of solid waste reduction goals. Therefore, the Proposed Project would have no impact on compliance with solid waste regulations and no mitigation is required.

Mitigation Measures: None required.

2.20 Wildfire

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

Environmental Setting

The Proposed Project area is located in a State Responsibility Area with a moderate Fire Hazard Severity Zone (CAL FIRE 2007). Wildfire protection services for the Proposed Project area are provided by CAL FIRE and Stanislaus County. TID also has a *Wildfire Mitigation Plan* that was developed in 2020 to implement wildfire protection measures in TID projects (TID 2020).

Under the direction of the Stanislaus County Fire Warden, the Fire Prevention Bureau provides fire protection services for the unincorporated areas of Stanislaus County according to the Stanislaus County Office of Emergency Services/Fire Warden's *2016 Strategic Plan* (Strategic Plan) (Stanislaus County Fire Warden 2016). The Strategic Plan identifies core functions, programs, objectives, performance measures, lead personnel, and funding sources for fire protection in Stanislaus County.

Impact Analysis

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

Impact: Less than significant impact.

On a temporary basis, construction associated with the Proposed Project could result in temporary and minor impacts to local traffic during the 9-week construction period. However, emergency access routes would be maintained during construction to ensure emergency vehicles can travel to

work areas when needed. Therefore, during construction, the Proposed Project would not interfere with emergency evacuation plans or impair implementation of the Strategic Plan.

On a long-term basis, operation and maintenance of the Proposed Project would have no impact on traffic in the Project area, and the Proposed Project would not involve construction of any facilities that could affect existing evacuation and emergency service routes. Therefore, during long-term operations, the Proposed Project would not interfere with emergency response or evacuation plans.

Therefore, because construction traffic would be short-term and temporary and Project construction would not alter emergency services, implementation of the Proposed Project would not substantially impair an adopted emergency response plan or emergency evacuation plan. As a result, impacts from the Proposed Project would be less than significant.

Mitigation Measures: None required.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Impact: Less than significant impact.

The Proposed Project area contains natural areas of steep-sloped vegetation that are subject to periodic wildfire. Further, construction of the Proposed Project would involve use of motorized vehicles, and it has been determined that equipment use is one of the top causes of fire in California (CAL FIRE 2019). Project construction workers would temporarily occupy the Project area during work hours for the 9-week duration of the construction work. Therefore, the Proposed Project would have the potential to exacerbate fire risk and could expose workers to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire during construction. However, the TID *Wildfire Mitigation Plan* (TID 2020) would be implemented to reduce the risk of wildfires and the uncontrolled spread of wildfires to workers. In the long term, Proposed Project activities would not exacerbate the physical conditions beyond current existing conditions.

Therefore, the Proposed Project would have a less-than-significant impact related to exacerbation of wildfire risks or the exposure of Project occupants to increased pollutant concentrations of uncontrolled wildfire. As a result, no mitigation would be required.

Mitigation Measures: None required.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Impact: No impact.

The Proposed Project would involve surfacing of the sluice channel and installation of a diversion structure. Installation or maintenance of this infrastructure would not affect the environment in a way that would exacerbate fire risks beyond that of existing conditions. Therefore, the Proposed Project would have no impact attributable to the installation or maintenance of associated infrastructure that could exacerbate fire risk or that may result in temporary or ongoing impacts on the environment. As a result, no impact would occur and no mitigation would be required.

Mitigation Measures: None required.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Impact: No impact.

While surfacing of the sluice channel would cause a small increase in the amount of impervious surfaces in the Project area, the sluice channel would be located in a rocky area that is already used as a sluice channel. In addition, the small increase in the amount of impervious surface in the Project area would not alter current surface drainage and would not create new flood or landslide risks. Therefore, the Proposed Project would not result in the significant risks from creation of new flooding or landslide risks.

The Proposed Project would not place people or structures in areas with risk of post-fire downslope or downstream flooding or landslides because the sluice channel and diversion structure are situated on rocky outcrops and are designed to handle water flows. Therefore, the Proposed Project would not result in an impact related to the exposure of people or structures to post-fire flooding or landslide risk.

Therefore, the Proposed Project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. As a result, no impact would occur and no mitigation is required.

Mitigation Measures: None required.

References

California Department of Forestry and Fire Protection (CAL FIRE). 2007. “Fire Hazard Severity Zones Maps.” Accessed March 26, 2020. https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/.

———. 2019. “2017 Wildfire Activity Statistics.” Accessed March 26, 2019. https://www.fire.ca.gov/media/10059/2017_redbook_final.pdf.

Turlock Irrigation District (TID). 2020. *Wildfire Mitigation Plan*.

Stanislaus County Office of Emergency Services/Fire Warden (Stanislaus County Fire Warden). 2016. “2016 Strategic Plan.” Accessed May 26, 2020. http://www.stanoes.com/pdf/strategic-plan.pdf.

2.21 Mandatory Findings of Significance

Environmental Issue Area:	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

Impact Analysis

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Impact: Less than significant impact.

The Proposed Project involves surfacing of the sluice channel and installation of a diversion structure connecting the tailrace channel to the main channel of the Tuolumne River and the La Grange Dam in Stanislaus County. The Project Description includes measures that would be implemented with the Proposed Project that would reduce impacts to the environment and resources. In addition, where necessary, mitigation measures are proposed to offset the remaining potential for impacts. Mitigation measures include: MM CULT-01 Inadvertent Discovery of Historical and Archaeological Resources, MM CULT-02 Inadvertent Discovery of Human Remains, MM BIO-1 Minimize Footprint, MM BIO-2 Biological Monitoring and Worker Environmental Awareness Training, MM BIO-3 Restoration of Temporarily Disturbed Areas, MM BIO-4 In-water Work Window,

MM BIO-5 Dewatering, MM BIO-6 Fish Relocation Plan, MM BIO-7 Construction Hours, MM BIO-8 In-water Work Best Management Practices (BMPs), MM BIO-9: Water Management, MM BIO-10: Migratory Bird and Raptor Surveys, MM BIO-11 Nest Avoidance, and MM BIO-12 No Net Loss of Sensitive Communities and Aquatic Resources.

Given the limited footprint of disturbance and incorporation of environmental protection measures and mitigation measures to reduce the potential for adverse impacts, impacts from the Proposed Project are not expected to substantially degrade the quality of the environment, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory. As a result, this impact would be less than significant and no mitigation is required.

Mitigation Measures: None required.

b) Does the project have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Impact: Less than significant impact.

The Proposed Project is part of operations at the La Grange Dam, which is part of the La Grange Hydroelectric Project (FERC No. 14581). Construction impacts from the Proposed Project and other future projects related to the La Grange Hydroelectric Project would be short-term and temporary and would be generally consistent with existing operations of the La Grange Hydroelectric Project. Therefore, impacts of the Proposed Project would be less than significant because they are individually limited and would not be cumulatively considerable when viewed in connection with other past, present, or probable future projects. As a result, no mitigation is required.

Mitigation Measures: None required.

c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?

Impact: No impact.

The Proposed Project involves surfacing of the sluice channel and installation of a diversion structure at the La Grange Dam. This Project would ultimately improve operations at the La Grange Dam facilities. Construction of these facilities would not directly or indirectly cause an adverse impact on human beings. Therefore, the Proposed Project would have no adverse effects on human beings, either directly or indirectly.

Mitigation Measures: None required.

This page is intentionally blank.

Appendix A. Plan Set

This page is intentionally blank.

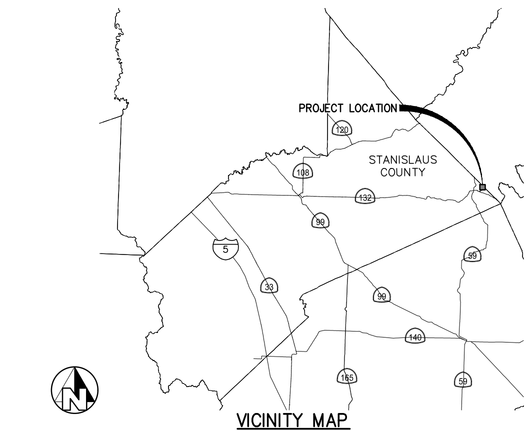
Know what's **below.**
Call before you dig.

WARNING
POWER LINES OVERHEAD

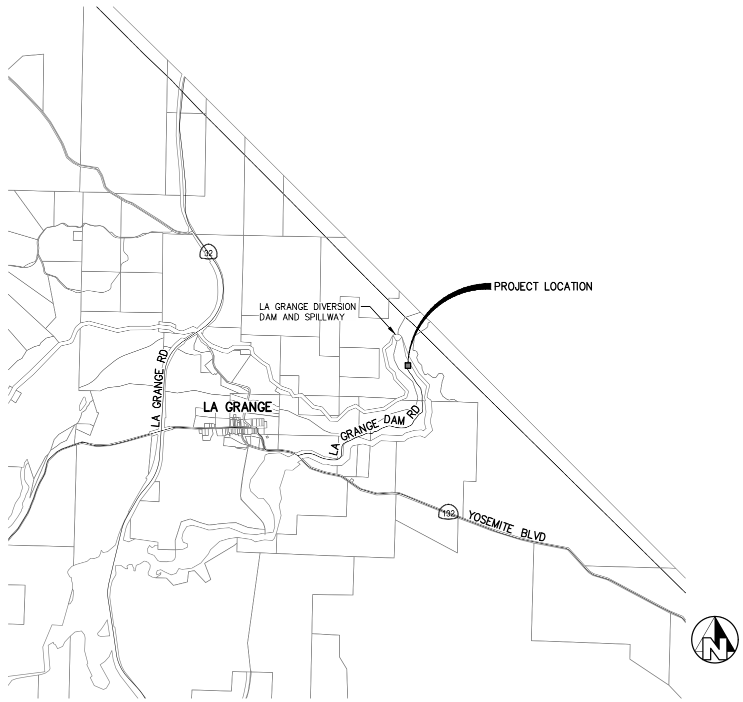
TURLOCK IRRIGATION DISTRICT

STANISLAUS COUNTY

LA GRANGE FOREBAY DEWATERING



VICINITY MAP
NOT TO SCALE



SITE MAP
NOT TO SCALE

GENERAL NOTES

1. TURLOCK IRRIGATION DISTRICT (TID) (209-883-8222) SHALL BE CONTACTED AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK ON OR NEAR EXISTING DISTRICT FACILITIES.
2. USED MATERIAL, REJECTS, MISFITS, OR SECONDS, ETC. ARE NOT ACCEPTABLE FOR USE ON TID FACILITIES.
3. ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THESE PLANS, PROJECT SPECIFICATIONS AND TID SPECIFICATIONS.
4. CONTRACTOR SHALL FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING FACILITIES PRIOR TO COMMENCING WORK. CALL UNDERGROUND SERVICE ALERT (USA) AT 8-1-1. CONTRACTOR SHALL MAKE ENGINEER AWARE OF ANY DISCREPANCIES.
5. ALL CAST-IN-PLACE CONCRETE STRUCTURES SHALL BE FORMED INSIDE AND OUT AND CONCRETE VIBRATED SUFFICIENTLY TO PROVIDE FOR SMOOTH SURFACED WALLS/FLOORS WITHOUT VOIDS AND HONEYCOMBS.
6. TID SHALL INSPECT ALL WORK PHASES ON CONCRETE FACILITIES FOR CONFORMANCE TO TID SPECIFICATIONS. REINFORCING SHALL NOT BE ENCASED IN CONCRETE WITHOUT PRIOR TID INSPECTIONS. LIKEWISE, CONCRETE SHALL NOT BE COVERED WITH EARTH PRIOR TO TID INSPECTION.
7. CONCRETE DESIGN MIX SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. ALL CONCRETE SHALL HAVE A 28-DAY MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI UNLESS OTHERWISE SPECIFIED.
8. ALL STEEL APPURTENANCES AND FITTINGS SHALL BE FURNISHED WITH A SHOP APPLIED HIGH SOLIDS EPOXY COATING ON THE INTERIOR AND EXTERIOR, UNLESS OTHERWISE INDICATED. ALL OTHER EXPOSED STEEL SHALL BE PAINTED WITH A PRE-TREATMENT PRIMER, AN UNDERCOAT AND A FINAL COAT OF PAINT IN ACCORDANCE WITH TID SPECIFICATIONS.
9. ALL NUTS, BOLTS, AND WASHERS USED TO SECURE UNDERGROUND FITTINGS SHALL BE STAINLESS STEEL. AFTER INSTALLATION, ALL STEEL HARDWARE SHALL BE COATED WITH A RUST PREVENTATIVE, WRAPPED WITH 4 MIL POLYETHYLENE SHEETING, AND SECURE WITH PVC TAPE.
10. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE HEALTH AND SAFETY LAWS OF THE STATE OF CALIFORNIA AND CAL/OSHA STANDARDS.
11. TRENCH BACKFILL AND EMBANKMENTS SHALL BE COMPACTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. THE CONTRACTOR SHALL RETURN DISTURBED EARTHWORK AREAS TO ITS ORIGINAL EXISTING CONDITION.
12. CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OF ALL PIPELINE CRACKS, WHICH DEVELOP DURING CONSTRUCTION OF IMPROVEMENTS AFFECTING EXISTING FACILITIES.
13. CONCRETE VAULTS AND BOXES MAY BE PURCHASED FROM A PRECAST MANUFACTURER OR CONTRACTOR MAY CONSTRUCT THE STRUCTURES IF STRUCTURAL CALCULATIONS AND DESIGN IS APPROVED BY TID AND THE ENGINEER.
16. ALL EXCESS MATERIAL AND/OR DEBRIS SHALL BE REMOVED UPON COMPLETION OF INSTALLATION.
17. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE DUST CONTROL AT ALL TIMES.

SPECIAL NOTE

WHERE UNDERGROUND AND SURFACE STRUCTURES ARE SHOWN ON THE PLANS, THE LOCATIONS, DEPTH AND DIMENSIONS OF STRUCTURES ARE BELIEVED TO BE REASONABLY CORRECT, BUT ARE NOT GUARANTEED. SUCH STRUCTURES ARE SHOWN FOR THE INFORMATION OF THE CONTRACTOR, BUT INFORMATION SO GIVEN IS NOT TO BE CONSTRUED AS A REPRESENTATION THAT SUCH STRUCTURES WILL, IN ALL CASES, BE FOUND WHERE SHOWN, OR THAT THEY REPRESENT ALL OF THE STRUCTURES WHICH MAY BE ENCOUNTERED.

SITE SAFETY AND PROTECTION NOTES

THE DUTY OF THE ENGINEER, OWNER OR ITS AGENTS TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE AND THE UNDERTAKING OF INSPECTIONS OR THE GIVING OF INSTRUCTIONS AS AUTHORIZED HEREIN IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF THE ACTUAL CONSTRUCTION NOR MAKE THE ENGINEER, OWNER OR ITS AGENTS RESPONSIBLE FOR PROVIDING A SAFE PLACE FOR THE PERFORMANCE OF WORK BY THE CONTRACTOR, SUBCONTRACTORS, OR SUPPLIERS, OR FOR ACCESS, VISITS, USE, WORK, TRAVEL OR OCCUPANCY BY ANY PERSON.

THE CONTRACTOR SHALL HAVE AT THE WORK SITE, COPIES OR SUITABLE EXTRACTS OF CONSTRUCTION SAFETY ORDERS, ISSUED BY CAL-OSHA. CONTRACTOR SHALL COMPLY WITH PROVISIONS OF THESE AND ALL OTHER APPLICABLE LAWS, ORDINANCES AND REGULATIONS. THE CONTRACTOR MUST COMPLY WITH PROVISIONS OF THE SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION, PROMULGATED BY THE SECRETARY OF LABOR UNDER SECTION 107 OF THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT, AS SET FORTH IN TITLE 29 C.F.R.

TO PROTECT THE LIVES AND HEALTH OF CONTRACTOR'S EMPLOYEES UNDER THE CONTRACT, THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT PROVISIONS OF THE "MANUAL OF ACCIDENT PREVENTION IN CONSTRUCTION" ISSUED BY THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC., AND SHALL MAINTAIN AN ACCURATE RECORD OF ALL CASES OF DEATH, OCCUPATIONAL DISEASE, AND INJURY REQUIRING MEDICAL ATTENTION OR CAUSING LOSS OF TIME FROM WORK, ARISING OUT OF AND IN THE COURSE OF EMPLOYMENT OR WORK UNDER THE CONTRACT.

THE CONTRACTOR ALONE SHALL BE RESPONSIBLE FOR THE SAFETY, EFFICIENCY, AND ADEQUACY OF CONTRACTOR'S FACILITIES, APPLIANCES, AND METHODS AND FOR ANY DAMAGE, WHICH MAY RESULT FROM THEIR FAILURE OR THEIR IMPROPER CONSTRUCTION, MAINTENANCE OR OPERATION.

THE CONTRACTOR AGREES THAT IT SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, PROVOST & PRITCHARD CONSULTING GROUP, AND THEIR RESPECTIVE AGENTS HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF OWNER, ENGINEER, OR THEIR RESPECTIVE AGENTS.

THE OWNER AND ITS AGENTS' SITE RESPONSIBILITIES ARE LIMITED SOLELY TO THE ACTIVITIES OF THEIR EMPLOYEES ON SITE. THESE RESPONSIBILITIES SHALL NOT BE INFERRED BY ANY PARTY TO MEAN THAT THE OWNER OR ITS AGENTS HAVE RESPONSIBILITY FOR SITE SAFETY. SAFETY IN, ON, OR ABOUT THE SITE IS THE SOLE AND EXCLUSIVE RESPONSIBILITY OF THE CONTRACTOR ALONE. THE CONTRACTOR'S METHODS OF WORK PERFORMANCE, SUPERINTENDENCE AND THE CONTRACTOR'S EMPLOYEES, AND SEQUENCING OF CONSTRUCTION ARE ALSO THE SOLE AND EXCLUSIVE RESPONSIBILITIES OF THE CONTRACTOR ALONE.

TOPOGRAPHY NOTE

TOPOGRAPHY SHOWN WAS COLLECTED BY PROVOST AND PRITCHARD CONSULTING GROUP DURING A FIELD SURVEY CONDUCTED IN OCTOBER OF 2019.

CONTROL TABLE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	2066508.40	6578033.59	296.91	BM 327 296.91
103	2066210.51	6578027.65	218.70	PK NAIL
104	2066417.16	6577871.93	215.65	SPIKE
105	2066343.25	6577823.09	189.04	SPIKE LOWER
106	2066234.59	6577998.41	214.33	PK NAIL
107	2066656.00	6577906.22	271.37	NAIL@ TRAIL
108	2066512.11	6577906.77	211.51	SPIKE UPPER
201	2066508.40	6578033.57	296.93	BM 327 296.91

SHEET INDEX

APPROVALS

TURLOCK IRRIGATION DISTRICT DATE

PRELIMINARY
NOT FOR CONSTRUCTION
12/18/19

No.	REVISION	BY	DATE

FOR REVIEW ONLY
DATE SIGNED:

LA GRANGE FOREBAY DEWATERING
TURLOCK IRRIGATION DISTRICT
STANISLAUS COUNTY
30% PLAN SET
COVER SHEET

PROVOST & PRITCHARD CONSULTING GROUP
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

DESIGN ENGINEER: DANIEL DE GRAAF
LICENSE NO: 86415
DRAFTED BY: GAT/JMG
CHECKED BY: ACC
DATE: 12/18/2019
JOB NO: 206519002
PROJECT NO:
PHASE:

ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

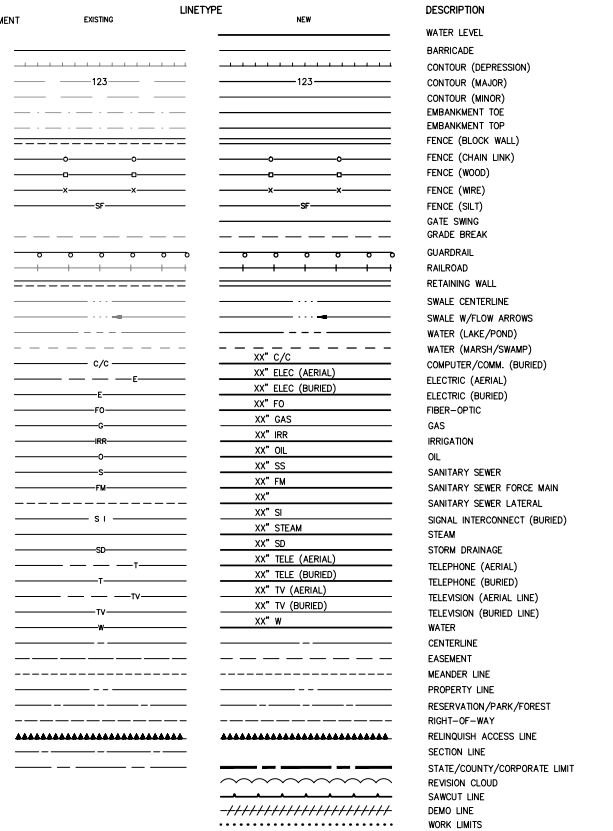
SHEET 1 OF 8

12/18/2019 2:49 PM G:\Turlock ID-2065\206519002-La Grange Forebay Dewatering\DWG\40_Sheet Sets\01_General\1 COVER SHEET.dwg -John Gudino

ABBREVIATIONS

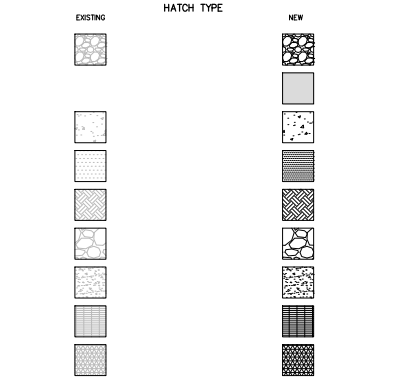
AB	AGGREGATE BASE	HORIZ	HORIZONTAL	TC	TOP OF CURB
AC	ASPHALT CONCRETE	HP	HINGE POINT, HIGH POINT, HORSEPOWER	TCE	TEMPORARY CONSTRUCTION EASEMENT
ACP	ASBESTOS-CEMENT PIPE	HP GAS	HIGH PRESSURE GAS	TDI	TENSILE DUCTILE IRON
AD	ALUMINUM DISK	HPS	HIGH PRESSURE SWITCH	TELE	TELEPHONE
AGG	AGGREGATE	HR	HANDRAIL	TF	TOP OF FOOTING
AH	AHEAD	H/T	HUB & TACK	TFC	TOP FACE OF CURB
ALT	ALTERNATE	HWL	HIGH WATER LEVEL	TG	TOP OF GRATE
AP	ANGLE POINT	HYDRO	HYDROPNEUMATIC	TH	THREAD
APPROX	APPROXIMATE	ID	INSIDE DIAMETER	TID	TURLOCK IRRIGATION DISTRICT
APN	ASSESSOR'S PARCEL NUMBER	IN	INCH	TL	TOP OF LINING
ARV	AIR RELIEF VALVE	INV	INVERT	TOE	TOE OF SLOPE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	IP	IRON PIPE	TOP	TOP OF SLOPE
AV	AIR VENT	IRR	IRRIGATION	TP	TELEPHONE POLE
AVE	AVENUE	JP	JUNCTION POLE	TR	TELEPHONE RISER
AWWA	AMERICAN WATER WORKS ASSOCIATION	LBS	POUNDS	TRANS	TRANSFORMER
BAR	BARRIER	LC	LENGTH OF CURVE	TRFC	TRAFFIC
BC	BEGIN CURVE	LCW	LONG CRESTED WEIR	TS	TOP OF STRUCTURE
BD	BRASS DISK	LF	LINEAR FEET	TSB	TELEPHONE SPLICE BOX
BFP	BACKFLOW PREVENTER	LG	LONG	TYP	TYPICAL
BK	BACK	LT	LEFT	TWL	TOP OF WALL
BLDG	BUILDING	LPG	LIQUEFIED PETROLEUM GAS	UG	UNDERGROUND
BM	BENCHMARK	MAX	MAXIMUM	UP	UTILITY POLE
BO	BOLLARD	MB	MAILBOX	UT	UTILITY
BTM	BOTTOM	MCC	MOTOR CONTROL CENTER	U/S	UPSTREAM
BVC	BEGIN VERTICAL CURVATURE	MFR	MANUFACTURER	VCP	VERIFIED CLAY PIPE
BW	BACK OF WALK	MH	MANHOLE	VERT	VERTICAL
BWL	BACK OF WALL	MIN	MINIMUM	VG	VALLEY GUTTER
BWR	BARB WIRE	MISC	MISCELLANEOUS	VLT	VAULT
C, CONC	CONCRETE	MJ	MECHANICAL JOINT	VLV	VALVE
CA	CALIFORNIA	MN	MAG NAIL	(W)	WEST
CAB	CABINET	MP	MEDIUM PRESSURE GAS LINE	W	WATER
CBL	CABLE	MPT	MALE PIPE THREAD	WL	WATER LINE
CFS	CUBIC FEET PER SECOND	MRKR	MARKER	WM	WATER METER
C&G	CURB & GUTTER	MS	MILD STEEL	WS	WATER SERVICE
CHK	CHECK	(N)	NORTH	WV	WATER VALVE
CHLK	CHAIN LINK	NAVD	NORTH AMERICAN VERTICAL DATUM	WW	WASTE WATER
CI	CAST IRON	NC	NORMALLY CONSOLIDATED	W/	WITH
CIP	CAST IRON PIPE	NGVD	NATIONAL GEODETIC VERTICAL DATUM	W/O	WITHOUT
CIPCP	CAST-IN-PLACE CONCRETE PIPE	NIC	NOT IN CONTRACT		
CL	CLASS	NPT	NATIONAL PIPE THREAD		
CLVT	CULVERT	NTS	NOT TO SCALE		
℄	CENTERLINE	OC	ON CENTER		
CLF	CHAIN LINK FENCE	OD	OUTSIDE DIAMETER		
CLR	CLEAR, CLEARANCE	OH	OVERHEAD		
CMLC	CEMENT MORTAR LINED & COATED	OP	OPERATING		
CMP	CORRUGATED METAL PIPE	OSHA	OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION		
CN	CONCRETE NAIL	O&M	OPERATIONS & MAINTENANCE		
CNS	COMPACTED NATIVE SOIL	(P)	PROPOSED		
CO	SEWER CLEAN OUT	PB	PULL BOX		
CONT	CONTINUOUS	PC	POINT OF CURVATURE		
CONST	CONSTRUCT/CONSTRUCTION	PCC	POINT OF COMPOUND CURVATURE		
COR	CORNER	PCC	PORTLAND CEMENT CONCRETE		
CORP	CORPORATION	PE	PERMANENT EASEMENT		
COL	COLUMN	PER	PERIMETER		
COUP	COUPLING	PI	POINT OF INTERSECTION		
CP	CONTROL POINT	PIP	PLASTIC IRRIGATION PIPE		
CR	CROWN	PLC	PROGRAMMABLE LOGIC CONTROLLER		
CU	CUBIC	℄	PROPERTY LINE		
CY	CUBIC YARDS	PNL	PANEL		
DA	DRIVE APPROACH	POC	POINT ON CURVE		
DEC	DECIDUOUS	POL	POINT ON LINE		
DEMO	DEMOLISH/DEMOLITION	POT	POINT ON TANGENT		
DI	DROP INLET	PP	POWER POLE		
DIA, ø	DIAMETER	PRC	POINT OF REVERSE CURVATURE		
DIM	DIMENSION	PRV	PRESSURE REDUCING VALVE		
DIP	DUCTILE IRON PIPE	PSF	POUNDS PER SQUARE FOOT		
D/S	DOWNSTREAM	PSI	POUNDS PER SQUARE INCH		
DW	DRIVEWAY	PT	POINT OF TANGENCY		
DWG	DRAWING	PVC	POLYVINYL CHLORIDE		
(E)	EXISTING, EAST	PVCC	POINT OF VERTICAL COMPOUND CURVATURE		
EA	EACH	PVMT	PAVEMENT		
EC	END CURVE	PVRC	POINT OF VERTICAL REVERSE CURVATURE		
ECC	ECCENTRIC	PVI	POINT OF VERTICAL INTERSECTION		
EF	EACH FACE	R	RADIUS		
EG	EXISTING GRADE	RBR	REBAR		
EL, ELEV	ELEVATION	RC	RADIUS OF CURVE		
ELC	EPOXY LINED & COATED	RCP	REINFORCED CONCRETE PIPE		
ELEC	ELECTRIC	RD	RELATIVE DENSITY		
ELL	ELBOW	RD	ROAD		
EM	ELECTRIC METER	RE	REFERENCE		
EOL	END OF LINE	REQD	REQUIRED		
EP	EDGE OF PAVEMENT	RET	RETURN		
EQUIV	EQUIVALENT	REV	REVISION		
ESMT	EASEMENT	RGRCP	RUBBER GASKETED REINFORCED CONCRETE PIPE		
EUC	EUCALYPTUS	RGS	RIGID GALVANIZED STEEL		
EVC	END VERTICAL CURVE	RP	RADIUS POINT		
EW	EACH WAY	RR	RAILROAD		
EXP	EXPOSED	RT	RIGHT		
(F)	FUTURE	RTU	REMOTE TERMINAL UNIT		
F&I	FURNISH & INSTALL	R/W	RIGHT OF WAY		
FD	FOUND	(S)	SOUTH, SOLVENT WELD		
FDC	FIRE DEPARTMENT CONNECTION	S	SLIP		
FF	FINISHED FLOOR	S=	SLOPE		
FG	FINISHED GRADE	SCH	SCHEDULE		
FH	FIRE HYDRANT	SCP	STANDARD CONCRETE PIPE		
℄ , FL	FLOW LINE	SD	STORM DRAIN		
FLG	FLANGE	SDMH	STORM DRAIN MANHOLE		
FLGD	FLANGED	SEC	SECTION		
FM	FORCE MAIN	SERV	SERVICE		
FNC	FENCE	SF	SQUARE FEET		
FRP	FIBER REINFORCED POLYESTER PIPE	SP	SERVICE POLE		
FT	FOOT/FEET	SPEC	SPECIFICATION		
FW	FRONT OF WALK	SPNDL	SPINDLE		
FWL	FACE OF WALL	SQ	SQUARE		
GA	GAUGE	SS	SANITARY SEWER		
GAL	GALLON	SS OR STS	STAINLESS STEEL		
GALV	GALVANIZED	SSMH	SANITARY SEWER MANHOLE		
GB	GRADE BREAK	STA	STATION		
GM	GAS METER	STD	STANDARD		
GPM	GALLONS PER MINUTE	STL	STEEL		
GRVL	GRAVEL	STP	STAND PIPE		
GS	GAS	STRC	STRUCTURE		
GSV	GAS VALVE	STRP	STRIPING		
GUY	GUY WIRE	SWL	SWALE		
GV	GATE VALVE	STWL	STILLING WELL		
HD	HEAD	(T)	THREADED		
HDPE	HIGH DENSITY POLYETHYLENE	T	THREAD		
HDR	HEADER	T&B	TOP & BOTTOM		
HDW	HEADWALL	TB	TOP OF BANK		
HGL	HYDRAULIC GRADE LINE	TBM	TEMPORARY BENCHMARK		

LINETYPES



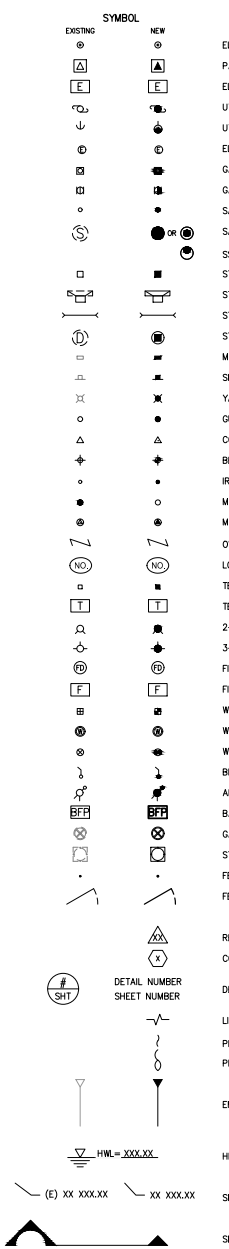
DESCRIPTION
WATER LEVEL
BARRICADE
CONTOUR (DEPRESSION)
CONTOUR (MAJOR)
CONTOUR (MINOR)
EMBANKMENT TOE
EMBANKMENT TOP
FENCE (BLOCK WALL)
FENCE (CHAIN LINK)
FENCE (WOOD)
FENCE (WIRE)
FENCE (SILT)
GATE SWING
GRADE BREAK
GUARDRAIL
RAILROAD
RETAINING WALL
SWALE CENTERLINE
SWALE W/FLOW ARROWS
WATER (LAKE/POND)
WATER (MARSH/SWAMP)
COMPUTER/COMM. (BURIED)
ELECTRIC (AERIAL)
ELECTRIC (BURIED)
FIBER-OPTIC
GAS
IRRIGATION
OIL
SANITARY SEWER
SANITARY SEWER FORCE MAIN
SANITARY SEWER LATERAL
SIGNAL INTERCONNECT (BURIED)
STEAM
STORM DRAINAGE
TELEPHONE (AERIAL)
TELEPHONE (BURIED)
TELEVISION (AERIAL LINE)
TELEVISION (BURIED LINE)
WATER
CENTERLINE
EASEMENT
MEANDER LINE
PROPERTY LINE
RESERVATION/PARK/FOREST
RIGHT-OF-WAY
RELINQUISH ACCESS LINE
SECTION LINE
STATE/COUNTY/CORPORATE LIMIT
REVISION CLOUD
SAWCUT LINE
DEMO LINE
WORK LIMITS

HATCHES



DESCRIPTION
AGGREGATE
AC PAVEMENT
CONCRETE
CONCRETE LINING (PLAN VIEW)
EARTH
RIP RAP
SAND
GRATING
EXPANDED METAL

SYMBOLS



DESCRIPTION
ELECTRIC METER
PAD MOUNTED TRANSFORMER
ELECTRIC VAULT
UTILITY POLE
UTILITY POLE ANCHOR
ELECTRIC MANHOLE
GAS METER
GAS VALVE
SANITARY SEWER CLEAN OUT
SANITARY SEWER MANHOLE
SSMH (ECCENTRIC CONE)
STORM DRAIN CATCH BASIN
STORM DRAIN INLET
STORM DRAIN CULVERT
STORM DRAIN MANHOLE
MAIL BOX
SIGN
YARD LIGHT
GUARD POST
CONTROL POINT
BENCH MARK
IRON PIPE
MONUMENT
MONUMENT (OPTIONAL)
OWNERSHIP TIE
LOT NUMBER
TELEPHONE RISER
TELEPHONE VAULT
2-NOZZLE HYDRANT
3-NOZZLE HYDRANT
FIRE DEPT. CONNECTION
FIRE VAULT
WATER METER
WELL
WATER VALVE
BLOW-OFF
AIR RELIEF VALVE
BACK FLOW PREVENTOR
GATE VALVE HANDLE
STILLING WELL
FENCE POST
FENCE GATE
REVISION
CONSTRUCTION CALLOUT
DETAIL CALLOUT
LINE BREAK
PIPE END (SCHEMATIC)
PIPE END
EMBANKMENT ARROW
HIGH WATER LINE
SPOT ELEVATION
SECTION VIEW

PRELIMINARY
NOT FOR CONSTRUCTION
12/18/19

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER DANIEL E. DE GRAAF 86415 CIVIL STATE OF CALIFORNIA

DATE SIGNED: _____

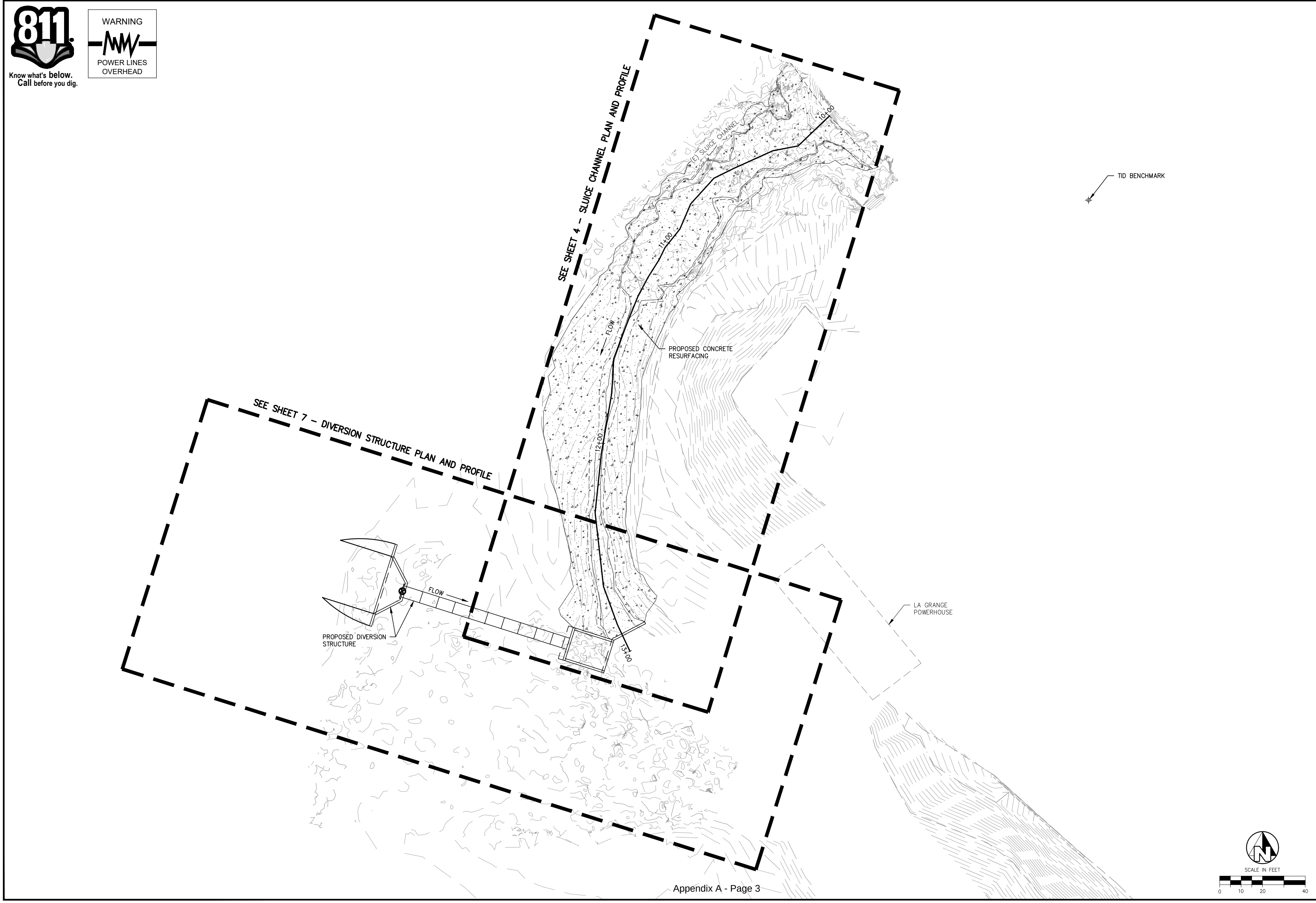
LA GRANGE FOREBAY DEWATERING
TURLOCK IRRIGATION DISTRICT
STANISLAUS COUNTY
30% PLAN SET

LEGEND AND ABBREVIATIONS

PROVOST & PRITCHARD
Consulting Engineers
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711
559.449-2700 FAX 559.449-2715
www.ppeng.com

DESIGN ENGINEER: DANIEL DE GRAAF	
LICENSE NO: 86415	
DRAFTED BY: GAT/JMG	CHECKED BY: ACC
DATE: 12/18/2019	
JOB NO: 206519002	
PROJECT NO:	
PHASE:	
0 1" ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.	
SHEET 2 OF 8	

12/18/2019 2:50 PM G:\Turlock ID-206519002-La Grange Forebay Dewatering\DWG\40-Sheet Sets\01-General\2 LEGEND AND ABBREVIATIONS.dwg -John Gudino



PRELIMINARY
NOT FOR CONSTRUCTION
12/18/19

No.	REVISION	BY	DATE

FOR REVIEW ONLY

DATE SIGNED: ______

LA GRANGE FOREBAY DEWATERING

TURLOCK IRRIGATION DISTRICT
STANISLAUS COUNTY

30% PLAN SET

OVERALL SITE PLAN AND KEYMAP

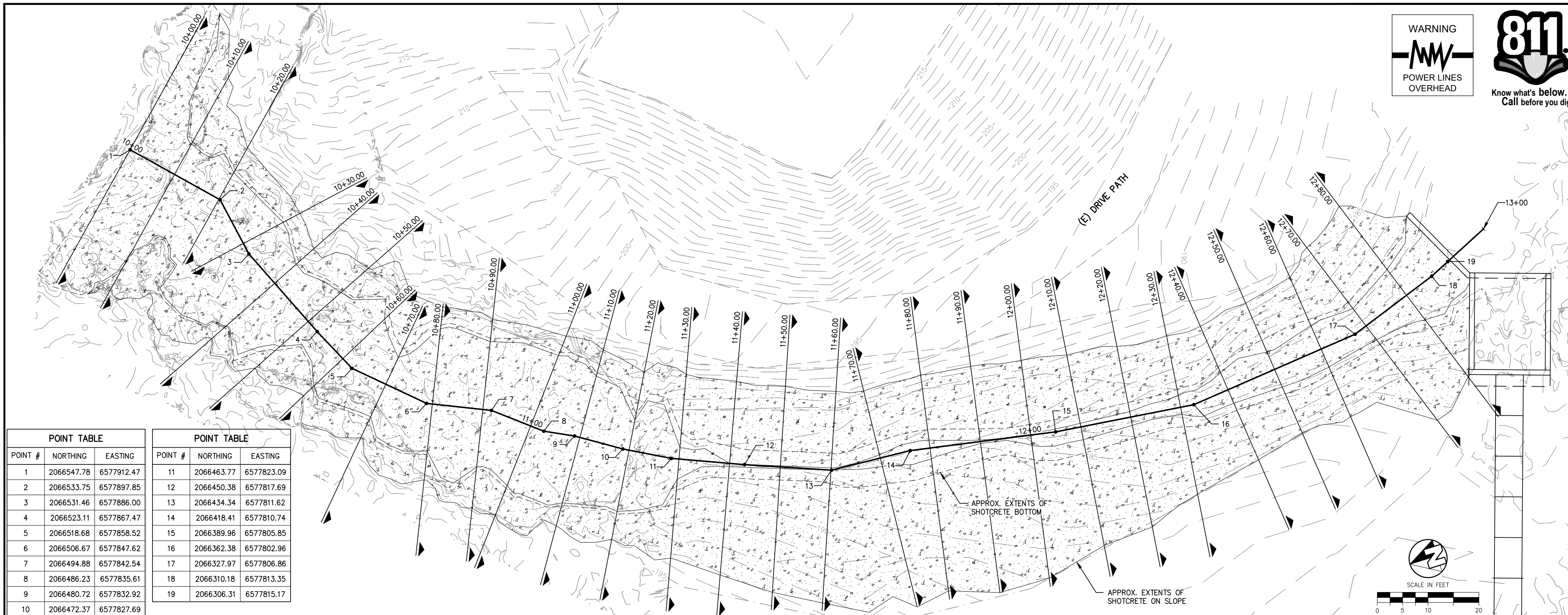
PROVOST & PRITCHARD
CONSULTING GROUP
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

DESIGN ENGINEER: DANIEL DE GRAAF
LICENSE NO: 86415
DRAFTED BY: GAT/JMG
CHECKED BY: ACC
DATE: 12/18/2019
JOB NO: 206519002
PROJECT NO:
PHASE:

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 3 OF 8

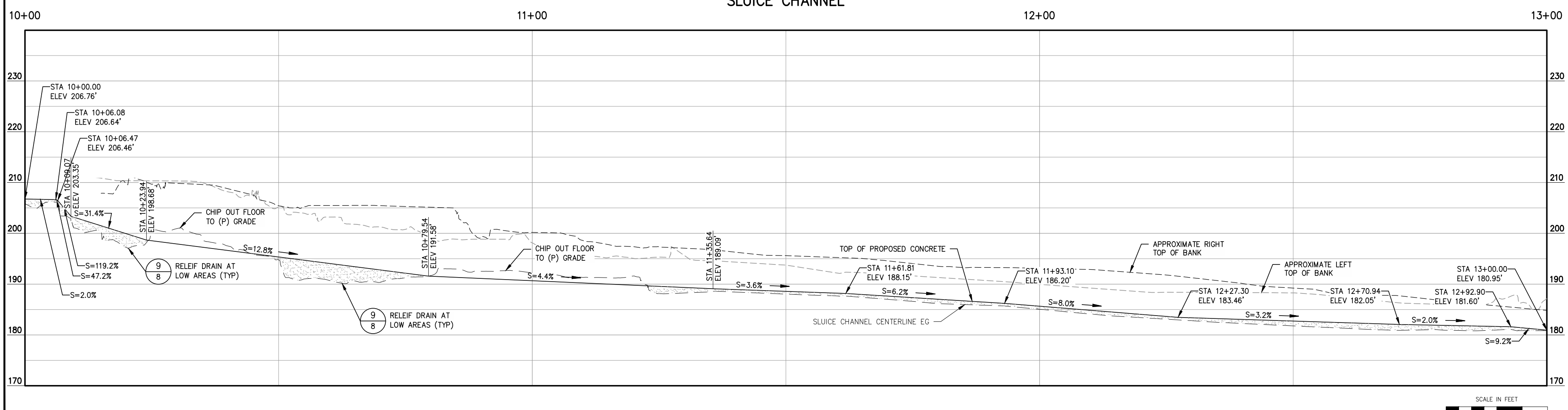
12/18/2019 2:50 PM G:\Turlock ID-2065\206519002-La Grange Forebay Dewatering\DWG\40_Sheet Sets\02_Plans_Maps\3 OVERALL SITE PLAN AND KEYMAP.dwg -John Gudino



POINT TABLE		
POINT #	NORTHING	EASTING
1	2066547.78	6577912.47
2	2066533.75	6577897.85
3	2066531.46	6577886.00
4	2066523.11	6577867.47
5	2066518.68	6577858.52
6	2066506.67	6577847.62
7	2066494.88	6577842.54
8	2066486.23	6577835.61
9	2066480.72	6577832.92
10	2066472.37	6577827.69

POINT TABLE		
POINT #	NORTHING	EASTING
11	2066463.77	6577823.09
12	2066450.38	6577817.69
13	2066434.34	6577811.62
14	2066418.41	6577810.74
15	2066389.96	6577805.85
16	2066362.38	6577802.96
17	2066327.97	6577806.86
18	2066310.18	6577813.35
19	2066306.31	6577815.17

SLUICE CHANNEL



PRELIMINARY
NOT FOR CONSTRUCTION
12/18/19

No.	REVISION	BY	DATE

FOR REVIEW ONLY

LA GRANGE FOREBAY DEWATERING
TURLOCK IRRIGATION DISTRICT
STANISLAUS COUNTY
30% PLAN SET

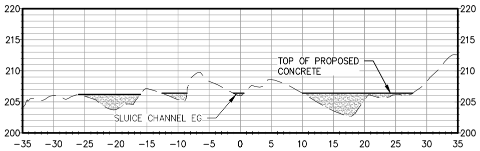
SLUICE CHANNEL PLAN AND PROFILE

PROVOST & PRITCHARD CONSULTING GROUP
An Employee Owned Company
286 W. CROMWELL AVENUE, FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

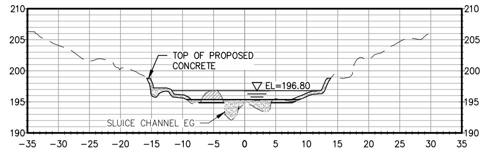
DESIGN ENGINEER: DANIEL DE GRAAF
LICENSE NO: 86415
DRAFTED BY: GAT/JMG
CHECKED BY: ACC
DATE: 12/18/2019
JOB NO: 206519002
PROJECT NO:
PHASE:

ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

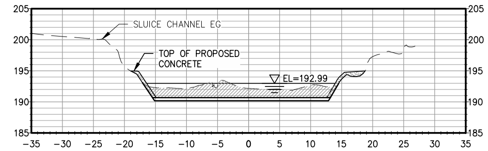
SHEET 4 OF 8



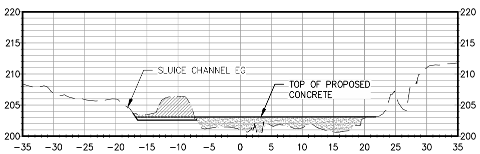
LAGRANGE CENTERLINE
STA 10+00



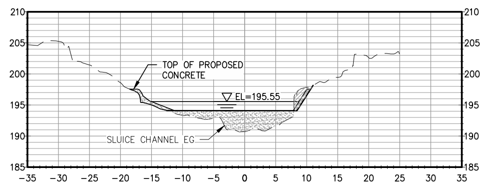
LAGRANGE CENTERLINE
STA 10+50



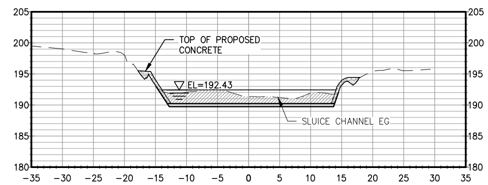
LAGRANGE CENTERLINE
STA 11+00



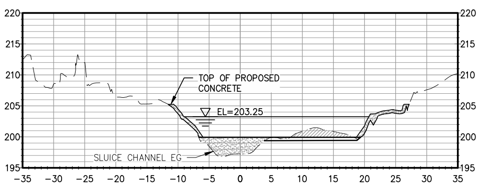
LAGRANGE CENTERLINE
STA 10+10



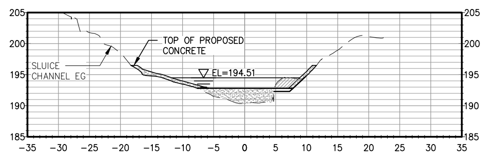
LAGRANGE CENTERLINE
STA 10+60



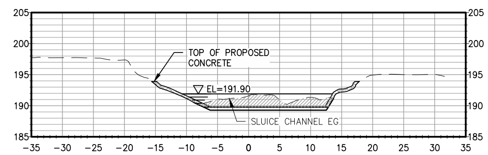
LAGRANGE CENTERLINE
STA 11+10



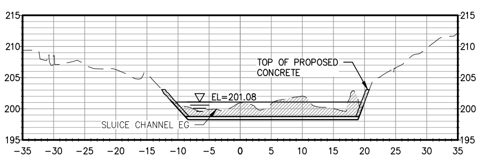
LAGRANGE CENTERLINE
STA 10+20



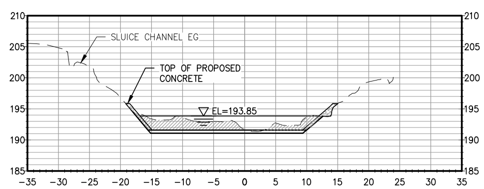
LAGRANGE CENTERLINE
STA 10+70



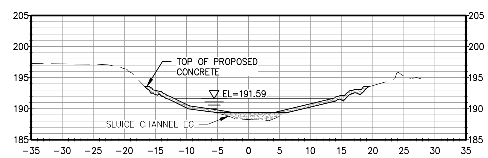
LAGRANGE CENTERLINE
STA 11+20



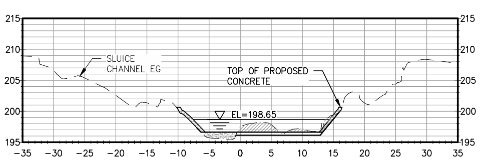
LAGRANGE CENTERLINE
STA 10+30



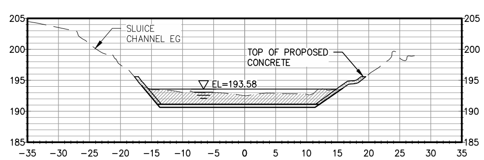
LAGRANGE CENTERLINE
STA 10+80



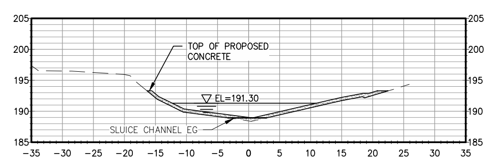
LAGRANGE CENTERLINE
STA 11+30



LAGRANGE CENTERLINE
STA 10+40



LAGRANGE CENTERLINE
STA 10+90



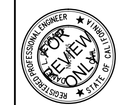
LAGRANGE CENTERLINE
STA 11+40

NOTE

1. WATER ELEVATIONS SHOWN IN SECTIONS ARE BASED ON 700 CFS FLOW.
2. CONCRETE LINER LIMITS ON SLOPE TO BE SET 2 FEET ABOVE 700 CFS FLOW ELEVATION.
3. SIDE SLOPE LINER 6" MINIMUM THICKNESS
4. CONTRACTOR TO FURNISH AND INSTALL RELIEF DRAIN IN POOL AREAS WHERE CONCRETE FILL IS GREATER THAN 12".

PRELIMINARY
NOT FOR CONSTRUCTION
12/18/19

No.	REVISION	BY	DATE



DATE SIGNED:

LA GRANGE FOREBAY DEWATERING
TURLOCK IRRIGATION DISTRICT
STANISLAUS COUNTY
30% PLAN SET

CROSS SECTIONS

PROVOST & PRITCHARD
CONSULTING GROUP
An Employee Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
559/449-2700 FAX 559/449-2715
www.ppeng.com

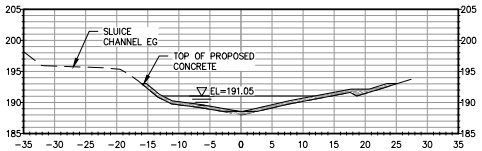
DESIGN ENGINEER: DANIEL DE GRAAF
LICENSE NO: 86415

DRAFTED BY: GAT/JMG	CHECKED BY: ACC
DATE: 12/18/2019	
JOB NO: 206519002	
PROJECT NO:	
PHASE:	

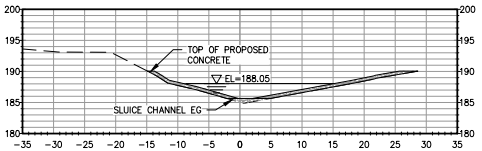
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET 5 OF 8

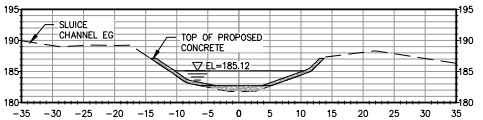
12/18/2019 3:06 PM G:\Turlock ID-2065\206519002-La Grange Forebay Dewatering\DWG\40_Sheet Sets\03_Sections_Profiles\5 CROSS SECTIONS.dwg -John Gudino



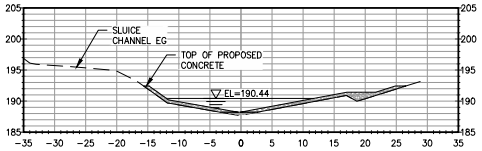
LAGRANGE CENTERLINE
STA 11+50



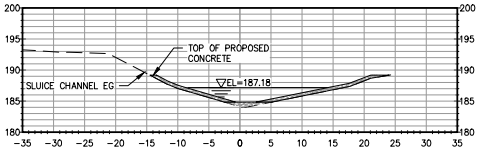
LAGRANGE CENTERLINE
STA 12+00



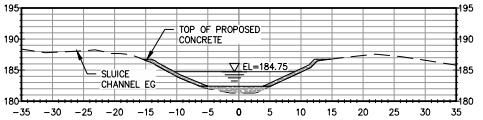
LAGRANGE CENTERLINE
STA 12+50



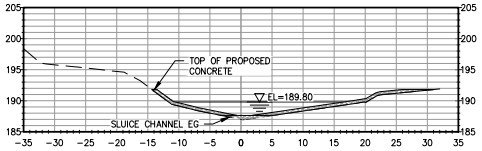
LAGRANGE CENTERLINE
STA 11+60



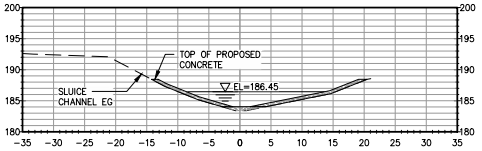
LAGRANGE CENTERLINE
STA 12+10



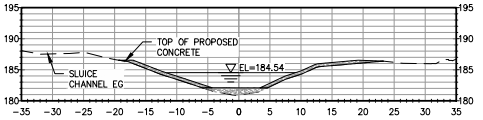
LAGRANGE CENTERLINE
STA 12+60



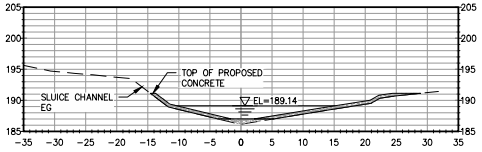
LAGRANGE CENTERLINE
STA 11+70



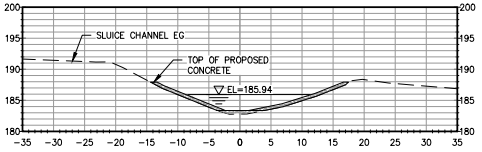
LAGRANGE CENTERLINE
STA 12+20



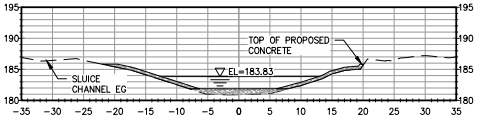
LAGRANGE CENTERLINE
STA 12+70



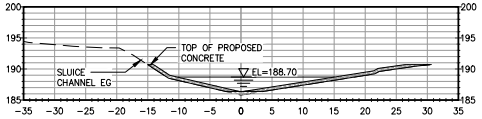
LAGRANGE CENTERLINE
STA 11+80



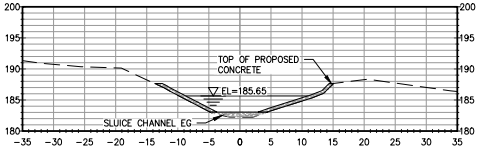
LAGRANGE CENTERLINE
STA 12+30



LAGRANGE CENTERLINE
STA 12+80



LAGRANGE CENTERLINE
STA 11+90



LAGRANGE CENTERLINE
STA 12+40

NOTE

1. WATER ELEVATIONS SHOWN IN SECTIONS ARE BASED ON 700 CFS FLOW.
2. CONCRETE LINER LIMITS ON SLOPE TO BE SET 2 FEET ABOVE 700 CFS FLOW ELEVATION.
3. SIDE SLOPE LINER 6" MINIMUM THICKNESS
4. CONTRACTOR TO FURNISH AND INSTALL RELIEF DRAIN IN POOL AREAS WHERE CONCRETE FILL IS GREATER THAN 12".

PRELIMINARY
NOT FOR CONSTRUCTION
12/18/19

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — DANIEL C. DE GRAAF — No. 86415 — STATE OF CALIFORNIA

DATE SIGNED: _____

LA GRANGE FOREBAY DEWATERING
TURLOCK IRRIGATION DISTRICT
STANISLAUS COUNTY
30% PLAN SET

CROSS SECTIONS

PROVOST & PRITCHARD
An Employee-Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711
559.440-7700 FAX 559.449-2715
www.ppeng.com

DESIGN ENGINEER:
DANIEL DE GRAAF
LICENSE NO:
86415

DRAFTED BY:	CHECKED BY:
GAT/JMG	ACC

DATE: 12/18/2019

JOB NO: 206519002

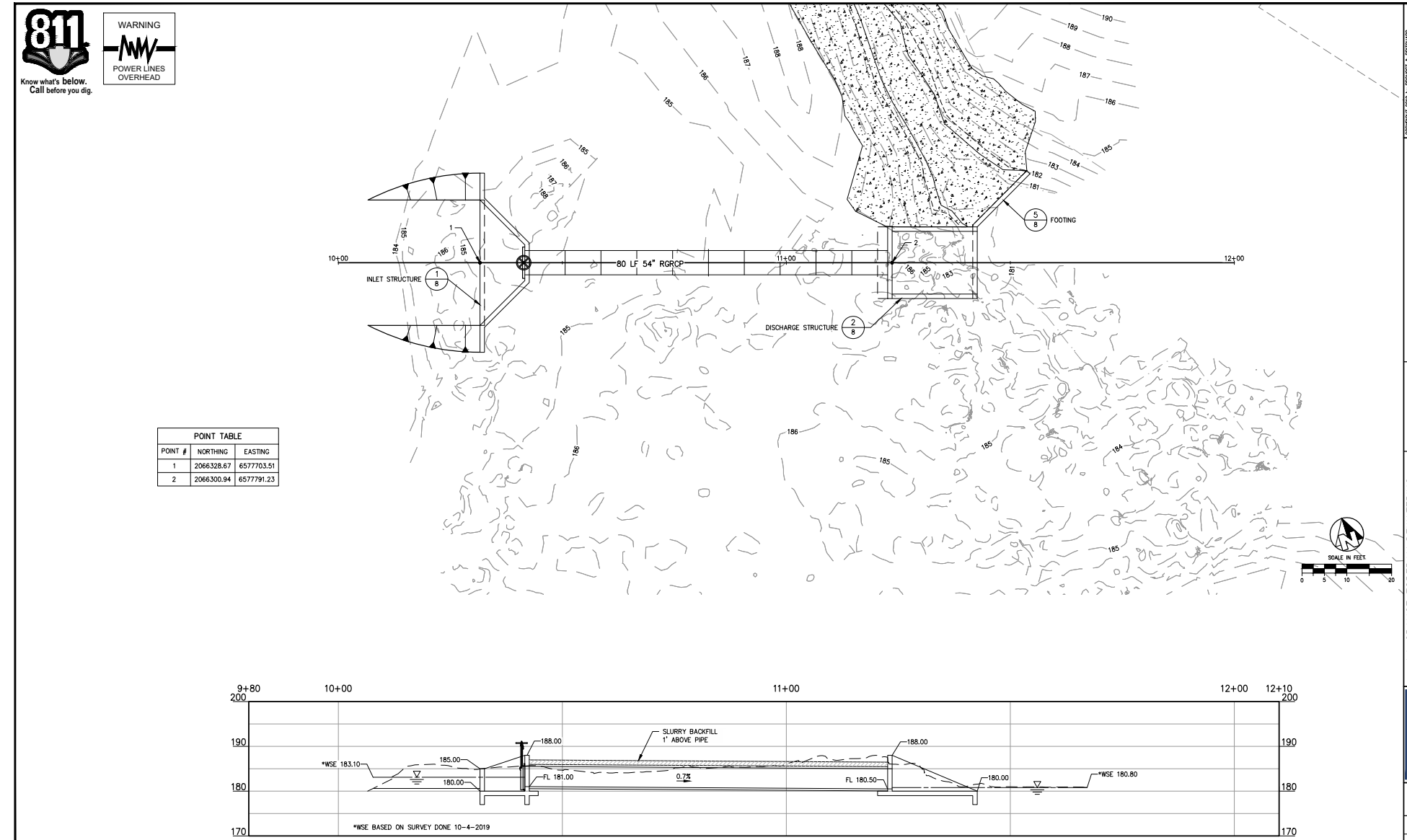
PROJECT NO:

PHASE:

0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.

SHEET
6
OF 8

12/18/2019 2:51 PM G:\Turlock ID-2065\206519002-La Grange Forebay Dewatering\DWG\40_Sheet Sets\03_Sections_Profiles\S CROSS SECTIONS.dwg John Gudino



POINT TABLE		
POINT #	NORTHING	EASTING
1	2066328.67	6577703.51
2	2066300.94	6577791.23

PRELIMINARY
NOT FOR CONSTRUCTION
12/18/19

No.	REVISION	BY	DATE

REGISTERED PROFESSIONAL ENGINEER — VINCENT E. FEWELL — No. 86415 — STATE OF CALIFORNIA — CIVIL

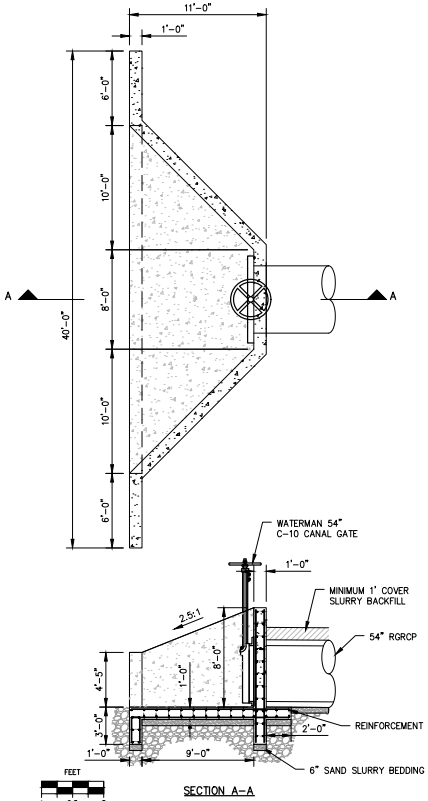
DATE SIGNED: _____

LA GRANGE FOREBAY DEWATERING
TURLOCK IRRIGATION DISTRICT
STANISLAUS COUNTY
30% PLAN SET
DIVERSION STRUCTURE
PLAN AND PROFILE

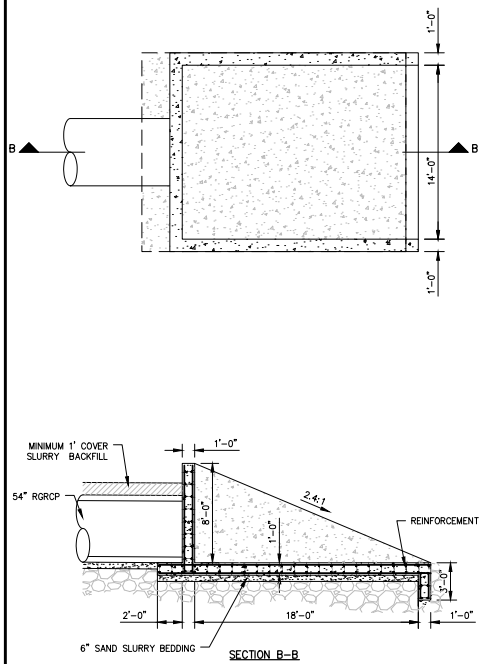
PROVOST & PRITCHARD
An Employee-Owned Company
286 WEST CROMWELL AVENUE
FRESNO, CA 93711-6162
559.449-2700 FAX 559.449-2715
www.ppeng.com

DESIGN ENGINEER: DANIEL DE GRAAF
LICENSE NO: 86415
DRAFTED BY: GAT/JMG
CHECKED BY: ACC
DATE: 12/18/2019
JOB NO: 206519002
PROJECT NO:
PHASE:
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 7 OF 8

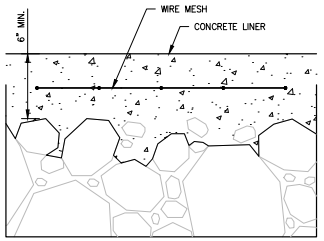
12/18/2019 2:51 PM G:\Turlock ID-2065\206519002-La Grange Forebay Dewatering\DWG\40_Sheet Sets\03_Sections_Profiles\7 DIVERSION STRUCTURE PLAN AND PROFILE.dwg --John Gudino



1/8 INLET STRUCTURE DETAIL

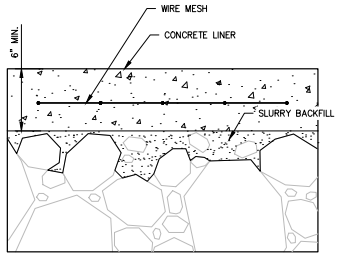


2/8 DISCHARGE STRUCTURE DETAIL



NOT TO SCALE

3/8 CHANNEL LINING SECTION–NO BACKFILL

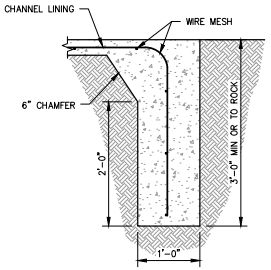


NOT TO SCALE

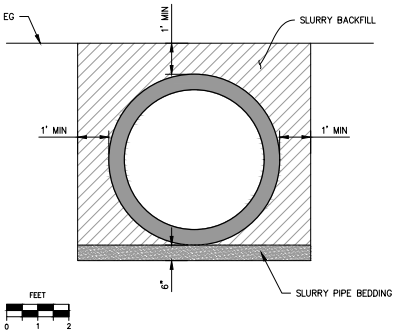
DETAIL TO BE USED IN LOCATIONS WHERE AVERAGE CONCRETE THICKNESS IS 6" OR MORE

4/8 BACKFILLED CHANNEL LINING SECTION

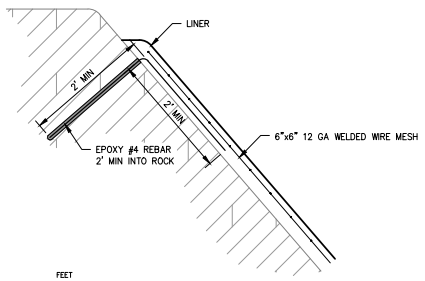
PC–0235



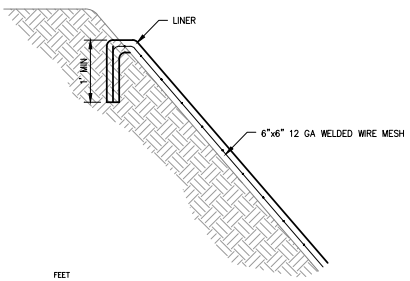
5/8 FOOTING



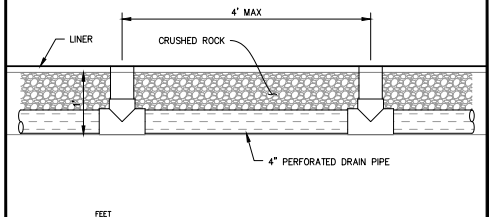
6/8 TRENCH SECTION



7/8 LINER EDGE CONNECTION–ROCK



8/8 LINER EDGE CONNECTION–SOIL



9/8 RELIEF DRAIN

PRELIMINARY
NOT FOR CONSTRUCTION
12/18/19

No.	REVISION	BY	DATE

DATE SIGNED:

LA GRANGE FOREBAY DEWATERING
TURLOCK IRRIGATION DISTRICT
STANISLAUS COUNTY
30% PLAN SET

DETAILS

PROVOST & PRITCHARD
Advancing Opportunity
286 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711
559.449-2700 FAX 559.449-2715
www.ppeng.com

DESIGN ENGINEER: DANIEL DE GRAAF
LICENSE NO: 86415
DRAFTED BY: GAT/JMG
CHECKED BY: ACC
DATE: 12/18/2019
JOB NO: 206519002
PROJECT NO:
PHASE:
0 1"
ORIGINAL SCALE SHOWN IS ONE INCH. ADJUST SCALE FOR REDUCED OR ENLARGED PLANS.
SHEET 8 OF 8

12/18/2019 4:10 PM G:\Turlock ID-2065\206519002-La Grange Forebay Dewatering\DWG\40_Sheet Sets\04_Civil_Details\8 DETAILS.dwg —John Gudino

Appendix B. Biological Resources Database Query Results

This page is intentionally blank.

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: November 11, 2019
Consultation Code: 08ESMF00-2020-SLI-0324
Event Code: 08ESMF00-2020-E-00913
Project Name: TID La Grange

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

Project Summary

Consultation Code: 08ESMF00-2020-SLI-0324

Event Code: 08ESMF00-2020-E-00913

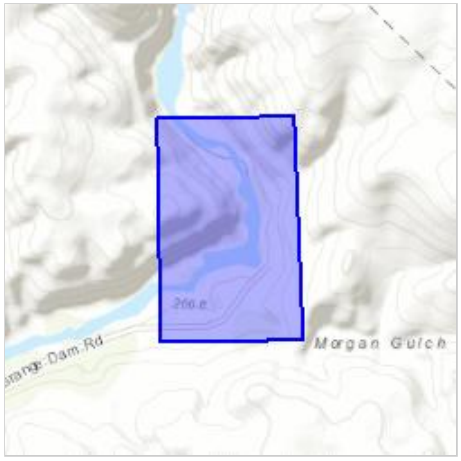
Project Name: TID La Grange

Project Type: ** OTHER **

Project Description: Spillway Enhancement

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.66642915993422N120.4429837625523W



Counties: Stanislaus, CA

Endangered Species Act Species

There is a total of 8 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
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

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 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/321

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*	Threatened

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

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio*	Endangered

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/8246

Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/498

Flowering Plants

NAME	STATUS
Hartweg's Golden Sunburst *Pseudobahia bahiifolia*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/1704

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Quad Name **La Grange**
Quad Number **37120-F4**

ESA Anadromous Fish

SONCC Coho ESU (T) -
CCC Coho ESU (E) -
CC Chinook Salmon ESU (T) -
CVSR Chinook Salmon ESU (T) -
SRWR Chinook Salmon ESU (E) -
NC Steelhead DPS (T) -
CCC Steelhead DPS (T) -
SCCC Steelhead DPS (T) -
SC Steelhead DPS (E) -
CCV Steelhead DPS (T) - **X**
Eulachon (T) -
sDPS Green Sturgeon (T) -

ESA Anadromous Fish Critical Habitat

SONCC Coho Critical Habitat -
CCC Coho Critical Habitat -
CC Chinook Salmon Critical Habitat -
CVSR Chinook Salmon Critical Habitat -
SRWR Chinook Salmon Critical Habitat -
NC Steelhead Critical Habitat -
CCC Steelhead Critical Habitat -
SCCC Steelhead Critical Habitat -
SC Steelhead Critical Habitat -
CCV Steelhead Critical Habitat - **X**
Eulachon Critical Habitat -
sDPS Green Sturgeon Critical Habitat -

ESA Marine Invertebrates

Range Black Abalone (E) -
Range White Abalone (E) -

ESA Marine Invertebrates Critical Habitat

Black Abalone Critical Habitat -

ESA Sea Turtles

East Pacific Green Sea Turtle (T) -
Olive Ridley Sea Turtle (T/E) -
Leatherback Sea Turtle (E) -
North Pacific Loggerhead Sea Turtle (E) -

ESA Whales

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) -

ESA Pinnipeds

Guadalupe Fur Seal (T) -
Steller Sea Lion Critical Habitat -

Essential Fish Habitat

Coho EFH -
Chinook Salmon EFH - **X**
Groundfish EFH -
Coastal Pelagics EFH -
Highly Migratory Species EFH -

MMPA Species (See list at left)

ESA and MMPA Cetaceans/Pinnipeds

See list at left and consult the NMFS Long Beach office 562-980-4000

MMPA Cetaceans -
MMPA Pinnipeds -

CNDDB 9-Quad Species List 226 records.

Element Type	Scientific Name	Common Name	Element Code	Federal Status	State Status	CDFW Status	CA Rare Plant Rank	Quad Code	Quad Name	Data Status	Taxonomic Sort
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	WL	-	3712065	COOPERSTOWN	Mapped and Unprocessed	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	WL	-	3712064	LA GRANGE	Mapped and Unprocessed	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	WL	-	3712055	TURLOCK LAKE	Mapped and Unprocessed	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	WL	-	3712054	SNELLING	Mapped and Unprocessed	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA01180	Threatened	Threatened	WL	-	3712053	MERCED FALLS	Mapped	Animals - Amphibians - Ambystomatidae - Ambystoma californiense
Animals - Amphibians	Batrachoseps diabolicus	Hell Hollow slender salamander	AAAAD02130	None	None	-	-	3712073	MOCCASIN	Unprocessed	Animals - Amphibians - Plethodontidae - Batrachoseps diabolicus
Animals - Amphibians	Rana boylii	foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	SSC	-	3712073	MOCCASIN	Mapped and Unprocessed	Animals - Amphibians - Ranidae - Rana boylii
Animals - Amphibians	Rana boylii	foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	SSC	-	3712074	CHINESE CAMP	Mapped and Unprocessed	Animals - Amphibians - Ranidae - Rana boylii
Animals - Amphibians	Rana boylii	foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	SSC	-	3712063	PENON BLANCO PEAK	Mapped	Animals - Amphibians - Ranidae - Rana boylii
Animals - Amphibians	Rana draytonii	California red-legged frog	AAABH01022	Threatened	None	SSC	-	3712063	PENON BLANCO PEAK	Unprocessed	Animals - Amphibians - Ranidae - Rana draytonii
Animals - Amphibians	Rana draytonii	California red-legged frog	AAABH01022	Threatened	None	SSC	-	3712054	SNELLING	Unprocessed	Animals - Amphibians - Ranidae - Rana draytonii
Animals - Amphibians	Spea hammondii	western spadefoot	AAABF02020	None	None	SSC	-	3712054	SNELLING	Mapped	Animals - Amphibians - Scaphiopodidae - Spea hammondii
Animals - Amphibians	Spea hammondii	western spadefoot	AAABF02020	None	None	SSC	-	3712053	MERCED FALLS	Mapped	Animals - Amphibians - Scaphiopodidae - Spea hammondii
Animals - Amphibians	Spea hammondii	western spadefoot	AAABF02020	None	None	SSC	-	3712055	TURLOCK LAKE	Mapped and Unprocessed	Animals - Amphibians - Scaphiopodidae - Spea hammondii
Animals - Amphibians	Spea hammondii	western spadefoot	AAABF02020	None	None	SSC	-	3712064	LA GRANGE	Mapped	Animals - Amphibians - Scaphiopodidae - Spea hammondii
Animals - Amphibians	Spea hammondii	western spadefoot	AAABF02020	None	None	SSC	-	3712065	COOPERSTOWN	Mapped and Unprocessed	Animals - Amphibians - Scaphiopodidae - Spea hammondii
Animals - Birds	Accipiter cooperii	Cooper's hawk	ABNKC12040	None	None	WL	-	3712055	TURLOCK LAKE	Unprocessed	Animals - Birds - Accipitridae - Accipiter cooperii

Animals - Birds	Aquila chrysaetos	golden eagle	ABNKC22010	None	None	FP , WL	-	3712053	MERCED FALLS	Unprocessed	Animals - Birds - Accipitridae - Aquila chrysaetos
Animals - Birds	Buteo regalis	ferruginous hawk	ABNKC19120	None	None	WL	-	3712053	MERCED FALLS	Mapped	Animals - Birds - Accipitridae - Buteo regalis
Animals - Birds	Buteo regalis	ferruginous hawk	ABNKC19120	None	None	WL	-	3712075	KEYSTONE	Unprocessed	Animals - Birds - Accipitridae - Buteo regalis
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3712064	LA GRANGE	Mapped	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3712065	COOPERSTOWN	Mapped	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC19070	None	Threatened	-	-	3712054	SNELLING	Mapped	Animals - Birds - Accipitridae - Buteo swainsoni
Animals - Birds	Circus hudsonius	northern harrier	ABNKC11011	None	None	SSC	-	3712054	SNELLING	Mapped	Animals - Birds - Accipitridae - Circus hudsonius
Animals - Birds	Circus hudsonius	northern harrier	ABNKC11011	None	None	SSC	-	3712063	PENON BLANCO PEAK	Unprocessed	Animals - Birds - Accipitridae - Circus hudsonius
Animals - Birds	Haliaeetus leucocephalus	bald eagle	ABNKC10010	Delisted	Endangered	FP	-	3712055	TURLOCK LAKE	Mapped and Unprocessed	Animals - Birds - Accipitridae - Haliaeetus leucocephalus
Animals - Birds	Haliaeetus leucocephalus	bald eagle	ABNKC10010	Delisted	Endangered	FP	-	3712063	PENON BLANCO PEAK	Mapped and Unprocessed	Animals - Birds - Accipitridae - Haliaeetus leucocephalus
Animals - Birds	Haliaeetus leucocephalus	bald eagle	ABNKC10010	Delisted	Endangered	FP	-	3712065	COOPERSTOWN	Mapped	Animals - Birds - Accipitridae - Haliaeetus leucocephalus
Animals - Birds	Haliaeetus leucocephalus	bald eagle	ABNKC10010	Delisted	Endangered	FP	-	3712064	LA GRANGE	Mapped	Animals - Birds - Accipitridae - Haliaeetus leucocephalus
Animals - Birds	Haliaeetus leucocephalus	bald eagle	ABNKC10010	Delisted	Endangered	FP	-	3712053	MERCED FALLS	Mapped and Unprocessed	Animals - Birds - Accipitridae - Haliaeetus leucocephalus
Animals - Birds	Eremophila alpestris actia	California horned lark	ABPAT02011	None	None	WL	-	3712065	COOPERSTOWN	Mapped	Animals - Birds - Alaudidae - Eremophila alpestris actia
Animals - Birds	Eremophila alpestris actia	California horned lark	ABPAT02011	None	None	WL	-	3712075	KEYSTONE	Mapped	Animals - Birds - Alaudidae - Eremophila alpestris actia
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3712065	COOPERSTOWN	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3712064	LA GRANGE	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3712053	MERCED FALLS	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
Animals - Birds	Ardea alba	great egret	ABNGA04040	None	None	-	-	3712054	SNELLING	Unprocessed	Animals - Birds - Ardeidae - Ardea alba
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3712054	SNELLING	Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3712053	MERCED FALLS	Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3712064	LA GRANGE	Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3712065	COOPERSTOWN	Unprocessed	Animals - Birds - Ardeidae - Ardea herodias

Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	3712074	CHINESE CAMP	Unprocessed	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Charadrius montanus	mountain plover	ABNNB03100	None	None	SSC	-	3712065	COOPERSTOWN	Unprocessed	Animals - Birds - Charadriidae - Charadrius montanus
Animals - Birds	Charadrius montanus	mountain plover	ABNNB03100	None	None	SSC	-	3712055	TURLOCK LAKE	Mapped and Unprocessed	Animals - Birds - Charadriidae - Charadrius montanus
Animals - Birds	Falco columbarius	merlin	ABNKD06030	None	None	WL	-	3712075	KEYSTONE	Unprocessed	Animals - Birds - Falconidae - Falco columbarius
Animals - Birds	Falco mexicanus	prairie falcon	ABNKD06090	None	None	WL	-	3712075	KEYSTONE	Unprocessed	Animals - Birds - Falconidae - Falco mexicanus
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	Threatened	SSC	-	3712075	KEYSTONE	Mapped	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	Threatened	SSC	-	3712065	COOPERSTOWN	Mapped and Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	Threatened	SSC	-	3712064	LA GRANGE	Mapped	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	Threatened	SSC	-	3712055	TURLOCK LAKE	Mapped and Unprocessed	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB0020	None	Threatened	SSC	-	3712054	SNELLING	Mapped	Animals - Birds - Icteridae - Agelaius tricolor
Animals - Birds	Icteria virens	yellow-breasted chat	ABPBX24010	None	None	SSC	-	3712054	SNELLING	Mapped	Animals - Birds - Icteriidae - Icteria virens
Animals - Birds	Pandion haliaetus	osprey	ABNKC01010	None	None	WL	-	3712054	SNELLING	Mapped	Animals - Birds - Pandionidae - Pandion haliaetus
Animals - Birds	Pandion haliaetus	osprey	ABNKC01010	None	None	WL	-	3712053	MERCED FALLS	Mapped and Unprocessed	Animals - Birds - Pandionidae - Pandion haliaetus
Animals - Birds	Pandion haliaetus	osprey	ABNKC01010	None	None	WL	-	3712063	PENON BLANCO PEAK	Unprocessed	Animals - Birds - Pandionidae - Pandion haliaetus
Animals - Birds	Baeolophus inornatus	oak titmouse	ABPAW01100	None	None	-	-	3712063	PENON BLANCO PEAK	Mapped	Animals - Birds - Paridae - Baeolophus inornatus
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712065	COOPERSTOWN	Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712075	KEYSTONE	Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712053	MERCED FALLS	Mapped	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712055	TURLOCK LAKE	Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB10010	None	None	SSC	-	3712054	SNELLING	Unprocessed	Animals - Birds - Strigidae - Athene cunicularia
Animals - Birds	Strix nebulosa	great gray owl	ABNSB12040	None	Endangered	-	-	3712074	CHINESE CAMP	Unprocessed	Animals - Birds - Strigidae - Strix nebulosa
Animals - Birds	Vireo bellii pusillus	least Bell's vireo	ABPBW01114	Endangered	Endangered	-	-	3712065	COOPERSTOWN	Mapped	Animals - Birds - Vireonidae - Vireo bellii pusillus
Animals - Birds	Vireo bellii pusillus	least Bell's vireo	ABPBW01114	Endangered	Endangered	-	-	3712064	LA GRANGE	Mapped	Animals - Birds - Vireonidae - Vireo bellii pusillus
Animals - Birds	Vireo bellii pusillus	least Bell's vireo	ABPBW01114	Endangered	Endangered	-	-	3712063	PENON BLANCO PEAK	Mapped	Animals - Birds - Vireonidae - Vireo bellii pusillus

Animals - Birds	Vireo bellii pusillus	least Bell's vireo	ABPBW01114	Endangered	Endangered	-	-	3712054	SNELLING	Mapped	Animals - Birds - Vireonidae - Vireo bellii pusillus
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3712055	TURLOCK LAKE	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3712053	MERCED FALLS	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3712054	SNELLING	Mapped	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Branchinecta lynchi	vernal pool fairy shrimp	ICBRA03030	Threatened	None	-	-	3712075	KEYSTONE	Unprocessed	Animals - Crustaceans - Branchinectidae - Branchinecta lynchi
Animals - Crustaceans	Stygobromus harai	Hara's Cave amphipod	ICMAL05470	None	None	-	-	3712073	MOCCASIN	Mapped	Animals - Crustaceans - Crangonyctidae - Stygobromus harai
Animals - Crustaceans	Linderiella occidentalis	California linderiella	ICBRA06010	None	None	-	-	3712065	COOPERSTOWN	Unprocessed	Animals - Crustaceans - Linderiellidae - Linderiella occidentalis
Animals - Crustaceans	Linderiella occidentalis	California linderiella	ICBRA06010	None	None	-	-	3712054	SNELLING	Mapped and Unprocessed	Animals - Crustaceans - Linderiellidae - Linderiella occidentalis
Animals - Crustaceans	Linderiella occidentalis	California linderiella	ICBRA06010	None	None	-	-	3712053	MERCED FALLS	Mapped and Unprocessed	Animals - Crustaceans - Linderiellidae - Linderiella occidentalis
Animals - Crustaceans	Lepidurus packardi	vernal pool tadpole shrimp	ICBRA10010	Endangered	None	-	-	3712055	TURLOCK LAKE	Mapped	Animals - Crustaceans - Triopsidae - Lepidurus packardi
Animals - Fish	Cottus gulosus	riffle sculpin	AFC4E02140	None	None	SSC	-	3712054	SNELLING	Unprocessed	Animals - Fish - Cottidae - Cottus gulosus
Animals - Fish	Cottus gulosus	riffle sculpin	AFC4E02140	None	None	SSC	-	3712065	COOPERSTOWN	Unprocessed	Animals - Fish - Cottidae - Cottus gulosus
Animals - Fish	Cottus gulosus	riffle sculpin	AFC4E02140	None	None	SSC	-	3712064	LA GRANGE	Unprocessed	Animals - Fish - Cottidae - Cottus gulosus
Animals - Fish	Lavinia exilicauda exilicauda	Sacramento hitch	AFCJB19012	None	None	SSC	-	3712063	PENON BLANCO PEAK	Unprocessed	Animals - Fish - Cyprinidae - Lavinia exilicauda exilicauda
Animals - Fish	Lavinia exilicauda exilicauda	Sacramento hitch	AFCJB19012	None	None	SSC	-	3712054	SNELLING	Unprocessed	Animals - Fish - Cyprinidae - Lavinia exilicauda exilicauda
Animals - Fish	Lavinia symmetricus ssp. 1	San Joaquin roach	AFCJB19021	None	None	SSC	-	3712063	PENON BLANCO PEAK	Mapped	Animals - Fish - Cyprinidae - Lavinia symmetricus ssp. 1
Animals - Fish	Lavinia symmetricus ssp. 1	San Joaquin roach	AFCJB19021	None	None	SSC	-	3712073	MOCCASIN	Mapped and Unprocessed	Animals - Fish - Cyprinidae - Lavinia symmetricus ssp. 1
Animals - Fish	Lavinia symmetricus ssp. 3	Red Hills roach	AFCJB19028	None	None	SSC	-	3712074	CHINESE CAMP	Mapped	Animals - Fish - Cyprinidae - Lavinia symmetricus ssp. 3
Animals - Fish	Lavinia symmetricus ssp. 3	Red Hills roach	AFCJB19028	None	None	SSC	-	3712075	KEYSTONE	Mapped	Animals - Fish - Cyprinidae - Lavinia symmetricus ssp. 3

Animals - Fish	Mylopharodon conocephalus	hardhead	AFCJB25010	None	None	SSC	-	3712064	LA GRANGE	Mapped and Unprocessed	Animals - Fish - Cyprinidae - Mylopharodon conocephalus
Animals - Fish	Mylopharodon conocephalus	hardhead	AFCJB25010	None	None	SSC	-	3712065	COOPERSTOWN	Mapped and Unprocessed	Animals - Fish - Cyprinidae - Mylopharodon conocephalus
Animals - Fish	Mylopharodon conocephalus	hardhead	AFCJB25010	None	None	SSC	-	3712054	SNELLING	Mapped and Unprocessed	Animals - Fish - Cyprinidae - Mylopharodon conocephalus
Animals - Fish	Entosphenus hubbsi	Kern brook lamprey	AFBAA02040	None	None	SSC	-	3712054	SNELLING	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus hubbsi
Animals - Fish	Entosphenus hubbsi	Kern brook lamprey	AFBAA02040	None	None	SSC	-	3712053	MERCED FALLS	Mapped	Animals - Fish - Petromyzontidae - Entosphenus hubbsi
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	3712065	COOPERSTOWN	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	3712064	LA GRANGE	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3712065	COOPERSTOWN	Mapped	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 11
Animals - Fish	Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3712064	LA GRANGE	Mapped	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 11
Animals - Fish	Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3712053	MERCED FALLS	Mapped	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 11
Animals - Fish	Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	-	-	3712054	SNELLING	Mapped	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 11
Animals - Fish	Oncorhynchus tshawytscha pop. 13	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3712054	SNELLING	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 13
Animals - Fish	Oncorhynchus tshawytscha pop. 13	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3712064	LA GRANGE	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 13
Animals - Fish	Oncorhynchus tshawytscha pop. 13	chinook salmon - Central Valley fall / late fall-run ESU	AFCHA0205N	None	None	SSC	-	3712065	COOPERSTOWN	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 13
Animals - Insects	Bombus crotchii	Crotch bumble bee	IIHYM24480	None	Candidate Endangered	-	-	3712053	MERCED FALLS	Mapped	Animals - Insects - Apidae - Bombus crotchii
Animals - Insects	Bombus morrisoni	Morrison bumble bee	IIHYM24460	None	None	-	-	3712064	LA GRANGE	Mapped	Animals - Insects - Apidae - Bombus morrisoni
Animals - Mammals	Vulpes macrotis mutica	San Joaquin kit fox	AMAJA03041	Endangered	Threatened	-	-	3712064	LA GRANGE	Mapped	Animals - Mammals - Canidae - Vulpes macrotis mutica
Animals - Mammals	Erethizon dorsatum	North American porcupine	AMAFJ01010	None	None	-	-	3712053	MERCED FALLS	Mapped and Unprocessed	Animals - Mammals - Erethizontidae - Erethizon dorsatum

Animals - Mammals	Dipodomys heermanni dixoni	Merced kangaroo rat	AMAFD03062	None	None	-	-	3712053	MERCED FALLS	Mapped and Unprocessed	Animals - Mammals - Heteromyidae - Dipodomys heermanni dixoni
Animals - Mammals	Dipodomys heermanni dixoni	Merced kangaroo rat	AMAFD03062	None	None	-	-	3712054	SNELLING	Mapped and Unprocessed	Animals - Mammals - Heteromyidae - Dipodomys heermanni dixoni
Animals - Mammals	Dipodomys heermanni dixoni	Merced kangaroo rat	AMAFD03062	None	None	-	-	3712064	LA GRANGE	Mapped	Animals - Mammals - Heteromyidae - Dipodomys heermanni dixoni
Animals - Mammals	Perognathus inornatus	San Joaquin Pocket Mouse	AMAFD01060	None	None	-	-	3712054	SNELLING	Mapped and Unprocessed	Animals - Mammals - Heteromyidae - Perognathus inornatus
Animals - Mammals	Eumops perotis californicus	western mastiff bat	AMACD02011	None	None	SSC	-	3712075	KEYSTONE	Mapped	Animals - Mammals - Molossidae - Eumops perotis californicus
Animals - Mammals	Eumops perotis californicus	western mastiff bat	AMACD02011	None	None	SSC	-	3712073	MOCCASIN	Mapped	Animals - Mammals - Molossidae - Eumops perotis californicus
Animals - Mammals	Taxidea taxus	American badger	AMAJF04010	None	None	SSC	-	3712064	LA GRANGE	Mapped	Animals - Mammals - Mustelidae - Taxidea taxus
Animals - Mammals	Taxidea taxus	American badger	AMAJF04010	None	None	SSC	-	3712054	SNELLING	Mapped	Animals - Mammals - Mustelidae - Taxidea taxus
Animals - Mammals	Antrozous pallidus	pallid bat	AMACC10010	None	None	SSC	-	3712054	SNELLING	Mapped	Animals - Mammals - Vespertilionidae - Antrozous pallidus
Animals - Mammals	Antrozous pallidus	pallid bat	AMACC10010	None	None	SSC	-	3712053	MERCED FALLS	Mapped and Unprocessed	Animals - Mammals - Vespertilionidae - Antrozous pallidus
Animals - Mammals	Antrozous pallidus	pallid bat	AMACC10010	None	None	SSC	-	3712064	LA GRANGE	Unprocessed	Animals - Mammals - Vespertilionidae - Antrozous pallidus
Animals - Mammals	Antrozous pallidus	pallid bat	AMACC10010	None	None	SSC	-	3712073	MOCCASIN	Mapped	Animals - Mammals - Vespertilionidae - Antrozous pallidus
Animals - Mammals	Corynorhinus townsendii	Townsend's big-eared bat	AMACC08010	None	None	SSC	-	3712064	LA GRANGE	Mapped	Animals - Mammals - Vespertilionidae - Corynorhinus townsendii
Animals - Mammals	Corynorhinus townsendii	Townsend's big-eared bat	AMACC08010	None	None	SSC	-	3712053	MERCED FALLS	Mapped and Unprocessed	Animals - Mammals - Vespertilionidae - Corynorhinus townsendii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3712053	MERCED FALLS	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3712054	SNELLING	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii
Animals - Mammals	Lasiurus blossevillii	western red bat	AMACC05060	None	None	SSC	-	3712073	MOCCASIN	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus blossevillii

Animals - Mammals	Lasiurus cinereus	hoary bat	AMACC05030	None	None	-	-	3712073	MOCCASIN	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus cinereus
Animals - Mammals	Lasiurus cinereus	hoary bat	AMACC05030	None	None	-	-	3712054	SNELLING	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus cinereus
Animals - Mammals	Lasiurus cinereus	hoary bat	AMACC05030	None	None	-	-	3712053	MERCED FALLS	Mapped	Animals - Mammals - Vespertilionidae - Lasiurus cinereus
Animals - Mammals	Myotis volans	long-legged myotis	AMACC01110	None	None	-	-	3712073	MOCCASIN	Mapped	Animals - Mammals - Vespertilionidae - Myotis volans
Animals - Mammals	Myotis yumanensis	Yuma myotis	AMACC01020	None	None	-	-	3712073	MOCCASIN	Mapped	Animals - Mammals - Vespertilionidae - Myotis yumanensis
Animals - Mollusks	Monadenia mormonum hirsuta	hirsute Sierra sideband	IMGASC7072	None	None	-	-	3712075	KEYSTONE	Mapped	Animals - Mollusks - Bradybaenidae - Monadenia mormonum hirsuta
Animals - Mollusks	Monadenia mormonum hirsuta	hirsute Sierra sideband	IMGASC7072	None	None	-	-	3712074	CHINESE CAMP	Mapped	Animals - Mollusks - Bradybaenidae - Monadenia mormonum hirsuta
Animals - Mollusks	Margaritifera falcata	western pearlshell	IMBIV27020	None	None	-	-	3712053	MERCED FALLS	Unprocessed	Animals - Mollusks - Margaritiferidae - Margaritifera falcata
Animals - Mollusks	Anodonta californiensis	California floater	IMBIV04020	None	None	-	-	3712075	KEYSTONE	Mapped	Animals - Mollusks - Unionidae - Anodonta californiensis
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712073	MOCCASIN	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712074	CHINESE CAMP	Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712075	KEYSTONE	Mapped	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712064	LA GRANGE	Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712063	PENON BLANCO PEAK	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712054	SNELLING	Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	3712053	MERCED FALLS	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Animals - Reptiles	Phrynosoma blainvillii	coast horned lizard	ARACF12100	None	None	SSC	-	3712073	MOCCASIN	Unprocessed	Animals - Reptiles - Phrynosomatidae - Phrynosoma blainvillii
Community - Terrestrial	Northern Hardpan Vernal Pool	Northern Hardpan Vernal Pool	CTT44110CA	None	None	-	-	3712065	COOPERSTOWN	Unprocessed	Community - Terrestrial - Northern Hardpan Vernal Pool
Community - Terrestrial	Northern Hardpan Vernal Pool	Northern Hardpan Vernal Pool	CTT44110CA	None	None	-	-	3712054	SNELLING	Unprocessed	Community - Terrestrial - Northern Hardpan Vernal Pool
Community - Terrestrial	Northern Hardpan Vernal Pool	Northern Hardpan Vernal Pool	CTT44110CA	None	None	-	-	3712055	TURLOCK LAKE	Mapped	Community - Terrestrial - Northern Hardpan Vernal Pool
Plants - Vascular	Chlorogalum grandiflorum	Red Hills soaproot	PMLIL0G020	None	None	-	1B.2	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Agavaceae - Chlorogalum grandiflorum

Plants - Vascular	Allium sanbornii var. congdonii	Congdon's onion	PMLIL02211	None	None	-	4.3	3712073	MOCCASIN	Unprocessed	Plants - Vascular - Alliaceae - Allium sanbornii var. congdonii
Plants - Vascular	Allium tuolumnense	Rawhide Hill onion	PMLIL022W0	None	None	-	1B.2	3712073	MOCCASIN	Mapped	Plants - Vascular - Alliaceae - Allium tuolumnense
Plants - Vascular	Allium tuolumnense	Rawhide Hill onion	PMLIL022W0	None	None	-	1B.2	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Alliaceae - Allium tuolumnense
Plants - Vascular	Allium tuolumnense	Rawhide Hill onion	PMLIL022W0	None	None	-	1B.2	3712075	KEYSTONE	Mapped	Plants - Vascular - Alliaceae - Allium tuolumnense
Plants - Vascular	Eryngium pinnatisectum	Tuolumne button-celery	PDAPI0Z0P0	None	None	-	1B.2	3712073	MOCCASIN	Mapped	Plants - Vascular - Apiaceae - Eryngium pinnatisectum
Plants - Vascular	Eryngium pinnatisectum	Tuolumne button-celery	PDAPI0Z0P0	None	None	-	1B.2	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Apiaceae - Eryngium pinnatisectum
Plants - Vascular	Eryngium racemosum	Delta button-celery	PDAPI0Z0S0	None	Endangered	-	1B.1	3712055	TURLOCK LAKE	Mapped	Plants - Vascular - Apiaceae - Eryngium racemosum
Plants - Vascular	Eryngium spinosepalum	spiny-sepaled button-celery	PDAPI0Z0Y0	None	None	-	1B.2	3712053	MERCED FALLS	Mapped	Plants - Vascular - Apiaceae - Eryngium spinosepalum
Plants - Vascular	Eryngium spinosepalum	spiny-sepaled button-celery	PDAPI0Z0Y0	None	None	-	1B.2	3712054	SNELLING	Mapped	Plants - Vascular - Apiaceae - Eryngium spinosepalum
Plants - Vascular	Eryngium spinosepalum	spiny-sepaled button-celery	PDAPI0Z0Y0	None	None	-	1B.2	3712064	LA GRANGE	Mapped	Plants - Vascular - Apiaceae - Eryngium spinosepalum
Plants - Vascular	Lomatium congdonii	Congdon's lomatium	PDAPI1B0B0	None	None	-	1B.2	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Apiaceae - Lomatium congdonii
Plants - Vascular	Lomatium congdonii	Congdon's lomatium	PDAPI1B0B0	None	None	-	1B.2	3712075	KEYSTONE	Mapped	Plants - Vascular - Apiaceae - Lomatium congdonii
Plants - Vascular	Lomatium congdonii	Congdon's lomatium	PDAPI1B0B0	None	None	-	1B.2	3712073	MOCCASIN	Mapped	Plants - Vascular - Apiaceae - Lomatium congdonii
Plants - Vascular	Calycadenia hooveri	Hoover's calycadenia	PDAST1P040	None	None	-	1B.3	3712075	KEYSTONE	Mapped	Plants - Vascular - Asteraceae - Calycadenia hooveri
Plants - Vascular	Calycadenia hooveri	Hoover's calycadenia	PDAST1P040	None	None	-	1B.3	3712064	LA GRANGE	Mapped	Plants - Vascular - Asteraceae - Calycadenia hooveri
Plants - Vascular	Calycadenia hooveri	Hoover's calycadenia	PDAST1P040	None	None	-	1B.3	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Asteraceae - Calycadenia hooveri
Plants - Vascular	Calycadenia hooveri	Hoover's calycadenia	PDAST1P040	None	None	-	1B.3	3712054	SNELLING	Mapped	Plants - Vascular - Asteraceae - Calycadenia hooveri
Plants - Vascular	Calycadenia hooveri	Hoover's calycadenia	PDAST1P040	None	None	-	1B.3	3712053	MERCED FALLS	Mapped	Plants - Vascular - Asteraceae - Calycadenia hooveri
Plants - Vascular	Eriophyllum confertiflorum var. tanacetiflorum	tansy-flowered woolly sunflower	PDAST3N0D0	None	None	-	4.3	3712073	MOCCASIN	Unprocessed	Plants - Vascular - Asteraceae - Eriophyllum confertiflorum var. tanacetiflorum
Plants - Vascular	Hesperevax caulescens	hogwallow starfish	PDASTE5020	None	None	-	4.2	3712065	COOPERSTOWN	Unprocessed	Plants - Vascular - Asteraceae - Hesperevax caulescens

Plants - Vascular	Hesperevax caulescens	hogwallow starfish	PDASTE5020	None	None	-	4.2	3712064	LA GRANGE	Unprocessed	Plants - Vascular - Asteraceae - Hesperevax caulescens
Plants - Vascular	Lagophylla dichotoma	forked hare-leaf	PDAST5J070	None	None	-	1B.1	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Asteraceae - Lagophylla dichotoma
Plants - Vascular	Packera layneae	Layne's ragwort	PDAST8H1V0	Threatened	Rare	-	1B.2	3712073	MOCCASIN	Mapped	Plants - Vascular - Asteraceae - Packera layneae
Plants - Vascular	Packera layneae	Layne's ragwort	PDAST8H1V0	Threatened	Rare	-	1B.2	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Asteraceae - Packera layneae
Plants - Vascular	Pseudobahia bahiifolia	Hartweg's golden sunburst	PDAST7P010	Endangered	Endangered	-	1B.1	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Asteraceae - Pseudobahia bahiifolia
Plants - Vascular	Pseudobahia bahiifolia	Hartweg's golden sunburst	PDAST7P010	Endangered	Endangered	-	1B.1	3712064	LA GRANGE	Mapped	Plants - Vascular - Asteraceae - Pseudobahia bahiifolia
Plants - Vascular	Pseudobahia bahiifolia	Hartweg's golden sunburst	PDAST7P010	Endangered	Endangered	-	1B.1	3712053	MERCED FALLS	Mapped	Plants - Vascular - Asteraceae - Pseudobahia bahiifolia
Plants - Vascular	Pseudobahia bahiifolia	Hartweg's golden sunburst	PDAST7P010	Endangered	Endangered	-	1B.1	3712054	SNELLING	Mapped	Plants - Vascular - Asteraceae - Pseudobahia bahiifolia
Plants - Vascular	Senecio clevelandii var. heterophyllus	Red Hills ragwort	PDAST8H0R2	None	None	-	1B.2	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Asteraceae - Senecio clevelandii var. heterophyllus
Plants - Vascular	Senecio clevelandii var. heterophyllus	Red Hills ragwort	PDAST8H0R2	None	None	-	1B.2	3712075	KEYSTONE	Mapped	Plants - Vascular - Asteraceae - Senecio clevelandii var. heterophyllus
Plants - Vascular	Senecio clevelandii var. heterophyllus	Red Hills ragwort	PDAST8H0R2	None	None	-	1B.2	3712073	MOCCASIN	Mapped	Plants - Vascular - Asteraceae - Senecio clevelandii var. heterophyllus
Plants - Vascular	Cryptantha hooveri	Hoover's cryptantha	PDBOR0A190	None	None	-	1A	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Boraginaceae - Cryptantha hooveri
Plants - Vascular	Cryptantha mariposae	Mariposa cryptantha	PDBOR0A1Q0	None	None	-	1B.3	3712064	LA GRANGE	Mapped	Plants - Vascular - Boraginaceae - Cryptantha mariposae
Plants - Vascular	Cryptantha mariposae	Mariposa cryptantha	PDBOR0A1Q0	None	None	-	1B.3	3712075	KEYSTONE	Mapped	Plants - Vascular - Boraginaceae - Cryptantha mariposae
Plants - Vascular	Cryptantha mariposae	Mariposa cryptantha	PDBOR0A1Q0	None	None	-	1B.3	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Boraginaceae - Cryptantha mariposae
Plants - Vascular	Cryptantha spithamaea	Red Hills cryptantha	PDBOR0A2M2	None	None	-	1B.3	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Boraginaceae - Cryptantha spithamaea
Plants - Vascular	Cryptantha spithamaea	Red Hills cryptantha	PDBOR0A2M2	None	None	-	1B.3	3712073	MOCCASIN	Mapped	Plants - Vascular - Boraginaceae - Cryptantha spithamaea
Plants - Vascular	Downingia pusilla	dwarf downingia	PDCAM060C0	None	None	-	2B.2	3712064	LA GRANGE	Mapped	Plants - Vascular - Campanulaceae - Downingia pusilla
Plants - Vascular	Downingia pusilla	dwarf downingia	PDCAM060C0	None	None	-	2B.2	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Campanulaceae - Downingia pusilla
Plants - Vascular	Downingia pusilla	dwarf downingia	PDCAM060C0	None	None	-	2B.2	3712054	SNELLING	Mapped	Plants - Vascular - Campanulaceae - Downingia pusilla
Plants - Vascular	Downingia pusilla	dwarf downingia	PDCAM060C0	None	None	-	2B.2	3712053	MERCED FALLS	Mapped	Plants - Vascular - Campanulaceae - Downingia pusilla

Plants - Vascular	Githopsis pulchella ssp. serpentinicola	serpentine bluecup	PDCAM07053	None	None	-	4.3	3712073	MOCCASIN	Unprocessed	Plants - Vascular - Campanulaceae - Githopsis pulchella ssp. serpentinicola
Plants - Vascular	Githopsis pulchella ssp. serpentinicola	serpentine bluecup	PDCAM07053	None	None	-	4.3	3712074	CHINESE CAMP	Unprocessed	Plants - Vascular - Campanulaceae - Githopsis pulchella ssp. serpentinicola
Plants - Vascular	Githopsis pulchella ssp. serpentinicola	serpentine bluecup	PDCAM07053	None	None	-	4.3	3712075	KEYSTONE	Unprocessed	Plants - Vascular - Campanulaceae - Githopsis pulchella ssp. serpentinicola
Plants - Vascular	Githopsis tenella	delicate bluecup	PDCAM07070	None	None	-	1B.3	3712074	CHINESE CAMP	Mapped and Unprocessed	Plants - Vascular - Campanulaceae - Githopsis tenella
Plants - Vascular	Cuscuta obtusiflora var. glandulosa	Peruvian dodder	PDCUS01111	None	None	-	2B.2	3712054	SNELLING	Mapped	Plants - Vascular - Convolvulaceae - Cuscuta obtusiflora var. glandulosa
Plants - Vascular	Euphorbia hooveri	Hoover's spurge	PDEUP0D150	Threatened	None	-	1B.2	3712055	TURLOCK LAKE	Mapped	Plants - Vascular - Euphorbiaceae - Euphorbia hooveri
Plants - Vascular	Euphorbia hooveri	Hoover's spurge	PDEUP0D150	Threatened	None	-	1B.2	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Euphorbiaceae - Euphorbia hooveri
Plants - Vascular	Lupinus spectabilis	shaggyhair lupine	PDFAB2B3P0	None	None	-	1B.2	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Fabaceae - Lupinus spectabilis
Plants - Vascular	Lupinus spectabilis	shaggyhair lupine	PDFAB2B3P0	None	None	-	1B.2	3712073	MOCCASIN	Mapped	Plants - Vascular - Fabaceae - Lupinus spectabilis
Plants - Vascular	Monardella leucocephala	Merced monardella	PDLAM180C0	None	None	-	1A	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Lamiaceae - Monardella leucocephala
Plants - Vascular	Monardella leucocephala	Merced monardella	PDLAM180C0	None	None	-	1A	3712064	LA GRANGE	Mapped	Plants - Vascular - Lamiaceae - Monardella leucocephala
Plants - Vascular	Trichostema rubisepalum	Hernandez bluecurls	PDLAM220C0	None	None	-	4.3	3712074	CHINESE CAMP	Unprocessed	Plants - Vascular - Lamiaceae - Trichostema rubisepalum
Plants - Vascular	Fritillaria agrestis	stinkbells	PMLIL0V010	None	None	-	4.2	3712074	CHINESE CAMP	Mapped and Unprocessed	Plants - Vascular - Liliaceae - Fritillaria agrestis
Plants - Vascular	Fritillaria agrestis	stinkbells	PMLIL0V010	None	None	-	4.2	3712063	PENON BLANCO PEAK	Mapped and Unprocessed	Plants - Vascular - Liliaceae - Fritillaria agrestis
Plants - Vascular	Fritillaria agrestis	stinkbells	PMLIL0V010	None	None	-	4.2	3712054	SNELLING	Unprocessed	Plants - Vascular - Liliaceae - Fritillaria agrestis
Plants - Vascular	Clarkia biloba ssp. australis	Mariposa clarkia	PDONA05051	None	None	-	1B.2	3712053	MERCED FALLS	Mapped	Plants - Vascular - Onagraceae - Clarkia biloba ssp. australis
Plants - Vascular	Clarkia biloba ssp. australis	Mariposa clarkia	PDONA05051	None	None	-	1B.2	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Onagraceae - Clarkia biloba ssp. australis
Plants - Vascular	Clarkia biloba ssp. australis	Mariposa clarkia	PDONA05051	None	None	-	1B.2	3712063	PENON BLANCO PEAK	Mapped	Plants - Vascular - Onagraceae - Clarkia biloba ssp. australis
Plants - Vascular	Clarkia rostrata	beaked clarkia	PDONA050Y0	None	None	-	1B.3	3712063	PENON BLANCO PEAK	Mapped	Plants - Vascular - Onagraceae - Clarkia rostrata
Plants - Vascular	Clarkia rostrata	beaked clarkia	PDONA050Y0	None	None	-	1B.3	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Onagraceae - Clarkia rostrata
Plants - Vascular	Clarkia rostrata	beaked clarkia	PDONA050Y0	None	None	-	1B.3	3712053	MERCED FALLS	Mapped	Plants - Vascular - Onagraceae - Clarkia rostrata
Plants - Vascular	Clarkia rostrata	beaked clarkia	PDONA050Y0	None	None	-	1B.3	3712054	SNELLING	Mapped	Plants - Vascular - Onagraceae - Clarkia rostrata

Plants - Vascular	Castilleja campestris var. succulenta	succulent owl's-clover	PDSCR0D3Z1	Threatened	Endangered	-	1B.2	3712054	SNELLING	Mapped	Plants - Vascular - Orobanchaceae - Castilleja campestris var. succulenta
Plants - Vascular	Castilleja campestris var. succulenta	succulent owl's-clover	PDSCR0D3Z1	Threatened	Endangered	-	1B.2	3712053	MERCED FALLS	Mapped	Plants - Vascular - Orobanchaceae - Castilleja campestris var. succulenta
Plants - Vascular	Castilleja campestris var. succulenta	succulent owl's-clover	PDSCR0D3Z1	Threatened	Endangered	-	1B.2	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Orobanchaceae - Castilleja campestris var. succulenta
Plants - Vascular	Castilleja campestris var. succulenta	succulent owl's-clover	PDSCR0D3Z1	Threatened	Endangered	-	1B.2	3712064	LA GRANGE	Mapped	Plants - Vascular - Orobanchaceae - Castilleja campestris var. succulenta
Plants - Vascular	Erythranthe marmorata	Stanislaus monkeyflower	PDPHR01130	None	None	-	1B.1	3712075	KEYSTONE	Mapped	Plants - Vascular - Phrymaceae - Erythranthe marmorata
Plants - Vascular	Neostapfia colusana	Colusa grass	PMPOA4C010	Threatened	Endangered	-	1B.1	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Poaceae - Neostapfia colusana
Plants - Vascular	Neostapfia colusana	Colusa grass	PMPOA4C010	Threatened	Endangered	-	1B.1	3712055	TURLOCK LAKE	Mapped	Plants - Vascular - Poaceae - Neostapfia colusana
Plants - Vascular	Orcuttia pilosa	hairy Orcutt grass	PMPOA4G040	Endangered	Endangered	-	1B.1	3712055	TURLOCK LAKE	Mapped	Plants - Vascular - Poaceae - Orcuttia pilosa
Plants - Vascular	Orcuttia pilosa	hairy Orcutt grass	PMPOA4G040	Endangered	Endangered	-	1B.1	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Poaceae - Orcuttia pilosa
Plants - Vascular	Tuctoria greenei	Greene's tuctoria	PMPOA6N010	Endangered	Rare	-	1B.1	3712065	COOPERSTOWN	Mapped	Plants - Vascular - Poaceae - Tuctoria greenei
Plants - Vascular	Navarretia paradoxiclara	Patterson's navarretia	PDPLM0C150	None	None	-	1B.3	3712075	KEYSTONE	Mapped	Plants - Vascular - Polemoniaceae - Navarretia paradoxiclara
Plants - Vascular	Navarretia paradoxiclara	Patterson's navarretia	PDPLM0C150	None	None	-	1B.3	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Polemoniaceae - Navarretia paradoxiclara
Plants - Vascular	Eriogonum tripodum	tripod buckwheat	PDPGN085Y0	None	None	-	4.2	3712073	MOCCASIN	Unprocessed	Plants - Vascular - Polygonaceae - Eriogonum tripodum
Plants - Vascular	Eriogonum tripodum	tripod buckwheat	PDPGN085Y0	None	None	-	4.2	3712074	CHINESE CAMP	Unprocessed	Plants - Vascular - Polygonaceae - Eriogonum tripodum
Plants - Vascular	Potamogeton zosteriformis	eel-grass pondweed	PMPOT03160	None	None	-	2B.2	3712053	MERCED FALLS	Mapped	Plants - Vascular - Potamogetonaceae - Potamogeton zosteriformis
Plants - Vascular	Delphinium hansenii ssp. ewanianum	Ewan's larkspur	PDRAN0B0T2	None	None	-	4.2	3712075	KEYSTONE	Unprocessed	Plants - Vascular - Ranunculaceae - Delphinium hansenii ssp. ewanianum
Plants - Vascular	Jepsonia heterandra	foothill jepsonia	PDSAX0J010	None	None	-	4.3	3712073	MOCCASIN	Unprocessed	Plants - Vascular - Saxifragaceae - Jepsonia heterandra
Plants - Vascular	Jepsonia heterandra	foothill jepsonia	PDSAX0J010	None	None	-	4.3	3712074	CHINESE CAMP	Unprocessed	Plants - Vascular - Saxifragaceae - Jepsonia heterandra
Plants - Vascular	Jepsonia heterandra	foothill jepsonia	PDSAX0J010	None	None	-	4.3	3712063	PENON BLANCO PEAK	Unprocessed	Plants - Vascular - Saxifragaceae - Jepsonia heterandra

Plants - Vascular	Jepsonia heterandra	foothill jepsonia	PDSAX0J010	None	None	-	4.3	3712064	LA GRANGE	Unprocessed	Plants - Vascular - Saxifragaceae - Jepsonia heterandra
Plants - Vascular	Jepsonia heterandra	foothill jepsonia	PDSAX0J010	None	None	-	4.3	3712053	MERCED FALLS	Unprocessed	Plants - Vascular - Saxifragaceae - Jepsonia heterandra
Plants - Vascular	Brodiaea pallida	Chinese Camp brodiaea	PMLIL0C0C0	Threatened	Endangered	-	1B.1	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Themidaceae - Brodiaea pallida
Plants - Vascular	Verbena californica	Red Hills vervain	PDVER0N050	Threatened	Threatened	-	1B.1	3712074	CHINESE CAMP	Mapped	Plants - Vascular - Verbenaceae - Verbena californica
Plants - Vascular	Verbena californica	Red Hills vervain	PDVER0N050	Threatened	Threatened	-	1B.1	3712075	KEYSTONE	Mapped	Plants - Vascular - Verbenaceae - Verbena californica

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

38 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3712075, 3712074, 3712073, 3712065, 3712064, 3712063, 3712055 3712054 and 3712053;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Allium sanbornii var. congdonii	Congdon's onion	Alliaceae	perennial bulbiferous herb	Apr-Jul	4.3	S3	G4T3
Allium tuolumnense	Rawhide Hill onion	Alliaceae	perennial bulbiferous herb	Mar-May	1B.2	S2	G2
Brodiaea pallida	Chinese Camp brodiaea	Themidaceae	perennial bulbiferous herb	May-Jun	1B.1	S1	G1
Calycadenia hooveri	Hoover's calycadenia	Asteraceae	annual herb	Jul-Sep	1B.3	S2	G2
Castilleja campestris var. succulenta	succulent owl's-clover	Orobanchaceae	annual herb (hemiparasitic)	(Mar)Apr-May	1B.2	S2S3	G4? T2T3
Chlorogalum grandiflorum	Red Hills soaproot	Agavaceae	perennial bulbiferous herb	May-Jun	1B.2	S3	G3
Clarkia biloba ssp. australis	Mariposa clarkia	Onagraceae	annual herb	Apr-Jul	1B.2	S3	G4G5T3
Clarkia rostrata	beaked clarkia	Onagraceae	annual herb	Apr-May	1B.3	S2S3	G2G3
Cryptantha hooveri	Hoover's cryptantha	Boraginaceae	annual herb	Apr-May	1A	SH	GH
Cryptantha mariposae	Mariposa cryptantha	Boraginaceae	annual herb	Apr-Jun	1B.3	S2S3	G2G3
Cryptantha spithamaea	Red Hills cryptantha	Boraginaceae	annual herb	Apr-May	1B.3	S2	G2
Cuscuta obtusiflora var. glandulosa	Peruvian dodder	Convolvulaceae	annual vine (parasitic)	Jul-Oct	2B.2	SH	G5T4?
Delphinium hansenii ssp. ewanianum	Ewan's larkspur	Ranunculaceae	perennial herb	Mar-May	4.2	S3	G4T3
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	2B.2	S2	GU
Eryngium jepsonii	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
Eryngium pinnatisectum	Tuolumne button-celery	Apiaceae	annual / perennial herb	May-Aug	1B.2	S2	G2

Eryngium racemosum	Delta button-celery	Apiaceae	annual / perennial herb	Jun-Oct	1B.1	S1	G1
Eryngium spinosepalum	spiny-sepaled button-celery	Apiaceae	annual / perennial herb	Apr-Jun	1B.2	S2	G2
Erythranthe marmorata	Stanislaus monkeyflower	Phrymaceae	annual herb	Mar-May	1B.1	SX	GXQ
Euphorbia hooveri	Hoover's spurge	Euphorbiaceae	annual herb	Jul-Sep(Oct)	1B.2	S1	G1
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	4.2	S3	G3
Githopsis pulchella ssp. serpentinicola	serpentine bluecup	Campanulaceae	annual herb	May-Jun	4.3	S3	G4T3
Githopsis tenella	delicate bluecup	Campanulaceae	annual herb	Apr-Jun	1B.3	S2	G2
Jepsonia heterandra	foothill jepsonia	Saxifragaceae	perennial herb	Aug-Dec	4.3	S3	G3
Lagophylla dichotoma	forked hare-leaf	Asteraceae	annual herb	Apr-May	1B.1	S2	G2
Lomatium congdonii	Congdon's lomatium	Apiaceae	perennial herb	Mar-Jun	1B.2	S2	G2
Lupinus spectabilis	shaggyhair lupine	Fabaceae	annual herb	Apr-May	1B.2	S2	G2
Monardella leucocephala	Merced monardella	Lamiaceae	annual herb	May-Aug	1A	SH	GH
Navarretia paradoxiclara	Patterson's navarretia	Polemoniaceae	annual herb	May-Jun(Jul)	1B.3	S2	G2
Neostapfia colusana	Colusa grass	Poaceae	annual herb	May-Aug	1B.1	S1	G1
Orcuttia pilosa	hairy Orcutt grass	Poaceae	annual herb	May-Sep	1B.1	S1	G1
Packera layneae	Layne's ragwort	Asteraceae	perennial herb	Apr-Aug	1B.2	S2	G2
Potamogeton zosteriformis	eel-grass pondweed	Potamogetonaceae	annual herb (aquatic)	Jun-Jul	2B.2	S3	G5
Pseudobahia bahiifolia	Hartweg's golden sunburst	Asteraceae	annual herb	Mar-Apr	1B.1	S2	G2
Senecio clevelandii var. heterophyllus	Red Hills ragwort	Asteraceae	perennial herb	May-Jul	1B.2	S2	G4?T2Q
Trichostema rubisepalum	Hernandez bluecurls	Lamiaceae	annual herb	Jun-Aug	4.3	S4	G4
Tuctoria greenei	Greene's tuctoria	Poaceae	annual herb	May-Jul(Sep)	1B.1	S1	G1
Verbena californica	Red Hills vervain	Verbenaceae	perennial herb	May-Sep	1B.1	S2	G2

Suggested Citation

California Native Plant Society, Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 11 November 2019].

Search the Inventory
Simple Search
Advanced Search
Glossary

Information
About the Inventory
About the Rare Plant Program
CNPS Home Page
About CNPS
Join CNPS

Contributors
The Calflora Database
The California Lichen Society
California Natural Diversity Database
The Jepson Flora Project
The Consortium of California Herbaria
CalPhotos

Questions and Comments

Appendix C. Special-status Species

This page is intentionally blank.

Appendix Table Bio-1. Special-status species with the potential to occur in the Proposed Project area

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Plants[a]							
Allium tuolumnense	Rawhide Hill onion	—	—	1B.2	Serpentine soil in cismontane woodland. Elevation: 980–1,970 feet. Blooming period: March–May.	No	Required soils for this species are absent from the Proposed Project area.
Brodiaea pallida	Chinese Camp brodiaea	FT	SE	1B.1	Vernal streambed, often in serpentine soils in cismontane woodland and grassland. Elevation: 540–1,265 feet. Blooming period: May–June.	No	This species has a restricted distribution and has not been found less than 14 miles from the Proposed Project area (CCH 2019).
Calycadenia hooveri	Hoover's calycadenia	—	—	1B.3	Rocky soils in cismontane woodland and grassland. Elevation: 210–985 feet. Blooming period: July–September.	No	Habitat for this species is present in upland portions of the Proposed Project area. No impacts are expected in these areas based on Project design.
Castilleja campestris var. *succulenta*	succulent owl's-clover	FT	SE	1B.2	Vernal pools that are often acidic. Elevation: 160–2,460 feet. Blooming period: March–May.	No	This species is associated with vernal pools, which are absent from the Proposed Project area.
Chlorogalum grandiflorum	Red Hills soaproot	—	—	1B.2	Serpentine, gabbro, or other soils in chaparral, cismontane woodland, and lower montane coniferous forest. Elevation: 800–5,545 feet. Blooming period: May–June.	No	The elevation range of this species is more than 500 feet above the range of the Proposed Project area.
Clarkia biloba ssp. *australis*	Mariposa clarkia	—	—	1B.2	Serpentine soils in chaparral and cismontane woodland. Elevation: 980–4,790 feet. Blooming period: April–July.	No	Required soils for this species are absent from the Proposed Project area.
Clarkia rostrata	beaked clarkia	—	—	1B.3	Grassland and cismontane woodland. Elevation: 195–1,640 feet. Blooming period: April–May.	No	Records of this species within 18 miles are nearly 80 years old (CCH 2019).

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Cryptantha hooveri	Hoover's cryptantha	—	—	1A	Inland dune and sandy grassland. Elevation: 29–492 feet. Blooming period: April–May.	No	This species is considered to be extinct.
Cryptantha mariposae	Mariposa cryptantha	—	—	1B.3	Serpentine or rocky soils in chaparral. Elevation: 655–2,135 feet. Blooming period: April–June.	No	Habitat for this species is not present in the Proposed Project area.
Cryptantha spithamaea	Red Hills cryptantha	—	—	1B.3	Serpentine soils sometimes in streambeds and openings of chaparral and cismontane woodland. Elevation: 900–1,510 feet. Blooming period: April–May.	No	Required soils for this species are absent from the Proposed Project area.
Cuscuta obtusiflora var. *glandulosa*	Peruvian dodder	—	—	2B.2	Marshes and freshwater swamps. Elevation: 49–918 feet. Blooming period: July–October.	No	Habitat for this species is not present in the Proposed Project area.
Downingia pusilla	dwarf downingia	—	—	2B.2	Vernal pools and mesic grassland. Elevation: 0–1,460 feet. Blooming period: March–May.	No	This species is associated with vernal pools, which are absent from the Proposed Project area.
Eryngium jepsonii	Jepson's coyote thistle	—	—	1B.2	Clay soil in vernal pools and grassland. Elevation: 5–985 feet. Blooming period: April–August.	No	This species is associated with vernal pools, which are absent from the Proposed Project area.
Eryngium pinnatisectum	Tuolumne button-celery	—	—	1B.2	Mesic soils in vernal pools, cismontane woodland, and lower montane coniferous forest. Elevation: 225–3,000 feet. Blooming period: May–August.	No	This species is associated with vernal pools, which are absent from the Proposed Project area.
Eryngium racemosum	Delta button-celery	—	SE	1B.1	Vernally mesic clay depressions in riparian scrub. Elevation: 5–100 feet. Blooming period: June–October.	No	Required soils for this species are absent from the Proposed Project area.
Eryngium spinosepalum	spiny-sepaled button-celery	—	—	1B.2	Vernal pools and grassland. Elevation: 262–2,034 feet. Blooming period: April–June	No	This species is associated with vernal pools, which are absent from the Proposed Project area.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Erythranthe marmorata	Stanislaus monkey-flower	—	—	1B.1	Cismontane woodland and lower montane coniferous forest. Elevation: 325–2,955 feet. Blooming period: March–May.	No	The only record of this species recorded in 70 years is more than 80 miles away (CCH 2019).
Euphorbia hooveri	Hoover's spurge	FT	—	1B.2	Vernal pools. Elevation: 80–820 feet. Blooming period: July–October.	No	This species is associated with vernal pools, which are absent from the Proposed Project area.
Githopsis tenella	delicate bluecup	—	—	1B.3	Mesic soils in chaparral and cismontane woodland. Elevation: 3,608–6,233 feet. Blooming period: May–June.	No	The elevation range of this species is more than 500 feet above the range of the Proposed Project area.
Lagophylla dichotoma	forked hare-leaf	—	—	1B.1	Sometimes in clay soils in cismontane woodland and grassland. Elevation: 145–1,100 feet. Blooming period: April–May.	No	The only records of this species within 80 years are in Calaveras and Fresno Counties (CCH 2019).
Lomatium congdonii	Congdon's lomatium	—	—	1B.2	Serpentine soils in chaparral and cismontane woodland. Elevation: 980–6,890 feet. Blooming period: March–June.	No	The elevation range of this species is more than 500 feet above the range of the Proposed Project area.
Lupinus spectabilis	shaggyhair lupine	—	—	1B.2	Serpentine soils in chaparral and cismontane woodland. Elevation: 850–2,705 feet. Blooming period: April–May.	No	The elevation range of this species is more than 500 feet above the range of the Proposed Project area.
Monardella leucocephala	Merced monardella	—	—	1A	Sandy and mesic soils in grassland. Elevation: 110–330 feet. Blooming period: May–August.	No	This species is considered to be extinct.
Navarretia paradoxiclara	Patterson's navarretia	—	—	1B.3	Serpentine, vernally mesic soils in openings and drainages of meadows and seeps. Elevation: 490–1,410 feet. Blooming period: May–July.	No	Required soils for this species are absent from the Proposed Project area.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Neostapfia colusana	Colusa grass	FT	SE	1B.1	Large vernal pools with adobe soils. Elevation: 15–655 feet. Blooming period: May–August	No	This species is associated with vernal pools, which are absent from the Proposed Project area.
Orcuttia pilosa	hairy Orcutt grass	FE	SE	1B.1	Vernal pools. Elevation: 150–655 feet. Blooming period: May–September.	No	This species is associated with vernal pools, which are absent from the Proposed Project area.
Packera layneae	Layne's ragwort	FT	SR	1B.2	Rocky serpentine or gabbro soils in chaparral and cismontane woodland. Elevation: 655–3,560 feet. Blooming period: April–August.	No	Required soils for this species are absent from the Proposed Project area.
Potamogeton zosteriformis	eel-grass pondweed	—	—	2B.2	Freshwater marshes and swamps. Elevation: 0–6,100 feet. Blooming period: June–July.	No	Habitat for this species is not present in the Proposed Project area.
Pseudobahia bahiifolia	Hartweg's golden sunburst	FE	SE	1B.1	Clay, often acidic, soils in cismontane woodland and grassland. Elevation: 45–490 feet. Blooming period: March–April.	No	Required soils for this species are absent from the Proposed Project area.
Senecio clevelandii var. *heterophyllus*	Red Hills ragwort	—	—	1B.2	Serpentine seeps of cismontane woodland. Elevation: 850–1,265 feet. Blooming period: May–July.	No	Required soils for this species are absent from the Proposed Project area.
Tuctoria greenei	Greene's tuctoria	FE	SR	1B.1	Vernal pools. Elevation: 95–3,510 feet. Blooming period: May–July (September).	No	This species is associated with vernal pools, which are absent from the Proposed Project area.
Verbena californica	Red Hills vervain	FT	ST	1B.1	Serpentine seeps and creeks in mesic soils in cismontane woodland and grassland. Elevation: 850–1,310 feet. Blooming period: May–September.	No	Required soils for this species are absent from the Proposed Project area.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Invertebrates							
Bombus crotchii	crotch bumble bee	—	CE	—	Uncommon. Occurs primarily in California, including the Mediterranean region, Pacific Coast, Western Desert, Great Valley, and adjacent foothills through most of southwestern California (Xerces 2018). In California, the species is known to inhabit open grassland and scrub habitats. Bumble bees are known to produce annual colonies and typically nest underground. Mated queens overwinter in soft debris, leaf litter, or disturbed soils and emerge in early spring to feed and search for a new colony site; typically in former burrows (Xerces 2018; UFIFAS 2019). Preferred food source species include *Antirrhinum* spp., *Phacelia* spp., *Clarkia* spp., *Dendromecon* spp., *Eschscholzia* spp., and *Eriogonum* spp. (USFS 2012).	No	The steep slopes, rocky outcrops and soils, and lack of appropriate food plants likely precludes the presence of this species' colony in the proposed Project area. Furthermore, the only possible habitat for this species is in open, undisturbed areas that would not be impacted by project activities. Additionally, the nearest record of this species in the past 50 years is 51 miles away (CDFW 2019b).
Branchinecta conservatio	conservancy fairy shrimp	FE	—	—	Endemic to California vernal pools, almost entirely in the Central Valley, with the exception of one population along the central coast in Ventura County. Majority of sites inhabited by this species are large and turbid pools, which remain inundated much longer than typical vernal pools (USFWS 2012).	No	No vernal pools present.
Branchinecta lynchi	vernal pool fairy shrimp	FT	—	—	Endemic to California and the Agate Desert of southern Oregon. Found only in cool water vernal pools and vernal pool-like habitats (USFWS 2007).	No	No vernal pools present.
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	FT	—	—	Dependent on host plant, elderberry (*Sambucus* spp.), which most commonly grows in riparian woodlands, but also in some upland habitats such as oak savannas and annual grasslands. Current presumed range in Central Valley extends from Shasta County south to Fresno County, including the valley floor and lower foothills up to about 500 feet in elevation (USFWS 2017).	No	Host plant elderberry present along La Grange Dam Road outside of the Proposed Project area; however, road is paved and wide enough to accommodate Project-related traffic. No improvements, off-roading, or changes from the existing conditions would occur.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Fishes							
Collus gulosus	riffle sculpin	—	SSC	—	Adults require clean, gravelly riffles in permanent streams for spawning, while the ammocoetes require sandy backwaters or stream edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 25°C (Moyle 2002).	Yes	Suitable habitat present.
Entosphenus tridentatus	pacific lamprey	—	SSC	—	Cold, clear water for spawning and incubation. Peak spawning appears to be closely tied to water temperatures that are suitable for early development, but can occur at temperatures above 22ºC. Adults use gravel areas to build nests, while ammocoetes need soft sediments in which to burrow during rearing. Nests are generally associated with cover, including gravel and cobble substrates, vegetation and woody debris. Ammocoetes burrow into larger substrates as they grow. Ammocoetes also need detritus that produces algae for food and habitats with slow or moderately slow water velocities, such as low gradient riffles, pool tailouts and lateral scour pools (CDFW 2015).	Yes	Suitable habitat present.
Hypomesus transpacificus	delta smelt	FT	SE	—	Endemic to open waters of San Francisco Bay and Sacramento-San Joaquin River Delta. Distribution includes San Pablo Bay up through Suisun Bay, upstream through the Delta to the Sacramento River below Isleton, and the San Joaquin River below Mossdale. Spawning is thought to take place in sloughs and shallow edge-water channels in the upper Delta and in Montezuma Slough near Suisun Bay (USFWS 2010a).	No	Outside of known species range.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Lampetra hubbsi	Kern brook lamprey	—	SSC	—	A non-predatory lamprey that is endemic to the east side of the San Joaquin Valley. Have been found in the Kern-Friant Canal, as well as the Merced, Kaweah, Kings, and San Joaquin Rivers. Typically found in slow-moving shallow pools and edgewater habitats where flows are slight in substrates of sand and mud (Moyle 2002).	No	Outside known species range.
Lavinia exilicauda exilicauda	Sacramento hitch	—	SSC	—	The Sacramento hitch is a subspecies of hitch that occurs in the Central Valley. They have a scattered distribution within the Central Valley from the Tulare Lake basin to Shasta Reservoir (Moyle 2002).	Yes	Suitable habitat present.
Lavinia symmetricus ssp. 1	San Joaquin roach	—	SSC	—	Typically found in small, warm, intermittent streams with population density increasing near isolated pools. Species abundant in mid-elevation streams in the Sierra foothills. Roach are tolerant of relatively high temperatures (30–35°C). However, they are habitat generalists, also being found in cold, well-aerated clear streams, in human-modified habitats, and in the main channels of rivers, such as the Russian and Tuolumne. The San Joaquin roach population is known from the Sacramento and San Joaquin River drainages, except the Pit River (CDFW 1995; Moyle 2002).	Yes	Suitable habitat present.
Lavinia symmetricus ssp. 3	Red Hills roach	—	SSC	—	Typically found in small, warm, intermittent streams with population density increasing near isolated pools. Species abundant in mid-elevation streams in the Sierra foothills. Roach are tolerant of relatively high temperatures (30–35°C). However, they are habitat generalists, also being found in cold, well-aerated clear streams, in human-modified habitats, and in the main channels of rivers, such as the Russian and Tuolumne (CDFW 1995). The Red Hills roach is a fairly distinct population that occurs in tributaries within the Red Hills between New Melones Lake and Don Pedro Reservoir (UC Davis 2019).	No	Outside of known species range.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Mylopharodon conocephalus	hardhead	—	SSC	—	Small to large streams in low- to mid-elevation environments. Hardhead may also inhabit lakes or reservoirs. Preferred stream temperature might easily exceed 20ºC, although these fish do not favor low dissolved oxygen levels. Usually found in clear deep streams with a slow, but present flow. Although spawning may occur in pools, runs, or riffles, the bedding area will typically be characterized by gravel and rocky substrate. Occurs from Sacramento-San Joaquin and Russian River drainages from the Pit River, Modoc County in the north to the Kern River, Kern County in the south (University of California, Davis 2017).	Yes	Suitable habitat present.
Oncorhynchus mykiss irideus	steelhead (central valley DPS)	FT	None	—	Includes naturally spawned anadromous steelhead originating below natural and manmade impassable barriers from the Sacramento and San Joaquin Rivers and their tributaries; excludes such fish originating from San Francisco and San Pablo Bays and their tributaries. This DPS does include steelhead from two artificial propagation programs: Coleman National Fish Hatchery Program and Feather River Fish Hatchery Program. Spawning habitat = gravel-bottomed, fast-flowing, well-oxygenated rivers and streams. Non-spawning = estuarine, marine waters (NOAA 2019).	Yes	Suitable habitat present.
Oncorhynchus tshawytscha pop. 13	chinook salmon – Central Valley fall/ late fall-run ESU	—	SSC	—	Currently found primarily in the Sacramento River, where most spawning and rearing of juveniles takes place in the reach between Red Bluff Diversion Dam and Redding's Keswick Dam. The specific habitat requirements of late fall-run Chinook salmon have not been determined but they are presumably similar to other Central Valley Chinook salmon runs. It is believed that optimal conditions fall within the range of physical and chemical characteristics of the unimpaired Sacramento River above Shasta Dam (CDFW 2015).	Yes	Suitable habitat present.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Amphibians							
Ambystoma californiense	California tiger salamander	FT	ST	—	Known to breed in fish-free ephemeral ponds. Also known to breed in slow streams and semi-permanent waters, including cattle ponds. Spends most of the year underground in small mammal burrows, especially those of California ground squirrel (*Otospermophilus beecheyi*). Typical habitat associations include grassland, oak savanna, edges of mixed woodland, and lower elevation coniferous forest (Nafis 2019).	No	Although suitable breeding ponds may exist near the Proposed Project area, and a critical habitat unit occurs adjacent to the Proposed Project area, large canals parallel either side of the Tuolumne River, isolating the Proposed Project area from suitable habitat and precluding the presence of this species.
Rana boylii	foothill yellow-legged frog	—	ST	—	Ranges in the northern half of California except for the Central Valley, Modoc Plateau, and eastern side of the Sierra Nevada Mountains. Generally found in shallow flowing streams and rivers with at least cobble-sized substrate. Breeding generally occurs at the margins of wide shallow channels with reduced flow variation near tributary confluences. Specifically, egg masses are placed in low-flow locations on or under rocks with preferred substrates being boulders, cobbles, or gravel. Eggs have been found at depths to nearly 3 feet in water velocities of 0–0.7 feet per second and, at most, 41 feet from shore. Maximum water temperature for breeding is 26ºC, and 9ºC to 21.5ºC is the preferred range. Tadpoles avoid areas below 13ºC and prefer temperatures between 16.5ºC and 22.2ºC (Thomson et al. 2016).	No	Suitable habitat not present. All occurrences in regional vicinity are higher elevation in tributaries to larger water bodies (CDFW 2019b).

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Rana draytonii	California red-legged frog	FT	SSC	—	Can be found in ponds and streams in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover in lowlands or foothills. Breeding habitat includes permanent or ephemeral water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. Ephemeral wetland habitats require animal burrows or other moist refuges for estivation when the wetlands are dry. From sea level to 5,000 feet. Occurs along the Coast Ranges from Mendocino County south to northern Baja California, and inland across the northernmost reaches of the Sacramento Valley and locally south through portions of the Sierra Nevada foothills as far south as northern Tulare County (Nafis 2019).	No	The majority of reported occurrences are in lower elevations on the valley floor, with an isolated occurrence north of the Proposed Project area within the Woods Creek drainage (CDFW 2019b). Suitable breeding habitat not present. Although suitable breeding ponds may exist near the Proposed Project area, large canals and steep canyon walls parallel either side of the Tuolumne River, isolating the project area and precluding the presence of this species.
Spea hammondii	western spadefoot	—	SSC	—	Ranges in western California except for the northwest corner. Generally found in grasslands, oak woodlands, coastal sage scrub, and chaparral in washes, floodplains, alluvial fans, playas, and alkali flats. Natural and artificial water bodies are used for breeding. Specifically, vernal pools used by this species have an average ponding duration of 81 days, and successful recruitment occurs in ponds that last, on average, 21 days longer than larval development time. Pool temperature requirements are from 9ºC to 32ºC. Pools with invasive species, such as crayfish (Astacoidea), bullfrogs (*Xenopus laevis*), or fish often exclude this species in its northern population. The southern population is not necessarily excluded by the presence of invasive species; however the effects of invasives on the southern population are not fully understood (Thomson et al. 2016).	No	Suitable breeding habitat not present. Although suitable breeding ponds may exist near the Proposed Project area, large canals parallel either side of the Tuolumne River, isolating the Project area and precluding the presence of this species.
Reptiles							

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Emys marmorata	western pond turtle	—	SSC	—	Ranges throughout California except for Inyo and Mono Counties. Generally occurs in various water bodies including permanent and ephemeral systems either natural or artificial. Upland habitat that is at least moderately undisturbed and is required for nesting and overwintering, in soils that are loose enough for excavation (Thomson et al. 2016).	No	Suitable habitat not present. Soils in Proposed Project area are very rocky, steep and compacted and unsuitable for nesting. Species does not typically occur in large mainstem river systems such as this, more typical of slower moving tributaries and backwaters.
Phrynosoma blainvillii	coast horned lizard	—	SSC	—	Known to occur in open areas of sandy soil and low vegetation in valleys, foothills, and semiarid mountains. Furthermore, grasslands, coniferous forests, woodlands, and chaparral, with patches of loose soil in open habitat. Frequently found in sandy washes with scattered shrubs and along dirt roads, and frequently found near ant hills. Ranges up onto the Kern Plateau east of the crest of the Sierra Nevada (CDFW 2018).	No	Suitable habitat not present based on lack of open soft sandy soils. Soils in Proposed Project area are very rocky, steep and compacted.
Birds							
*Accipiter gentilis**	Northern goshawk	—	SSC	—	Nests in mature and old-growth coniferous forests at high elevations in the Sierra Nevada, Cascade, North Coast, and Transverse Ranges. Prefers stands with Pacific Ponderosa pine (*Pinus ponderosa* var. *pacifica*), Jeffrey pine (*Pinus jeffreyi*), lodgepole pine (*Pinus contorta*), Douglas-fir (*Pseudotsuga menziesii*), and rarely pinyon-juniper (*Pinus monophylla* and *Juniperus* spp.) or quaking aspen (Populus tremuloides). Prefers stands with larger trees, denser canopies, and relatively open understories (Shuford and Gardali 2008).	No	Suitable habitat not present.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Agelaius tricolor	tricolored blackbird	—	ST	—	Preferred nesting habitat includes cattails (*Typha* spp.), bulrushes (*Schoenoplectus* spp.), Himalayan blackberry (*Rubus armeniacus*), and agricultural silage. Dense vegetation is preferred but heavily lodged cattails not burned in recent years may preclude settlement. Requires access to open water. Strips of emergent vegetation along canals are avoided as nest sites unless they are about 30 or more feet wide, but in some ponds, especially where associated with Himalayan blackberries and deep water, settlement may be in narrower stands of cattails. (Hamilton 2004).	No	Suitable habitat not present. Blackberry patches within the Proposed Project area are small and not of sufficient size to support breeding colonies. Additionally, the Proposed Project area lacks the required wetland vegetation.
Aquila chrysaetos	golden eagle	—	FP	—	Habitat includes rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Uncommon resident in hills and mountains throughout California, and an uncommon migrant and winter resident in the Central Valley and Mojave Desert (CDFW 2018).	Yes	Suitable habitat present.
Athene cunicularia	burrowing owl	—	SSC	—	Species known to be a yearlong resident of open, dry grasslands and varying desert habitats (CWHR 1999). Nesting habitat includes open areas with mammal burrows, including rolling hills, grasslands, fallow fields, sparsely vegetated desert scrub, vacant lots, and human disturbed lands. Soils must be friable for burrows (Bates 2006).	No	Suitable habitat not present. Soils extremely rocky and not friable.
Buteo swainsoni	Swainson's hawk	—	ST	—	Nests in stands with few trees in riparian areas, juniper-sage flats, and oak savannah. Forages in adjacent grasslands, agricultural fields, and pastures. Breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert. Very limited breeding reported from Lanfair Valley, Owens Valley, Fish Lake Valley, and Antelope Valley (CWHR 2006).	No	The Proposed Project area is outside the range of this species. The nearest occurrences of this species are over 100 years old and are not expected within 0.25 mile of the Proposed Project area (CDFW 2019).

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Charadrius montanus	mountain plover	—	SSC	—	California's Sacramento, San Joaquin, and Imperial Valleys support many wintering populations. Frequents open plains with low, herbaceous or scattered shrub vegetation below 3,200 feet (CWHR 2008).	No	Suitable habitat not present.
Circus cyaneus	northern harrier	—	SSC	—	Nest on the ground in patches of dense, tall vegetation in undisturbed areas. Breed and forage in variety of open habitats such as marshes, wet meadows, weedy borders of lakes, rivers and streams, grasslands, pastures, croplands, sagebrush flats, and desert sinks (Shuford 2008).	Yes	Suitable habitat present.
*Contopus cooperi**	olive-sided flycatcher	—	SSC	—	Nests in a wide variety of forest and woodland habitats below 9,000 feet in elevation in the coastal and mountainous portions of California. Occurs only as a migrant elsewhere in the state. Prefers forests and woodlands with adjacent meadows, lakes, or open terrain for foraging. (CDFW 2018).	Yes	Suitable nesting habitat present.
*Empidonax traillii**	willow flycatcher	—	SE	—	Uncommon summer resident in wet meadows and montane riparian habitats from 2,000 to 8,000 feet in elevation in the Sierra Nevada and Cascade Ranges. Most numerous where extensive thickets of low, dense willows (*Salix* spp.) edge on wet meadows, ponds, or backwaters (CDFW 2018).	No	Suitable nesting habitat not present.
*Falco peregrinus**	peregrine falcon	—	FP	—	Breeds near wetlands, lakes, rivers, or other waters on cliffs, banks, dunes or mounds, mostly in woodland, forest, and coastal habitats. Nest is a scrape on a depression or ledge in an open site. May use man-made structures (such as bridges, skyscrapers, or electrical towers), large snags, or trees for nesting (CDFW 2018).	Yes	Suitable nesting habitat present.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
*Gavia immer**	common loon	—	SSC	—	Very rare as a breeder in the state on large mountain lakes in the Cascade and Sierra Nevada Ranges. Common September through May in estuarine and subtidal marine habitats along the entire coast. A very few non-breeding individuals oversummer on the north coast. Also, less commonly winters on large, deep lakes in valleys and foothills throughout the state (CDFW 2018).	No	Suitable nesting habitat not present.
Haliaeetus leucocephalus	bald eagle	—	SE, FP	—	Nests in large, old-growth, or dominant live tree with open branchwork, especially ponderosa pine (*Pinus ponderosa*). Requires large bodies of water or rivers with abundant fish and adjacent snags. Permanent resident, and uncommon winter migrant, now restricted to breeding mostly in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity Counties. About half of the wintering population is in the Klamath Basin (CWHR 1999).	Yes	Suitable habitat present. Two CNDDB records occur within 1 mile of the Proposed Project area (CDFW 2019).
Icteria virens	yellow-breasted chat	—	SSC	—	Nest in early-successional riparian habitats with a well-developed shrub layer and an open canopy. Restricted to narrow border of streams, creeks, sloughs, and rivers. Often nest in dense thicket plants such as blackberry and willow (*Salix* spp.) (Shuford 2008).	Yes	Suitable habitat present.
Lanius ludovicianus	loggerhead shrike	—	SSC	—	Shrublands and open woodlands with a fair amount of grass cover and areas of bare ground. Requires tall shrubs or trees, fences, or power lines for hunting perches and territorial advertisement. Also requires open areas of short grasses, forbs, or bare ground for hunting, large shrubs or trees for nest placement, and thorny vegetation or barbed wire fences for impaling prey. Ranges across most of the state, but absent from the highest mountains and the northwest forests and coast (Shuford 2008).	Yes	Suitable habitat present.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Setophaga petechial	yellow warbler				Usually found in riparian deciduous habitats in summer: cottonwoods (*Populus* ssp.), willows (*Salix* ssp.), alders (*Alnus* ssp.), and other small trees and shrubs typical of low, open-canopy riparian woodland. Also breeds in montane shrubbery in open coniferous forests (CDFW 2018).	Yes	Suitable habitat present.
Strix nebulosa	great gray owl	—	SE	—	Breeds in red fir (*Abies magnifica*), mixed conifer, or lodgepole pine (*Pinus contorta*) habitats, always near wet meadows. Nests in large, broken-topped snags usually 25–72 feet above the ground. A rarely seen resident at 4,500–7,500 feet in the Sierra Nevada from the vicinity of Quincy, Plumas Counties, south to the Yosemite region. (CDFW 2017).	No	Suitable habitat not present. Proposed project outside of known species range (CDFW 2019).
Vireo bellii pusillus	least Bell's vireo	FE	SE	—	Obligate riparian breeder. Cottonwood and willow thickets, oak woodlands, and mule fat scrub along watercourses (USFWS 1998). Early to mid-successional riparian habitat is typically used for nesting. Nest site fidelity is known to be high among breeding adults, with many birds not only returning to the same territory, but putting nests in the same shrub used the previous year (Kus 2002).	No	Outside of known species range.
Mammals							
Antrozous pallidus	pallid bat	—	SSC	—	Ranges across all of California except for high-elevation portions of the Sierra Nevada Mountains and Del Norte, western Siskiyou, Humboldt, and northern Mendocino Counties. Generally found in a wide variety of habitats but with some preference for drier areas. Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings (CDFW 2018).	Yes	Suitable habitat present.

Scientific Name	Common Name	Federal Status	State Status	CRPR	General Habitat Characteristics	Impacts Analyzed	Rationale
Corynorhinus townsendii	Townsend's big-eared bat	—	SSC	—	Ranges throughout California except for high elevation portions of the Sierra Nevada Mountains. Generally prefers mesic habitats but known to occur in all non-alpine habitats of California. Roosting occurs in caves, tunnels, mines, buildings, or other structures and this species may use different roosting sites for day and night (CDFW 2018)..	Yes	Suitable habitat present.
Eumops perotis californicus	western mastiff bat	—	SSC	—	Ranges throughout all of Southern California, the central coast, and the Sierra Nevada Mountain Range. Generally occurs in open, arid, or semi-arid habitats. Specifically, this species roosts in rock crevices and buildings (CDFW 2018).	Yes	Suitable habitat present.
Lasiurus blossevillii	western red bat	—	SSC	—	Ranges in the western half of California except for Del Norte and Humboldt Counties. Generally occurs in most habitats except for the desert. Roosts in trees, sometimes shrubs, and typically at the margins of habitats (CDFW 2018).	Yes	Suitable habitat present.
Taxidea taxus	American badger	—	SSC	—	Ranges in all of California except the extreme northwest corner. Generally found in drier open areas of habitats with friable soils (CDFW 2018).	No	Suitable habitat not present.
Vulpes macrotis mutica	San Joaquin kit fox	FE	ST	—	Occur in desert-like habitats characterized by sparse or absent shrub cover, sparse ground cover, and short vegetative structure. Prefers areas having open, level, sandy ground that is relatively stone free (USFWS 2010b). The San Joaquin kit fox is absent or scarce in areas where soils are shallow from high water tables, hardpans, or proximity to bedrock. The species typically does not den in saturated soils or in areas subjected to periodic flooding.	No	Suitable habitat not present. Proposed Project area is surrounded by canals on either side of the Tuolumne River, and work would occur within the river channel and immediate floodplain. Proposed Project area is very rocky with steep slopes.

[a] Source for all habitat characteristics for plants is CNPS (2019)
*Species was not returned in database queries; however, species was included in the

Key	
Federal and State Status	
(FC) Federal Candidate	(SCE) State Candidate Endangered
(FE) Federally Endangered	(SCT) State Candidate Threatened
(FT) Federally Threatened	(SE) State Endangered
(FD) Federally Delisted	(SR) State Rare
	(SSC) State Species of Special Concern
	(ST) State Threatened
	(FP) Fully Protected
CNPS Rare Plant Rank	
Rareness Ranks	
(1A) Presumed Extinct in California	
(1B) Rare, Threatened, or Endangered in California and Elsewhere	
(2B) Rare, Threatened, or Endangered in California, but More Common Elsewhere	
Threat Ranks	
(0.1) Seriously threatened in California	
(0.2) Fairly threatened in California	
(0.3) Not very threatened in California	

References:

Bates, C. 2006. Burrowing Owl (*Athene cunicularia*). In The Draft. Desert Bird Conservation Plan: a strategy for reversing the decline of desert-associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/desert.htm

California Department of Fish and Wildlife (CDFW). 2015. Fish Species of Special Concern Accounts, 3rd Edition https://www.wildlife.ca.gov/Conservation/SSC/Fishes

California Department of Fish and Wildlife (CDFW). 2018. California Wildlife Habitat Relationships System Life History Accounts and Range Maps. Available online: <https://www.wildlife.ca.gov/Data/CWHR/Life-History-and-Range>. CDFW Biogeographic Data Branch; Sacramento, CA.

California Department of Fish and Wildlife (CDFW). 2019. California Natural Diversity Database BIOS 5 Viewer. Internet web site: https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data.

California Native Plant Society (CNPS). 2019. “Inventory of Rare and Endangered Plants” (online edition, v8-03). Accessed November 11, 2019.Internet web site: http://www.rareplants.cnps.org/. Ac

California Wildlife Habitat Relationships (CWHR). 1999. Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sacramento, California. Updated by CWHR Program staff, September 1999

California Wildlife Habitat Relationships (CWHR). 2006. Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sacramento, California. Updated by CWHR Program staff, January 2006.

California Wildlife Habitat Relationships (CWHR). 2008. California Wildlife Habitat Relationships (CHWR) System. Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sacramento, California. Updated by CWHR Program Staff, August 2005 and August 2008.

Consortium of California Herbaria (CCH). 2019. “Consortium of California Herbaria.” Data provided by participants of the Consortium of California Herbaria. Berkeley, CA: University of California. http://ucjeps.berkeley.edu/consortium/.

Hamilton, W. J. 2004. Tricolored Blackbird (*Agelaius tricolor*). In The Riparian Bird Conservation Plan:a strategy for reversing the decline of riparian-associated birds in California. California Partners in Flight. | CDFW. 2019. California Wildlife Habitat Relationships System

Moyle, P. B. 2002. Inland fishes of California. Revised and expanded. University of California Press, Berkeley. xv + 502 pp. | moyle, P. B., R. m. Yoshiyama, J. E. Williams, and E. D. Wikramanayake. 1995. Fish species of special concern in California. Sec

Nafis, Gary. 2019. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/

National Oceanic and Atmospheric Administration (NOAA). 2019. NOAA Fisheries, West Coast Region, Protected Species Accounts, https://archive.fisheries.noaa.gov/wcr/protected_species/salmon_steelhead/salmon_and_steelhead_listings/steelhead/california_central_valley/california_central_valley_steelhead.html

Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Thomson, Robert C., Wright, Amber N., and Shaffer H. Bradley. 2016. California Amphibian and Reptile Species of Special Concern. University of California Press Berkeley, CA.

UC Davis PISCES: Center for Watershed Sciences. 2017. Hardhead (*Mylopharodon conocephalus*). Accessed March 1, 2017

UC Davis PISCES: Center for Watershed Sciences. 2019. Red Hills roach (*Lavinia symmetricus* ssp. 3).

U.S. Fish and Wildlife Service (USFWS). 1998. Draft recovery plan for least Bell's vireo. U.S. Fish and Wildlife Service, Portland, Oregon

U.S. Fish and Wildlife Service (USFWS). 2007. Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) 5-Year Review: Summary and Evaluation. USFWS; Sacramento, CA.

U.S. Fish and Wildlife Service (USFWS). 2010a. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to Reclassify the Delta Smelt from Threatened to Endangered throughout its Range. USFWS; Sacramento CA.

U.S. Fish and Wildlife Service (USFWS). 2010b. San Joaquin Kit Fox 5-Year Review. USFWS; Sacramento, CA.

U.S. Fish and Wildlife Service (USFWS). 2012. Conservancy Fairy Shrimp (*Branchinecta conservatio*) 5-Year Review: Summary and Evaluation. USFWS; Sacramento, CA.

U.S. Fish and Wildlife Service (USFWS). 2017. Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*). USFWS; Sacramento, CA.

Williams, P.H., R.W. Thorp, L.L. Richardson, and S.R. Colla. 2014b. Bumble bees of North America: an Identification Guide. Princeton University Press

Appendix D. Cultural Setting

This page is intentionally blank.

Cultural Setting and References Cited (TID/MID 2017)

3.0 CULTURAL SETTING

This Section presents an overview of information on the local prehistory, ethnography, and history of the APE and vicinity. Understanding local cultural history is critical in defining important local, state, and/or regional events, trends, or patterns in prehistory and history by which the significance of prehistoric and historical cultural resources may be evaluated and their eligibility for listing in the NRHP may be established.

The prehistoric context and much of the historic context were excerpted from the recent Don Pedro Hydroelectric Project Historic Properties Study Report (TID/MID 2015). The historic context in particular has been augmented to focus on the current Project location. The prehistoric and historic contexts of the Don Pedro Hydroelectric Project Historic Properties Study Report were authored by Sharon Waechter of Far Western Anthropological Research Group, Inc., Dwight Simons, HDR contractor, and Judith Marvin of Foothill Resources, LTD.

3.1 Prehistoric and Archaeological Background[5]

3.1.1 An Overview

The broad outline of prehistoric California cultural chronology and culture history has been established primarily by observation of basic changes through time in artifact assemblages in areas in the vicinity of the Project. These include overviews of the central Sierra Nevada (cf., Arnold et al. 2004:41-43; Chartkoff and Chartkoff 1984:121-124, 162-165 [Table 4.9], 176-178; Hull 2007:184, Figure 12.4; Jackson et al. 1994; Moratto 1984: Chapters 5 and 7; 1999: Table 4.9; Rosenthal et al. 2007). A number of other culture-historical schemes have also been applied to various western-slope drainages over the last several decades (e.g., Bennyhoff 1956; Elston et al. 1977; Moratto 1972; Wirth Environmental Associates 1985). Many of these schemes link back to temporal divisions originally outlined in the traditional western Great Basin projectile point chronology (e.g., Baumhoff and Byrne 1959; Bettinger and Taylor 1974; Clewlow 1967; Heizer and Baumhoff 1961; Heizer and Hester 1978; Thomas 1970, 1981), and to a lesser extent the original Central Valley chronology (Bennyhoff and Heizer 1958; Bennyhoff and Hughes 1987; Heizer 1951; Ragir 1972).

Cultural chronologies/culture histories of particular relevance to the current APE include that developed for the new Don Pedro Project by Michael Moratto, who conducted a study of the reservoir locality in 1970-1971 using students from San Francisco State College (Moratto 1984:311-312; papers in Moratto 1971). In addition to the Don Pedro Reservoir area, project localities in the north-central Sierras of particular interest include New Melones Reservoir (Moratto 2002; Moratto et al. 1988), and the Sonora Locality (papers in Rosenthal 2011b). These are summarized below.

[5] This section, authored by Sharon Waechter of Far Western Anthropological Research Group, Inc., and Dwight Simons, HDR contractor, is excerpted from the recent Don Pedro Hydroelectric Project Historic Properties Study Report (TID/MID 2015).

3.1.1.1 Don Pedro Reservoir Cultural Chronology/Culture History

During 1970-1971, M. Moratto and others conducted an archaeological survey and limited excavations at the site of the new Don Pedro Reservoir, recording 28 historic-era resources and 41 prehistoric sites or features (Moratto 1984:311-312; papers in Moratto 1971). The latter were mostly small middens, bedrock milling stations, a few cupule petroglyphs, and a single rock shelter. Moratto noted that many of the cultural sites and features had been damaged or nearly destroyed by previous earth-moving operations, including dredging, tunneling, hydraulic mining, road construction, agricultural activities, and inundation by La Grange and Old Don Pedro reservoirs in the 1890s and 1923, respectively.

Test excavations at seven of the prehistoric sites located by Moratto suggested that they dated to the last 1,500 years, and at least four of them to the last 500 years. Despite the lack of identified older components, Moratto surmised that there were probably older settlements along the now inundated reaches of the Tuolumne River. The lithic materials at the seven Don Pedro sites were dominated by local cryptocrystalline silicate toolstone, with smaller amounts of obsidian. Some of the later sites also yielded steatite disc beads, ornaments, and vessels; small (presumably arrow) points; small obsidian flake tools; and the remains of circular, semi-subterranean houses. Moratto reported that heavy flake and core tools "occur throughout the sequence without noticeable temporal clustering" (1971:144). One site, CA-TUO-300, produced "heavy" projectile points, a "boatstone," and disc beads made of abalone shell. Two of the sites contained a total of at least 16 burials.

Moratto (1984:311-312) recognized two well-documented cultural phases at the Don Pedro locality. One dated to c. 500-300 years before present (B.P.)[6] and was considered an expression of the Mariposa Phase, representing Miwok prehistory. The other, dated at c. 1700-500 B.P., was correlated with the Crane Flat Phase, generally associated with the Yosemite area of the Sierra Nevada and often affiliated with Yokuts prehistory. Evidence for earlier occupation of the area suggested that humans were present from c. 5000 B.P. on. These studies documented a long and intensive history of use of the Don Pedro Reservoir area by native people.

Jackson (1971) sourced 112 obsidian artifacts from five Don Pedro locality sites, representing one of the first attempts to systematically source prehistoric obsidian artifacts from the central Sierra. Bodie Hills was the primary source, followed by Casa Diablo, and Mount Hicks. One artifact was made from Mono Glass Mountain obsidian and one from Mt. Konocti glass.

3.1.1.2 New Melones Reservoir Cultural Chronology/Culture History

Over a period of 30 years, numerous survey efforts documented more than 700 archaeological sites in a cultural resources study that has become known as the New Melones Archaeological Project[7]. Testing and/or data recovery, conducted by several entities, occurred at 34 historic and 68 prehistoric sites. A ten-volume final report was prepared on the investigations and a synthesis and summary of findings volume has also been prepared (Moratto et al. 1988).

[6] Years before present (B.P.) is a time scale used in archaeology, geology, and other scientific disciplines to specify when events in the past occurred. Because the "present" time changes, standard practice is to use the year 1950 as the arbitrary origin of the age scale (i.e., the present).

[7] See Moratto 2002 for a summary of project history, and a bibliography of relevant resultant literature.

Moratto (2002) has summarized the prehistoric chronology/culture history of the New Melones locality in a series of temporal and formal units (Moratto 2002:36, Figure 7; see also pp. 31-35, Figures 2-6 for locations of archaeological sites associated with each major time period). In addition to Moratto's work, Peak and Crew (1990) defined the earliest signs of human occupancy at New Melones. A brief synopsis of the prehistoric chronology for the New Melones vicinity, based on this work, including the identified temporal periods, is provided below.

The earliest occupants of the region used large stemmed points between c. 9450 and 5450 B.P., and after c. 5950 B.P. Pinto and Humboldt Series points were also used. The Clarks Flat Phase occurred from c. 9450 B.P. to c. 6950/6450 B.P., followed by the Stanislaus Phase (c. 6950/5950 B.P. to 6200 B.P.), and a terminal period of undesignated components (c. 6200-5450 B.P.). During Early Clarks Flat Subphase times (c. 9450-7950 B.P.), bipointed, foliate, and stemmed points were used, along with scrapers, notched tools, and beaked gravers. Great Basin transverse points (i.e., "crescents") may be associated with this or possibly an earlier, undesignated phase. Several sites appear to have functioned as hunting camps. Low assemblage diversity and artifact densities suggest limited, temporary use of sites during this time period. During the subsequent Late Clarks Flat Subphase, c. 7950-6950/6450 B.P., Early Clarks Flat flaked stone tool types continued to be used, with the addition of milling slabs, handstones, a variety of scrapers, and Western Stemmed Series points.

The "Stanislaus Phase" is characterized by continuance of Late Clarks Flat artifact types, with the addition of Stanislaus Broad-Stemmed points and abundant milling tools. Pinto and Humboldt Series points began to appear after c. 5950 B.P. Increasing artifact densities and assemblage diversity mark archaeological deposits from the Late Clarks Flat through Stanislaus Phase sequence. This is thought to reflect diversification of economic pursuits, especially those resulting from expanding use of plant resources, and occupational intensification. Some New Melones sites contain poorly documented assemblages with Pinto and Humboldt Series points, which appear to be unrelated to the Clarks Flat-Stanislaus continuum.

The period c. 5450-4750 B.P. witnessed the Texas Charley Phase, typified by the presence of Pinto and Humboldt points, large lanceolate bifaces, and distinctive scrapers. A hiatus in the New Melones archaeological records appears to have occurred after the Texas Charley Phase and lasted until c. 4450 B.P. when the Calaveras Phase commenced, marked by the increased presence of Pinto and Humboldt Series points and milling stones. For a period after the Calaveras Phase ended, c. 3950 B.P., the New Melones archaeological record is poorly known, with traces of minimal site occupancy noted.

Moratto referred to the period between c. 2950 B.P. and 1450 B.P., as the Sierra Phase. Typical artifacts included Elko Series, Sierra Concave Base, and Sierra Side-notched projectile points, bowl mortars, cylindrical pestles, and *Olivella* F and G Series shell beads (the *Olivella* bead types are based on Bennyhoff and Hughes 1987). This phase was marked by economic diversity, acorn use, large populations, intensive occupation, middens and structural remains, cemeteries, use of mortuary caves, abundant funerary artifacts, and signs of extensive material conveyance (i.e., trade).

The period from c. 1450-950 B.P is referred to in Moratto's chronology as the Redbud Phase. Typical artifacts of this phase are Rosegate Series projectile points and *Olivella* D, K, and M Series beads. During the subsequent 300 years, ephemeral site use by small populations engaged in minimal material conveyance seems to have occurred in the New Melones region. This may reflect unfavorable climatic conditions resulting from the Medieval Climatic Anomaly (Stine 1994).

The Horseshoe Bend Phase, c. 600 B.P. to A.D. 1848 (the beginning of the California Gold Rush), was marked by Stockton Serrated, Cottonwood Triangular, Desert Side-Notched, and Gunther Barbed projectile points, and *Olivella* E, K, and M Series beads. At this time, the New Melones region was occupied by large numbers of people, who lived in larger more sedentary settlements. These were ancestral Sierra Miwok speakers who practiced an intensified acorn-based economy and lived in year-round settlements below the snow line, moving up to higher elevations in the summer months.

The Peoria Basin Phase (A.D. 1848-1910) is associated with historic Sierra Miwok village communities. Associated artifacts include glass trade beads and Desert Side-Notched and Cottonwood Triangular points. During this period, the Sierra Miwok experienced severe depopulation from a variety of causes along with the effects of acculturation with introduced elements of Euro-American culture.

3.1.1.3 The Sonora Region Cultural Chronology/Culture History

Recent and ongoing research in the Sonora region of Tuolumne County by Far Western and Sonoma State University, directed by archaeologists Jeffrey Rosenthal and Jack Meyer (e.g., Meyer 2008, 2011; Meyer and Dalldorf 2004; Meyer et al. 2005; Rosenthal 2008, 2011a; Rosenthal et al. 2008; Whitaker and Rosenthal 2009) has resulted in development of a more inclusive regional cultural chronology/culture history. This scheme was developed for the Sonora region based on a synthesis of chronological information from more than 100 excavated sites in the watersheds of the Mokelumne, Calaveras, Stanislaus, and Tuolumne rivers, including those excavated as part of the New Melones project (cf., papers in Rosenthal 2011b). Based on spatial and stratigraphic analyses of more than 200 radiocarbon dates, more than 4,000 source-specific obsidian hydration readings, slightly more than 875 projectile points, and close to 600 shell beads, five major time periods were defined, including the Early Archaic, Middle Archaic, Late Archaic, Recent Prehistoric I, and Recent Prehistoric II (Table 3.1-1).

Also identified were dominant projectile point styles and obsidian hydration brackets associated with each time period, facilitating interpretation of calendric ages of Bodie Hills hydration readings below 4,000 feet (1,219 meters) in elevation (Rosenthal 2011c:48, Table 16). This new chronology revises the one developed for New Melones, and provides a framework for timing of major prehistoric technological, subsistence, and land-use changes occurring in the central Sierra Nevada (cf., papers in Rosenthal 2011b). The general chronological sequences described in the following Section reflect this new regional chronology.

Table 3.1-1. Archaeological Chronology of the West-Central Sierra Nevada Developed for the Sonora Region.

Period	Age Range (cal B.P.)[a]	Hydration Range (microns)[b]
Recent Prehistoric II	610-100	2.4-0.9
Recent Prehistoric I	1100-610	3.1-2.5
Late Archaic	3000-1100	4.7-3.2
Middle Archaic	7000-3000	6.8-4.8
Early Archaic	11,500-7000	8.6-6.9

[a] "cal" refers to calibrated. Uncorrected, or 'conventional' radiocarbon ages are calculated using an assumption that the concentration of naturally occurring radiocarbon in the atmosphere is constant. Calibration of these conventional ages to calendar years corrects for known minor variations over time in the concentration of atmospheric radiocarbon. This calibration also corrects for an error in the estimate of 'half-life,' or the rate at which radiocarbon decays. While the half-life of radiocarbon is now known to be slightly longer than was estimated when the technique was invented, laboratories continue to report radiocarbon dates using the older, less accurate value, hence the term 'conventional.' Because of this, uncalibrated dates earlier than about 2000 years before present (B.P.) tend to be substantially 'younger' than calibrated dates.

[b] Bodie Hills Obsidian; applicable only below 4,000 feet (below snow line). From Rosenthal (2008), based on Rosenthal and Meyer (2011).

3.1.2 General Chronological Sequence

The following chronological sequence is derived from the work completed by Jeffrey Rosenthal and Jack Meyer for the Sonora region (e.g., Meyer 2008, 2011; Meyer and Dalldorf 2004; Meyer et al. 2005; Rosenthal 2008, 2011; Rosenthal et al. 2008; Whitaker and Rosenthal 2009). While created by Rosenthal and Meyer for the Sonora region, this sequence also provides a current temporal chronology useful for the Don Pedro Project area.

3.1.2.1 Early Archaic (11,500-7000 cal B.P.)

Like most places in California, well-dated deposits from the Early Archaic are quite rare in the Sierra Nevada foothills. To date, they have been identified at Skyrocket (CA-CAL-629/630) in Salt Springs Valley and at Clark's Flat (CA-CAL-342), located upstream from New Melones Reservoir along the Stanislaus River. Both sites were observed in buried stratigraphic contexts. Artifacts included large numbers of Wide-Stem and Large-stemmed dart points, as well as very small numbers of other notched and stemmed projectile points.

The Early Archaic stratum at the Skyrocket site contained hundreds of handstones and milling slabs, and a variety of cobble-core tools, large percussion-flaked "greenstone" bifaces, and comparatively high frequencies of obsidian from the Bodie Hills and Casa Diablo sources located east of the Sierra crest (LaJeunesse and Pryor 1996). Milling equipment was substantially less abundant at the Clark's Flat site. Plant macrofossil assemblages recovered from Skyrocket are dominated by gray pine and acorn nutshell, but include few if any small seeds or other spring- and summer-ripening plant foods (e.g., manzanita). This suggests that the site was primarily used during the fall and early winter when nuts were available. Plant remains were not sampled at Clarks Flat.

The large accumulation of ground stone in the early stratum at CA-CAL-629/630 probably represents sustained residential use or the residue of repeated seasonal occupations occurring over many millennia. This pattern of repeated or extended occupation suggests that Early

Archaic land use in the western central Sierra was seasonally structured, and was not the wide-ranging, highly mobile lifestyle often believed to characterize the Early Archaic throughout the mountain west. This conclusion is further supported by the almost exclusive use of local toolstone for the manufacture of bifaces and projectile points at both Skyrocket and Clark's Flat.

Other sites with evidence of Early Archaic occupation include Taylor's Bar (CA-CAL-1180) on the Calaveras River. There, large stemmed points and an early Holocene radiocarbon date are reported from buried soil. This material was mixed with a substantial Late Holocene deposit (Milliken et al. 1997). In addition, the Poppy Hills site (CA-TUO-2797/H), located downslope from Sonora near Jamestown, produced Early Holocene radiocarbon dates and obsidian hydration readings from a buried soil mixed with Middle Archaic material (Whitaker and Rosenthal 2010).

3.1.2.2 Middle Archaic (7000-3000 cal B.P.)

The Middle Archaic has traditionally been the most misunderstood portion of the central Sierra Nevada archaeological record, with sites from this time period once thought to be quite rare in many foothill areas (e.g., Moratto et al. 1988). However, the apparent absence of this record can be attributed primarily to long-standing confusion over the timing of Corner-notched dart points on the western slope. The common assumption has been that they date to only the last 3,000 years, and that either broad-stem points (e.g., Stanislaus Broad Stem), or Pinto and Humboldt Concave points, are diagnostic of this period (cf., Moratto 2002; Moratto et al. 1988; Peak and Crew 1990). However, recent excavations of several well-dated and stratified Middle Archaic sites clearly indicate that Corner-notched dart points were the predominant projectile point form used on the western slope of the north-central Sierra Nevada from about 7,000 to 1,100 years ago (Rosenthal 2011c; Rosenthal and McGuire 2004). Other stemmed and notched dart points also were used during the Middle Archaic, but in significantly lower numbers.

Like the Early Archaic, most known Middle Archaic deposits from the western Sierran slope have been identified in buried stratigraphic contexts. These often include large numbers of handstones and milling slabs, a variety of cobble-based pounding, chopping, and milling tools; and an occasional mortar and pestle (found only at the most intensively occupied sites). The earliest house structures identified so far on the western slope were present in a Middle Archaic stratum at the Edgemont Knoll site (CA-TUO-4559) at Sonora, associated with large subterranean storage pits (Meyer 2008).

A diverse assemblage of flaked, ground, and battered stone tools, along with comparatively high densities of dietary debris (i.e., plant remains and animal bone) suggests that the Edgemont site served as a primary residential encampment. Archaeobotanical remains, dominated by gray pine and acorn nutshell, reveal that the site was used primarily in the fall and winter, when large quantities of nuts were stored in underground granaries. The overwhelming abundance of nut crops at other Middle Archaic sites in the foothill woodlands suggests a similar season of occupation. In contrast, summer-ripening berries and other fruits are dominant in higher elevation sites located in the Lower Montane Forest.

These differences indicate a pattern of seasonal transhumance, with fall and winter villages placed below the snow line in the Blue Oak-Gray Pine Woodland, and summer camps situated in the conifer forest zone where annual roots, bulbs, seeds, and fruits were common during warmer months. Faunal assemblages from Middle Archaic sites are dominated by large mammal remains (e.g., deer), a pattern that continued throughout the remainder of the prehistoric sequence. The presence of atlatl weights and spurs in these deposits confirms that the dart and atlatl were the primary hunting implements. Soapstone "frying pans" and other vessels first appear in the local record during the Middle Archaic, along with various types of stone pendants, incised slate, and stone beads.

3.1.2.3 Late Archaic (3000-1100 cal B.P.)

Late Archaic sites are among the most common on the western slope, with many of these also occurring in buried stratigraphic contexts (Meyer 2011). Late Archaic lifeways, technologies, and subsistence patterns were quite similar to that of the previous Middle Archaic period, the primary difference being an increase in the use of obsidian. Handstones and milling slabs made up the vast majority of ground stone implements, and Corner-notched dart points were the most common projectile.

Various expedient, cobble-core tools, battered cobbles, and heavily used flake-based implements are common in Late Archaic foothill deposits. These heavy-duty tools were probably associated with the processing of pine nuts, the primary plant-food refuse present in Late Archaic foothill sites. Fall-ripening acorn nutshell also occurs regularly. Summer grass seeds and fruit and berry pits continue to be rare in foothill deposits, and common in higher elevation sites, indicating that seasonal mobility remained the primary strategy for overcoming spatial and seasonal differences in the availability of important plant foods.

This pattern of seasonal movements between the foothills and conifer forest is further supported by the distribution of different toolstones. Chert, only available in the western Sierra foothills below about 3,000 feet, is common at Archaic sites in the Lower Montane Forest up to about 6,000 feet. Above that elevation, flaked stone assemblages on the western slope are composed almost entirely of obsidian (>80 percent). This suggests groups using the upper elevations of the western Sierra traveled from the east side, where obsidian was the primary toolstone.

3.1.2.4 Recent Prehistoric I and II (1100-100 cal B.P.)

Moratto (2002; Moratto et al. 1978, 1988) pointed out that sites dating to the Recent Prehistoric I Period are under-represented in the foothills of the western Sierra Nevada, a pattern that continues to be apparent in subsequent studies (e.g., Rosenthal 2008). He suggested that pervasive drought in the Sierra Nevada may be responsible for wide-spread settlement disruption (Moratto 1984:338; 2002; Moratto et al. 1988). Subsequent research has shown that this period coincides with a region-wide interval of reduced precipitation and higher temperatures, the Medieval Climatic Anomaly.

During this period, among the most important changes in the archaeological record of the western slope is the introduction of the bow and arrow at about 1100 cal B.P., an innovation apparently borrowed from neighboring groups to the north or east. This shift in technology is clearly reflected by the dominance of Small-stemmed and Corner-notched arrow points in the earlier Recent Prehistoric I sites. It remains unclear whether bedrock mortars were first widely used during this period. Their common occurrence at Recent Prehistoric II sites in the Sonora vicinity suggests that they had become an important milling technology by 610 cal B.P. Unlike the earliest arrow points, bedrock mortar technology appears to have developed west of the Sierra Nevada, the center of distribution for these milling features.

Unfortunately, too few single-component Recent Prehistoric I assemblages exist to adequately describe the basic lifeways and subsistence patterns characterizing this period. For the Recent Prehistoric II Period, however, numerous well-dated sites and components provide abundant evidence for changes in the nature of local subsistence economies. The dominance of acorn nutshell in these sites is among the most compelling evidence for acorn intensification in central California. Bedrock milling fixtures are established across the landscape, near well-developed residential middens, and as isolated features both above and below the oak zone. Subsistence remains in foothill sites include many more spring and summer grass seeds, and fruits and berry pits than were present in Archaic deposits. This indicates that occupation occurred for a longer part of the year, or that sites below the snow line were more regularly used to store warm-season resources for winter use.

There also appears to have been greater settlement differentiation during the Recent Prehistoric II Period. Residential sites often include house-depressions and other structural remains. Special-use localities consisting simply of bedrock milling features also occur. Summer use of higher elevations is also apparent. Many sites from this time period are found in the Lower Montane Forest, often containing high proportions of summer-ripening plant foods.

Like the Archaic, large mammal remains continue to make up a substantial portion of faunal assemblages from both high- and low-elevation sites. Similarly, the distribution of different east- and west-side toolstones indicates that regions above 6,000 feet remained primarily within the seasonal round of east-side people, probably targeting sheep and deer which congregate at high elevations during the summer. Many more specialized technologies are associated with the Recent Prehistoric II Period than were evident during the Archaic, including stone drills and bone awls.

The Desert Side-notched arrow point was first introduced on the western slope at about 610 cal B.P., clearly borrowed from Great Basin peoples to the east. Circular, perforated stone shaft-straighteners are also common in these sites, consistent with use of the bow and arrow. Imported shell beads from coastal California first appear in appreciable amounts in Recent Prehistoric II village sites, as do other rare items such as shell ornaments and bone whistles.

3.2 Ethnohistory

This Section provides a brief summary of the ethnographic context of the Project area. More extensive and thorough ethnographic and ethnohistorical background data can be found in the TCP investigation report found in Attachment I, as well as the recent Native American Traditional Cultural Properties Study prepared by Michael Moratto for the nearby Don Pedro Hydroelectric Project (TID/MID 2015b).

Ethnographically, the Project area is on the western edge of the Central Sierra Miwok territory, close to the traditional territory of the Northern Valley Yokuts (Kroeber 1925: Map of Territory and Villages of the Maidu and Miwok). Central Sierra Miwok territory is located in the Sierra Nevada foothills and mountains spanning the upper drainages of the Stanislaus and Tuolumne Rivers. The Central Sierra Miwok group is considered a member of the Eastern Miwok, one of the two major divisions of the Miwokan subgroup of the Utian language family (Levy 1978). The Eastern Miwok peoples belonged to five separate linguistic and cultural groups each of which had distinct language and cultural characteristics (Levy 1978). Anthropologists have categorized the Eastern Miwok into language areas according to geographical location, which consist of: (1) the Bay Miwok that occupied the eastern area of the Contra Costa County extending from Walnut Creek eastward to the Sacramento-San Joaquin delta; (2) the Plains Miwok, which inhabited the lower reaches of the Mokelumne and Calaveras river drainages; (3) the Northern Sierra Miwok that occupied foothills and mountains of the Mokelumne and Calaveras river drainages; (4) the Southern Sierra Miwok, which inhabited the foothill and mountain portions of the Merced and Chowchilla drainages; and (5) the Central Sierra Miwok mentioned above (Levy 1978).

These five groups were further designated as three distinct groups based on their phonological history and structural and lexical similarity (Levy 1978). Plains and Bay Miwok are both members of a distinct group, while the other three groups comprise a Sierra Miwok language group (Levy 1978). It has been suggested that Plains Miwok separated from the Sierra Miwok languages around 2,000 years ago (Levy 1978). Lexicostatistical chronology and language classification suggests that ancestral Miwok occupation of the Sierra Nevada and its foothills is probably a much more recent event compared to the central California delta region, since Sierra Miwok internal time depth is estimated at around 800 years (Levy 1978).

The main political unit of the Miwok was the tribelet, which was an independent and sovereign nation that had a defined and bounded territory designating its zone of control over natural resources. Among the Sierra Miwok, tribelets included political lineage localities that made up the permanent settlements with an average population estimate of around 25 persons, as well as several semi-permanent settlements and numerous seasonally occupied campsites that were used at various times throughout the seasonal round of gathering, hunting, and fishing activities (Levy 1978). Ethnographic literature points to the presence of a chief or an assembly house in the community at the capital or principal settlement (Levy 1978). The dominant form of house was a conical structure of bark slabs, supported by posts or frameworks.

The main foci of subsistence were the gathering of wild plant foods, especially acorn, and the hunting of mammals. The Sierra Miwok traveled to higher or lower elevation levels during various seasons of the year to obtain subsistence resources unavailable in the vicinity of their permanent settlements. The inhabitants occupying the Transition Zone forest moved to higher elevations during the summer months in pursuit of deer. Those in the foothill areas would occasionally visit the plains of the central valley to hunt antelope and tule elk, which are unavailable in the mountains. Gathering of plant foods varied seasonally, as greens were gathered in the spring and were used to supplement the diet of acorns stored since the previous fall. Seeds were gathered from May to August. Pine nuts were collected after August, when the land was burned. In the late fall and early winter, acorns were gathered (Levy 1978). Meat consumption was greatest in the winter months when plant resources were limited to stored foods (Levy 1978).

Technological skills included basket making and production of ground stone items, such as mortars and pestles used in acorn processing. Lithic technology consisted of projectile points, knives, scrapers, and expedient tools like hammer stones and choppers made from various materials, such as chert and obsidian (Levy 1978).

The Eastern Miwok were first contacted by the Spanish in the second part of the eighteenth century in the Sacramento-San Joaquin Valley by explorers (Levy 1978). Since then, dramatic cultural changes developed, including the transformation of previously independent tribelets into unified militias resisting forced labor, forced missionization, and displacement that was intensified by epidemics and targeted violence against the Miwok by the Spanish, which killed many thousands of Miwok persons in the first half of the nineteenth century (Levy 1978).

During the 1840s, fur trappers, gold miners, and settlers arrived in large numbers and often hostile relations arose between these newcomers and Sierra Miwok. For a brief time, Southern Sierra Miwok supplied labor for J.D. Savage's gold mining operations in the Big Oak Flat district, but as the number of miners increased, large mining operations were shut down and Miwok participations decreased (Levy 1978). Records indicate that at least 200 Miwok were killed by the miners during the years 1847 to 1860 (Levy 1978).

A period of confiscation of Indian lands occurred with the annexation of California by the U.S. (Levy 1978). Although treaties were signed by several members of the tribelets, they were never ratified by the U.S. Senate (Levy 1978). A few groups of Sierra Miwok were removed to the Fresno area but most of the Sierra Miwok population remained in rancherias scattered throughout the Sierra Nevada foothills (Levy 1978). Reliance on wage labor steadily increased and dependence on gathering and hunting diminished throughout the end of the nineteenth century and early twentieth century. Federally recognized Sierra Miwok Tribes in the immediate vicinity of the Project area include the Chicken Ranch Rancheria of Jamestown, California and the Tuolumne Band of Me-Wuk Indians of Tuolumne, California.

3.3 Non-Native History

The La Grange Project is located in both Stanislaus and Tuolumne Counties. The only feature related to the Project located outside of Stanislaus County is the La Grange pool, which is located primarily in Tuolumne County. The Project has had an effect on the economic and infrastructural development of both counties, particularly as it relates to irrigation, agriculture, and hydropower generation. The following historic context was largely exerted from the historic context included in the Don Pedro Hydroelectric Project Historic Properties Study Report which was authored by Judith Marvin of Foothill Resources, LTD, with augmentation for focus on the current project (TID/MID 2015). Additionally, Alan Paterson, a local historian who focuses on the history of water control in California, wrote the section titled "Water and Power Development" (Section 3.3.2.4)[8]. The context first provides an overview of the history of both counties, and then breaks into historical themes in order to develop them further.

3.3.1 Historical Overview of Stanislaus and Tuolumne Counties

The discovery of gold on the American River in January 1848 provided the impetus for settlement in the San Joaquin Valley and the Sierra Nevada foothills to the east. Trails and roads were quickly developed to reach the gold regions, many of them traversing what is now Stanislaus County. Many of the first settlements occurred at river crossings, where the high waters of the Stanislaus and Tuolumne Rivers necessitated the construction of ferries to carry passengers, livestock, and freight. Communities quickly sprang up around these crossings, providing lodging, sustenance, and services to travelers.

When California became a state in 1850, Tuolumne County was established as one of its original 27 counties, with Sonora as the county seat. Stanislaus County was named for the Christian Indian Estanislao, a member of the Lakisamni Tribe who was baptized by the Spanish padres and named for a Polish saint. The county was organized in 1854 from a part of Tuolumne County. The first Stanislaus county seat was established at Adamsville in 1854, moving to Empire City within a few months, then to La Grange in 1855, Knight's Ferry in 1862, and finally to Modesto in 1872 (Hoover et al. 1990:539).

The story of Tuolumne and Stanislaus Counties during the first few years of non-Native American settlement is not much different from other Mother Lode communities. In the earliest years of the Gold Rush, virtually all settlement sprang up around the gold discoveries and their supply camps. As placer mining was the major industry those first few years, most of the towns were established along the streams and rivers where the gold could be placer mined. The earliest settlements in the APE vicinity were located along the Tuolumne River and its drainages, often at the river's confluence with creeks, as the river gravel bars tended to be built up there, trapping the free gold (Figure 3.3-1).

[8] The last paragraph of this Section was prepared by the primary report authors and was not written by Dr. Paterson.

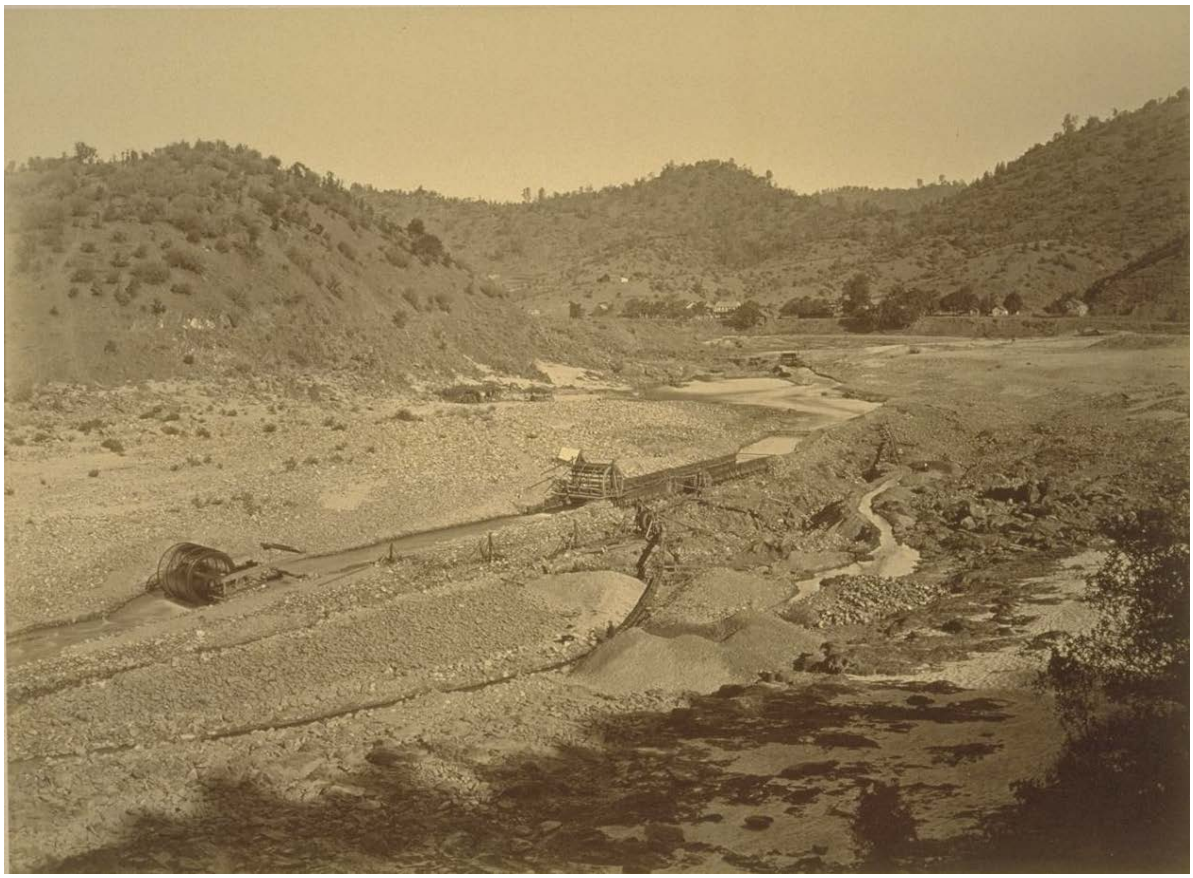


Figure 3.3-1. Placer Mining on the Tuolumne River, 1850s. Courtesy Bancroft Library U.C. Berkeley.

Social order began early in the region, primarily located in the San Joaquin District of the state. The first local election was in August 1849, signaling the arrival of government and politics to the area. At that time, churches, schools, and social institutions began developing in populated areas across both counties. In addition, local newspapers, laws, and localized governments began being developed. Nevertheless, violence was commonplace in the mining camps, not only among the newly arrived miners, but also between them and the Native people who had lived in the area for centuries.

By the mid-1860s the placer gold deposits were exhausted, the technology for extracting gold from deep veins was not yet well-developed, and mining entered a major depression in the region. Many miners and their families rushed to other strikes, notably the Comstock Lode in Nevada, hoping to find work, while local support industries suffered or collapsed. Farms were abandoned, businesses auctioned off and closed, and the mines shut down. Tuolumne County's population decreased by 50 percent between 1860 and 1870 (from 16,229 to 8,150). Due to the growth of animal husbandry in Stanislaus County, and the relatively small size of the county to begin with, population numbers were far less volatile and the county's population increased 189 percent between 1860 and 1870 (from 2,245 to 6,499). From this depression came the second, or hard rock gold rush, which began in the late 1880s and lasted through World War I (Clark

1970:7). With the advent of hard-rock mining in the 1880s, towns were built near the rich ore veins, often far from natural bodies or streams of water. Hordes of miners came to the area; water-supply systems and transportation networks developed; farms, orchards, and truck gardens sprang up; saloons and fandango halls, along with boardinghouses, provided bed, bath, sustenance and entertainment to the miners.

Though the hard rock gold rush allowed for mining to make resurgence, it was however short lived and less expansive than the 1848 gold rush. Soon many entrepreneurs, disillusioned miners, and other settlers quickly turned to agriculture as a means of providing a livelihood, profiting from the need for fresh produce by the burgeoning mining settlements in the foothills. Initially producing extensive stands of wheat, barley, and other dry land crops, settlers in Stanislaus County also began developing vast herds of cattle and sheep. By the 1870s most of the county was under cultivation and the remaining grasslands were occupied by "cattle kings" (Napton 1992:20). Movement of the Stanislaus county seat to Modesto in 1872 reflected the change in the political importance of the river towns, mining centers, and, finally, the centers of agriculture.

With the expansion of agriculture came a strong need for good transportation routes, reliable irrigation sources, and electrical generation. These three developments allowed both counties to survive after mining activities ended nearly entirely by World War I. A small and short lived mining resurgence occurred toward the end of the 1930s, lasting only until mining operations were shut down during World War II. Today, the region continues to reflect a strong connection to agriculture, which remains the primary industry.

3.3.2 General Historical Themes

3.3.2.1 Regional Mining History

Gold mining has captured the fancy and interest of historians and archaeologists for many years. Like every other county along California's Mother Lode, reaching from Mariposa in the south to Auburn in the north (Clark 1992:15), intensive non-Native settlement in Tuolumne County began with its gold mining operations.

County folklore credits the initial discovery of gold in Tuolumne County to James Savage and Benjamin Wood and company in July of 1848, on what is now Woods Creek near its crossing with the Stockton Road (State Route 108). Although it is not known who first mined for gold in the region, evidence points to people of Hispanic origin. The diaries of Americans who arrived in the area in 1848 provide accounts of Mexicans from Sonora, Mexico, working the flats and streams for gold. Extensive placer mining was carried out during the early years of the Gold Rush in nearly all of the ravines and gulches in present-day Tuolumne County, to be followed by hydraulic and hard-rock or quartz mining.

This Section focuses on mining in Tuolumne County, which is in the heart of the Mother Lode, with attention paid to the extensive hydraulic and dredging activities around La Grange.

Placer Mining

The richest deposits of retrievable gold in California were found in the Sierra Nevada foothill region. How the gold came to the foothills is an involved story of geological processes. In brief, granitic rock, quartz lodes, and the contact zones were washed and eroded, and naturally milled by flowing water which concentrated the native gold in former and present streams and gravel beds. It was this "free" or placer gold which attracted the Gold Rush miners. Placer mining was the initial extraction method used in Tuolumne County, already familiar to miners from Mexico, Central America, and South America, where placer mining began in the 1500s.

Typical miners' tools included the pan or *batea*, a cradle or rocker, a sluice box, a long tom, or a mixture of these. Miners would literally move the streambeds, removing gravels, sifting and re-depositing them, all the while storing water in check dams and redirecting the streams into ditches. Breached dams, ditches, flumes, terraces, and rock walls, in addition to the waste rock in sluicing piles and channels, are remains typically found along drainages that have been placer mined. Other forms of placer mining included dry-panning (or winnowing), dry-washing, and ground sluicing and booming (the latter was not common in the Project vicinity but was found in some locations in Tuolumne County).

The early miners quickly exhausted the gold in the streambeds and soon were searching out the ridgetops with Cenozoic-age gravels. As early as 1853, Dr. J.B. Trask (the first State Geologist), described the gravels and their mining, recognizing that they were ancient rivers. During the latter part of the 19th century, Tuolumne County miners concentrated on these gravels, washing them with high-head streams of water gushing from hydraulic monitors; the dislodged soils were then passed through a sluice box, much in the same manner that placer gold was extracted from stream gravels.

Hydraulic Mining

After placer mining declined in the 1860s, hydraulic and quartz lode mining gave the region a more permanently based mining economy, one which continued—with cycles of expansion and contraction—through the 1930s and in some areas until the 1950s. Invented in California, hydraulic mining began in the 1850s when Anthony Chabot attached a wooden nozzle to a canvas hose and washed ancient river gravels. Over the next 20 years, miners improved upon Chabot's design, developing "the Little Giant," used for more than 100 years thereafter. The Little Giant, or monitor, required vast amounts of gravity-fed water at high head to spray on the Tertiary river gravels. Torrents of water would melt away boulders, trees, gravel, and dirt, all mixed with gold (Figure 3.3-2). By 1880 the La Grange Hydraulic Mining Company, headed by San Francisco attorney Edmund Green, had $50,000 invested in hydraulic mining operations north of La Grange, where gold was found in the rich auriferous gravels in surface diggings and in an old river channel (United States Census Office 1880:184-186). Some 1,200 acres were included in the hydraulic mining field.

Although a simple and economic way of recovering rich nuggets deep in the gravels, hydraulic mining created disastrous problems downstream, where thousands of cubic yards of dirt and rocks were sent into the Central Valley. The tons of waste that entered the valley rivers caused

the water to rise, resulting in floods that destroyed crops, agricultural fields, and buildings. Fighting back, the farmers were successful in curtailing hydraulic mining in 1884, when Judge Sawyer of the United States Circuit Court granted an injunction making it illegal to discharge mining residue into rivers and streams. Hydraulic mining was effectively ended in California and Tuolumne County. The 1893 Caminetti Act permitted hydraulic mining if debris-impounding dams were constructed, but the construction and maintenance of the dams were generally too expensive and not very successful and so the method was not widely used.

Figure 3.3-2. Hydraulicking, n.d. Courtesy California Gold Mines, A Sesquicentennial Photograph Collection, California Department of Mines and Geology.

Hard-Rock Mining

Hard-rock (or quartz) mining began in Tuolumne County in the 1850s. Hard-rock mining is a method of exploration that is largely subsurface but did leave many remains on the landscape, including shafts, adits, haul roads, waste rock, prospects, surface vein workings, and tunnels.

The advent of the hard-rock mining boom of the late 1880s, which continued until most of the mills were shut down for World War I, was induced by a combination of advanced mining and milling technologies, primarily the invention of dynamite and the development of square-set timbering in the Comstock lode, the chlorination and cyanide ore refining processes, water or steam power drills, water pumps and air power, along with investment of foreign capital. The hard-rock mining boom provided for the resurgence of the mining industry in Tuolumne County and the foothills. It was the second boom that more permanently changed the face of the countryside (Clark 1970:7).

Mines throughout Tuolumne County were reopened during the late 1880s, often with new names and under new ownership. The larger mines were owned by corporations with abundant capital to invest in the construction of modern and larger stamp mills and recovery systems. The Eagle-Shawmut near Jacksonville (now beneath the waters of Don Pedro Reservoir) and the Harvard Mine near Jamestown were the largest of these, although hundreds of small and medium-sized mines were developed at Confidence, Soulsbyville, Jamestown, Stent, Quartz, Carters, Big Oak Flat, Groveland, Tuttletown, Sonora, and other locations. This boom continued for two decades, and by 1915, mining was still the major industry in the county (Hamilton 1915:136-166).

Gold Dredging

Bucket-line and dragline dredges became important producers of placer gold in the early 20th century. They are based on large-scale processing of low-grade placer-bearing gravel. Although introduced into California in 1897, dredging did not become a viable method of mining in Tuolumne County until the 1930s, when dredges worked on the Stanislaus and the Tuolumne rivers, Moccasin Creek, and at Montezuma. However, after the 1884 Sawyer Decision in federal court essentially ended large-scale hydraulic mining in California (except for those operations that contained the tailings behind debris dams), gold recovery along the Tuolumne River in the La Grange area in Stanislaus County shifted primarily to dredging operations in the early 20th century. In 1905 the founders of the La Grange Gold Dredging Company purchased lands adjacent to the Tuolumne River west of La Grange which were to be mined by a dredge. The La Grange Gold Dredging Company operated a dredge in this area from 1907-42 and 1945-51 (Clark 1970:85-86). The dredging field extended westward from the town of La Grange along the Tuolumne River for nine miles. The dredge left in its wake large gravel bars that mark its path. Tailings from the extensive dredge mining near La Grange were used in the construction of the New Don Pedro Dam (Figure 3.3-3).

Figure 3.3-3. La Grange Dredge, 1948. Courtesy Sidney Moon, in Bear 1988.

3.3.2.2 Agricultural Development

Farming and animal husbandry are the primary economies in Stanislaus and Tuolumne Counties and have been since approximately 1870. As discussed in Section 3.3.1, the fall of the mining industry necessitated a shift in development away from mineral extraction, and led to the growth of crops and raising animals.

In addition to miners already located in the state switching to farming practices, families from the eastern states and Europe also saw opportunities for stock-raising and truck-garden operations on the open grasslands and began to migrate to the region. Many of the agricultural establishments that had been developed to provide food for miners also began to expand into larger regional markets.

The most common crops planted during the agricultural boom of the 1860s and 70s were hay, alfalfa, wheat, and orchard fruits. Most farms combined agricultural activities such as crop farming and animal husbandry in order to thrive amongst many early difficulties. Common animals raised during that time were cattle, sheep, and hogs. Early agriculture did not have reliable sources of irrigation water, which limited the types of crops that would be successful (Modesto Bee 1938).

Hay and grasses also served the important function of feeding the animals that labored on expanding farms and over time significant land acreage began being devoted to those crops. By 1909, about 18,000 acres were being devoted to "hay" (wheat, barley, and oats) and between 1903 and 1914 alfalfa was the number one crop being raised in the region (Winkle 1928) (Figure 3.3-4). Stock grazing of cattle on large swaths of land occurred at this time as well. Hogs were popular as they took little care to raise to maturity. In addition, animals such as goats, llamas, and poultry have also been raised within the region.

Figure 3.3-4. Haying on the Rosasco Ranch in Tuolumne County, n.d. Courtesy Tuolumne County Museum.

Raising livestock was the leading agricultural industry in the vicinity of the APE during the late nineteenth and early twentieth centuries and continues to have a significant impact on the region today. In 1909, nearly half of the cattle ranches in Tuolumne County were located within the vicinity of the Project and immediately to the north, which brought major economic development to the region. Cattle stealing soon became an issue, and even with branding being required by law, many thieves would obscure brand markings and re-brand cattle as their own. This led to much anger and social disruption, including the hanging of those caught in the act. Another major blow to the industry was the competition for grazing land with growing crop development. In 1870, a law was passed requiring cattle ranchers to pay for damages to nearby crops if they did not put up fencing and their animals wandered. This caused a dramatic decrease from 18,562 cattle in 1860 to 6,576 in 1870 (Tinkham 1921:52-53). Cattle ranching continues to be a major local industry, but has been surpassed by agricultural crop cultivation.

What started as a cattle-dominant market soon grew to encompass a sheep market. In Stanislaus County, sheep breeding was particularly popular and expanded immensely from 1856 (3,384) to 1870 (118,460). 1870 is considered the height of the sheep herding industry in early Stanislaus County and by 1900 only about 23,052 sheep remained. Similarly to cattle ranching, sheep herding took a blow from an 1872 law prohibiting the encroachment of sheep upon grain lands. During that time, pressure had begun to mount between differing agricultural interests and land and grazing rights received a lot of political attention (Tinkham 1921:50-51).

Hog farming, which required less intensive use of land and smaller grazing areas, increased significantly between 1860 (5,039) and 1900 (23,327). Not everyone was excited about hog farming as hogs would be let loose to roam the city streets to feed on garbage, creating a nuisance that triggered an 1878 law requiring hogs to be tied up within city limits. Horse breeding was also common in the vicinity of the APE and evolved from the early horse trading developed by the Spanish in the 1500s. The height of the horse breeding industry also occurred in 1870, where numbers reached over 100,000. By 1880, however, that number had greatly decreased to about 21,000 (Tinkham 1921:541-52).

As animal husbandry declined and increasing political pressure was placed on creating a favorable market for crops, wheat began to increase greatly in cultivation. Between 1860 and 1870, wheat harvests in Stanislaus County grew from 22,597 bushels to 2,317,652 bushels. During that same time, barley grew from 33,897 bushels to 859,860 and hay from 6,238 bushels to 1,500 tons. The highest recorded year for wheat harvesting in those early years was 7,000,000 bushels in 1881 (Tinkham 1921:54-56).

Pressure also began to mount surrounding the need for irrigation water in the region, particularly as more water-intensive crops such as orchards began to increase in popularity. Today, irrigation and agriculture work together in Stanislaus and Tuolumne Counties and are the lifeblood of the region.

3.3.2.3 Transportation Development

Most of the major highways and corridors in California follow the routes of Indian trails (Davis 1961). The first routes in present-day Tuolumne and Stanislaus Counties followed early Indian trails and were undoubtedly used by the first Euro-Americans to visit the area. These include State Route 49 and likely State Route 120 in Tuolumne County. Spanish soldiers and mission priests visited the San Joaquin Valley beginning in 1772, searching for inland mission sites and Indians to convert. By 1790, the Spanish had removed many of the Indians in the western San Joaquin foothills to Mission Santa Clara as "neophytes." With the secularization of the missions in 1834, many returned to their native lands along the Stanislaus and Tuolumne Rivers. Within Tuolumne County, and the foothills in general, the pattern of roads leading to fords, then ferries, then successive bridge crossings persists to this day. Stevens Bar was bridged in 1859 and Wards Ferry in 1879. La Grange had a bridge across the Tuolumne by the 1860s as is shown on the 1867 General Land Office (GLO) plat for Township 3 South, Range 14 East. Numerous avenues between towns, camps, wood mills, mines, ranches, and all the other human additions to the landscape were developed, especially during the period 1849-1900. With the advent of the automobile and other gasoline-powered vehicles, there grew a state-wide interest in transportation development.

Early Wagon Roads

Several early roads and routes traversed the Project vicinity and are depicted on historical maps; including the late 19th century GLO plats, historic USGS topographic maps, and others (GLO 1867, 1869, 1870; also refer to Barton 1896; Beauvais 1882; Dart 1879; Thom 1907; USGS 1897, 1900; Tuolumne County Surveyor's Red Book, on file with the Tuolumne County Surveyor in Sonora, California). These include Coulterville Road, Merced and Coulterville Road, Chinese Camp and Jacksonville Road, Knights Ferry Road, Road from Knights Ferry to Coulterville, Knights Ferry and Don Pedro Bar Road, Crimea House Road, Indian Bar Road, and other smaller routes between ranches and settlements. Most of them were established in the 1850s, first as public roads, then as county roads, and some later as state highways, with portions becoming part of State Route 120, State Route 49, State Route 132, and County Road J-59.

Fords, ferries and bridges located within the APE vicinity connected towns and settlements. Bridges in the vicinity of the APE, located between La Grange and Waterford on the Tuolumne River, include the old La Grange Bridge, a metal truss bridge built between 1913 and 1914, the Old Basso Bridge, a metal truss bridge built in 1911, and the Roberts Ferry Bridge, another metal truss bridge built in 1915 and replaced in 2000.

Railroads

The Southern Pacific San Joaquin Valley mainline began construction in December 1869 at Lathrop: the specific route was determined by engineering considerations, grant requirements, local aid, and a desire for monopoly control; it also took advantage of the vast agricultural potential of the Central Valley and the proximity to potential centers of population. The line was completed to Los Angeles in 1876, with towns founded along the way at Modesto, Turlock, and Merced (Branch 1881:111; Hoover et al. 1990:539; Lewis Publishing Co. 1892:120).

Additional railroad-oriented settlements in Stanislaus County included Ceres and Keyes. Those towns that were bypassed by the railroad soon faded away. As one of the great food-producing regions of the United States, the San Joaquin Valley benefited greatly from the railroads, while the towns along the line became hubs for the movement of goods and passengers to and from the agricultural communities of the Central Valley and the smaller towns to the east.

It was not until the end of the nineteenth century that Tuolumne County began to consider building a railroad. The first one in the county, the Sierra Railway, was incorporated in 1897 as a standard gauge railroad between the cities of Oakdale (on the Southern Pacific line) and Angels Camp in Calaveras County (Coleman 1952:165). When it was completed to Tuolumne in 1901 it penetrated farther into the Sierra Nevada than any other railroad in California except the Central Pacific (Deane 1960:318).

3.3.2.4 Water and Power Development

This Section was prepared by Alan Paterson[9], a local historian who focuses on the history of water control in California.

Water Development

Mining Dams and Ditches

Gold mining along the Tuolumne River in the vicinity of La Grange began in 1849-1850. The original settlement of French Bar (named for the nationality of the first miners) was situated along the river but floods in 1851-1852 forced its gradual relocation to higher ground just upstream, and the name La Grange was in use by late 1854 (Branch 1881:114; Brotherton 1982:162-163). Stanislaus County Surveyor Silas Wilcox reported that "For one or two miles south and southeast of these mines on the river, the flats and gulches have been prospected, and in places have proved to be rich; they have been worked to some extent, but abandoned at present for the want of water" (Wilcox 1854:57-58).

To develop a water supply, the Franklin Water Company was organized on November 30, 1854, followed on December 6 by the French Bar Water Company, and almost a year later, on November 17, 1855, the Stanislaus Water Company was established and absorbed the rights of the two earlier companies (Adams 1904:102). A dam was erected, probably in 1855, in the narrow canyon about two miles upstream from La Grange, near the site of the present La Grange Diversion Dam, for the purpose of diverting water for mining. It was described as being 23 feet high and constructed of logs bolted together with a ditch on the south side of the river (Ancestry 2016; Grunsky 1899:44). The dam was reportedly washed out by floods in December 1861 (California Farmer 1862).

[9] The last paragraph of this Section was prepared by the primary report authors and was not written by Dr. Paterson.

Mining in the La Grange area was revived by the La Grange Ditch & Hydraulic Mining Company. In November 1871 the company had one thousand men, including six hundred Chinese, at work building a 17-mile ditch along the south side of the river from a low log-and-brush diversion dam at Indian Bar to La Grange (Stanislaus County Weekly News 1871; Huber 1917:9). The ditch was nine feet wide and four feet deep with a grade of seven or eight feet per mile (see Figure 3.3-5). In most places it was cut into the rocky canyon wall and in other spots the downslope side of the ditch consisted of parallel hand-laid stone walls with a compacted dirt fill between them. Where the canyon was too steep for excavation the ditch was carried in long wooden flumes. It reached the mining ground at La Grange at an elevation of 250 to 300 feet above the Tuolumne River, and was later extended to the 1,320 acre foot Patricksville Reservoir, about three miles south of La Grange (Bowie, Jr. 1900:141-142; Grunsky 1899:44; Huber 1917:9).

Figure 3.3-5. Image of La Grange Ditch, n.d. Courtesy of La Grange Museum.

Hydraulic mining used water from high pressure nozzles to wash away whole hillsides, running a slurry of mud and gravel through long sluice boxes to capture the gold and discharging immense amounts debris in the process. The La Grange mine was the largest in the San Joaquin Basin, covering 1,200 acres. It was estimated that about 70 percent of its debris was trapped in ravines below the sluices but the rest went directly into the Tuolumne River, and the river was repeatedly filled with tailings during the 1870s (Payson 1880:2509; Bowie, Jr. 1900:242). The 1884 Sawyer Decision prohibited the dumping of mining debris into rivers, and as a result hydraulic mines were forced to close or scale back their operations. The La Grange mine continued to operate, and by 1891 was still excavating an estimated 1.1 million cubic yards per year, but the claims that discharged to the river had been closed (Huggins 1891:3117). As the network of ravines filled up, only the higher deposits could still be worked.

Irrigation Projects

During the 1850s and early 1860s cattle grazed on the San Joaquin Valley plains and settlement remained along the rivers. In the late 1860s, dry-farmed wheat rapidly replaced grazing, and settlement moved out onto the plains. Wheat farms were large, mechanized and devoted entirely to grain production. The railroad arrived in 1870-1871 and Modesto, Turlock and Ceres were founded. With agriculture came talk of irrigation. In 1871 J.M. Thompson, Charles Elliott and M.A. Wheaton acquired the rights to the dam site where the original mining dam had been built and set up the Tuolumne Water Company. It offered to build canals to the plains on both sides of the Tuolumne and sell water on long-term contracts. Farmers balked at the cost and terms, but the company nonetheless built a dam at a cost of $24,000. A quarter million board feet of sawed lumber and sixteen tons of bolts went into the thirty-foot high dam. It had a rough timber covering on its sloped upstream side, replaced once during its life, and was nearly vertical on its downstream face. Its only diversion was into a short canal on the south side that was initially used to power a pump to take water from the river near La Grange for mining and later irrigated up to fifty acres of orchards and gardens in nearby bottomlands (Grunsky 1899:44; Paterson 1987:24-27, 38-39).

Ownership of the dam passed to M. A. Wheaton and in 1876 he offered a new proposal to sell his property to a landowners' corporation that would build and operate the canals. An engineering investigation followed as did another attempt to secure public financing but the farmers were still not ready to invest in irrigation. By 1886 the situation had changed, and irrigation began to be seen not only as a benefit to the grain famers but as a way to encourage new crops and build community-wide prosperity. That year Modesto attorney C.C. Wright was elected to the California State Assembly on a promise to promote irrigation development. His legislation provided for the establishment of irrigation districts by petition and popular vote, and allowed the districts to issue bonds and collect taxes. The Wright Act became law on March 7, 1887 (Paterson 1987:43-46, 51-58).

The Turlock Irrigation District was organized under the Wright Act in June 1887 and the Modesto district followed the next month. TID began filing water right claims at or near Wheaton Dam in 1887 and in 1890 began excavation of its main canal from La Grange to the edge of the plains near Hickman. MID initially planned to take water from the Stanislaus River but by 1890 had decided on the Tuolumne. Wheaton Dam occupied the best site for a diversion dam but TID could not reach agreement with Wheaton so it bought an alternative dam site just upstream and filed condemnation suits for a canal right-of-way across Wheaton's land. Meanwhile, Wheaton sold his dam, water right and enough land for a new, higher dam to MID in June 1890. Extended negotiations between Wheaton and the two irrigation districts led to an August 9, 1890 TID-MID agreement to purchase all of Wheaton's property and rights and construct a joint dam. The Districts agreed to share in the cost and ownership of the dam and property in equal shares, with water diverted at the dam divided in proportion to their acreages. The 1890 Agreement not only provided for the construction of La Grange Diversion Dam but became the foundation for the Districts' partnership in the future development of the river (Paterson 1987: 68-74; Barnes 1987:29-32).

Design and Construction of La Grange Diversion Dam

On August 25, 1890, MID engineer Luther Wagoner and TID engineer E.H. Barton submitted similar plans for coarse rubble masonry dams situated within 25 feet of each other. Consulting engineer Col. G.H. Mendell of the Army Corps of Engineers selected Wagoner's plans but recommended changes to the dam profile that were incorporated in the final design (Modesto Evening News 1890; Grunsky 1899:45; Barton 1900:895). The dam was arched with a radius of 300 feet and had a gravity cross-section, a design chosen to insure stability when large floods passed over its crest. The upstream face was nearly vertical while the downstream face was sloped and curved at the base so that water could flow down the face and be discharged almost horizontally to the river (Wagoner 1907:443).

Luther Wagoner left MID in November 1890, leaving E.H. Barton to draw up the final plans. Those plans had to change in 1891 when it was discovered that the depth to bedrock at the dam site was much greater than expected. Barton explained that "the river-channel had been filled to a depth of 32 feet with boulders from 1 to 5 cubic yards in size, the interstices being occupied with sand and gravel. Consequently, a new profile was designed to suit an increase of 32 feet in the height of the structure" (Barton 1900:895).

The only bid received in September 1890 was rejected as too high. The Districts received three bids in June 1891 and awarded the contract to R.W. Gorrill at a price that reflected the depressed value of the bonds the Districts offered as payment. The contract covered excavation and construction only; the Districts were to supply the cement (Paterson 1987:75-76).

Work got underway immediately (see Figures 3.3-6 and 3.3-7). A stone quarry was opened near the dam site, and sand was pulled from the river upstream from the dam by a cable car system until that deposit was exhausted in early 1893 and replaced by one downstream (Stanislaus County Weekly News 1891a, 1892). The Districts' cement warehouse was located on the north bluff, where barrels were opened and the loose cement delivered to the mixing plant by a pipeline (Stanislaus County Weekly News 1891b).

A cofferdam and flumes carried the low-water flow of the river past the site of foundation work. Masonry construction began in September 1891 and by November 180 men were at work. When the dam rose above the low-water elevation the flumes were replaced by several four-by-six-foot tunnels in the dam that would be closed and cemented later. The capacity of the tunnels was limited to the low flow of the river, so one side of the work was always kept lower than the other so that water could spill over part of the unfinished structure without stopping work (Paterson 1987:78).

Figure 3.3-6. Early construction of La Grange Diversion Dam, n.d. Courtesy of La Grange Museum.

As the dam was nearing completion, *Scientific American* described the placement of the huge, irregularly shaped boulders that made up the dam's core:

> *The dam is built of "cyclopean rubble," and is a model of solidity. Huge rocks, weighing from six to ten tons, were first laid on the bottom. All of their projecting pieces were cut off, and a flat but rough surface was prepared for the lower bed. Before being placed in the bottom, all stones, whatever their size, were scrubbed, and subjected to the action of numerous jets of water under pressure of seventy-five feet.*
>
> *A level bed was first prepared in the rock and covered with a two-inch layer of cement mortar, which was beaten to free it of air. A large stone was then lowered into position by a steam crane, and was beaten down into the mortar by blows from heavy handmauls. Other large stones were similarly placed, but so as not to touch each other. The spaces left between them were filled with concrete, which was thrust into the narrow spaces with tampers.*

> *The work within the reach of each crane was brought up from six to eight feet before the crane was moved. In each course the immense stones were laid so as to bind with those in the course below. No horizontal joints passed through the wall, as the top of each course was left with projecting stones and hollows, which permit it to be well bound with the next course. To make the back face thoroughly water-tight, the vertical joints were filled with mortar alone, and into this broken stone was forced (Scientific American 1893:346).*

Smaller roughly dressed stones set in cement made up the outer faces. In late 1892 the cranes were replaced by an overhead cable system operated by a 40 horsepower steam plant on the south bluff. The cables were able to carry loads of up to ten tons (Elias 1924: 66).

Figure 3.3-7. Photo showing early construction of La Grange Diversion Dam, n.d. Courtesy La Grange Museum.

The dam was completed on December 13, 1893. It stood over 125 feet high from bedrock to crest and had a masonry volume of about 39,500 cubic yards. Over 29,000 barrels of Portland cement were used. The total cost was about $550,000. At the time of its completion it was believed to be the highest overflow dam in the United States, if not the world. It was also unusual because such large masonry structures were not usually built for the sole purpose of raising the elevation of the water surface for irrigation diversion (Schuyler 1912:256-257).

The height of the dam was raised twice by adding concrete caps; eighteen inches in 1923 and two feet in 1930. The top of the dam was originally flat but the additions gave it a sloping profile.

Completing the Canals

The TID and MID canals were still under construction when La Grange Diversion Dam was finished, and both districts faced substantial obstacles. The difficulty of selling irrigation district bonds left the Districts chronically short of cash and the situation worsened with the start of a national depression in 1893. Challenges to the legality of the Wright Act continued until the question was finally settled by the U.S. Supreme Court in 1896. Despite that victory, opposition intensified in the late 1890s, and anti-irrigationists even captured control of the MID Board of Directors from 1897 to 1900, bringing work there to a halt. Diminishing yields from the worn-out wheat fields and falling grain prices forced even some staunch supporters of irrigation to join in suits to prevent the collection of irrigation taxes (Paterson 1987:88-91, 95-96; Barnes 1987:22-27).

Still, there was progress. MID excavated its main canal in 1891-1894, and in 1895 completed the wooden flume that connected the canal to the headworks at La Grange Diversion Dam. TID resumed canal construction in 1894, including work on the 600-foot tunnel through the solid rock bluff next to the dam. By late 1898 the TID canal was finished to the edge of the plains, and graders and scrapers were digging the main canals and laterals that would distribute water. Irrigation began while the system was being completed in 1900. Irrigation began in MID on a limited scale in 1903, and the district had its first full season in 1904 (Paterson 1987:86-88, 92-102; Barnes 1987:32, 35-36, 39).

Irrigation transformed the landscape and economy of the Turlock and Modesto districts. The big wheat farms were soon subdivided into small farms and sold to new farmers who grew new crops, mainly alfalfa at first, and that crop became the basis of a dairy industry. The acreage of peaches, apricots and grapes grew more slowly, and the sandy soils of the Turlock area proved well adapted to sweet potatoes and especially melons. An Irrigation Jubilee in Modesto in April 1904 attended by Gov. George Pardee and featuring a working model of the La Grange Diversion Dam celebrated the completion of the MID canal system and promoted settlement on irrigated farms in both districts. In TID the number of tax-paying landowners grew from 313 in 1900 to over 2,000 in 1910, and during the same period the population of Stanislaus County more than doubled. Existing towns quickly gained population and new towns like Hilmar, Hughson and Denair were established as part of real estate developments. The pattern continued in succeeding decades as most of the remaining land in the districts was converted to irrigated farms (Paterson 1987:111-121, 128-132; Barnes 1987:41-49).

Power Development

Private Power Companies at La Grange

By early 1902 a group of mining men including J.E. Doolittle, Alexander Brown and E.A. Wiltsee had taken control of the La Grange Ditch & Hydraulic Mining Company and announced

plans to put a gold dredger in the Tuolumne River and convert the mining ditch and its water right to hydroelectric power generation (Mining & Scientific Press 1902:287-288). The La Grange Water & Power Company was incorporated in November 1906 and by deeds dated December 1, 1906 and May 21, 1907 acquired all the assets of the La Grange Ditch & Hydraulic Mining Company (La Grange Ditch & Hydraulic Mining Co. 1908). At the same time the La Grange Gold Dredging Company was organized.

The neglected mining ditch was repaired and a hydroelectric plant with a capacity of 450 kw was installed in late 1907 about a mile downstream from La Grange Diversion Dam to utilize the drop from the mining ditch to the river (DOI 1913: 106). The plant was needed to run the electrically-powered gold dredger and the company also planned to sell commercial power. By July 1908 the company had received a county franchise to build power lines, and in October 1908 was granted a franchise for electric service in the city of Turlock (Electrical World 1908a:57, 1908b:923). The company soon expanded its service to Hickman, Hughson, Ceres and Denair and Waterford. In June 1910 an additional Pelton-Francis turbine, direct connected to the new 450 kw generator was installed, bringing total capacity to 900 kw (Journal of Electricity, Power and Gas 1910:528). A forebay with a capacity of approximately 150 acre feet allowed the plant to operate at full capacity to meet peak demands (Huber 1917:5, 9).

In 1911 the well-known mining engineer John Hays Hammond and associates including E.A. Wiltsee and J.E. Doolittle's heirs acquired the La Grange Water & Power Company and combined it with two companies promoting hydroelectric projects on the South and Middle forks of the Tuolumne River to form the Yosemite Power Company (Electrical World 1911:143). That company sold the La Grange division—its only operating property—to the Sierra & San Francisco Power Company (Sierra & San Francisco) in September 1917. Sierra & San Francisco, which had hydroelectric plants on the Stanislaus River, provided power to San Francisco's street railways as well as to customers in the San Joaquin Valley and in the Monterey area. When it acquired the La Grange power system, Sierra & San Francisco was aware that the mining ditch water right had potential financial value for irrigation that might exceed the value of the power generated by the small plant (Huber 1917:8). In January 1919 the company agreed to sell the use of the water right to the Waterford Irrigation District for six months each year for a one-time payment of $170,000 (Sierra & San Francisco Power Co. 1920). The decision to idle the La Grange powerplant for up to six months demonstrated that it was no longer a significant part of the regional power supply.

Pacific Gas & Electric took control of the Sierra & San Francisco system, including the La Grange plant, in January 1920. By that time TID and MID were moving toward construction of Don Pedro Dam, which would flood the upper part of the mining ditch. In May 1921 the Districts bought the mining ditch and powerplant, subject to the contractual rights of the La Grange Gold Dredging Company, the Waterford Irrigation District and the town of La Grange, which relied on the mining ditch for its domestic water supply. In payment, the Districts agreed to deliver 10 million kilowatt hours of electricity annually to PG&E for 25 years (Paterson 1987:221). Although the Districts shut down the powerhouse, they continued to operate the ditch until 1925 when they built a new water system for La Grange connected to the TID canal.

TID La Grange Power Development

No sooner had La Grange Diversion Dam been completed than thoughts turned to its use for electrical generation. In December 1893 the Modesto Daily Evening News promoted the power potential of the dam and compared it to the hydroelectric project being built at Niagara Falls (Paterson 1987: 81). Preliminary plans for powerplants at La Grange Diversion Dam and on the TID main canal at Hickman Drop were drawn up by TID chief engineer Burton Smith in 1910 for the primary purpose of running electric drainage pumps to relieve the rising water table that accompanied the start of irrigation. A subsequent and equally short-lived TID plan for electrical development for drainage in 1916 did not include La Grange Diversion Dam. In both cases there was also interest in providing power for general use in the district (Paterson 1987:215).

Although they could have sold the entire output of Don Pedro Dam to private power companies, public sentiment was in favor of distribution by the Districts. Legislation in 1919 sponsored by local Assemblywomen Esto Broughton and Senator L.L. Dennett gave irrigation districts the right to generate and sell electric power, and advisory elections in both districts in June 1922 strongly endorsed public ownership. TID began construction of a transmission line from Don Pedro to Turlock in late 1922 and began delivering power in April 1923 (Paterson 1987:215-216, 222-224, 233-234).

As part of its power development program, TID filed a water right application in November 1922 for diversion of up to 1,725 cubic feet per second through its canal for generation at a site just below La Grange Diversion Dam (Division of Water Rights 1922). In September 1923, TID won the bid to purchase the decommissioned La Grange Water & Power Company powerplant and equipment for $6,000 (TID 1923:275). When it entered the electrical business TID was competing with private power companies and did not have agreements that would provide emergency power in case of failure of the Don Pedro powerplant. The district needed standby generation and a severe drought in 1924 made the power supply situation more acute. In March 1924 the TID Board of Directors authorized construction of the La Grange powerplant (Paterson 1987:244; TID 1924:365).

The La Grange powerhouse had two penstocks from the headworks of the TID canal, one connected to the two horizontal-shaft generating units salvaged from the old powerplant and the other to a new Allis-Chalmers vertical-shaft unit. The plant went into operation in December 1924 with a total capacity of 4,300 Kw. Besides providing standby service the plant contributed to the district's generation but only to the extent that there was water available in excess of irrigation demand. After the irrigation season ended, operation of the La Grange plant reduced the amount of water that had to be released from Don Pedro exclusively for generation allowing TID to retain more water in storage for the next irrigation season (Paterson 1987:245-246).

Development of the New Don Pedro Dam and Reservoir

The 1940s through the 1960s proved to be a critical period for TID and MID, as the Districts often had to defend their water rights on the Tuolumne River water (Barnes 1987). During this time, the Districts arranged with CCSF to more fully develop the river's watershed, thus providing for the future requirements of the Districts. To ensure that water requirements for TID

and MID would be met "for all time," the Districts began planning for the New Don Pedro Dam and Reservoir, which would require a Federal Power Commission (FPC) license (Barnes 1987:124). In November 1958, the Bechtel Corporation of San Francisco was hired to make preliminary engineering studies and determine the most economical size and type of construction, and in July 1959, they recommended construction of an earth and rock fill structure (TID/MID 2015b Vol I). In the early 1960s, designs for the New Don Pedro Dam were completed and approved, and the Guy F. Atkinson Company won the bid for the contract. The final design called for a 585-foot-high dam, creating a lake 24 miles long and with a surface area of 12,960 acres. The construction site for the dam was located in a V-shaped gorge, approximately 2.5 miles upstream from the La Grange Diversion Dam, where terrain was rugged, access was difficult, and the river was violent. Interestingly, access to much of the river was achieved by filling the old La Grange Ditch, which was perched on the side of the hill. Later, John Goodier, vice-president and chief engineer of the Guy F. Atkinson Company, noted that it had been an interesting job for a contractor, with two diversion tunnels, a shaft, a powerhouse, a switchyard, a dam, and a spillway—all in one job (TID/MID 2015b Vol III).

Dam construction began in 1967 and finished in 1970. Upon completion, the New Don Pedro Dam facilities included a dam, powerhouse, reservoir, switchyard, power intake tunnel, outlet/diversion tunnel, spillways, and dikes (TID/MID 2015b Vol III).

3.3.2.5 Settlement

The nearest settlement to the Project is the town of La Grange, located a little over a mile downstream from La Grange Diversion Dam. The town of La Grange, also known as French Bar, was one of the important mining camps on the Tuolumne River, established by a group of Frenchmen in the early 1850s (Tinkham 1921:70-71). Floods in 1851-1852 forced settlements to relocate to higher ground and the settlement of La Grange was formed (Brotherton 1982:162-163; Branch 1881:114). The wealth of the area was based upon the rich gravel bars along the river and associated terraces. A townsite was laid out in 1852 and by 1856 mining had proved so successful that La Grange (French for "the farm") became the Stanislaus county seat (Figure 3.3-8). It held that honor until 1862, when the county seat was moved to Knights Ferry. After the county seat was moved and the mining excitement had subsided, the town lost its former prestige and began to show signs of decline (Branch 1881:114, 116).

By the mid-1860s, gold placer mining in the area had exhausted resources and the population of the town decreased by 50 percent (Clark 1970:7). Any lingering gold was out of reach and mining technology would not become advanced enough to find it until the turn of the century, although mining would never again be as prominent to the community as it once was. In 1908, the La Grange Gold Dredging Company was established and bought out the La Grange Ditch & Hydraulic Mining Company (Winston 1910:210-211). From the early 1900s and into the early 1950s, the company dredged the river gravels from the west side of the town of La Grange roughly nine miles to the east. By 1959, mining prospects were exhausted and mining activities ceased in La Grange (Koschmann and Bergendahl 1968).

The picturesque La Grange Diversion Dam became a local point of interest for the community after its construction in 1893. Postcards of the nearby La Grange Diversion Dam can be seen as early as 1907, showing La Grange to be a beautiful point of interest on the way to Yosemite National Park (Figures 3.3-9 and 3.3-10).

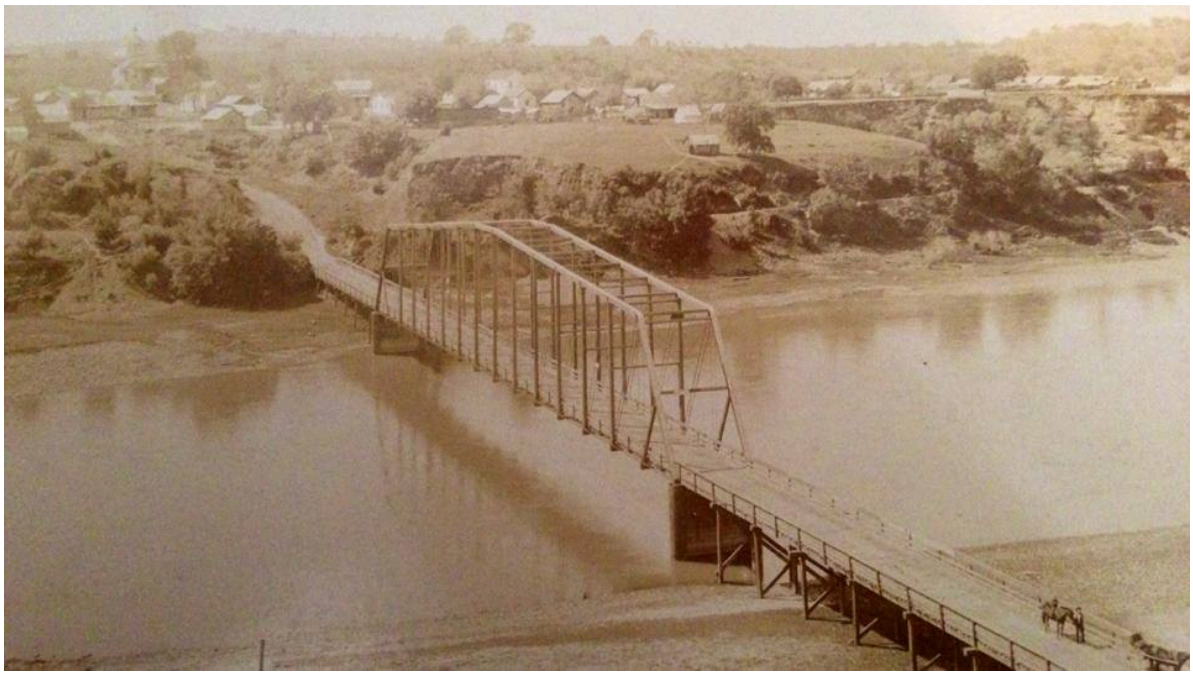


Figure 3.3-8. Original La Grange Bridge, shown here in 1896, was opened to traffic in 1891 and collapsed in 1913 while a herd of cattle was crossing it. Photo courtesy of John Bates, La Grange Museum.

In 1948, the town of La Grange was registered as a California State Historical Landmark. Several buildings were placed on the NRHP in 1979, including the Kingen Hotel, the Odd Fellows Hall, the Old Adobe Barn, the Old La Grange Schoolhouse, the Shell Gas Station, St. Louis Catholic Church, and a Stage Stop (OHP 2016). The Catholic Church is also the oldest in all of Stanislaus County. La Grange lies east of the intersection between La Grange Road and Highway 132 and is 31 miles east of Modesto, California. Today La Grange is a small agricultural community that remains a tourist stop on the way to Yosemite and other locales in the region.

Figure 3.3-9. 1907 Postcard of La Grange Diversion Dam. Courtesy of the La Grange Museum.

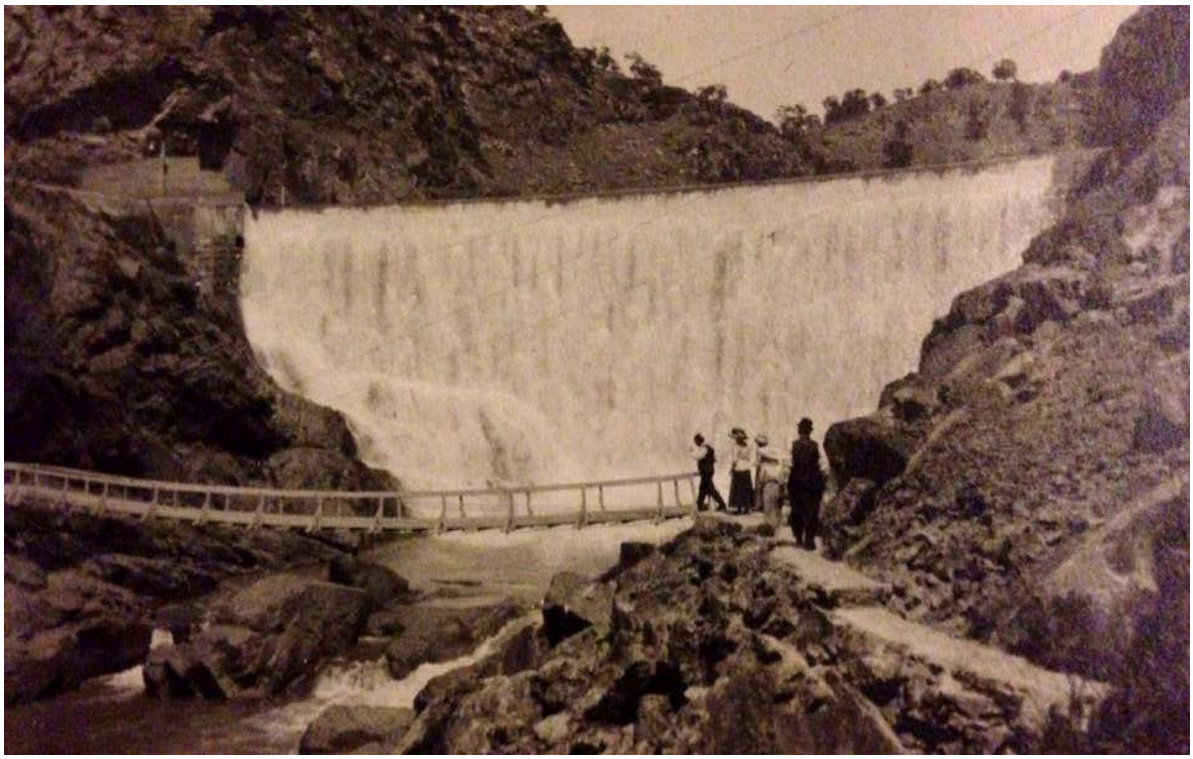


Figure 3.3-10. Postcard showing Turlock teachers viewing La Grange Diversion Dam, n.d. Courtesy of the La Grange Museum.

9.0 REFERENCES

Adams, Frank. 1904. "The Distribution and Use of Water in the Modesto and Turlock Irrigation Districts, California". U.S. Department of Agriculture, Annual Report of Irrigation and Drainage Investigations. Government Publishing Office. Washington D.C.

Ancestry.com. 2016. Miners and Businessmen's Directory for the Year Commencing January 1st, 1856: General Directory of the Citizens of Tuolumne and Portions of Calaveras, Stanislaus and San Joaquin Counties. http://freepages.genealogy.rootsweb.ancestry.com/~npmelton/mnr_indx.htm. Accessed December 9, 2016.

Arnold, J. F., M. R. Walsh, and S. E. Hollimon. 2004. The Archaeology of California. *Journal of Archaeological Research* 12(1):1-73.

Barnes, Dwight H. 1987. The Greening of Paradise Valley: The First 100 Years (1887-1987) of the Modesto Irrigation District. Modesto (CA): MID.

Barton, E.H. 1896. Map of the Mother Lode and Principal Quartz Mines in the Counties of Tuolumne and Calaveras. Eugene H. Barton, Sonora, California.

Baumhoff, M. A., and J. S. Byrne. 1959. Desert Side-notched Points as a Time Marker in California. Reports of the University of California Archaeological Survey 48:32-65.

Beauvais, A.B. 1882. Map of the County of Tuolumne. Compiled from United States Surveys and the Maps and Records of the County Surveyor and County Assessor. Copy on file, Tuolumne County Recorder's Office, Sonora, California.

Bennyhoff, J. A. 1956. An Appraisal of the Archaeological Resources of Yosemite National Park. Reports of the University of California Archaeological Survey 34.

Bennyhoff, J. A., and R. F. Heizer. 1958. Cross-dating Great Basin Sites by California Shell Beads. In Current Views on Great Basin Archaeology, 42:60-92. University of California Archaeological Survey Reports.

Bennyhoff, J. A., and R. E. Hughes. 1987. Shell Bead and Ornament Exchange Networks between California and the Western Great Basin. Anthropological Papers of the American Museum of Natural History 64(2). American Museum of Natural History, New York.

Bettinger, R. L., and R. E. Taylor. 1974. Suggested Revisions in Archaeological Sequences in the Great Basin and the Interior of Southern California. Nevada Archaeological Survey Research Papers 5:1-26.

Bowie, Jr., Augustus J. 1900. A Practical Treatise on Hydraulic Mining in California. Ninth edition. D. Van Nostrand Co. New York.

Branch, L. C. 1881. History of Stanislaus County, California, with Illustrations Descriptive of its Scenery, Farms, Residences, Public Buildings, Factories, Hotels, Business Houses, Schools, Churches, and Mines. San Francisco: Elliott & Moore, Publishers.

Brotherton, L. N. 1982. Annals of Stanislaus County, Vol 1, River Towns and Ferries. Western Tanager Press. Santa Cruz, California.

Burgess, Jack A. 2004. Trains to Yosemite. Signature Press, Berkeley.

California Department of Parks and Recreation (CDPR). 1976. California Inventory of Historic Resources. Department of Parks and Recreation, Sacramento, CA.

_____. 1989. Survey of Surveys: A Summary of California's Historical and Architectural Resources Surveys. Department of Parks and Recreations, Sacramento, CA

_____. 1996. California Historical Landmarks. California Department of Parks and Recreation, Sacramento, CA.

California Farmer and Journal of Useful Sciences. 1862. "The Flood at Stanislaus County". Vol. 16, No. 14. San Francisco, California.

California Office of Historic Preservation (OHP). 1995. Instructions for Recording Historical Resources. State of California, Department of Parks and Recreation, Sacramento, California.

_____. 2016. California Historical Resources. http://ohp.parks.ca.gov/listedresources/. Accessed 12/29/2016.

Chadwick, Wallace L., and Eric B. Kollgaard, eds. 1988. Development of Dam Engineering in the United States. Elmsford (NY): Pergamon press.

Chartkoff, Joseph L., and K. K. Chartkoff. 1984. The Archaeology of California, Stanford University Press, Stanford.

Clark, William B. 1970. Gold Mining Districts of California. Bulletin 193. San Francisco: California Division of Mines and Geology.

Clewlow, C. W., Jr. 1967. Time and Space Relations of Some Great Basin Projectile Points. University of California Archaeological Survey Reports 70:141-149.

Coleman, Charles M. 1952. P.G. and E. of California: The Centennial History of Pacific Gas and Electric Company, 1852–1952. New York: McGraw-Hill.

Dart, J.P. 1888. Plat of William Sharwood's Willietta Gold Quartz Mine.

Davis, James T. 1961. Trade Routes and Economic Exchange Among the Indians of California. Report No. 54 of the University of California Archaeological Survey. University of California Department of Anthropology. Available online at http://digitalassets.lib.berkeley.edu/anthpubs/ucb/text/ucas054-001.pdf.

Davis-King, S. and J. Marvin. 1994. Contextual History of Tuolumne County. Prepared for the County of Tuolumne, Sonora, California. With contributions by Dorothea J Theodoratus, Carlos De Ferrari, and Mark V. Thornton. Submitted to Tuolumne County Planning Department, Sonora.

Deane, Dorothy Newell. 1960. Sierra Railway. Berkeley, California: Howell-North.

Division of Water Rights. 1922. Water Right Application No. 3139. November 16, 1922.

Electrical World. 1908a. Electrical World, Vol. 52. 4 Jul. 1908.

_____. 1908b. Electrical World, Vol. 54. 24 October 1908.

_____. 1911. Electrical World, Vol. 57, No. 2.

Elias, Sol P. 1924. Stories of the Stanislaus: A Collection of Stories on the History and Achievements of Stanislaus County. Modesto (CA): Elias P. Sol.

Elston, R. G., J. O. Davis, A. Leventhal, and C. Covington. 1977. The Archaeology of the Tahoe Reach of the Truckee River. On file, Northern Division of the Nevada Archeological Survey, University of Nevada, Reno.

Ford, T. and L.R. Brown. 2001. Distribution and Abundance of Chinook Salmon and Resident Fishes of the lower Tuolumne River, California. Fish Bulletin.

_____. 2002 Effects of flow on the fish communities of a regulated California river: implications for managing native fishes. River Research and Applications 18: 331-342.

Francis, C.M and J. Vittands. 2005. Department Parks and Recreation 523 Form for Site P-55-7353/CA-TUO-4795H. On file, Central California Information Center, Turlock, California.

Francis, Mark S. 2009. "Yosemite Short Line Railroad Company: A Fresh Look." Pacific Coast Narrow Gauge (PacificNG). http://www.pacificng.com/template.php?page=roads/ca/ysl/afreshlook.htm. (Accessed October 2016).

Grunsky, C.E. 1899. "Irrigation Near Merced, California". Department of the Interior, USGS Water Supply and Irrigation Paper No. 19. U.S. Geological Survey.

Guzman, Brandon, and Miguel Velazquez. 2015. Images of America: Along the Tuolumne River. Mount Pleasant (SC): Arcadia Publishing.

Hamilton, Fletcher. 1915. Mines and Mineral Resources of Amador County, Calaveras County, Tuolumne County. California State Mining Bureau, San Francisco.

Harp, J.C. 1960. Mines and Mining Claims, Jacksonville Area. Turlock Irrigation District. On file, Turlock Irrigation District, Turlock, California.

Heckendorn, John, and W.A. Wilson. 1856. Miners & Business Men's Directory. Heckendorn & Wilson, Columbia. Reprinted 1976 by the Donald I. Segerstrom Memorial Fund, Publication No. 2. Tuolumne County Historical Society, Sonora.

Heizer, R. F. 1951. An Assessment of Certain Nevada, California, and Oregon Radiocarbon Dates. In Radiocarbon Dating, Edited by F. Johnson, pp. 23-25. Memoirs No. 8, Society for American Archaeology, Washington, D.C.

Heizer, R. F., and M. A. Baumhoff. 1961. Wagon Jack Shelter. In The Archaeology of Two Sites at Eastgate, Churchill County, Nevada, pp. 119-138. University of California Anthropological Records 20(4).

Heizer, R. F., and T. R. Hester. 1978. Great Basin Projectile Points: Forms and Chronology. Ballena Press Publications in Archaeology, Ethnology and History.

Hohenthal, Helen Alma. 1972. Streams in a Thirsty Land. City of Turlock.

Hoover, M. B., H. E. Rensch, E. G. Rensch, and W. N. Abeloe. 1990. Historic Spots in California, 4th ed., revised by D. E. Kyle. Stanford, California: Stanford University Press.

Huber. 1917. Letter to Ford, Bacon & Davis. 3 July, 1917. Special Collections and University Archives, University of California, Riverside. Riverside, California.

Huggins, C.L. 1891. Condition of Farming Land and Hydraulic Mines in the Basin of the San Joaquin River and Its Tributaries, from Report of Mr. C.L. Huggins, Assistant Engineer. Annual Report of the Chief of Engineers, United States Army to the Secretary of War for the Year 1891. Government Publishing Office. Washington D.C.

Hull, K. C. 2007. The Sierra Nevada: Archaeology in the Range of Light. In California Prehistory: Colonization, Culture, and Complexity, edited by T. L. Jones and K. A. Klar, pp. 177-190, AltaMira Press, New York.

Hungry Wolf, Adolf. 2003 [1964]. Rails in the Mother Lode. Burbank, California: Darwin Publications.

Jackson, Thomas L. 1971. Appendix C: Determination 0of the Source of Artifactual Lithic Material. In A Study of the Prehistory of the Tuolumne River Valley, California, edited by M.J. Moratto, pp. 167-180. Papers No. 9, Treganza Anthropology Museum, San Francisco State College, San Francisco, California.

Jackson, R. J., T. Jackson, C. Miksicek, K. Roper, and D. Simons. 1994. Framework for Archaeological Research and Management, National Forests of the North Central Sierra Nevada. BioSystems Analysis, Inc., Sacramento, California. Submitted to and on file at the Eldorado National Forest, Placerville, California.

Journal of Electricity, Power and Gas. 1910. Journal of Electricity, Power and Gas, Vol. 24, No. 23. 4 Jun. 1910.

JRP Historical Consulting Services. 2005 Historical Resources Inventory and Evaluation Report, Turlock Irrigation District, Upper Main Canal, Stanislaus County, CA. Resource inventory and evaluation of irrigation canal prior to canal improvements/retrofitting.

Koschmann, A. H., and M. H. Bergendahl. 1968. Principal Gold-Producing Districts of the United States, A description of the geology, mining history, and production of major gold-mining districts in 21 states. Geological Survey Professional Paper 610. United States Publishing Office, Washington.

Kroeber, Alfred L. 1925. Handbook of the Indians of California. Bureau of American Ethnology.

La Grange Ditch & Hydraulic Mining Co. 1908. Confirmation Deed. La Grange Ditch & Hydraulic Mining Co. to La Grange Water & Power Co. 19 Sep. 1908.

LaJeunesse, R. M., and J. H. Pryor. 1996. Skyrocket Appendices. California State University, Fresno.

Lenihan, Daniel J, Toni Carrell, Stephen Fosberg, Larry Murphy, Sandra Rayl and John Ware 1981. The Final Report of the National Reservoir Inundation Study – Volume 1. National Park Service Library, Denver, Colorado.

Levy, Richard. 1978. Eastern Miwok. In California, edited by Robert F. Heizer, pp. 398-413. Vol. 8, Handbook of North American Indians, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Lewis Publishing Company. 1892. A Memorial and Biographical History of the Counties of Merced, Stanislaus, Calaveras, Tuolumne, and Mariposa, California. Illustrated. Chicago: The Lewis Publishing Company

McBain and Trush. 2000. Habitat restoration plan for the Lower Tuolumne River corridor, Final Report. Prepared by McBain and Trush, Arcata, California for the Tuolumne River Technical Advisory Committee with assistance from U.S. Fish and Wildlife Service Anadromous Fish Restoration Program.

Meyer, Jack. 2008. Volume IIa: Project-wide Geoarchaeological Study and Archaeological Investigations at Four Prehistoric Sites: CA-TUO-2640, -2643, -4556, and -4559. Prehistory of the Sonora Region, Archaeological and Geoarchaeological Investigations for Stage 1 of the East Sonora Bypass Project, State Route 108, Tuolumne County, California. Prepared for the California Department of Transportation, District 6 – Fresno. Far Western Anthropological Research Group, Inc.

_____. 2011 Holocene Landscape Evolution and the Archaeological Record at Sonora. In A New Frame of Reference: Prehistoric Culture Chronology and Ecology in the North-Central Sierra Nevada, edited by J. Rosenthal, pp. 67-80. Publication No. 16, Center for Archaeological Research at Davis, Davis, California.

Meyer, Jack, and G. Dalldorf. 2004. Geoarchaeological Investigations for State 2 of the East Sonora Bypass Project, State Route 108, Tuolumne County, California. Anthropological Studies Center, Sonoma State University, Rohnert Park, CA. Prepared for the California Department of Transportation, Stockton.

Meyer, Jack, D. Bieling, S. Stewart, and C. Caputo. 2005. Geoarchaeological Investigations and Archaeological Data Recovery at Four Prehistoric Sites (CA-TUO-2640, -2643, -4556, -4559) for the East Sonora Bypass Project (Stage 1) Tuolumne County, California. Anthropological Studies Center, Sonoma State University, Rohnert Park, CA. Prepared for the California Department of Transportation, Stockton.

Milliken, R., W. Bloomer, S. Stratton, J. Nelson, D. Furlong, D. C. Young, E. Wohlgemuth, J. Costello, P. Mikkelsen, T. Carpenter, and D. Jones. 1997. The Taylors Bar Site (CA-CAL-1180/H): Archaeological and Ethnohistoric Investigations in Calaveras County, California. Far Western Anthropological Research Group, Inc., Davis. Report submitted to and on file at Calaveras County Water District, San Andreas.

Mining & Scientific Press. 1902. Vol. 84, No. 21. 24 May 1902.

Modesto Bee. 1938. "Irrigation is Dominant in History of County." January. Available at the Stanislaus County Library Special Collections Archives, Stanislaus County: Irrigation Vertical File.

Modesto Daily Evening News. 1890. Newspaper. 26 Aug. 1890. Modesto, California.

Moratto, M. J. 1971. A Study of Prehistory in the Tuolumne River Valley, California. Treganza Anthropology Museum Papers, Number 9. San Francisco State University.

_____. 1972 A Study of Prehistory in the Southern Sierra Nevada Foothills, California. Ph.D. dissertation, Graduate School, Department of Anthropology, University of Oregon, Eugene.

_____. 1984 California Archaeology. Academic Press, Orlando, Florida.

_____. 2002 Culture History of the New Melones Reservoir Area, Calaveras and Tuolumne Counties, California. In Essays in California Archaeology: A Memorial to Franklin Fenenga, edited by W. J. Wallace and F. A. Riddell. pp. 25-54. Contributions of the University of California Archaeological Research Facility, Berkeley.

_____. 2009. Eligibility Determinations and Finding of Effect for the Pit 3, 4, 5 Spoil Pile Remediation and Road Improvement Projects, Pit 3, 4, 5 License Implementation Project, FERC No. 233, Shasta County, California. Prepared by Applied EarthWorks, Inc., Westlake Village, California. Prepared for HDR|DTA, Sacramento, California. Submitted to Pacific Gas and Electric Company, San Ramon, California.

Moratto, M. J., J. D. Tordoff, and L. Shoup. 1988. Final Report of the New Melones Archeological Project Vol IX—Culture Change in the Central Sierra Nevada, 8000 B.C.-A.D. 1950. Prepared for the National Park Service, Washington, D.C. INFOTEC, Inc., Sonora, California.

Moratto, M. J., T. F. King, and W. B. Woolfenden. 1978. Archaeology and California's Climate. The Journal of California Anthropology 5(2):147-161.

Moyle, P.B. 2002. Inland Fishes of California. University of California Press, Berkeley and Los Angeles, California.

Napton, L. Kyle. 1992. Cultural Resources Reconnaissance of the Proposed 230kV Transmission Line Corridor Preferred Route; Clavey River Project. California State University, Stanislaus Institute for Archaeological Research, Turlock, California.

O'Shaughnessy, M.M. 1916. Hetch Hetchy Railroad and Aqueduct in Tuolumne County. Hetch Hetchy Water Supply of the City and County of San Francisco, California. San Francisco Department of Public Works. Reprinted in Wurm 1973, frontispiece.

Paterson, Alan M. 1987. Land, Water and Power: A History of the Turlock Irrigation District, 1887-1987. Glendale, California: Arthur H. Clark Company.

Payson, A.H. 1880. Report of Lieutenant A.H. Payson, Corps of Engineers. Report of the Chief of Engineers, U.S Army, 1881. Letter dated 30 Dec. 1880.

Peak. A.S. and H. Crew. 1990. Parts I and II: An Archaeological Data Recovery Project at CA-CAL-S342, Clarks Flat, Calaveras County, California. In Cultural Resource Studies, North Fork Stanislaus River, Hydroelectric Development Project, Volume II. Peak & Associates, Sacramento. Report prepared for and on file at Northern California Power Agency, Roseville.

Ragir, S. 1972. The Early Horizon in Central California Prehistory. Contributions of the University of California Archaeological Research Facility 15. Berkeley.

Robertson, Donald B. 1998. Encyclopedia of Western Railroad History: Vol. IV California. Caxton Printers, Ltd., Caldwell, Idaho.

Rose, Al. 1970. Map of Don Pedro Lake, California. With hand written notations as to proposed names for geographical locations. Al—Rose Publications, Modesto, California. On file, Turlock Irrigation District, Turlock.

Rosenthal, J. S. 2008. Prehistory of the Sonora Region, Archaeological and Geoarchaeological Investigations for Stage 1 of the East Sonora Bypass Project, State Route 108, Tuolumne County, California. Volume I: Synthesis. Far Western Anthropological Research Group, Inc., Davis, CA. Prepared for the California Department of Transportation, Central California Cultural Resources Branch, Fresno.

_____. 2011a. A New Frame of Reference: Prehistoric Culture Chronology and Ecology in the North-Central Sierra Nevada. Center for Archaeological Research at Davis Publication 16, University of California, Davis.

_____. 2011b Projectile Point Typology and Chronology in the North-Central Sierra In A New Frame of Reference: Prehistoric Culture Chronology and Ecology in the North-Central Sierra Nevada, edited by J. S. Rosenthal, pp. 17-36. Publication No. 16, Center for Archaeological Research at Davis, Davis, California.

_____. 2011c. Building a New chronological Framework for the West-Central Sierra Nevada In A New Frame of Reference: Prehistoric Culture Chronology and Ecology in the North-Central Sierra Nevada, edited by J. S. Rosenthal, pp. 37-66. Publication No. 16, Center for Archaeological Research at Davis, Davis, California.

Rosenthal, J. S., G. G. White, and M. Q. Sutton. 2007. The Central Valley: A View from the Catbird's Seat. In California Prehistory: Colonization, Culture, and Complexity, edited by T. L. Jones and K. A. Klar, pp. 147-163, AltaMira Press, New York.

Rosenthal, J. S., J. King, K. R. McGuire, S. A. Waechter, J. Berg, and L. Leach-Palm. 2008. Prehistory of the Sonora Region: Archaeological and Geoarchaeological Investigations for State I of the East Sonora Bypass Project, State Route 108, Tuolumne County, California. Volume IIb: Data Recovery Excavations at CA-TUO-2195/H, -4513, -4514, -4523, -4524, -4525, and Additional Analysis of TUO-2642. Far Western Anthropological Research Group, Inc., Davis, CA. Prepared for the California Department of Transportation, Central California Cultural Resources Branch, Fresno.

Rosenthal, J. S., and K. McGuire. 2004. Middle Holocene Adaptations in the Central Sierra Nevada Foothills: Data Recovery Excavations at the Black Creek Site, CA-CAL-789. Far Western Anthropological Research Group, Inc., Davis, California. Submitted to California Department of Transportation, District 6, Fresno. On file, Central California Information Center, California State University, Stanislaus.

Rosenthal, J.S., and J. Meyer. 2011. Development of an Empirically Based Hydratuion Rate for Bodie Hills Obsidian. . In A New Frame of Reference: Prehistoric Culture Chronology and Ecology in the North-Central Sierra Nevada, edited by J. S. Rosenthal, pp. 7-16. Publication No. 16, Center for Archaeological Research at Davis, Davis, California.

Schlichtmann, Margaret, and Irene Paden. 1986. The Big Oak Flat Road to Yosemite. Fifth Printing. Awani Press, Fredericksburg, Texas.

Schultz, E., A. Vanderslice, Carey & Co. 2007. Primary Record for the Modesto Main Canal (P-50-002002). Information Center Report Numbers SJ-07527, ST-07527, TO-07527 .

Schuyler, James Dix. 1912. Reservoirs for Irrigation, Water-Power and Domestic Water-Supply. 2nd Edition. John Wiley & Sons. New York.

Sierra & San Francisco Power Co. 1920. Letter from Sierra & San Francisco Power Co. to Waterford Irrigation District. Dated 24 Jan. 1920.

Stanislaus County Weekly News. 1871. Newspaper. 10 Nov. 1871. Modesto, California.

_____. 1891a. Newspaper. 13 Nov. 1891. Modesto, California.

_____. 1891b. Newspaper. 3 July. 1891. Modesto, California.

_____. 1892. Newspaper. 30 Dec. 1892. Modesto, California.

Stine, Scott. 1994. Extreme and persistent drought in California and Patagonia during mediaeval time. Nature 369, 546 - 549 (16 June 1994).

Talmage, Valerie, Olga Chesler, and the Staff of Interagency Archaeological Services. 1977. The Importance of Small, Surface, and Disturbed Sites as Sources of Significant Archaeological Data. Interagency Archaeological Services Division, National Park Service, Washington, D.C.

Tinkham, George H. 1921. History of Stanislaus County. Los Angeles: Los Angeles History Record Company.

Thom, Robert, M.E. 1907. Official Map of Tuolumne County, California. Sonora Abstract and Title Company, Sonora, California.

Thomas, David H. 1970. Archaeology's Operational Imperative: Great Basin Projectile Points as a Test Case. University of California Archaeological Survey Annual Report 12:27-60.

_____. 1981. How to Classify Projectile Points from Monitor Valley, Nevada. Journal of Great Basin and California Anthropology 3(1):7-43.

Tuolumne County Historical Society. 2013. Tuolumne County Railroad Transportation. Online document, http://www.tchistory.org/TCHISTORY/railroads.htm (Accessed October 2016).

Tuolumne County Historical Society. 2013a. Tuolumne County Railroad Transportation. Online document, http://www.tchistory.org/TCHISTORY/railroads.htm, accessed February 28, 2013.

Turlock Irrigation District (TID). 1923. TID Board of Directors Minutes, September 4, 1923, Vol. 8.

_____. 1924. TID Board of Directors Minutes, March 24, 1924, Vol.8.

_____. 1975. Don Pedro Lake Place Names. List on file, Turlock Irrigation District, Turlock.

Turlock Irrigation District and Modesto Irrigation District (TID/MID). 2011 Pre-Application Document. Turlock Irrigation District and Modesto Irrigation District, California.

_____. 2012. Annual Summary Report. [Online] URL: http://tuolumnerivertac.com/Documents/2012_FERC_ Report.pdf. (Accessed April 26, 2013).

_____. 2013a. Meeting notes from W&AR-02: Operations Modeling Consultation Workshop filed with FERC on March 19, 2013.

_____. 2013b. Fish assemblage and population between Don Pedro and La Grange Dam Study Report, Don Pedro Project, FERC No. 2299. Prepared by HDR Engineering, Inc. January 2013.

_____. 2015a. Historic Properties Report (CR-01). Volumes I-III. Prepared by HDR and Far Western Anthropological Research Group, Inc., with contributions from Foothill Research, LTD. and Applied EarthWorks, Inc. May 2015.

_____. 2015b. Native American Traditional Cultural Properties Study. Prepared by Applied EarthWorks, Inc. April 2015.

U.S. Army Corps of Engineers (USACE). 1972. Don Pedro Lake, Tuolumne River, California: Reservoir Regulation for Flood Control. Department of the Army, Sacramento, California.

United States Census Office. 1880. Census Reports Tenth Census. June 1, 1880, Volume 13, Statistics and Technology of the Precious Metals.

United States Department of Agriculture, Forest Service (USFS). 2004. Vegetation Classification: CalVeg Zones and Alliances – Vegetation Descriptions. Pacific Southwest Region, Remote Sensing Lab, Ecosystem Planning. Sacramento, CA.

United States Department of the Interior (USDOI). 1913. USGS, Water Supply Paper 311, Surface Water Supple of United States, Part 11. Government Publishing Office. Washington D.C.

_____. 1979. Guidelines for Evaluating and Nominating Properties that Have Achieved Significance within the Past Fifty Years. Revised 1998. National Register Bulletin 22. U.S. Department of the Interior, National Park Service, Cultural Resources, National Register, History, and Education, Washington, D.C.

_____. 1983. Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines in the Federal Register, September 29, 1983 (48FR44716). Department of the Interior, Washington, D.C.

_____. 1990. How to Apply the National register Criteria for Evaluation. National Register Bulletin 15. Revised 2006. U.S. Department of the Interior, National Park Service, Interagency Resources Division, Washington D.C.

_____. 1997. How to Complete the National Register Registration Form. National Bulletin 16A. Revised. Guidelines for Completing National Register of Historic Places Forms, Part A. U.S. Department of the Interior, National Park Service, Cultural Resources Division, Washington, D.C.

_____. 2006 *How to Apply the National register Criteria for Evaluation. National Register Bulletin 15.* U.S. Department of the Interior, National Park Service, Interagency Resources Division, Washington D.C.

Wagner, Jack R. 1986 [1970]. Gold Mines of California. Howell-North Books, San Diego, California.

Wagoner, Luther. 1907. "Discussion: Design of the New Croton Dam". Transactions of the American Society of Civil Engineers. Letter dated June 1907. Vol. 58. American Society of Civil Engineers. New York.

Whitaker, A., and J. Rosenthal. 2009. Addendum Archaeological Survey and Phase II Evaluation for the East Sonora Bypass Stage II Project, Tuolumne County, California. Far Western Anthropological Research Group, Inc., Davis, CA. Prepared for the California Department of Transportation, Central California Cultural Resources Branch, Fresno.

_____. 2010. 9,000 Years of Prehistory at the Poppy Hills Site: Data Recovery Report for CA-TUO-2797/H. Prepared for the California Department of Transportation, Central California Cultural Resources Branch, Fresno, California. Far Western Anthropological Research Group, Inc., Davis, California.

Wilcox, Silas. 1854. "Annual Report of the Surveyor General of the State of California." Letter to S.H. Marlette. 10 Nov. 1854.

Winston, W. S. 1910. La Grange Gold Dredging Company: California Min. Bur. Bull. 57.

Wirth Environmental Associates. 1985. Mokelumne River Project, Cultural Resources Evaluation Program. Report prepared for Pacific Gas and Electric, San Francisco. On file, Central California Information Center, California State University, Stanislaus.

Interviews

August 8, 2016 interview at La Grange Dam with Lorenzo Sanchez, TID employee.

August 10, 2016 interview at La Grange Dam with Mark Pieczarka, MID employee.

Appendix E. SHPO Consultation

This page is intentionally blank.

STATE OF CALIFORNIA – THE RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

September 18, 2017

In reply refer to: FERC_2016_0628_001

Danielle Risse
Senior Cultural Resources Specialist
HDR, Inc.
2379 Gateway Oaks Dr., Suite 200
Sacramento, CA 95833-4240

RE: Cultural Resources Study, La Grange Hydroelectric Project FERC Licensing (FERC No. 14581) Tuolumne County, CA

Dear Ms. Risse:

Thank you for the letter received August 2, 2017, continuing consultation on behalf of the Turlock Irrigation District and Modesto Irrigation District (the Districts) for the above-referenced project in order to comply with Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations found at 36 CFR § 800. The Districts have been delegated Section 106 consultation authority by the Federal Energy Regulatory Commission (FERC), pursuant to FERC's May 23, 2014 *Notice of Filing of Pre-Application Document (PAD), Commencement of Pre-Filing Process, and Scoping; Request for Comments on the PAD and Scoping Document, and Identification of Issues and Associated Study Requests.* Included with the District's letter was the *Cultural Resources Study Study Report La Grange Hydroelectric Project FERC No. 14581*(study report), prepared by HDR, Inc. for the Districts in February 2017.

As defined by FERC in the February 2, 2015, Study Plan Determination, the Area of Potential Effect (APE) for the licensing includes lands immediately downstream of the La Grange diversion dam and the La Grange impoundment upstream of the La Grange diversion dam. The APE does not include the Don Pedro powerhouse because the La Grange project is a run of river project and the impoundment does not fluctuate under normal operations, and it's licensing and continued operation is not likely to result in direct or indirect effects to the Don Pedro dam or powerhouse. My office previously commented on this APE in the letter of July 8, 2016.

The study documents the results of the identification efforts within the APE, which included archival research, field survey, and Native American coordination. Inventory efforts identified two isolated finds, five archaeological sites, and 14 built environment resources. All resources have been evaluated for their eligibility for the National Register of Historic Places (NRHP) as summarized in the tables below:

NRHP evaluations for isolated finds identified in the APE.

Primary No.	Temporary No.	Age	Description	NRHP Eligibility
P-50-2190	HDR-LG-ISO-01	Historic	Two pieces of 8 foot long rebar, and a segment of railroad rail.	Ineligible
P-50-2191	HDR-LG-ISO-02	Historic	One chain link connected by an eye bolt that is anchored into a boulder.	Ineligible

NRHP evaluations for archaeological sites identified in the APE.

Primary No./ Trinomial	Temporary Site No.	Age	Description	NRHP Eligibility
P-50-2192/ CA-STA-439H	HDR-LG-01	Historic	Remnants of a residential building with five features comprised of three rock retaining walls, concrete curbing (likely modern) and a water pipe	Ineligible
P-50-2193/ CA-STA-440	HDR-LG-04	Prehistoric	Single milling station with 31 mortar cups	Ineligible
P-50-2194/ CA-STA-441H	HDR-LG-05	Historic	Remnants of a residential location and powerhouse support facilities with one artifact concentration, six features and various rock walls	Ineligible
P-55-9499/ CA-TUO-6004H	HDR-LG-02	Historic	Small pocket of relatively intact placer mining tailings	Ineligible
P-55-9500/ CA-TUO-5992H	HDR-LG-03	Historic	Remnants of construction from building the Don Pedro Hydroelectric Project: two abandoned road segments, two concrete footings, and a metal pipe	Ineligible

NRHP evaluations for built environment resources identified in the APE.

Building/Structure Field Designation	Date	Engineering Style/Type, Designer	NRHP Eligibility (NRHP criteria)
La Grange Diversion Dam and Irrigation System Resources			
La Grange Diversion Dam (P-50-0550)	1893	Stone and Concrete, Luther Wagoner (MID)	Eligible (A and C)
La Grange Forebay Bypass Spillway (P-50-2197)	1910	Concrete, TID	Ineligible
La Grange pool (P-50-2206 and P-55-9498)	1893	None, TID/MID	Ineligible
La Grange Irrigation Canal Forebay (P-50-2198)	1910	Concrete, TID	Ineligible
La Grange MID Old Canal Intake Structure (P-50-2199)	1893	Concrete, MID	Ineligible
La Grange TID Diversion Tunnel Intake Structure (P-50-2205)	1910	Concrete, TID	Ineligible
La Grange MID Old Canal Discharge Structure (P-50-2200)	1910	Concrete/Metal, MID	Ineligible
La Grange MID Old Canal Segment (P-50-2002)	1904	Stone, Earth, and Concrete, MID	Ineligible
La Grange Project Hydroelectric System Resources			
La Grange powerhouse (P-50-2204)	1924	Steel and Concrete, TID	Ineligible

Building/Structure Field Designation	Date	Engineering Style/Type, Designer	NRHP Eligibility (NRHP criteria)
La Grange powerhouse Penstocks (P-50-2202)	1924	Steel and Concrete, TID	Ineligible
La Grange powerhouse Tailrace (P-50-2203)	1924	Concrete and Earthen, TID	Ineligible
La Grange powerhouse Access Road (P-50-2201)	c. 1922	Asphalt and Earthen, TID	Ineligible
Residential Properties			
Garage on La Grange powerhouse Access Road (P-50-2195)	c. 1930	Wood-framed, Unknown	Ineligible
Historic Mining Resources			
La Grange Ditch (P-55-8888)	1872	Vernacular water conveyance structure, Augustus Bowie	Eligible (A and C)

The La Grange Ditch (P-55-8888) was previously determined eligible for listing on the NRHP (FERC111230A).

The Districts have determined that the La Grange Diversion Dam (P-50-0550) is eligible for listing in the NRHP under Criteria A and C for its relation to the development and growth of irrigation in the Central Valley and its association with the 1887 Wright Act. It also exhibits features unique to dams in the Central Valley, and is a rare example due to its height and integrated spillway and materials. The period of significance for the dam and spillway was identified as 1893. The remaining resources listed above, with the exception of the La Grange Ditch, have been determined by the Districts to be ineligible for listing in the NRHP.

The Districts have requested concurrence regarding the adequacy of identification efforts and on the determinations above. After reviewing the documentation provided, I offer the following comments:

- I agree that the La Grange Diversion Dam (P-50-0550) is eligible for listing in the NRHP under Criteria A and C for the reasons noted above, with a period of significance of 1893, per 36 CFR § 800.4(c)(2).
- I agree that the remaining newly-identified resources listed above are not eligible for listing in the NRHP, per 36 CFR § 800.4(c)(2).

I look forward to continuing this consultation with you. Please direct any questions or concerns that you may have to Kathleen Forrest, Historian, at 916-445-7022 or Kathleen.Forrest@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

Frank Winchell

From: Forrest, Kathleen@Parks <Kathleen.Forrest@parks.ca.gov>
Sent: Friday, December 12, 2014 6:02 PM

To: Risse, Danielle (Danielle.Risse@hdrinc.com)
Cc: Greenaway, Brendon@Parks; Frank Winchell
Subject: OHP Comments, Don Pedro Built Environment Evaluations (FERC111230A)

Hi Danielle,

Brendon and I discussed the review status of the Don Pedro project and decided it would be more efficient for me to send you the Built Environment comments via email. I reviewed the *Historic Properties Study: Volume III, Privileged/Confidential Draft Study Report, Don Pedro Project, FERC No. 2299* prepared for the Turlock Irrigation District (TID) and Modesto Irrigation District (MID) by HDR and Foothill Resources, dated October, 2014 (evaluation). Following the review, I offer the following comments:

- Regarding the **Don Pedro Project System Resources** (as listed in Table 5-1 of the evaluation), the **Don Pedro Project Recreation-Related Resources**(as listed in Table 5-5 of the evaluation), the **Don Pedro Historic District** (as listed in Table 5-6 of the evaluation), and the **Don Pedro Recreation Agency Historic District** (as listed in Table 5-7 of the evaluation), I **cannot concur** with the determinations that these resources are not eligible for listing on the National Register of Historic Places (NRHP) due to their age and not meeting Criterion Consideration G. Construction of these properties began in 1968, 46 years ago. As stated in National Register Bulletin 15, fifty years is a general estimate of the time needed to develop historical perspective and evaluate significance (p. 41). It is common practice, and encouraged by the OHP, to evaluate properties that are 45 years old and older for their significance when they are part of large or long-term projects, due to the length of the planning and design process. There's also quite a bit of information regarding the significance of hydroelectric properties, irrigation districts, and the associated recreation facilities to provide a context and significance for the 4 years of historical perspective lacking in this instance. Since these properties are currently 46 years old and the FERC relicensing process can take five or more years to complete, at which time the properties would be over 50 years old, it is appropriate that they be evaluated using the 45-year guideline. I recommend reexamining their significance as properties of sufficient age and integrity to be eligible for the NRHP.
- I agree that the evaluation of the **Hetch Hetchy Moccasin-Newark Transmission Line** as a contributor to a Hetch Hetchy Project historic district is outside the scope of the Don Pedro Project relicensing. As such, I recommend that this property be assumed eligible for the purposes of the Don Pedro Project and managed as a historic property until an evaluation of the Hetch Hetchy Project is completed and a formal determination can be made. I do not expect that such an evaluation would be done as part of the Don Pedro Project undertaking.
- The **three unevaluated resources** within the Area of Potential Effect (APE), the Moccasin Creek Stone building, Red Mountain Bar Siphon, and the Kanaka Creek Cabin, need to be evaluated for their eligibility to the NRHP.
- I concur that the **TID (east) Transmission Line** (P-55-8884), the **MID (west) Transmission Line** (P-55-8885), the **Guy F. Atkinson Company construction camp powder house** (P-55-8898), and the resources evaluated as part of the **Don Pedro Project Operations Support Resources** (listed on page 5-10, table 5-4 of the evaluation) **are not individually eligible** for listing in the NRHP.
- I concur that the **La Grange Ditch (P-55-8888) is individually eligible** for listing in the NHRP.

Correspondence from Brendon regarding the additions to the APE remaining resources and evaluations is forthcoming shortly. I hope this is helpful, and let me know if you have questions about the comments above or would like to discuss them.

Happy holidays!
Kathleen

Kathleen Forrest
Historian, Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816
916 445-7022
kathleen.forrest@parks.ca.gov

Appendix F. Air Quality Calculations

This page is intentionally blank.

La Grange Diversion Tunnel

Stanislaus County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Recreational	1.00	User Defined Unit	2.00	0.00	1

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	46
Climate Zone	3			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - I did not verify the utility, but that information is not used for anything in this estimate.

Land Use - There are no land use choices for dams so I chose recreational.
They are going to clean out and gunite only about 0.3 acres of sluice channel. I put in 2 acres for total project acreage.
Construction Phase - Project will take place over a 45 day period within one construction season.

Off-road Equipment - This phase will involve on-road trucks and pumps to dewater.

Off-road Equipment - Size of excavator and crawler tractor were specified in project description, and their HP ratings are slightly different from CalEEMod default HP.
Off-road Equipment - Size of excavator and crawler tractor and pump were specified in project description, and their HP ratings are slightly different from CalEEMod default HP.
Off-road Equipment - Size of excavator and crawler tractor were specified in project description, and their HP ratings are slightly different from CalEEMod default HP.

Off-road Equipment - Negligible off-road equipment operation for demobilization, mostly just on-road trucks in this phase.

Grading - For some reason CalEEMod offered only Phase 1 and Phase 5 for material movement.
In reality, the material movement will be in phases 2, 3, and 4.
Trips and VMT - Crew is expected to not exceed 12 workers, so 10 commute vehicles (e.g. construction crew trucks) 20 trips/day assumed.
Hauling includes excavated material, cement, gunnite, slurry, pipe, valve hardware, rebar, forms and cofferdam, etc.

Energy Use -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	200.00	5.00
tblConstructionPhase	NumDays	2.00	6.00
tblConstructionPhase	NumDays	200.00	14.00
tblConstructionPhase	NumDays	200.00	27.00
tblConstructionPhase	NumDays	2.00	3.00
tblConstructionPhase	PhaseEndDate	4/18/2022	6/18/2021
tblConstructionPhase	PhaseEndDate	7/6/2021	6/14/2021
tblConstructionPhase	PhaseStartDate	7/13/2021	6/14/2021
tblConstructionPhase	PhaseStartDate	7/3/2021	6/7/2021
tblGrading	AcresOfGrading	0.00	2.00
tblGrading	AcresOfGrading	0.00	2.00
tblGrading	MaterialExported	0.00	428.00
tblGrading	MaterialImported	0.00	2,005.00
tblGrading	MaterialImported	0.00	135.00

tblLandUse	LotAcreage	0.00	2.00
tblLandUse	Population	0.00	1.00
tblOffRoadEquipment	HorsePower	84.00	50.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	212.00	251.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	212.00	251.00
tblOffRoadEquipment	HorsePower	84.00	25.00
tblOffRoadEquipment	HorsePower	172.00	20.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	212.00	251.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	45.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	45.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	45.00
tblTripsAndVMT	HaulingTripNumber	304.00	14.00
tblTripsAndVMT	HaulingTripNumber	0.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	512.00
tblTripsAndVMT	HaulingTripNumber	0.00	154.00
tblTripsAndVMT	HaulingTripNumber	13.00	14.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripNumber	8.00	20.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0640	0.6569	0.5057	1.5200e-003	0.0269	0.0231	0.0500	6.9100e-003	0.0217	0.0286	0.0000	136.2816	136.2816	0.0228	0.0000	136.8508
Maximum	**0.0640**	**0.6569**	**0.5057**	**1.5200e-003**	**0.0269**	**0.0231**	**0.0500**	**6.9100e-003**	**0.0217**	**0.0286**	**0.0000**	**136.2816**	**136.2816**	**0.0228**	**0.0000**	**136.8508**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0640	0.6569	0.5057	1.5200e-003	0.0250	0.0231	0.0481	6.7000e-003	0.0217	0.0284	0.0000	136.2815	136.2815	0.0228	0.0000	136.8507
Maximum	**0.0640**	**0.6569**	**0.5057**	**1.5200e-003**	**0.0250**	**0.0231**	**0.0481**	**6.7000e-003**	**0.0217**	**0.0284**	**0.0000**	**136.2815**	**136.2815**	**0.0228**	**0.0000**	**136.8507**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**6.99**	**0.00**	**3.76**	**3.04**	**0.00**	**0.73**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	6-7-2021	9-6-2021	0.6970	0.6970
		Highest	0.6970	0.6970

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization and Dewatering	Site Preparation	6/7/2021	6/14/2021	5	6	
2	Sluice channel dredging	Building Construction	6/14/2021	6/18/2021	5	5	
3	Sluice channel resurfacing	Building Construction	6/16/2021	7/5/2021	5	14	
4	Diversion Construction	Building Construction	6/30/2021	8/5/2021	5	27	
5	Demobilization	Site Preparation	8/4/2021	8/6/2021	5	3	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sluice channel resurfacing	Cranes	0	8.00	231	0.29
Diversion Construction	Cranes	0	8.00	231	0.29
Sluice channel resurfacing	Forklifts	0	7.00	89	0.20
Sluice channel dredging	Generator Sets	0	8.00	84	0.74
Sluice channel dredging	Cranes	0	8.00	231	0.29
Sluice channel dredging	Forklifts	0	7.00	89	0.20
Mobilization and Dewatering	Graders	0	8.00	187	0.41
Diversion Construction	Forklifts	0	7.00	89	0.20
Sluice channel resurfacing	Generator Sets	0	8.00	84	0.74
Diversion Construction	Generator Sets	0	8.00	84	0.74
Demobilization	Graders	0	8.00	187	0.41
Sluice channel dredging	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Demobilization	Scrapers	0	8.00	367	0.48
Sluice channel resurfacing	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Diversion Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Mobilization and Dewatering	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Demobilization	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Sluice channel resurfacing	Welders	0	8.00	46	0.45
Mobilization and Dewatering	Scrapers	0	8.00	367	0.48
Sluice channel dredging	Welders	0	8.00	46	0.45
Diversion Construction	Welders	0	8.00	46	0.45
Mobilization and Dewatering	Pumps	1	24.00	50	0.74
Mobilization and Dewatering	Pumps	2	24.00	10	0.74
Sluice channel dredging	Excavators	2	8.00	162	0.38
Sluice channel dredging	Crawler Tractors	2	8.00	251	0.43
Sluice channel dredging	Air Compressors	1	8.00	78	0.48
Sluice channel resurfacing	Excavators	2	8.00	162	0.38
Sluice channel resurfacing	Crawler Tractors	2	8.00	251	0.43
Sluice channel resurfacing	Pumps	1	24.00	25	0.74
Sluice channel resurfacing	Air Compressors	1	8.00	78	0.48
Sluice channel resurfacing	Other Construction Equipment	1	8.00	20	0.42
Diversion Construction	Excavators	2	8.00	162	0.38
Diversion Construction	Crawler Tractors	2	8.00	251	0.43
Diversion Construction	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sluice channel resurfacing	7	20.00	0.00	512.00	30.00	6.60	45.00	LD_Mix	HDT_Mix	HHDT
Mobilization and Dewatering	3	20.00	0.00	14.00	30.00	6.60	45.00	LD_Mix	HDT_Mix	HHDT
Diversion Construction	5	20.00	0.00	154.00	30.00	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Sluice channel dredging	5	20.00	0.00	12.00	30.00	6.60	25.00	LD_Mix	HDT_Mix	HHDT
Demobilization	0	20.00	0.00	14.00	30.00	6.60	45.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

3.2 Mobilization and Dewatering - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.2000e-003	0.0000	1.2000e-003	1.4000e-004	0.0000	1.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.6300e-003	0.0338	0.0324	6.0000e-005		1.5300e-003	1.5300e-003		1.5300e-003	1.5300e-003	0.0000	4.2391	4.2391	4.6000e-004	0.0000	4.2505
Total	**5.6300e-003**	**0.0338**	**0.0324**	**6.0000e-005**	**1.2000e-003**	**1.5300e-003**	**2.7300e-003**	**1.4000e-004**	**1.5300e-003**	**1.6700e-003**	**0.0000**	**4.2391**	**4.2391**	**4.6000e-004**	**0.0000**	**4.2505**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	3.1400e-003	5.1000e-004	1.0000e-005	2.7000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.0800	1.0800	4.0000e-005	0.0000	1.0809
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.1000e-004	4.3000e-003	1.0000e-005	1.3300e-003	1.0000e-005	1.3400e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.1649	1.1649	3.0000e-005	0.0000	1.1657
Total	**6.6000e-004**	**3.5500e-003**	**4.8100e-003**	**2.0000e-005**	**1.6000e-003**	**2.0000e-005**	**1.6200e-003**	**4.2000e-004**	**2.0000e-005**	**4.5000e-004**	**0.0000**	**2.2449**	**2.2449**	**7.0000e-005**	**0.0000**	**2.2466**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-004	0.0000	2.0000e-004	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.6300e-003	0.0338	0.0324	6.0000e-005		1.5300e-003	1.5300e-003		1.5300e-003	1.5300e-003	0.0000	4.2391	4.2391	4.6000e-004	0.0000	4.2505
Total	**5.6300e-003**	**0.0338**	**0.0324**	**6.0000e-005**	**2.0000e-004**	**1.5300e-003**	**1.7300e-003**	**2.0000e-005**	**1.5300e-003**	**1.5500e-003**	**0.0000**	**4.2391**	**4.2391**	**4.6000e-004**	**0.0000**	**4.2505**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	3.1400e-003	5.1000e-004	1.0000e-005	2.7000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.0800	1.0800	4.0000e-005	0.0000	1.0809
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	4.1000e-004	4.3000e-003	1.0000e-005	1.3300e-003	1.0000e-005	1.3400e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.1649	1.1649	3.0000e-005	0.0000	1.1657
Total	**6.6000e-004**	**3.5500e-003**	**4.8100e-003**	**2.0000e-005**	**1.6000e-003**	**2.0000e-005**	**1.6200e-003**	**4.2000e-004**	**2.0000e-005**	**4.5000e-004**	**0.0000**	**2.2449**	**2.2449**	**7.0000e-005**	**0.0000**	**2.2466**

3.3 Sluice channel dredging - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.6000e-003	0.0473	0.0421	8.0000e-005		2.0800e-003	2.0800e-003		1.9300e-003	1.9300e-003	0.0000	7.2744	7.2744	2.1400e-003	0.0000	7.3278
Total	**4.6000e-003**	**0.0473**	**0.0421**	**8.0000e-005**		**2.0800e-003**	**2.0800e-003**		**1.9300e-003**	**1.9300e-003**	**0.0000**	**7.2744**	**7.2744**	**2.1400e-003**	**0.0000**	**7.3278**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.0000e-005	1.7600e-003	2.7000e-004	1.0000e-005	1.3000e-004	1.0000e-005	1.3000e-004	4.0000e-005	1.0000e-005	4.0000e-005	0.0000	0.5447	0.5447	3.0000e-005	0.0000	0.5454
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	3.4000e-004	3.5900e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.9707	0.9707	3.0000e-005	0.0000	0.9714
Total	**5.2000e-004**	**2.1000e-003**	**3.8600e-003**	**2.0000e-005**	**1.2400e-003**	**2.0000e-005**	**1.2500e-003**	**3.3000e-004**	**2.0000e-005**	**3.4000e-004**	**0.0000**	**1.5155**	**1.5155**	**6.0000e-005**	**0.0000**	**1.5168**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.6000e-003	0.0473	0.0421	8.0000e-005		2.0800e-003	2.0800e-003		1.9300e-003	1.9300e-003	0.0000	7.2744	7.2744	2.1400e-003	0.0000	7.3278
Total	**4.6000e-003**	**0.0473**	**0.0421**	**8.0000e-005**		**2.0800e-003**	**2.0800e-003**		**1.9300e-003**	**1.9300e-003**	**0.0000**	**7.2744**	**7.2744**	**2.1400e-003**	**0.0000**	**7.3278**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.0000e-005	1.7600e-003	2.7000e-004	1.0000e-005	1.3000e-004	1.0000e-005	1.3000e-004	4.0000e-005	1.0000e-005	4.0000e-005	0.0000	0.5447	0.5447	3.0000e-005	0.0000	0.5454
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	3.4000e-004	3.5900e-003	1.0000e-005	1.1100e-003	1.0000e-005	1.1200e-003	2.9000e-004	1.0000e-005	3.0000e-004	0.0000	0.9707	0.9707	3.0000e-005	0.0000	0.9714
Total	**5.2000e-004**	**2.1000e-003**	**3.8600e-003**	**2.0000e-005**	**1.2400e-003**	**2.0000e-005**	**1.2500e-003**	**3.3000e-004**	**2.0000e-005**	**3.4000e-004**	**0.0000**	**1.5155**	**1.5155**	**6.0000e-005**	**0.0000**	**1.5168**

3.4 Sluice channel resurfacing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0191	0.1682	0.1402	2.9000e-004		7.5800e-003	7.5800e-003		7.1600e-003	7.1600e-003	0.0000	24.3921	24.3921	6.5600e-003	0.0000	24.5560
Total	**0.0191**	**0.1682**	**0.1402**	**2.9000e-004**		**7.5800e-003**	**7.5800e-003**		**7.1600e-003**	**7.1600e-003**	**0.0000**	**24.3921**	**24.3921**	**6.5600e-003**	**0.0000**	**24.5560**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.6700e-003	0.1150	0.0188	4.1000e-004	9.8100e-003	4.5000e-004	0.0103	2.7000e-003	4.3000e-004	3.1300e-003	0.0000	39.4982	39.4982	1.3300e-003	0.0000	39.5314
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3100e-003	9.6000e-004	0.0100	3.0000e-005	3.1000e-003	2.0000e-005	3.1300e-003	8.2000e-004	2.0000e-005	8.4000e-004	0.0000	2.7181	2.7181	7.0000e-005	0.0000	2.7199
Total	**4.9800e-003**	**0.1159**	**0.0289**	**4.4000e-004**	**0.0129**	**4.7000e-004**	**0.0134**	**3.5200e-003**	**4.5000e-004**	**3.9700e-003**	**0.0000**	**42.2163**	**42.2163**	**1.4000e-003**	**0.0000**	**42.2514**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0191	0.1682	0.1402	2.9000e-004		7.5800e-003	7.5800e-003		7.1600e-003	7.1600e-003	0.0000	24.3921	24.3921	6.5600e-003	0.0000	24.5560
Total	**0.0191**	**0.1682**	**0.1402**	**2.9000e-004**		**7.5800e-003**	**7.5800e-003**		**7.1600e-003**	**7.1600e-003**	**0.0000**	**24.3921**	**24.3921**	**6.5600e-003**	**0.0000**	**24.5560**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.6700e-003	0.1150	0.0188	4.1000e-004	9.8100e-003	4.5000e-004	0.0103	2.7000e-003	4.3000e-004	3.1300e-003	0.0000	39.4982	39.4982	1.3300e-003	0.0000	39.5314
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3100e-003	9.6000e-004	0.0100	3.0000e-005	3.1000e-003	2.0000e-005	3.1300e-003	8.2000e-004	2.0000e-005	8.4000e-004	0.0000	2.7181	2.7181	7.0000e-005	0.0000	2.7199
Total	**4.9800e-003**	**0.1159**	**0.0289**	**4.4000e-004**	**0.0129**	**4.7000e-004**	**0.0134**	**3.5200e-003**	**4.5000e-004**	**3.9700e-003**	**0.0000**	**42.2163**	**42.2163**	**1.4000e-003**	**0.0000**	**42.2514**

3.5 Diversion Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	0.0248	0.2553	0.2275	4.5000e-004		0.0112	0.0112		0.0105	0.0105	0.0000	39.2820	39.2820	0.0115	0.0000	39.5703
Total	**0.0248**	**0.2553**	**0.2275**	**4.5000e-004**		**0.0112**	**0.0112**		**0.0105**	**0.0105**	**0.0000**	**39.2820**	**39.2820**	**0.0115**	**0.0000**	**39.5703**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.8000e-004	0.0256	4.0000e-003	9.0000e-005	1.9700e-003	9.0000e-005	2.0600e-003	5.4000e-004	9.0000e-005	6.3000e-004	0.0000	8.2129	8.2129	3.7000e-004	0.0000	8.2221
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5200e-003	1.8600e-003	0.0194	6.0000e-005	5.9900e-003	4.0000e-005	6.0300e-003	1.5900e-003	4.0000e-005	1.6300e-003	0.0000	5.2420	5.2420	1.4000e-004	0.0000	5.2456
Total	**3.3000e-003**	**0.0274**	**0.0234**	**1.5000e-004**	**7.9600e-003**	**1.3000e-004**	**8.0900e-003**	**2.1300e-003**	**1.3000e-004**	**2.2600e-003**	**0.0000**	**13.4549**	**13.4549**	**5.1000e-004**	**0.0000**	**13.4676**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0248	0.2553	0.2275	4.5000e-004		0.0112	0.0112		0.0105	0.0105	0.0000	39.2819	39.2819	0.0115	0.0000	39.5703
Total	**0.0248**	**0.2553**	**0.2275**	**4.5000e-004**		**0.0112**	**0.0112**		**0.0105**	**0.0105**	**0.0000**	**39.2819**	**39.2819**	**0.0115**	**0.0000**	**39.5703**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.8000e-004	0.0256	4.0000e-003	9.0000e-005	1.9700e-003	9.0000e-005	2.0600e-003	5.4000e-004	9.0000e-005	6.3000e-004	0.0000	8.2129	8.2129	3.7000e-004	0.0000	8.2221
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5200e-003	1.8600e-003	0.0194	6.0000e-005	5.9900e-003	4.0000e-005	6.0300e-003	1.5900e-003	4.0000e-005	1.6300e-003	0.0000	5.2420	5.2420	1.4000e-004	0.0000	5.2456
Total	**3.3000e-003**	**0.0274**	**0.0234**	**1.5000e-004**	**7.9600e-003**	**1.3000e-004**	**8.0900e-003**	**2.1300e-003**	**1.3000e-004**	**2.2600e-003**	**0.0000**	**13.4549**	**13.4549**	**5.1000e-004**	**0.0000**	**13.4676**

3.6 Demobilization - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					1.0600e-003	0.0000	1.0600e-003	1.1000e-004	0.0000	1.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.0600e-003**	**0.0000**	**1.0600e-003**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	3.1400e-003	5.1000e-004	1.0000e-005	2.7000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.0800	1.0800	4.0000e-005	0.0000	1.0809
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	2.1000e-004	2.1500e-003	1.0000e-005	6.7000e-004	0.0000	6.7000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.5824	0.5824	2.0000e-005	0.0000	0.5828
Total	**3.8000e-004**	**3.3500e-003**	**2.6600e-003**	**2.0000e-005**	**9.4000e-004**	**1.0000e-005**	**9.5000e-004**	**2.5000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**1.6625**	**1.6625**	**6.0000e-005**	**0.0000**	**1.6638**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.8000e-004	0.0000	1.8000e-004	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-004	3.1400e-003	5.1000e-004	1.0000e-005	2.7000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	9.0000e-005	0.0000	1.0800	1.0800	4.0000e-005	0.0000	1.0809
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	2.1000e-004	2.1500e-003	1.0000e-005	6.7000e-004	0.0000	6.7000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.5824	0.5824	2.0000e-005	0.0000	0.5828
Total	**3.8000e-004**	**3.3500e-003**	**2.6600e-003**	**2.0000e-005**	**9.4000e-004**	**1.0000e-005**	**9.5000e-004**	**2.5000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**1.6625**	**1.6625**	**6.0000e-005**	**0.0000**	**1.6638**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.516452	0.033212	0.173817	0.123150	0.022816	0.005352	0.027555	0.088301	0.001837	0.001119	0.004633	0.000845	0.000911

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

La Grange Diversion Tunnel

Stanislaus County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Recreational	1.00	User Defined Unit	2.00	0.00	1

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	46
Climate Zone	3			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - I did not verify the utility, but that information is not used for anything in this estimate.

Land Use - There are no land use choices for dams so I chose recreational.
They are going to clean out and gunite only about 0.3 acres of sluice channel. I put in 2 acres for total project acreage.
I put in a population of 1 to avoid CalEEMod DBNull errors.

Construction Phase - Project will take place over a 45 day period within one construction season.

Off-road Equipment - This phase will involve on-road trucks and pumps to dewater.

Off-road Equipment - Size of excavator and crawler tractor were specified in project description, and their HP ratings are slightly different from CalEEMod default HP.

Off-road Equipment - Size of excavator and crawler tractor and pump were specified in project description, and their HP ratings are slightly different from CalEEMod default HP.

Off-road Equipment - Size of excavator and crawler tractor were specified in project description, and their HP ratings are slightly different from CalEEMod default HP.

Off-road Equipment - Negligible off-road equipment operation for demobilization, mostly just on-road trucks in this phase.

Grading - For some reason CalEEMod offered only Phase 1 and Phase 5 for material movement.
In reality, the material movement will be in phases 2, 3, and 4.

Trips and VMT - Crew is expected to not exceed 12 workers, so 10 commute vehicles (e.g. construction crew trucks) 20 trips/day assumed.
Hauling includes excavated material, cement, gunnite, slurry, pipe, valve hardware, rebar, forms and cofferdam, etc.

Energy Use -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	200.00	5.00
tblConstructionPhase	NumDays	2.00	6.00
tblConstructionPhase	NumDays	200.00	14.00
tblConstructionPhase	NumDays	200.00	27.00
tblConstructionPhase	NumDays	2.00	3.00
tblConstructionPhase	PhaseEndDate	4/18/2022	6/18/2021
tblConstructionPhase	PhaseEndDate	7/6/2021	6/14/2021
tblConstructionPhase	PhaseStartDate	7/13/2021	6/14/2021
tblConstructionPhase	PhaseStartDate	7/3/2021	6/7/2021
tblGrading	AcresOfGrading	0.00	2.00
tblGrading	AcresOfGrading	0.00	2.00
tblGrading	MaterialExported	0.00	428.00
tblGrading	MaterialImported	0.00	2,005.00

tblGrading	MaterialImported	0.00	135.00
tblLandUse	LotAcreage	0.00	2.00
tblLandUse	Population	0.00	1.00
tblOffRoadEquipment	HorsePower	84.00	50.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	212.00	251.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	212.00	251.00
tblOffRoadEquipment	HorsePower	84.00	25.00
tblOffRoadEquipment	HorsePower	172.00	20.00
tblOffRoadEquipment	HorsePower	158.00	162.00
tblOffRoadEquipment	HorsePower	212.00	251.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	45.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	45.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	45.00
tblTripsAndVMT	HaulingTripNumber	304.00	14.00
tblTripsAndVMT	HaulingTripNumber	0.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	512.00
tblTripsAndVMT	HaulingTripNumber	0.00	154.00
tblTripsAndVMT	HaulingTripNumber	13.00	14.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripLength	16.80	30.00
tblTripsAndVMT	WorkerTripNumber	8.00	20.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	5.5365	60.9089	43.2282	0.1494	2.4977	1.9906	4.4883	0.6762	1.8698	2.5460	0.0000	14,908.2710	14,908.2710	2.2294	0.0000	14,964.0048
Maximum	**5.5365**	**60.9089**	**43.2282**	**0.1494**	**2.4977**	**1.9906**	**4.4883**	**0.6762**	**1.8698**	**2.5460**	**0.0000**	**14,908.2710**	**14,908.2710**	**2.2294**	**0.0000**	**14,964.0048**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	5.5365	60.9089	43.2282	0.1494	2.4977	1.9906	4.4883	0.6762	1.8698	2.5460	0.0000	14,908.2710	14,908.2710	2.2294	0.0000	14,964.0047
Maximum	**5.5365**	**60.9089**	**43.2282**	**0.1494**	**2.4977**	**1.9906**	**4.4883**	**0.6762**	**1.8698**	**2.5460**	**0.0000**	**14,908.2710**	**14,908.2710**	**2.2294**	**0.0000**	**14,964.0047**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization and Dewatering	Site Preparation	6/7/2021	6/14/2021	5	6	
2	Sluice channel dredging	Building Construction	6/14/2021	6/18/2021	5	5	
3	Sluice channel resurfacing	Building Construction	6/16/2021	7/5/2021	5	14	
4	Diversion Construction	Building Construction	6/30/2021	8/5/2021	5	27	
5	Demobilization	Site Preparation	8/4/2021	8/6/2021	5	3	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Sluice channel resurfacing	Cranes	0	8.00	231	0.29
Diversion Construction	Cranes	0	8.00	231	0.29
Sluice channel resurfacing	Forklifts	0	7.00	89	0.20
Sluice channel dredging	Generator Sets	0	8.00	84	0.74

Sluice channel dredging	Cranes	0	8.00	231	0.29
Sluice channel dredging	Forklifts	0	7.00	89	0.20
Mobilization and Dewatering	Graders	0	8.00	187	0.41
Diversion Construction	Forklifts	0	7.00	89	0.20
Sluice channel resurfacing	Generator Sets	0	8.00	84	0.74
Diversion Construction	Generator Sets	0	8.00	84	0.74
Demobilization	Graders	0	8.00	187	0.41
Sluice channel dredging	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Demobilization	Scrapers	0	8.00	367	0.48
Sluice channel resurfacing	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Diversion Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Mobilization and Dewatering	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Demobilization	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Sluice channel resurfacing	Welders	0	8.00	46	0.45
Mobilization and Dewatering	Scrapers	0	8.00	367	0.48
Sluice channel dredging	Welders	0	8.00	46	0.45
Diversion Construction	Welders	0	8.00	46	0.45
Mobilization and Dewatering	Pumps	1	24.00	50	0.74
Mobilization and Dewatering	Pumps	2	24.00	10	0.74
Sluice channel dredging	Excavators	2	8.00	162	0.38
Sluice channel dredging	Crawler Tractors	2	8.00	251	0.43
Sluice channel dredging	Air Compressors	1	8.00	78	0.48
Sluice channel resurfacing	Excavators	2	8.00	162	0.38
Sluice channel resurfacing	Crawler Tractors	2	8.00	251	0.43
Sluice channel resurfacing	Pumps	1	24.00	25	0.74
Sluice channel resurfacing	Air Compressors	1	8.00	78	0.48
Sluice channel resurfacing	Other Construction Equipment	1	8.00	20	0.42
Diversion Construction	Excavators	2	8.00	162	0.38
Diversion Construction	Crawler Tractors	2	8.00	251	0.43
Diversion Construction	Air Compressors	1	8.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Sluice channel resurfacing	7	20.00	0.00	512.00	30.00	6.60	45.00	LD_Mix	HDT_Mix	HHDT
Mobilization and Dewatering	3	20.00	0.00	14.00	30.00	6.60	45.00	LD_Mix	HDT_Mix	HHDT
Diversion Construction	5	20.00	0.00	154.00	30.00	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Sluice channel dredging	5	20.00	0.00	12.00	30.00	6.60	25.00	LD_Mix	HDT_Mix	HHDT
Demobilization	0	20.00	0.00	14.00	30.00	6.60	45.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

3.2 Mobilization and Dewatering - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3994	0.0000	0.3994	0.0451	0.0000	0.0451			0.0000			0.0000

Off-Road	1.8751	11.2584	10.7897	0.0200		0.5102	0.5102		0.5102	0.5102		1,557.5864	1,557.5864	0.1676		1,561.7759
Total	**1.8751**	**11.2584**	**10.7897**	**0.0200**	**0.3994**	**0.5102**	**0.9095**	**0.0451**	**0.5102**	**0.5553**		**1,557.5864**	**1,557.5864**	**0.1676**		**1,561.7759**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0333	1.0127	0.1674	3.7900e-003	0.0916	4.1000e-003	0.0957	0.0251	3.9200e-003	0.0290		398.5238	398.5238	0.0128		398.8433
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.2307**	**1.1392**	**1.8892**	**8.5000e-003**	**0.5477**	**7.1700e-003**	**0.5548**	**0.1460**	**6.7500e-003**	**0.1528**		**867.8888**	**867.8888**	**0.0260**		**868.5381**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0665	0.0000	0.0665	7.5100e-003	0.0000	7.5100e-003			0.0000			0.0000
Off-Road	1.8751	11.2584	10.7897	0.0200		0.5102	0.5102		0.5102	0.5102	0.0000	1,557.5864	1,557.5864	0.1676		1,561.7759
Total	**1.8751**	**11.2584**	**10.7897**	**0.0200**	**0.0665**	**0.5102**	**0.5767**	**7.5100e-003**	**0.5102**	**0.5177**	**0.0000**	**1,557.5864**	**1,557.5864**	**0.1676**		**1,561.7759**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0333	1.0127	0.1674	3.7900e-003	0.0916	4.1000e-003	0.0957	0.0251	3.9200e-003	0.0290		398.5238	398.5238	0.0128		398.8433
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.2307**	**1.1392**	**1.8892**	**8.5000e-003**	**0.5477**	**7.1700e-003**	**0.5548**	**0.1460**	**6.7500e-003**	**0.1528**		**867.8888**	**867.8888**	**0.0260**		**868.5381**

3.3 Sluice channel dredging - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8395	18.9123	16.8516	0.0332		0.8304	0.8304		0.7740	0.7740		3,207.4796	3,207.4796	0.9418		3,231.0234
Total	**1.8395**	**18.9123**	**16.8516**	**0.0332**		**0.8304**	**0.8304**		**0.7740**	**0.7740**		**3,207.4796**	**3,207.4796**	**0.9418**		**3,231.0234**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0209	0.6846	0.1032	2.3000e-003	0.0524	2.4000e-003	0.0548	0.0144	2.2900e-003	0.0167		241.9052	241.9052	0.0116		242.1962
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.2183**	**0.8111**	**1.8250**	**7.0100e-003**	**0.5084**	**5.4700e-003**	**0.5139**	**0.1353**	**5.1200e-003**	**0.1404**		**711.2703**	**711.2703**	**0.0248**		**711.8910**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8395	18.9123	16.8516	0.0332		0.8304	0.8304		0.7740	0.7740	0.0000	3,207.4796	3,207.4796	0.9418		3,231.0234
Total	**1.8395**	**18.9123**	**16.8516**	**0.0332**		**0.8304**	**0.8304**		**0.7740**	**0.7740**	**0.0000**	**3,207.4796**	**3,207.4796**	**0.9418**		**3,231.0234**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0209	0.6846	0.1032	2.3000e-003	0.0524	2.4000e-003	0.0548	0.0144	2.2900e-003	0.0167		241.9052	241.9052	0.0116		242.1962
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.2183**	**0.8111**	**1.8250**	**7.0100e-003**	**0.5084**	**5.4700e-003**	**0.5139**	**0.1353**	**5.1200e-003**	**0.1404**		**711.2703**	**711.2703**	**0.0248**		**711.8910**

3.4 Sluice channel resurfacing - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.7235	24.0325	20.0236	0.0409		1.0830	1.0830		1.0222	1.0222		3,841.0956	3,841.0956	1.0323		3,866.9042
Total	**2.7235**	**24.0325**	**20.0236**	**0.0409**		**1.0830**	**1.0830**		**1.0222**	**1.0222**		**3,841.0956**	**3,841.0956**	**1.0323**		**3,866.9042**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.5211	15.8721	2.6231	0.0595	1.4363	0.0643	1.5005	0.3934	0.0615	0.4549		6,246.2498	6,246.2498	0.2003		6,251.2579
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.7185**	**15.9986**	**4.3449**	**0.0642**	**1.8923**	**0.0674**	**1.9596**	**0.5143**	**0.0643**	**0.5787**		**6,715.6149**	**6,715.6149**	**0.2135**		**6,720.9527**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.7235	24.0325	20.0236	0.0409		1.0830	1.0830		1.0222	1.0222	0.0000	3,841.0956	3,841.0956	1.0323		3,866.9042
Total	**2.7235**	**24.0325**	**20.0236**	**0.0409**		**1.0830**	**1.0830**		**1.0222**	**1.0222**	**0.0000**	**3,841.0956**	**3,841.0956**	**1.0323**		**3,866.9042**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.5211	15.8721	2.6231	0.0595	1.4363	0.0643	1.5005	0.3934	0.0615	0.4549		6,246.2498	6,246.2498	0.2003		6,251.2579
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.7185**	**15.9986**	**4.3449**	**0.0642**	**1.8923**	**0.0674**	**1.9596**	**0.5143**	**0.0643**	**0.5787**		**6,715.6149**	**6,715.6149**	**0.2135**		**6,720.9527**

3.5 Diversion Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8395	18.9123	16.8516	0.0332		0.8304	0.8304		0.7740	0.7740		3,207.4796	3,207.4796	0.9418		3,231.0234
Total	**1.8395**	**18.9123**	**16.8516**	**0.0332**		**0.8304**	**0.8304**		**0.7740**	**0.7740**		**3,207.4796**	**3,207.4796**	**0.9418**		**3,231.0234**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0575	1.8390	0.2862	6.4300e-003	0.1494	6.7800e-003	0.1562	0.0409	6.4900e-003	0.0474		674.7159	674.7159	0.0286		675.4298
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.2550**	**1.9655**	**2.0080**	**0.0111**	**0.6054**	**9.8500e-003**	**0.6153**	**0.1618**	**9.3200e-003**	**0.1712**		**1,144.0810**	**1,144.0810**	**0.0418**		**1,145.1246**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8395	18.9123	16.8516	0.0332		0.8304	0.8304		0.7740	0.7740	0.0000	3,207.4796	3,207.4796	0.9418		3,231.0234
Total	**1.8395**	**18.9123**	**16.8516**	**0.0332**		**0.8304**	**0.8304**		**0.7740**	**0.7740**	**0.0000**	**3,207.4796**	**3,207.4796**	**0.9418**		**3,231.0234**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0575	1.8390	0.2862	6.4300e-003	0.1494	6.7800e-003	0.1562	0.0409	6.4900e-003	0.0474		674.7159	674.7159	0.0286		675.4298
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.2550**	**1.9655**	**2.0080**	**0.0111**	**0.6054**	**9.8500e-003**	**0.6153**	**0.1618**	**9.3200e-003**	**0.1712**		**1,144.0810**	**1,144.0810**	**0.0418**		**1,145.1246**

3.6 Demobilization - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7070	0.0000	0.7070	0.0763	0.0000	0.0763			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.7070**	**0.0000**	**0.7070**	**0.0763**	**0.0000**	**0.0763**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0665	2.0254	0.3347	7.5900e-003	0.1833	8.2000e-003	0.1915	0.0502	7.8500e-003	0.0581		797.0475	797.0475	0.0256		797.6866
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.2640**	**2.1518**	**2.0565**	**0.0123**	**0.6393**	**0.0113**	**0.6506**	**0.1711**	**0.0107**	**0.1818**		**1,266.4126**	**1,266.4126**	**0.0388**		**1,267.3813**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1177	0.0000	0.1177	0.0127	0.0000	0.0127			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.1177**	**0.0000**	**0.1177**	**0.0127**	**0.0000**	**0.0127**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0665	2.0254	0.3347	7.5900e-003	0.1833	8.2000e-003	0.1915	0.0502	7.8500e-003	0.0581		797.0475	797.0475	0.0256		797.6866
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1975	0.1265	1.7218	4.7100e-003	0.4560	3.0700e-003	0.4591	0.1209	2.8300e-003	0.1237		469.3651	469.3651	0.0132		469.6948
Total	**0.2640**	**2.1518**	**2.0565**	**0.0123**	**0.6393**	**0.0113**	**0.6506**	**0.1711**	**0.0107**	**0.1818**		**1,266.4126**	**1,266.4126**	**0.0388**		**1,267.3813**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate		
	Unmitigated	Mitigated	

Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-...	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.516452	0.033212	0.173817	0.123150	0.022816	0.005352	0.027555	0.088301	0.001837	0.001119	0.004633	0.000845	0.000911

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix G. CRHR Eligibility Recommendations

This page is intentionally blank.

Cultural Resources Identified within the Proposed Project Area

All eight cultural resources identified within the Proposed Project area were recommended ineligible for listing on the NRHP during FERC licensing efforts, and the SHPO agreed with these eligibility determinations in a letter dated September 18, 2017 (Appendix E). As such, none of the eight resources within the Proposed Project area would qualify as historical resources or unique archaeological resources. These resources are recommended ineligible for inclusion on the CRHR, as shown in Appendix Table Arch-1 and discussed below.[1]

Appendix Table Arch-1. Cultural resources within the Proposed Project area

Primary number/ trinomial	Resource type	Age	Description	CRHR Eligibility
P-50-2190	Isolated find	Historic	Two pieces of 8-foot-long rebar, and a segment of railroad rail.	Ineligible
P-50-2191	Isolated find	Historic	One chain link connected by an eye bolt that is anchored into a boulder.	Ineligible
P-50-2194/ CA-STA-441H	Archaeological site	Historic	Remnants of a residential location and powerhouse support facilities with one artifact concentration, six features, and various rock walls.	Ineligible
P-50-2197	Built environment resource	Historic	La Grange Forebay Bypass Spillway. Built in 1910, concrete, designed by TID.	Ineligible
P-50-2201	Built environment resource	Historic	La Grange Powerhouse Access Road. Built circa 1922, asphalt and earthen construction, designed by TID.	Ineligible
P-50-2202	Built environment resource	Historic	La Grange Powerhouse Penstocks. Built in 1924, steel and concrete construction, designed by TID.	Ineligible
P-50-2203	Built environment resource	Historic	La Grange Powerhouse Tailrace. Built in 1924, concrete and earthen construction, designed by TID.	Ineligible
P-50-2204	Built environment resource	Historic	La Grange Powerhouse. Built in 1924, steel and concrete construction, designed by TID.	Ineligible

[1] Information from the licensing cultural resources study (TID and MID 2017) has been used to illustrate the eligibility recommendations for the CRHR for all eight cultural resources identified within the Proposed Project area.

Isolated Archaeological Finds

P-50-2190 and P-50-2191: The two isolated finds are not associated with an important person or event and do not have characteristics that are unique in material, workmanship, or type. Also, these isolated finds do not possess the potential to provide substantive information that would further our understanding of the area's history. Subsequently, as is usual for isolated finds, these resources are evaluated as ineligible for inclusion on the CRHR.

Archaeological Site

P-50-2194 (CA-STA-441H): This site appears to represent the remains of a residential location (a dugout cut, large structural foundation, driveway, and artifact concentration), as well as support facilities associated with the powerhouse (various rock walls, concrete block, concrete fountain, and two concrete footings). It is likely that the residential location was related to housing the powerhouse operators, and perhaps construction personnel, when the powerhouse facilities were built. A structure in this location appears only on the 1962 La Grange, CA 7.5' USGS Topographic Quadrangle. However, given the site's close association with the La Grange Powerhouse facilities, it is assumed that the site components date to circa 1924 (when the powerhouse was built), and the residential structure that once stood here was demolished sometime after 1962. The site retains little integrity because the structures that were once represented by the site were demolished and removed, leaving very few remnants. The rock walls that are observed throughout the site are likely the most prominent features of the site; however, even these are heavily affected. Some are eroding and falling down, and may others have been capped or entirely covered by modern concrete, which has altered the following aspects of their integrity: materials, setting, design, workmanship, and feeling.

Built Environment Resources

The **La Grange Forebay Bypass Spillway (P-50-2197)** was constructed in 1910 and appears to have been altered in 1924 and extensively altered around 1988. It was constructed to provide an emergency bypass option for the forebay in case of emergency or repairs.

The spillway consists of five openings in the forebay wall along the west elevation that are divided by concrete piers and composed entirely of concrete except for their metal doors. In addition, the spillway includes the excavated, rough rock channel that water passes through on its way to the river. The water that comes through the spillway cascades down a steep hillside, passes through the La Grange Powerhouse Tailrace Area, and then reaches the Tuolumne River.

It is unknown what the spillway's exact dimensions and configuration were in 1910; drawings completed in 1924 suggest that the spillway had been altered in some way to match the drawings; they demonstrate how it looked at that time. In 1924, the spillway openings consisted of board-formed concrete piers that were 18 inches wide and 5 feet apart. The openings were recessed into the forebay wall 4 feet. The simple structure had no additional detailing. The rock channel is approximately 425 feet long and varies in width between approximately 25 and 75 feet.

Extensive alteration occurred to the spillway release point in circa 1988 when rehabilitation work was done on the La Grange Irrigation Canal Forebay. This included the replacement and reinforcement of at least two concrete piers. Original concrete that remained was covered with new concrete to reinforce the structure. All dimensions associated with the release point at that time were altered. Piers were widened, openings narrowed, and additional concrete was added. All work that was done

on the bypass spillway in circa 1988 was conducted by Bechtel Construction of San Francisco. It is unknown whether any additional blasting or alteration has occurred to the rock-lined channel that carries the water to the Tuolumne River.

The La Grange Forebay Bypass Spillway (P-50-2197) is a component of the irrigation system of the La Grange Diversion Dam (which is not within the Proposed Project area, but is within the 0.25-mile buffer), constructed between 1891 and 1910. This irrigation system, as described in the attached historic context (Appendix D) has played a key role in the establishment and continued prominence of the Central Valley of California agricultural industry, which is among the most productive in the United States. This resource meets the significance requirements under Criterion 1 for its association with the development of the Central Valley agricultural industry. However, as described above, the La Grange Forebay Bypass Spillway (P-50-2197) was extensively altered between 1988 and 1991 when rehabilitation work was done on the adjacent La Grange Irrigation Canal Forebay (P-50-2198). This included the replacement and reinforcement of multiple concrete piers that support the structure. Original concrete that remained was covered with shotcrete to reinforce the structure. All dimensions associated with the release point at that time were altered. Piers were widened, openings narrowed, and additional concrete was added. It is unknown whether any additional blasting or alteration has occurred to the rock-lined channel that carries the water to the Tuolumne River during that time. Thus, the spillway retains insufficient integrity of materials, design, workmanship, feeling, and association for listing in the CRHR under Criterion 1 for its association with irrigation and agriculture, or under Criterion 3 for its design and engineering.

Nor is this built environment resource associated with any individuals important in local, state, or national history. Therefore, it does not meet the significance requirements of Criterion 2. Finally, the La Grange Forebay Bypass Spillway (P-50-2197) does not offer research potential for furthering an understanding of the area's history and, therefore, does not meet the significance requirements of Criterion 4.

The **La Grange Powerhouse Access Road (P-50-2201), La Grange Powerhouse Penstocks (P-50-2202), La Grange Powerhouse Tailrace (P-50-2203),** and the **La Grange Powerhouse (P-50-2204)** compose the La Grange Project Hydroelectric System and were constructed between circa 1922 and 1924 to add electrical generation to the La Grange Diversion Dam. All four resources documented under this grouping are recommended as not eligible for listing in the CRHR.

The hydroelectric system as a whole provides electricity to TID customers as part of a greater electrical generation system owned and managed by TID and MID (collectively, the Districts). Plans for a powerhouse and electrical generation at La Grange were first drawn in 1910. At that time, the Districts' focus was on water delivery for agriculture, and there was not enough support to move forward with the plant's construction. In 1919, the Broughton Bill was established, which allowed irrigation districts to enter into the power business in competition with private utilities; at that time, TID and MID came together to develop hydroelectric power along the Tuolumne River. The two companies first developed electrical generation facilities at the old Don Pedro Dam located on the Tuolumne River north of La Grange, which was established and running by 1924. The La Grange Powerhouse was constructed in 1924 by TID and added to the electrical generation occurring on the Tuolumne River (Chadwick and Kollgaard 1988:335; JRP 2005:12–13).

The construction of the powerplant necessitated the construction of the La Grange Powerhouse Access Road. The powerhouse is located at the lower end of TID's 600-foot diversion tunnel. It cost $230,000 and was operated for the first time in December 1924. Its original capacity was

4,300 kilowatts and, originally, it was only operated during months with a surplus water supply (Hohenthal 1972:195). The powerplant and its associated features were extensively altered and rehabilitated between 1989 and 1991 when the switchyard was replaced and rehabilitated.

The La Grange Project Hydroelectric System is not considered a significant engineering development nor does it reflect the level of significance that the irrigation-related resources have. Many hydroelectric facilities had been constructed in California before the La Grange Diversion Dam was converted to hydropower operations in 1924. Examples include the Canyon Dam in Plumas County (1910), the Folsom Dam near Sacramento (1895), Lake Spaulding in Nevada County (1913), O'Shaughnessy Dam in Tuolumne County (1923), Potter Valley in Mendocino County (1908), and Volta in Shasta County (1901). In addition, the hydroelectric project began as an irrigation endeavor, not for hydropower development, and the La Grange Diversion Dam is considered most significant for its association with early irrigation developments. The introduction of hydropower to the La Grange Diversion Dam did not necessitate or overcome any significant engineering challenges and did not use or establish any significant advancement in hydropower design. In addition, the amount of power being produced, less than 5 megawatts, is considered small and would not have had a significant impact on the surrounding area. No major developments, industries, or endeavors have been found to be associated with the establishment of the La Grange Project Hydroelectric System or appear to have relied on its completion. For these reasons, none of the four resources in this group meet the significance requirements under Criterion 1 for their association with the development of hydropower in the Central Valley.

The La Grange Powerhouse (P-50-2204) was originally constructed in 1924. The powerhouse uses water power supplied by penstocks connected to the La Grange Irrigation Canal Forebay. The powerhouse complex originally contained three buildings and a substation. One building was demolished in circa 1990 and two remain. In addition, the substation and switchyard were modernized between 1988 and 1990. The powerhouse (the primary of the two remaining buildings) is oriented on a northwest-to-southeast axis, and the penstocks connect to the building along its northeast elevation. Its primary entrance is along the southeast elevation. The building measures approximately 72 by 29 feet and has a board-formed concrete subterranean level and steel-framed and clad main level. The building's front-gable roof is covered with corrugated metal, and there are clerestory windows imbedded in the steel walls on the southwest and northeast elevations. The second building on site is a very small outbuilding that appears to be an old, circa 1924 outhouse. The roughly 5- by 7-foot building has a front-gable roof covered in corrugated metal and is clad with corrugated metal siding. The only door is located on the north elevation and is wooden with five inset panels.

Extensive alteration has occurred to the powerhouse over time. This includes the replacement of all exterior cladding, windows, and vents; the replacement of one generator; alteration to the remaining generator and turbines; and the removal of a character-defining band of monitor windows that once lined the roof ridgeline. Thus, the powerhouse does not retain sufficient integrity of materials, design, workmanship, feeling, and association to demonstrate design significance under Criterion 3.

The La Grange Powerhouse Penstocks (P-50-2202) were originally constructed in 1924 to provide the waterpower necessary to run the turbines in the La Grange Powerhouse. The penstocks connect directly to the La Grange Irrigation Canal Forebay and carry water from the forebay to the powerhouse below. The La Grange Powerhouse Penstocks consist of two penstock units: Penstock Unit 1 and Penstock Unit 2. Penstock Unit 1 is a 235-foot-long and 5-foot-diameter riveted steel pipe. Penstock Unit 2 is a 212-foot-long, 7-foot-diameter riveted steel pipe. Both have been minimally

altered since they were constructed. When applying Criterion 3 for engineering or design significance, the La Grange Powerhouse Penstocks are not found to exhibit features unique to penstocks and were not the work of a master. The penstocks would not be considered significant or influential in penstock design or construction. Thus, the penstocks do not demonstrate significance under Criterion 3.

The La Grange Powerhouse Tailrace (P-50-2203) was originally constructed in 1924 to provide for a runoff point for the water that passes through the La Grange Powerhouse. The tailrace carries the water that flows from the southwest elevation of the powerhouse to the Tuolumne River. The tailrace was created through the partial dredging and displacement of sediment from the Tuolumne River. The approximately 670-foot tailrace varies in width between approximately 30 and 50 feet. The tailrace is primarily rock- and gravel-lined. When applying Criterion 3 for engineering or design significance, the La Grange Powerhouse Tailrace is not found to exhibit features unique to tailraces and was not the work of a master. The tailrace would not be considered significant or influential in tailrace design or construction. Thus, the tailrace does not demonstrate significance under Criterion 3.

The La Grange Powerhouse Access Road (P-50-2201) was constructed in circa 1922 to provide access to the powerhouse site. On average, the road measures 12 to 13 feet in width. The road was repaved within the past 10 years and has also been reconstructed in sections where flooding appears to have washed out a portion of the road. The road was originally constructed in circa 1922 to provide access to the La Grange Powerhouse location during construction. The powerhouse was completed in 1924 and the road has provided the only vehicular access to that location since circa 1922. It was not paved until after 1959. The access road is found to exhibit features typical of rural roads. Many roads in the region started as gravel or dirt paths that were later regraded, repeatedly repaved, and repaired over time. The road demonstrates a typical width and structural composition. In addition, the pavement was re-clad within the past 10 years and a 40-foot-segment of the road was replaced and reinforced approximately 7 years ago. The gravel shoulders were recently laid as well. All visible material on the roadbed and roadside appears newer, and no historic asphalt, concrete, curbing, or drainage is visible along the road, although some heavily eroded historic rock retaining walls are intermittently located below the roadbed on the river (west) side. Thus, the road does not retain sufficient integrity of materials, design, workmanship, feeling, or association to demonstrate design significance under Criterion 3.

None of the four hydropower-related resources are associated with any events or individuals important in local, state, or national history and, therefore, do not meet the significance requirements of Criteria 1 or 2. In addition, as provided for above, none of the four resources were found to be eligible for listing under Criterion 3 for their design and/or engineering. All four resources also do not offer research potential for furthering an understanding of the history of the area and, therefore, do not meet the significance requirements of Criterion 4.

References Cited

Chadwick, Wallace L., and Eric B. Kollgaard, eds. 1988. Development of Dam Engineering in the United States. Elmsford (NY): Pergamon Press.

Hohenthal, Helen Alma. 1972. *Streams in a Thirsty Land*. City of Turlock.

JRP Historical Consulting Services. 2005. *Historical Resources Inventory and Evaluation Report, Turlock Irrigation District, Upper Main Canal, Stanislaus County, CA*. Davis, California

Turlock Irrigation District (TID) and Modesto Irrigation District (MID). 2017. *Cultural Resources Study Report, La Grange Hydroelectric Project, FERC No. 14581*. Prepared by HDR, Inc. Filed with FERC as Privileged