RECLAMATION
Managing Water in the West

Draft Environmental Assessment/Initial Study and Mitigated Negative Declaration

Tranquillity Irrigation District Southeast Service Area Water Conservation and Conveyance Improvement Project

EA/IS-17-040

Mission Statements

The mission of the Department of the Interior is to conserve and manage the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provide scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honor the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Acronyms and Abbreviations

AB ..... Assembly Bill
APE ..... Area of Potential Effect
CARB..... California Air Resources Board
CDC ..... California Department of Conservation
CDFW..... California Department of Fish and Wildlife
CEQA..... California Environmental Quality Act
CH_4 ..... Methane
CNDDB ..... California Natural Diversity Database
CNPS ..... California Native Plant Society
CO ..... Carbon Monoxide
CO_2 ..... Carb on Dioxide
CO_2e..... Carbon Dioxide-Equivalent
County..... Fresno County
CRHR..... California Register of Historical Resources
EA ..... Environmental Assessment
EPA ..... U.S. Environmental Protection Agency
FEMA ..... Federal Emergency Management Agency
GHG..... Greenhouse Gases
IS ..... Initial Study
NEPA..... National Environmental Policy Act
NHPA..... National Historic Preservation Act
NO_2 ..... Nitrogen Dioxide
NRHP..... National Register of Historic Places
PG&E..... Pacific Gas and Electric
PM_{10} ..... Particulate Matter less than 10 Microns in Diameter
$PM_{2.5}$..... Particulate Matter less than 2.5 Microns in Diameter
Service ..... U.S. Fish and Wildlife Service
SJVAB ..... San Joaquin Valley Air Board
SJVAPCD ..... San Joaqin Valley Air Pollution Control District
SWPPP..... Stormwater Pollution Prevention Plan
Tranquillity ID ..... Tranquillity Irrigation District
USGRP..... United States Global Research Program
USGS ..... United States Geological Survey
VOC..... Volatile Organic Compound

Section 1 Introduction

This Environmental Assessment (EA)/Initial Study (IS) was jointly prepared by the Bureau of Reclamation (Reclamation) as the lead federal agency and Tranquillity Irrigation District (Tranquillity ID or District) as lead state agency to satisfy the requirements of both the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). The document addresses potential environmental impacts of the Tranquillity ID's proposed Southeast Service Area Water Conservation and Conveyance Improvement Project (Proposed Project). Reclamation's Proposed Action is the issuance of a WaterSMART: Water and Energy Efficiency Grant, to Tranquillity ID for its Proposed Project.

1.1 Background/Project Overview

Tranquillity ID was formed January 22, 1918, as a public agency initially designed to serve Tranquillity ID landowners and residents with water supplies (agricultural and drinking water), parks/recreation, energy production, streets and roads, and lighting. It is the second oldest such agency in Fresno County. Today the District provides agricultural and drinking water to its customers, and manages and maintains a community park. Tranquillity ID is approximately 10,750 acres in size and is located in the west central portion of Fresno County in the Central Valley of California. Its principal community is the unincorporated town of Tranquillity. Tranquillity ID is geographically adjacent to the Fresno Slough, a historic northern flood outlet of the Kings River.

The Sustainable Groundwater Management Act (SGMA) is a State of California law passed in September 2014. SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Tranquillity Irrigation District is a member agency of the Central Delta-Mendota Groundwater Sustainability Agency that is working to develop the Northern & Central Delta-Mendota Groundwater Sustainability Plan (NCDM GSP). The NCDM GSP outlines a path to achieving sustainability goals and avoiding significant and unreasonable undesirable results within the NCDM GSP area and the Delta-Mendota Sub-basin, in which it resides. Of the six sustainability indicators, the portion of the Sub-basin in the NCDM GSP area is primarily affected by changes in groundwater levels, subsidence, and changes in groundwater storage. The NCDM GSP implementation is scheduled to occur on January 31, 2020, and will encourage projects and management actions that improve groundwater levels, such as the use of surface water, water use efficiency, and groundwater recharge projects. The Proposed Project is consistent with the NCDM GSP and the Delta-Mendota Sub-basin's goals to achieve sustainability, by limiting reliance on groundwater and promoting surface water use and efficiency.

The Proposed Project is located approximately 2.5-miles south of the community of Tranquillity and three miles west of the community of San Joaquin in western Fresno County, California (Figure 1). The proposed five-acre work area ("area of potential effect" or APE) is centered on

the Slough Canal near the intersection of West Parlier Avenue and South Sonoma Avenue (Figure 2).

The Proposed Project would replace an instream lift-pump station and two road culverts to eliminate the existing bottleneck in the system. The lift-pump station would be capable of reverse directional flow to improve distribution flexibility in Tranquillity ID because of an increase in the power required for operation from two to three pumps. It is anticipated the existing electrical utility service for the lift-pump station would need to be upgraded and relocated next to the pump station at the electrical pole location.

1.2 Need for the Proposed Action/Project Objectives

The need for the Proposed Action is to provide funding in order for Tranquillity ID to carry out the Proposed Project. The Proposed Project is to replace Lift #3 and two culverts downstream of the pump station, which will eliminate the bottleneck that these structures cause within the Tranquillity ID water distribution system. Currently, Lift #3 constricts the District's operations of delivering water to about 15% of its customers. Currently, Tranquillity ID is able to move approximately 50 cubic feet per second (cfs) of water through this part of the existing system; however, there is a higher demand/need than can be met with the current system. Without the Proposed Project, Tranquillity ID is limited on how much water it can convey, causing a negative impact to the farmers and their crops in the area.

Tranquillity ID is a member of the Kings River Water Association and has rights to any floodwater that reaches the District. The District is at the tail end of the system and is encouraged to divert as much floodwater as the District can handle when available. Under the Proposed Project, the diversion capacity at Lift #3 would increase from 50 cfs to 100 cfs, a 50 cfs increase. The goal of the Proposed Project is to double the capacity of these Lift Pump structures from 50 cfs to 100 cfs by installing new pumps and culverts. The Proposed Project includes demolishing and removing the existing structures and replacing them with structures that are able to handle the increased capacity. This increased capacity would accommodate the diversion of about 3,600 acre-feet per year of Kings River high flows, thereby reducing groundwater pumping, conserving energy by replacing groundwater pumping with surface water deliveries, and promoting water marketing within the Sub-basin. Also, the District will install Supervisory Control and Data Acquisition (SCADA) and flow meters for more accurate readings and better water management.

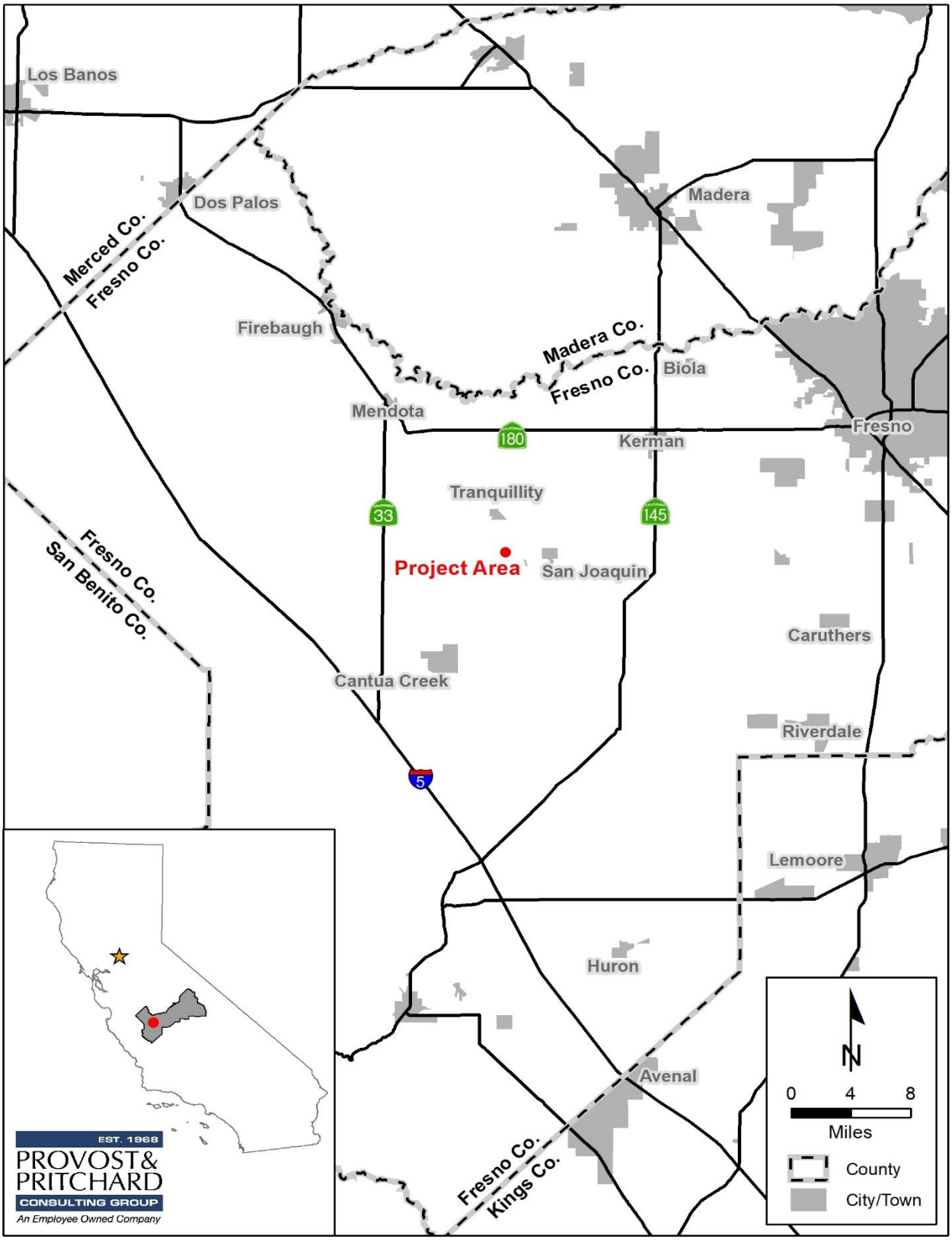

Figure 1 Regional Location Map

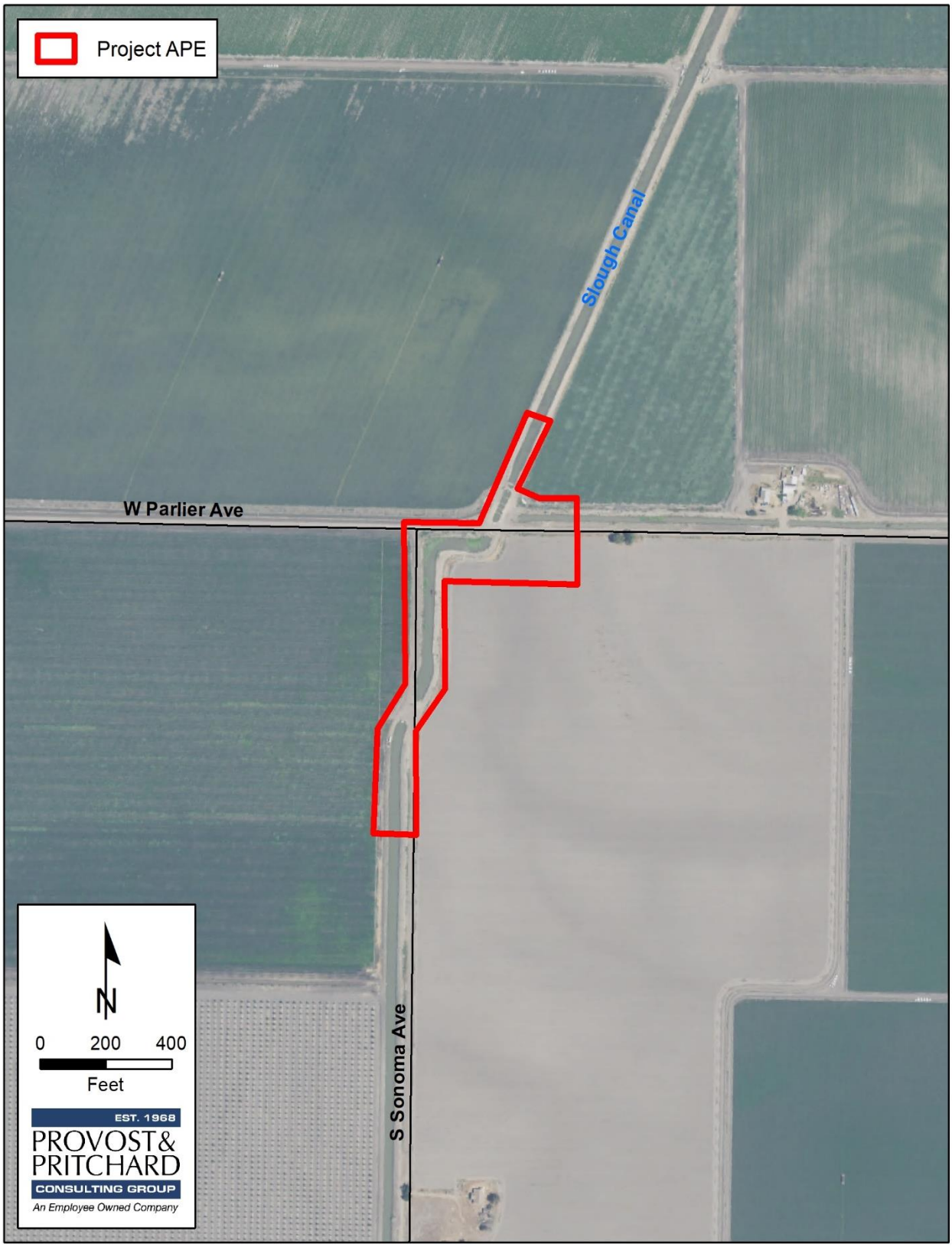

Figure 2 Proposed Project Area (APE)

Section 2 Alternatives and Proposed Action

This EA/IS considers two possible actions: The No Action alternative and the Proposed Action. The No Action alternative reflects future conditions without the Proposed Project and serves as a basis of comparison for determining potential effects to the human environment. For purposes of analysis, the No Action alternative represents existing conditions.

2.1 No Action Alternative

Under the No Action alternative, Reclamation would not issue a $503,542.50 WaterSMART: Water and Energy Efficiency Grant, to the Tranquillity ID for its Proposed Project. The existing bottleneck in the Lift #3 system area would continue to limit the District's operations and ability to provide surface water to its customers, until or unless other funding sources can be found.

2.2 Proposed Action

Reclamation proposes to award Tranquillity ID with $503,542.50 through a WaterSMART: Water and Energy Efficiency Grant, which would cover approximately half of the $1,007,085 needed for the District's Proposed Project.

Some of the proposed construction for the Proposed Project would occur during low flow periods (blue on Figure 3) and some of the proposed construction for the Proposed Project would occur during facility shutdown periods (red on Figure 3). Low flow is when surface water deliveries are minimal and not much water will be in the canal. The shutdown period is when canals are dry, because no irrigation deliveries are being made. This happens annually when the crops are dormant and the growers are not irrigating the fields.

Major components of this Proposed Project include:

- Demolition and removal of existing pump structure and culverts: 0.07 acres. This would occur during the irrigation shutdown period. The existing pump structures would be connected to the pipe bypass and used during low flow periods.
- Construction of new pump structure and culverts: 0.08 acres. The pump station would be constructed during the low flow periods and new culverts would be constructed during the shutdown period.
- Construction of bypass canal, or bypass pumping facility: 0.03 acres. This would occur during the low flow periods. The temporary pipe would be connected to the existing pump discharges and water would be detoured around the construction area and re-enter the canal downstream when it reaches the existing culvert. It would discharge back into the canal in between the culvert and a cofferdam.
- Installation of steel discharge pipes, trash screen, grating, and hand-railing: 0.01 acres. This would occur during the low flow periods.
- Purchase and installation of 100 cfs pumps with variable speed motors: 0.01 acres. This would occur during the low flow periods.

- Power upgrade: 0.02 acres. The current power service onsite is not sufficient for the proposed pumps that use more horsepower to operate. Pacific Gas and Electric (PG&E) will need to upgrade the service.
- SCADA integration: 0.01 acres. This is done by the District's integrator and involves programing the device with codes to operate the way Tranquillity ID needs to operate. This does not require ground disturbance, as all work is done on the computer.

All of these activities would occur within the five-acre APE and the majority of the activities would occur within the existing Tranquillity ID canal structure area (Figure 3). During the construction duration, which is expected to be approximately six months, roughly 5,000 gallons per day of water could be needed for dust control for culvert installation. This water would come from other canal alignments within the District. Construction would occur during low flow and shutdown periods. Water would be diverted around the construction area during the low flow season so as not to impact customers. Shutdown periods occur annually for District maintenance. Growers are not impacted during this time because the crops are dormant and do not need to be irrigated. If a grower needs water during this time, they can pump groundwater.

Under the Proposed Project, Tranquillity ID would increase the capacity of Lift #3 and the culverts downstream of the pump in order to move water more efficiently. Lift #3 is located in the Slough Canal and is made up of two pumping units. Lift #3 operates to its maximum capacity (50 cfs) to help meet grower demands. However, during peak months, Lift #3 and the downstream culverts are not sized large enough to capture flood flows or meet the District's peak flow demands. The existing 50 cfs lift-pump station would be replaced with a new 100 cfs lift-pump station with up to four pumps and would be installed north of West Parlier Avenue, and would be located in the canal channel. The existing structure will be demolished during the shutdown period and the new structure will be built just upstream during the wet season with the use of a cofferdam. Channel improvements would include reshaping of the channel and west levee. The two new replacement road crossings would consist of two new culverts (for the canal that crosses under Parlier and Sonoma Avenues) to handle the increase in flow. The proposed pump station would be constructed during the low flow period and culverts would be constructed during the shutdown period.

A new replacement electrical power distribution and control panel would also be installed, along with a telemetry antenna. To do this, an electrician will remove the old panel and install a new one. The size will be similar to what is being replaced and will be located adjacent to the pump station within the APE. A suitable staging area would also be provided for the contractor's use during construction within the APE. The APE is approximately five acres (Figure 2) including construction of all Proposed Project components and staging areas. If there is any excess dirt, the dirt would be spread on the canal banks or in an adjacent landowner's field with prior approval.

The Proposed Project would double pumping capacity, which would allow Tranquillity ID to increase utilization of Kings River high flows that enter the James Bypass, and subsequently flow into Fresno Slough.

The Proposed Project also includes installation of a SCADA system and flow meters for improved data collection and water management.

Figure 3 Site Plan

2.2.1 Environmental Protection Measures

The following mitigation/environmental protection measures would be implemented to avoid environmental consequences associated with the Proposed Action/Project.

Table 1 Mitigation/Environmental Protection Measures

Resource	Mitigation/Environmental Protection Measures
Swainson's Hawk	
Biological Resources	*Nest Tree Avoidance*. To ensure Project activities would have no deleterious effects on the adjacent Swainson's hawk nest tree, the Proposed Project would maintain a minimum 50-foot buffer around the adjacent eucalyptus tree throughout the course of construction during the nesting season. The buffer would be delineated with orange barrier fencing.
Biological Resources	*Temporal Avoidance*. In order to avoid impacts to nesting Swainson's hawks, construction activities would occur outside the nesting season, typically defined as March 1-September 15.
Biological Resources	*Pre-construction Survey*. If construction activities are initiated between March 1 and September 15, a qualified biologist would conduct pre-construction nest surveys for Swainson's hawks on and within ½ mile of the Proposed Project site within 30 days prior to the start of construction. The survey would consist of inspecting all accessible, suitable trees within the survey area for the presence of nests and hawks.
Biological Resources	*Avoidance of Active Nests*. Should any active Swainson's hawk nests be discovered within the survey area, an appropriate disturbance-free buffer would be established based on local conditions and agency guidelines. Disturbance-free buffers would be identified on the ground with flagging, fencing, or by other easily visible means, and would be maintained until a qualified biologist has determined that the young have fledged and are capable of foraging independently.
Biological Resources	*Biological Monitoring*. If construction activities are initiated before March 1, but continue into March, a qualified biologist would monitor Swainson's hawk nesting

Resource	Mitigation/Environmental Protection Measures
	activity at the onsite nest tree once a week beginning March 1. If Swainson's hawks begin nesting at the tree and Proposed Project activities continue, monitoring would occur daily for two weeks to determine Proposed Project effects on nesting behavior. If nesting behavior appears unaffected by Proposed Project activities, monitoring would be reduced to once a week. If Proposed Project activities appear to be having some effect on the nesting hawks, these activities would be stopped until the California Department of Fish and Wildlife (CDFW) is consulted.
Active Bird Nests	
Biological Resources	*Temporal Avoidance*: If feasible, the Proposed Project would be implemented outside of the avian nesting season, typically defined as February 1 to August 31.
Biological Resources	*Pre-construction Surveys*. If construction is to occur between February 1 and August 31, a qualified biologist would conduct pre-construction surveys for active migratory bird nests within 14 days prior to the start of construction. If there is a lapse in construction of 14 days or more, pre-construction surveys would need to be repeated. Should any active nests be discovered in or near proposed construction zones, the biologist would identify a suitable construction-free buffer around the nest. This buffer would be identified on the ground with flagging or fencing, and would be maintained until the biologist has determined that the young have fledged and are capable of foraging independently.
Burrowing Owls	
Biological Resources	*Pre-construction Survey*. A pre-construction survey would be conducted by a qualified biologist for burrowing owls between 14 and 30 days prior to the onset of construction according to methods described in the Staff Report on Burrowing Owl Mitigation (CDFW 2012). The survey area would include all suitable habitat on and within 200 meters of Proposed Project impact areas, where accessible.
Biological Resources	*Avoidance of Active Nests*. If Proposed Project activities are undertaken during the breeding season (February 1-August 31) and active nest burrows are identified within or near Proposed Project impact areas, a 200-meter disturbance-free buffer would be established around these burrows, or alternate avoidance measures implemented in consultation with CDFW so that no take would occur. The buffers would be enclosed with temporary fencing to prevent construction equipment and workers from entering the setback area. Buffers would remain in place for the duration of the breeding season, unless otherwise arranged with CDFW. After the breeding season (i.e. once all young have left the nest), passive relocation of any remaining owls may take place as described below.
Biological Resources	*Avoidance or Passive Relocation of Resident Owls*. During the non-breeding season (September 1-January 31), resident owls occupying burrows in Proposed Project impact areas may either be avoided, or passively relocated to alternative habitat. If the applicant chooses to avoid active owl burrows within the impact area during the non-breeding season, a 50-meter disturbance-free buffer would be established around these burrows, or alternate avoidance measures implemented in consultation with CDFW. The buffers would be enclosed with temporary fencing, and would remain in place until a qualified biologist determines that the burrows are no longer active. If the applicant chooses to passively relocate owls during the non-breeding season, this activity would be conducted in accordance with a relocation plan prepared by a qualified biologist.
Giant Garter Snake	
Biological Resources	*Temporal Avoidance*. If possible, construction activity within the canal prism should be conducted between May 1 and October 1.
Biological Resources	*Worker Training*. Construction personnel shall receive worker environmental awareness training regarding listed species, including giant garter snake. This training instructs workers to recognize giant garter snakes, their habitat, and their protected status.
Biological Resources	*Avoidance*. Vehicles shall travel at 15mph or less when in the Proposed Project Area. Vehicle operators shall be alert for the presence of snakes and shall safely avoid snakes when operating vehicles.
Biological Resources	*Pre-construction Survey*. 24-hours prior to construction activities, the Proposed Project area shall be surveyed for giant garter snakes by a qualified biologist. Survey of the Proposed Project area shall be repeated if a lapse in construction activity of two weeks or greater has occurred. The survey shall include uplands and any burrows of fossorial mammals in areas that would be exposed to ground disturbance or over travel by vehicles, or heavy equipment shall be flagged, and if possible, avoided.

Resource	Mitigation/Environmental Protection Measures
Biological Resources	*Avoidance*. If a giant garter snake is encountered during construction, activities shall cease and the snake shall be allowed to volitionally leave area that could be affected. A photograph of the snake should be obtained from a distance if that can be done without disturbing the snake. Reclamation and U.S. Fish and Wildlife Service (Service) biologists shall be notified immediately at (559-262-0300) (Reclamation) and (916) 414-6600 (Service), respectively. Further construction may not proceed until an appropriate course of action is determined through coordination between Reclamation and the Service, or consultation, as may be required.
San Joaquin kit fox	
Biological Resources	*Worker Training*. Construction personnel shall receive worker environmental awareness training regarding all listed species, including San Joaquin kit fox. This training instructs workers to recognize kit fox, their habitat, and their protected status in addition to all other potential listed species on site or in the area.
Biological Resources	*Pre-construction Survey*. A pre-construction/pre-activity survey shall be conducted on the Proposed Project site and surrounding areas, including at least 200 feet from the Proposed Project footprint. The survey shall be conducted by a qualified biologist no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities. A report of the survey findings shall be submitted to Reclamation and the Service within 5 days of the survey.
Biological Resources	*Avoidance*. If a natal/pupping den is discovered within the Proposed Project area or within 200-feet of the Proposed Project boundary, Reclamation and Service biologists shall be immediately notified and under no circumstances should the den be disturbed or destroyed without prior authorization. Upon discovery of an active den, Reclamation and Service biologists can be contacted at (559-262-0300) and at (916-414-6600), respectively. Construction may not proceed until an appropriate course of action is determined through consultation between Reclamation and the Service and authorization is obtained.
Biological Resources	*Avoidance*. If a San Joaquin kit fox is encountered during construction, but is clearly moving through the area, work activities shall cease until the fox volitionally leaves the Proposed Project area. Reclamation and Service Biologists shall be notified within one workday of the observation.
Biological Resources	*Avoidance*. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more over-night periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until Reclamation and Service biologists have been consulted.
Biological Resources	*Avoidance*. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in securely closed containers and removed at least once a week from a construction or Proposed Project site. No firearms shall be allowed on the Proposed Project site. No pets, such as dogs or cats, shall be permitted on the Proposed Project site to prevent harassment or mortality of kit foxes, or destruction of dens.
Cultural Resources	In the event that archaeological remains are encountered during Proposed Project development or ground-moving activities within any portion of the APE, all work in the vicinity of the find should be halted until a qualified archaeologist can identify the discovery and assess its significance. In addition, if human remains are uncovered during construction, the Fresno County Coroner is to be notified to arrange their proper treatment and disposition. If the remains are identified—on the basis of archaeological context, age, cultural associations, or biological traits—as those of a Native American, California Health and Safety Code 7050.5 requires that the coroner notify the Native American Heritage Commission within 24 hours of discovery. The Native American Heritage Commission would then identify the Most Likely Descendent, who would be afforded the opportunity to recommend means for treatment of the human remains following protocols in California Public Resources Code 5097.98.
Geology and Soils	Tranquillity ID will acquire a Stormwater Pollution Prevention Plan (SWPPP) if the construction footprint is one acre or more. If under one acre, a waiver must be received from the State Water Board. As part of the SWPPP, Tranquillity ID would be required to provide Best Management Practices to further protect the topsoil.

Environmental consequences for resource areas assume the measures specified would be fully implemented.

2.2.2 Permitting

Tranquillity ID anticipates the following permit applications for this Proposed Project on Slough Canal may be required.

- Stormwater Pollution Prevention Plan (SWPPP)
- Fresno County Road Encroachment Permit

Section 3 Analysis of the Proposed Action

3.1 Analysis of Potentially Affected Environment

This section of the EA/IS includes the NEPA and CEQA analysis portion of the potentially affected environment and the environmental consequences involved with the Proposed Project.

Although this document is a combined CEQA/NEPA document, significance determinations are made pursuant to CEQA only. Under NEPA, preparation of an EA is done in order to assess whether preparation of an Environmental Impact Statement is needed. NEPA does not require that a determination of significant impacts be stated in the EA. CEQA, on the other hand, requires identification of each significant effect on the environment resulting from the Proposed Project and ways to mitigate each significant effect.

3.1.1 Aesthetics

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
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 buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

Affected Environment

The Proposed Project area is largely surrounded by orchards and rural residences. The Proposed Project site is comprised of agricultural fields, ruderal areas, irrigation canals, and orchards. Agricultural lands surround the Proposed Project site and represent the dominant land use in the region. A short segment of the Slough Canal occurs on the site. The Proposed Project would be largely developed within the Slough channel. The closest residence is approximately 0.20 miles from the Proposed Project site.

Environmental Consequences

No Action

There would be no impact to aesthetics as no construction would occur and conditions would remain the same as existing conditions. The area would continue to be used for the existing canal and surrounding agricultural uses.

Proposed Action

While the Proposed Action/Project would slightly modify the existing character of the canal, it would not substantially degrade the visual quality of the site. Neither the temporary construction activities nor the proposed permanent pump station would affect a scenic vista. When the Proposed Project is completed, it will fit with the surrounding agricultural and canal facility infrastructure.

Cumulative Impacts

The Proposed Action/Project would not be precedent setting, nor have a cumulative adverse impact on aesthetics. There is not any past, present, or future projects in the area that could potentially contribute to a cumulative effect on aesthetic resources.

3.1.2 Agricultural Resources

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
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?	☐	☐	☐	☒

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.

Affected Environment

Agricultural land within Fresno County is the predominant open space landscape, and surrounds the Proposed Project site from all sides. In the vicinity of the Proposed Project site are local roads, other agricultural fields, and scattered rural residences. The site is relatively flat with no remarkable elevation contours or geologic features. It is currently being used to grow cotton.

Tranquillity ID encompasses approximately 10,750 acres. Land use is predominantly agricultural, including annual crops, vineyards, orchards, and agricultural related infrastructure. Tranquillity ID farmland produces a variety of commodities including cotton (pima and acala), canning tomatoes, alfalfa seeds, sugar beets, and almonds. Its principal community is the unincorporated town of Tranquillity. Several surrounding properties are under Williamson Act contracts. The Williamson Act was created by the California Legislature in order to protect the agricultural resources of the State from unnecessary or premature conversion to urban uses.

The surrounding land is zoned “Exclusive Agricultural – 20-acre minimum” (AE-20) by Fresno County. The AE-20 is intended to be an exclusive zone for agriculture, and for those uses that are necessary and an integral part of the agricultural operation. This zoning is intended to protect the general welfare of the agricultural community from encroachments of non-related agricultural uses which, by their nature, would be injurious to the physical and economic well-

being of the agricultural zone. The AE-20 is accompanied by an acreage designation which establishes the minimum size lot that may be created within such a zone.

Environmental Consequences

No Action

There would be no impact to agriculture as farming conditions in the area would remain the same as existing conditions.

Proposed Action

Under the Proposed Action/Project, no agriculture would be removed or affected as the Proposed Project would occur within the Tranquillity ID Slough Canal and within/under existing roadways, both of which are void of agriculture. The Proposed Project would have a beneficial effect on agricultural within Tranquillity ID as it would allow the movement of additional water supplies through increased capacity in the District's facilities. Agriculture in Tranquillity ID will not be negatively impacted during construction. Shutdown periods occur annually for Tranquility ID maintenance. Growers are not impacted during this time, because the crops are dormant and do not need to be irrigated.

Cumulative Impacts

The canals and their banks, rivers, and conveyance facilities associated with the Proposed Action/Project are managed primarily for agricultural supplies. The Proposed Project would not interfere with water deliveries, facility operations, or cause substantial adverse changes to the conveyance facilities, as the proposed pump station would be constructed during the low flow periods and culverts would be constructed during the shutdown period. The Proposed Project would not have a considerable contribution to a cumulative adverse impact on agriculture.

3.1.3 Air Quality

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or Projected air quality violation?	☐	☐	☒	☐
c) 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

f) Substantially alter air movement, moisture, or temperature, or cause any substantial change in climate?	☐	☐	☐	☒

Affected Environment

The Proposed Project lies within the San Joaquin Valley Air Basin (SJVAB), the second largest air basin in the State. Air basins share a common "air shed", the boundaries of which are defined by surrounding topography. Although mixing between adjacent air basins inevitably occurs, air quality conditions are relatively uniform within a given air basin. The San Joaquin Valley experiences episodes of poor atmospheric mixing caused by inversion layers formed when temperature increases with elevation above ground, or when a mass of warm, dry air settles over a mass of cooler air near the ground.

Despite years of improvements, the SJVAB does not meet some State and Federal health-based air quality standards. To protect health, the San Joaquin Valley Air Pollution Control District is required by Federal law to adopt stringent control measures to reduce emissions. On November 30, 1993, the Environmental Protection Agency (EPA) promulgated final general conformity regulations at 40 CFR 93 Subpart B for all Federal activities, except those covered under transportation conformity. The general conformity regulations apply to a proposed Federal action in a non-attainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by a Proposed Action equal or exceed certain emissions thresholds, thus requiring the Federal agency to make a Proposed Project conformity determination. Table 2 below presents the emissions thresholds and attainment status covering the Proposed Project location's overlying air basin.

Table 2 San Joaquin Valley General Conformity "de minimis" Thresholds.

Pollutant	**Federal Status**	**de minimis (Tons/year)**	**de minimis (Pounds/day)**
VOC (Volatile Organic Compounds)/ROG (Reactive Organic Gases) (as an ozone precursor)	Nonattainment serious 8-hour ozone	50	274
NO_x (Nitrogen oxides) (as an ozone precursor)	Nonattainment serious 8-hour standard	50	274
PM_{10} (Particulate matter < 10 microns in diameter)	Attainment	100	548
CO (Carbon monoxide)	Attainment	100	548

Sources: San Joaquin Valley Air Pollution Control District 2009a; 40 CFR 93.153

Environmental Consequences

No Action

Under the No Action/Project alternative, there would be no impacts to air quality since no construction would take place.

Proposed Action

Proposed Action/Project operations would not significantly contribute to criteria pollutant emissions, even though the Proposed Project pumps increase from two to three. Water distribution through the facilities would be a passive process; however, there would be emissions

associated with construction. Construction of the Proposed Project would be accomplished with graders, loaders, excavators, backhoes, concrete trucks, pumper trucks, water trucks, hauling trucks, and dump trucks. Construction is expected to take approximately six months.

There are three rural residences located within a half mile from the Proposed Project area. Short-term air quality impacts would be associated with construction and would generally arise from dust generation (fugitive dust) and operation of construction equipment. Fugitive dust results from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. Fugitive dust is a source of airborne particulates, including PM_{10} (particulate matter less than 10 microns in diameter) and $PM_{2.5}$ (particulate matter less than 2.5 microns in diameter). Large earth-moving equipment, trucks, and other mobile sources powered by diesel or gasoline are also sources of combustion emissions, such as nitrogen dioxide (NO_2), carbon dioxide (CO), carbon dioxide (CO_2), ROG (reactive organic gases), sulfur dioxide (SO_2), and small amounts of other air pollutants. Table 3 below provides a summary of the estimated emissions during construction of the Proposed Project.

Table 3 Calculated Maximum Unmitigated Proposed Action/Project Construction Emissions.

Pollutant	**2018 Project Construction Emissions (tons/year)**	**SJVAPCD Thresholds of Significance (tons/year)**
VOC/ROG (as an ozone precursor)	0.0118	10
NO_2 (as an ozone precursor)	0.1113	10
CO	0.0787	100
SO_2	1.4000e-004	27
PM_{10}	5.5400e-003	15
$PM_{2.5}$	606000e-003	15

Source: *CalEEMod, December 2018 (Appendix B).*

As shown in Table 3, Proposed Action/Project construction emissions are estimated to be below the Air District's thresholds. As shown by Table 4 below, the Proposed Project would be largely passive during operation, so there would be minimal operational emissions generated by its implementation. Emissions would be a result of an estimated 14 annual vehicle trips per year to the Proposed Project site for routine maintenance activities.

Table 4 Calculated Maximum Unmitigated Proposed Action/Project Operational Emissions.

Pollutant	Operational Emissions (tons/year)	SJVAPCD Thresholds of Significance (tons/yr)
VOC/ROG (as an ozone precursor)	0.0186	10
NO_2 (as an ozone precursor)	0.0000	10
CO	5.0000e-005	100
SO_2	0.0000	27
PM_{10}	0.0000	15
$PM_{2.5}$	0.0000	15

Source: CalEEMod, (December 2018 Appendix B).

As emissions are substantially below thresholds of significance, construction and operation under the Proposed Project would not result in adverse impacts to air quality.

Cumulative Impacts

Emissions for the Proposed Action/Project are well below the *de minimis* thresholds established by the San Joaquin Valley Air Pollution Control District and would not have a considerable contribution to a cumulative adverse impact on air quality.

3.1.4 Biological Resources

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
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, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (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 native 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?	☐	☐	☐	☒

Affected Environment

The Proposed Project site consists of highly disturbed lands that include roads, an irrigation canal, the margin of an immature orchard, and an irrigation basin, as well as disturbed areas bordering these uses. On June 19, 2018, Live Oak Associates, Inc. surveyed the Proposed Project site for biotic habitats, the plants and animals occurring in those habitats, and significant habitat values that may be protected by California and Federal law (Live Oak Associates 2018).

Habitats and land uses identified within the Proposed Project site included annual crop agricultural fields, orchards, irrigation canals, earthen roadways, and ruderal land. Agricultural lands that surround the Proposed Project site represent the dominant land use in the region. A short segment of the Slough Canal occurs on the site. The canal has earthen banks with concrete appurtenances with metal fixtures and pumps. All portions of the Proposed Project site are disturbed and of low quality for most native wildlife.

Live Oak Associates conducted an analysis of potential Proposed Project impacts based on the known and potential biotic resources of the Proposed Project site. Sources of information used in the preparation of this analysis included: (1) the California Natural Diversity Database (CDFW 2018), (2) the Online Inventory of Rare and Endangered Vascular Plants of California (California Native Plant Society 2018), (3) the Information for Planning and Consultation (IPaC) system on the Service's website, and (4) manuals, reports, and references related to plants and animals of the San Joaquin Valley region (Live Oak Associates 2018). Special status species that could occur in the vicinity of the Proposed Project are identified in Table 5 (Live Oak Associates 2018).

Table 5 Special Status Species that could occur in the Vicinity of the Proposed Project

Species and Critical Habitat	**Status**	**Habitat**	**Occurrence on the Project Site**
Palmate Bracted Salty Bird's Beak (*Chloropyron palmatum*)	FE, CE CNPS 1B.1	Occurs in chenopod scrub, valley and foothill grassland. Usually on Pescadero silty clay which is alkaline, with *Distichlis*, *Frankenia*, etc. Blooms June–Sept.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species. Furthermore, suitable soils are absent from the Project site.
San Joaquin Woollythreads (*Monolopia congdonii*)	FE, CNPS 1B.2	Occurs in chenopod scrub and valley and foothill grassland, often on sandy soils. Blooms February–May.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species. Furthermore, suitable soils are absent from the Project site.
Heartscale (*Atriplex cordulata* var. *cordulata*)	CNPS 1B.2	Occurs in cismontane woodland and valley and foothill grassland of the San Joaquin Valley; blooms April– October.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Lost Hills Crownscale (*Atriplex coronate* var. *vallicola*)	CNPS 1B.2	Occurs in chenopod scrub, valley and foothill grasslands, and vernal pools on alkaline soils. Blooms: April–August	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Brittlescale (*Atriplex depressa*)	CNPS 1B.2	Occurs in relatively barren areas with alkaline clay soils in chenopod scrub, playas, valley grasslands, and vernal pools of the Central Valley.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Lesser Saltscale (*Atriplex minuscula*)	CNPS 1B.1	Occurs in cismontane woodland and valley and foothill grassland of the San Joaquin Valley; blooms May–October.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.

Species and Critical Habitat	Status	Habitat	Occurrence on the Project Site
Subtle Orache (*Atriplex subtilis*)	CNPS 1B.2	Occurs in valley and foothill grasslands of the San Joaquin Valley. Blooms August-October.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Recurved Larkspur (*Delphinium recurvatum*)	CNPS 1B.2	Chenopod scrub, cismontane woodlands, and alkaline soils of valley and foothill grasslands. Blooms March-May.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Hoover's Eriastrum (*Eriastrum hooveri*)	CNPS 4.2	Chenopod scrub, valley and foothill grassland, pinyon and juniper woodland. Blooms March-July.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Munz' Tidy-Tips (*Layia munzii*)	CNPS 1B.2	Occurs in chenopod scrub and valley and foothill grasslands on alkaline clay. Blooms: March–April.	**Absent.** Habitats of the site are unsuitable for this species.
Indian Valley Bush-Mallow (*Tropidocarpum capparideum*)	CNPS 1B.2	Occurs in granitic outcrops and sandy bare soil of cismontane woodland and chaparral.	**Absent.** Suitable habitat is absent from the Project site and surrounding lands.
California Alkali Grass (*Puccinellia simplex*)	CNPS 1B.2	Seasonally moist areas within chenopod scrub, valley and foothill grasslands. Often associated with sinks, flats, and lake margins.	**Absent.** Suitable moist habitats are not present in the Project site.
Sanford's Arrowhead (*Sagittaria sanfordii*)	CNPS 1B.2	Freshwater marshes, pond margins, sloughs, etc. of California's Central Valley and low Sierra Foothills.	**Absent.** A survey of the site during this species' blooming period found this species to be absent from the Project site.
Vernal Pool Fairy Shrimp[1] (*Branchinecta lynchi*)	FT	Vernal pools of California's Central Valley.	**Absent.** Vernal pools required by this species are absent from the Project site and surrounding lands. Critical habitat is absent from Project Area.
Longhorn Fairy Shrimp (*Branchinecta longiantenna*)[1]	FE	Primarily found in vernal pools of California's Central Valley.	**Absent**. Vernal pools required by this species are absent from the Project site and surrounding lands. Critical habitat is absent from Project Area.
Delta Smelt (*Hypomesus transpacificus*)[1]	FT	This slender-bodied fish is endemic to the San Francisco Bay and Sacramento-San Joaquin Delta upstream through Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties.	**Absent.** Aquatic habitat suitable for this species is absent from the Project site, and the site is well outside of the known distribution of this species. Critical habitat is absent from the Project Area.
Central Valley steelhead (*Oncorhynchus mykiss*)[1]	FT	Anadromous species spawns in freshwater tributaries to Sacramento and San Joaquin Rivers. Migrates through the Sacramento-San Joaquin Delta as adults and juveniles. Young rear in cool water and migrate through the Delta as smolts, becoming adults in the Pacific Ocean, and returning to spawn. May spawn more than once.	**Absent**. Aquatic habitat suitable for this species is absent from the Project site. The Project site is outside of the distribution of this species. Not known to access upper reaches of Fresno Slough or the Kings River drainage. Critical habitat is absent from the Project Area.
Central Valley Spring-run chinook (*O. tshawytscha*)[1]	FT	Anadromous species spawns mostly in upper reaches of Sacramento River tributaries below dams. Experimental population being restored in San Joaquin River below Friant Dam. Young rear in cool water and migrate through the Delta as smolts, becoming adults in the Pacific	**Absent.** Aquatic habitat suitable for this species is absent from the Project site. The Project site is outside of the current distribution of this species. Not recently known to access upper reaches of Fresno Slough or the Kings River drainage. Critical habitat is absent from the Project Area.

Species and Critical Habitat	Status	Habitat	Occurrence on the Project Site
		Ocean, and returning to spawn and die usually in 2-5 years.	
Sacramento River Winter-run chinook (*O. tshawytscha*)[1]	FE	Anadromous species spawns in upper reaches of Sacramento River below Shasta Dam. Young rear in cool water and migrate through the Delta as smolts, becoming adults in the Pacific Ocean, and returning to spawn and die usually in 2-5 years.	**Absent**. Suitable aquatic habitat for this species is absent from the Project site, and the site is well outside of the known distribution of this species. Not known to access upper reaches of Fresno Slough or the Kings River drainage. Critical habitat is absent from the Project Area.
Southern Distinct Population Segment, North American green sturgeon (*Acipenser medirostris*)[1]	FT	Anadromous species spawn on rocky substrate in the upper reaches of Sacramento River below Shasta Dam. Occur throughout the Sacramento-San Joaquin Delta Juveniles spend 1-4 years in freshwater and the travel to the Pacific Ocean, returning to spawn.	**Absent**. Aquatic habitat suitable for this species is absent from the Project site, and the site is well outside of the known distribution of this species. Not known to access upper reaches of Fresno Slough or the Kings River drainage. Critical habitat is absent from the Project Area.
California Red-Legged Frog (*Rana aurora draytonii*)	FT	Perennial rivers, creeks, and stock ponds of the Coast Range and northern Sierra foothills with overhanging vegetation.	**Absent.** The Project site does not provide suitable habitat for this species and is outside of its current known range. Critical habitat is absent from the Project Area.
Blunt-Nosed Leopard Lizard (*Gambelia silus*)	FE, CE, CFP	Frequents grasslands, alkali meadows, and chenopod scrub of the San Joaquin Valley.	**Absent.** Historic and current use of the site and surrounding lands have eliminated habitat for this species. The closest documented occurrence is located on apparently untilled lands approximately 8 miles northeast of the Project site.
Giant Garter Snake (GGS) (*Thamnophis gigas*)	FT, CT	Habitat requirements consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter.	**Absent.** This species' distribution in the Tulare Basin is thought to be restricted to the Mendota Wildlife Area, located approximately 5 miles north of the Project site. Not detected there in trapping surveys (Hansen and Sherer 2017). The Project site's habitats are marginal, at best, for GGS. Canal banks are steep sided or near vertical. Emergent vegetation within the onsite canals is limited, and surrounding uplands offer insufficient vegetation cover and few burrows for cover during winter dormancy. Food and other resources on and adjacent to the site are expected to be too scarce to support GGS. Substantial access barriers exist between the Mendota Wildlife Area and the site, further diminishing the probability of giant garter snake occurrence on the site. See Section 2.5.1 for a more detailed discussion.
Swainson's Hawk (*Buteo swainsoni*)	CT, MBTA	Breeds in stands with few trees in juniper-sage flats, riparian areas, and in oak savannah. Requires adjacent suitable foraging areas	**Present.** The onsite agricultural fields provide suitable foraging habitat for the Swainson's hawk. One of two eucalyptus trees

Species and Critical Habitat	Status	Habitat	Occurrence on the Project Site
		such as grasslands or alfalfa fields supporting rodent populations. Winters in Central and South America.	immediately adjacent to W. Parlier Ave. contained an active Swainson's hawk nest during the June 2018 field survey.
Tricolored Blackbird (*Agelaius tricolor*)	CCE, MBTA	Breeds colonially near fresh water, primarily emergent wetlands, with tall thickets. Forages in grassland and cropland habitats.	**Possible.** Although the onsite canals contain sporadic patches of emergent wetland vegetation, this habitat is not extensive enough to support tricolored blackbird nest colonies. Observations of this species are rare in this part of Fresno County (eBird 2018, CDFW 2018). At most, this species may occasionally forage on the site.
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	CT	Frequents open shrublands and annual grassland habitats.	**Absent.** Habitats of the site provide unsuitable to very marginal habitat for this species. Furthermore, this diurnal species that spends a lot of time above ground was not observed during Live Oak Associates' field survey. The nearest documented occurrence of this species is 9.5 miles to the southwest from 1932 (CDFW 2018).
Giant Kangaroo Rat (*Dipodomys ingens*)	FE, CE	Inhabits grasslands on gentle slopes of generally less than 10°, with friable, sandy-loam soils.	**Absent.** Habitats of the site provide unsuitable to extremely marginal habitat for this species. Furthermore, the Project site is outside this species' known range, as it is not known to occur east of the California Aqueduct. The nearest documented occurrence of this species is 13 miles to the southwest documented in 1967 (CDFW 2018).
Fresno Kangaroo Rat (*Dipodomys nitratoides exilis*)	FE, CE	Occurs in alkali scrub and herbaceous habitats with scattered shrubs in the southwestern San Joaquin Valley.	**Absent.** Natural habitats suitable for this species are absent from the Project site and surrounding lands. Due to recent unsuccessful research trapping efforts on natural lands north of the Project site, this species is thought to be extirpated from the region (CDFW 2018). Critical habitat is absent from the Project Area and would not be affected by the action.
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, CT	Frequents desert alkali scrub and annual grasslands and may forage in adjacent agricultural habitats. Utilizes enlarged (5 to 10 inches in diameter) ground squirrel burrows as denning habitat.	**Unlikely.** All open burrows on and adjacent to the site were investigated during Live Oak Associates' field survey and no evidence of past or present kit fox occupation was found. The Project site has been highly modified for agricultural use and, as a result, provides only marginal foraging and breeding habitat for the kit fox. There are only two documented kit fox sightings within a ten-mile radius of the Project site, one from

Species and Critical Habitat	Status	Habitat	Occurrence on the Project Site
			1997 and one in 1975. No populations of kit fox are known to occur in this portion of Fresno County and kit foxes are extremely unlikely to occur at the site. Any occurrence would likely be from a transient individual.
Western Spadefoot (*Spea hammondii*)	CSC	Primarily occurs in grasslands, but also occurs in valley and foothill hardwood woodlands. Requires vernal pools or other seasonal pools for breeding.	**Absent.** Suitable breeding habitat is absent from the Project site and surrounding lands.
Western Pond Turtle (*Actinemys marmorata*)	CSC	Primarily occurs in grasslands, but also occurs in valley and foothill hardwood woodlands. Requires vernal pools or other seasonal pools for breeding.	**Absent.** Suitable breeding habitat is absent from the Project site and surrounding lands.
Coast Horned Lizard (*Phrynosoma blainvillii*)	CSC	Inhabits open areas of arid grasslands, coniferous forests, woodlands, and chaparral, with loose sandy soil. Often found in lowlands along sandy washes with scattered shrubs and along dirt roads, and frequently found near ant hills.	**Absent.** Suitable habitat for this species is absent from the Project site and surrounding lands.
Two-Striped Garter Snake (*Thamnophis hammondii*)	CSC	Highly aquatic; found in or near permanent fresh water, generally along streams with rocky beds and riparian growth.	**Absent.** Suitable habitat is absent from the Project site and surrounding lands. Furthermore, this species is not known to occur in the San Joaquin Valley.
San Joaquin Coachwhip (*Masticophis flagellum ruddocki*)	CSC	Open, dry habitats with little or no tree cover. Found in valley grasslands and saltbush scrub in the San Joaquin Valley. Uses mammal burrows for refuge and oviposition.	**Unlikely.** Ruderal, agricultural, and canal habitats of the site and adjacent lands provide unsuitable to extremely marginal habitat for this species.
Mountain Plover (*Charadrius montanus*)	CSC, MBTA	This winter migrant to California can be found in short grasslands, plowed fields, and sandy deserts.	**Possible.** Suitable foraging habitat for this species is present within onsite and adjacent agricultural fields. This species does not breed in California.
White-Tailed Kite (*Elanus leucurus*)	CFP, MBTA	Open grasslands and agricultural areas throughout central California	**Possible.** Foraging and nesting habitat for this species is present on the site.
Western Burrowing Owl (*Athene cunicularia*)	CSC, MBTA	Frequents open, dry annual or perennial grasslands, deserts, and scrublands characterized by low growing vegetation. Dependent upon burrowing mammals, most notably the California ground squirrel, for nest burrows.	**Possible.** While suitably sized burrows required by this species for roosting and nesting were absent from the Project site at the time of the field survey, this species may utilize future burrows that could become established prior to Project activities. This species has been observed in similar habitats in the region by Live Oak Associates biologists.
Loggerhead Shrike (*Lanius ludovicianus*)	CSC, MBTA	Frequents open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low herbaceous cover. Can often be found in cropland.	**Present.** This species was observed on the Project site during LOA's field survey. Foraging habitat for this species is present on the site. Nesting opportunity

Species and Critical Habitat	Status	Habitat	Occurrence on the Project Site
			occurs on the site in the roadside eucalyptus trees.
Pallid Bat (*Antrozous pallidus*)	CSC	Roosts in rocky outcrops, cliffs, and crevices with access to open habitats for foraging. May also roost in caves, mines, hollow trees, and buildings.	**Possible.** This species may forage over the site; roosting habitat is absent.
Western Mastiff Bat (*Eumops perotis* ssp. *californicus*)	CSC	Frequents open, semi-arid to arid habitats, including conifer forest, deciduous woodlands, coastal scrub, grasslands, palm oasis, chaparral, and urban areas. Roosts in cliff faces, high buildings, trees, and tunnels.	**Possible.** This species may forage over the site; roosting habitat is absent.
Western Red Bat (*Lasiurus blossevillii*)	CSC	This mostly solitary bat roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Possible.** This species may forage over the site; roosting habitat is absent. Potential roosting habitat occurs in onsite eucalyptus trees.
American Badger (*Taxidea taxus*)	CSC	Found in drier open stages of most shrub, forest and herbaceous habitats with friable soils.	**Absent.** Suitable habitat for this species is absent. Furthermore, no sign of this species was observed during Live Oak Associates' survey.

Plant information adapted from California Department of Fish and Wildlife 2018 and California Native Plant Society 2018.

Occurrence Terminology:

Present: Species observed on the site at time of field surveys or during recent past.
Likely: Species not observed on the site, but it may reasonably be expected to occur there on a regular basis.
Possible: Species not observed on the site, but it could occur there from time to time.
Unlikely: Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient.
Absent: Species not observed on the site and precluded from occurring there because habitat requirements not met.

STATUS CODES

FE	Federally Endangered	CE	California Endangered
FT	Federally Threatened	CT	California Threatened
FPE	Federally Endangered (Proposed)	CCE	California Endangered (Candidate)
FPT	Federally Threatened (Proposed)	CFP	California Fully Protected
FC	Federal Candidate	CSC	California Species of Special Concern
CNPS	California Native Plant Society Listing	MBTA	Migratory Bird Treaty Act

1A Plants Presumed Extinct in California
2 Plants Rare, Threatened, or Endangered in California, but more common elsewhere
1B Plants Rare, Threatened, or Endangered in California and elsewhere
[1]Critical habitat designated

The closest records for species that are both Federally and State listed, and which occur within 10 miles of the Proposed Project site, include those for vernal pool branchiopods (i.e., longhorn fairy shrimp and vernal pool fairy shrimp) and for the giant garter snake at approximately 9 and more than 5 air-miles (approximately 7 miles by water) to the northwest, respectively (CNDDB

2018). The nearest records for San Joaquin kit fox are approximately 8 miles northeast and Fresno Kangaroo rats have been spotted approximately 6 and 7 miles east and southeast of the Proposed Project site. There are no records for California state listed plants or animals on site or within one half-mile of the Proposed Project (CNDDB 2018). A nest discovered in 2018 for the California listed threatened Swainson's hawk (Biological Resources Evaluation 2018) is not yet logged in CNDDB records, but is within one thousand feet of the Proposed Project.

Reclamation reviewed the Proposed Action/Project and determined effects from the Proposed Project to species protected under the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. § 1531 et seq.) (Table 6).

Table 6 Determinations for Proposed Project Effects to Federally Listed Species

Species and Habitat	Determination[1]	Rationale for the Determination
Palmate Bracted Salty Bird's Beak (*Chloropyron palmatum*)	No effect	Habitat absent
San Joaquin Woollythreads (*Monolopia congdonii*)	No effect	Habitat absent
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	No effect	Habitat absent
Longhorn Fairy Shrimp (*Branchinecta longiantenna*)	No effect	Habitat absent
Central Valley steelhead (*Oncorhynchus mykiss*)	No effect[1]	Species absent from the Project site, Habitat unaffected
Central Valley Spring-run chinook (*O. tshawytscha*)	No effect[1]	Species absent from the Project site, Habitat unaffected
Delta Smelt (*Hypomesus transpacificus*)	No effect[1]	Species absent from the Project site, Habitat unaffected
Sacramento River Winter-run chinook (*O. tshawytscha*)	No effect[1]	Species absent from the Project site, Habitat unaffected
Southern Distinct Population Segment, North American green sturgeon (*Acipenser medirostris*)	No effect[1]	Species absent from the Project site, Habitat unaffected
California Red-legged Frog (*Rana aurora draytonii*)	No effect	Habitat absent, Project site outside the species range
Giant Garter Snake (GGS) (*Thamnophis gigas*)	No effect	Habitat deficient and unsupportive, Project site outside the species current known occupied range, Significant barriers between areas of suitable habitat and Project site
Blunt-Nosed Leopard Lizard (*Gambelia sila*)	No effect	Habitat absent
Giant Kangaroo Rat (*Dipodomys ingens*)	No effect	Habitat absent, Project site out of species' range
Fresno Kangaroo Rat (*Dipodomys nitratoides exilis*)	No effect	Habitat absent, Project site out of species' range
San Joaquin Kit Fox (SJKF) (*Vulpes macrotis mutica*)	No effect	Habitat deficient and unsupportive

[1]Species and Habitat

Environmental Consequences

No Action

Under the No Action alternative, there would be no new construction, and conveyance and use of surface water would continue to occur as currently practiced through the existing Tranquillity ID facilities. There would be no impacts to special-status wildlife species, habitats, migratory birds or other biological resources beyond those that occur from current activities.

Proposed Action

Temporary and permanent ground disturbance would occur as a consequence of the Proposed Action/Project. Excavation would occur in, and adjacent to, the Slough Canal Lift #3, at the adjacent road crossings, for SCADA upgrade, and at the staging area that would be located at the edge of an agricultural field. New supporting infrastructure (e.g., steel discharge pipes, trash screen, grating, SCADA) to replace existing infrastructure would be installed. In addition to the temporary disturbance, some water from Kings River flows that enter James Bypass and Fresno Slough would be diverted.

The temporary ground disturbance and work in the canal would not affect federally listed species. The increased flow capacity in Slough Canal would enable increased water diversion from the upper reach of Fresno Slough. Diversion of the additional water translates into less water potentially entering the San Joaquin River. Reduced flows could affect aquatic resources, however, the small amount or fraction of additional water diverted from Fresno Slough would not impact aquatic species, including protected species or their critical habitat. A known Swainson's hawk nesting tree is not within the Proposed Project APE. However, Swainson's hawks could forage in the Proposed Project site and avoidance of disturbance would be required if the Proposed Project is conducted during the nesting season. Mitigation includes trying to construct the Proposed Project outside the nesting season. The Proposed Project has the potential to result in construction-related mortality of nesting migratory birds protected under California Fish and Game Code and the Migratory Bird Treaty Act (MBTA; 16 U.S.C. §703-712). Mortality of protected avian species would be considered a significant impact of the Proposed Project under CEQA. However, by implementing the Proposed Project outside of the avian nesting season or by avoiding active nests identified during pre-construction surveys (Table 1), the Proposed Project proponent can reduce the magnitude of this potential impact to a less than significant level and take of migratory birds can be avoided.

Reclamation and the Tranquillity ID have included environmental commitments (Table 1) to avoid potential environmental effects from the Proposed Project. With the implementation of these measures, there would be no effect to federally listed species. Potential impacts to other biological resources would be less than significant, including migratory birds, which would not experience take.

Cumulative Impacts

The increased water capacity at the new pump station may result in minor reductions in the amount or fraction of water from the upper end of Fresno Slough that enters the San Joaquin River. However, the Proposed Project will increase the ability to use surface water by up to 50 cfs, which will result in an approximate water savings of up to 50 cfs that would not have to be pumped from groundwater.

This Proposed Action/Project, when added to the effects of future State, tribal, local or private actions that are reasonably certain to occur in the Proposed Project area is unlikely to result in cumulative impacts on the biological resources of the study area.

3.1.5 Cultural Resources

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

The Proposed Action/Project requires compliance with CEQA as well as the National Historic Preservation Act (NHPA) of 1966, as amended. Both the NHPA and CEQA essentially mandate that government agencies take into consideration the effects of their actions on cultural resources listed on or eligible for inclusion in the California Register of Historical Resources (CRHR) (defined as historical resources at 14 CCR § 15064.5[a]) and the National Register of Historic Places (NRHP) (defined as historic properties at 36 CFR § 800.16[l]). A cultural resource is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. While the NRHP and CRHR significance criteria are similar, the former is given precedence in this analysis because cultural resources eligible for the NRHP are also eligible for inclusion in the CRHR, but the reverse is not necessarily true (PRC 5024.1[c]). Therefore, employing the federal standards would be applicable in both Federal and State regulatory contexts. Reclamation initiated NHPA Section 106 consultation with the California State Historic Preservation Officer on a finding of no historic properties affected, pursuant to 36 CFR § 800.4(d)(1).

Affected Environment

On August 7, 2018, Applied Earthworks staff conducted a pedestrian archaeological survey and built environment surveys of the 5-acre APE. Applied Earthworks staff intensively surveyed the area for prehistoric and historic-era archaeological resources, and staff also surveyed the area for built environment resources over 50 years old. The survey area includes portions of Assessor's Parcel Nos. (APN) 030-220-30, 030-2103-3S, and 030-220-13. Applied Earthworks staff returned to the area on October 5, 2018, to complete an intensive archaeological survey of a portion of the APE that was inaccessible during the initial field visit. At the time of survey, the parcels were cultivated for tomatoes, cotton, and almonds. Tranquillity ID's Slough Canal vertically bisects the APE.

Ground visibility within the APE ranged from poor (less than 5 percent) to excellent (100 percent). The canal berms, shoulders of South Sonoma and West Parlier avenues, dirt access roads, and almond orchards within the APE provided excellent ground visibility. Ground

visibility within the western and southern margins of the APE was generally poor due to the presence of dense tomato and cotton crops. Soils within the APE are light brown clay interspersed with gravels and small cobbles.

Records Search and Background Research

On July 24, 2018, the Southern San Joaquin Valley Information Center responded to Applied Earthwork's records search request (Records Search File No. 18-299) and stated that there have been no previously identified cultural resources or previous cultural resource studies in the APE or within a 0.5-mile radius of the APE.

In order to obtain information on historical developments within the Proposed Project area, Applied Earthwork's Architectural Historian Annie McCausland conducted archival research. She examined historical maps, including the San Joaquin, CA (1925, 1946, 1963), 7.5-minute USGS quadrangle maps and maps in various Fresno County atlases (1909, 1911, 1913, 1920), to identify historical structures and property ownership within the Proposed Project area. McCausland also reviewed aerial photographs dating from 1946, 1958, 1962, 1971, 1998, 2005, 2009, 2010, 2012, and 2014 to identify historical land use of the area and changes within the built environment (NETROnline 2018). Historical maps illustrate that the Proposed Project area and general vicinity have comprised agricultural properties since at least 1911. A historical 1925 USGS quadrangle map shows three buildings near the Proposed Project area (USGS 1925). The building illustrated east of the canal is an extant early twentieth-century dwelling. Historical aerial photographs demonstrate the land within the Proposed Project area has been under agricultural cultivation since at least 1946 (NETROnline 2018). The dwelling is outside the APE. Established in 1918, the Tranquillity ID began construction of its facilities in 1920. The Slough Canal was built from 1920 to 1921 as one of Tranquillity ID's early conveyances intended to irrigate these agricultural properties (Progressive Map Service 1920; USGS 1925).

Native American Outreach

In its July 23, 2018, response to Applied Earthwork's request, the Native American Heritage Commission stated that a search of the Sacred Lands File did not indicate the presence of resources in the immediate Proposed Project APE. However, they cautioned that the absence of specific site information in the Sacred Lands File does not indicate the absence of tribal cultural resources in the Proposed Project area. The Native American Heritage Commission suggested contacting other sources who might have specific knowledge regarding Native American use of the Proposed Project area and provided contact information for 12 Native American Representatives. A log detailing the outreach efforts and responses is in the Cultural Report (Appendix D).

Pursuant to the regulations at 36 CFR § 800.3(f)(2), Reclamation identified the Big Sandy Rancheria of Western Mono Indians, Cold Springs Rancheria, North Fork Mono Tribe, Santa Rosa Rancheria Tachi Yokut Tribe, and the Table Mountain Rancheria as Indian tribes who might attach religious and cultural significance to historic properties within the APE. Reclamation contacted these tribes by letter dated October 12, 2018, inviting their participation in the Section 106 process and requesting their assistance in the identification of sites of religious and cultural significance or historic properties that may be affected by the proposed undertaking, pursuant to 36 CFR § 800.4(a)(4). Reclamation did not receive any response to these letters.

Buried Site Assessment

Review of the geologic and soils literature for the area indicates that the APE exhibits moderate sensitivity for buried soils containing archaeological resources within a "natural" context (i.e., undisturbed by modern agricultural practice). Predicted sensitivity areas are weighted based on distance to water, landform slope, and the distribution and age of geological deposits present at modern ground surface. Given this level of sensitivity, there was potential for intact buried archaeological sites on the aggrading floodplain adjacent to the Slough Canal at one time; however, extensive earthwork within the APE has most likely destroyed stratigraphic deposits containing archaeological resources.

Due to the prevailing paleo-environmental conditions within the Central Valley, prior to historic occupation, the marshy landscape associated with the local sloughs would not have been favorable for substantial seasonal or long-term habitation within the APE. The likelihood of encountering buried soils with extensive in situ cultural deposits throughout the vertical and horizontal APE is low. The extent of previous disturbance throughout the APE is high, and the proposed undertaking would have little impact on intact deposits, if present. As such, additional archaeological subsurface testing or the presence of an archaeological monitor during construction is not recommended.

Environmental Consequences

No Action

Under the No Action alternative, Tranquillity ID would not proceed with the replacement of the pump station within the Slough Canal or removal of culverts. There would be no change in operations. Conditions related to cultural resources would remain the same as existing conditions.

Proposed Action/Project

The Proposed Action/Project is the type of activity that has the potential to affect historic properties; however, the Cultural Resources and Evaluation Determination (Appendix D) did not identify any cultural resources within the APE. In order to avoid potential affects to unknown cultural resources, mitigation measures/environmental commitments were included in Table 1.

Reclamation reached a finding of no historic properties affected for the current undertaking, pursuant to 36 CFR § 800.4(d)(1) and entered into consultation with the State Historic Preservation Officer on November 27, 2018. State Historic Preservation Officer concurred with Reclamation in a letter dated December 18, 2018, concluding the Section 106 process (Appendix A).

Cumulative Impacts

Reclamation has determined that the Proposed Action would not result in impacts to cultural resources; therefore, there would be no cumulative impacts.

3.1.6 Geology and Soils

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Expose people or structures to 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?	☐	☐	☐	☒
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 18-1-B of the most recently adopted Uniform Building Code creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Affected Environment

The topography of the site is relatively level with a median elevation of 165 feet above mean sea level. Soils in the Proposed Project site area are predominantly clay and there are not any active faults close to the area. Currently on site there is a pump station, canal, and roadways with infrastructure that would be replaced. The Proposed Project area is the existing canal and Lift #3. The surrounding lands are currently used to grow cotton.

Environmental Consequences

No Action

There would be no impact to geology and soils as conditions would remain the same as existing conditions. With the No Action alternative, there would be no ground disturbance or excavation performed on site.

Proposed Action/Project

Under the Proposed Action/Project, no habitable structures would be constructed on the site nor would substantial grading change the topography to the point where the Proposed Project would expose people or structures to potential substantial adverse effects. There would be no import of soil. Any extra dirt would be graded out onsite spread on the canal banks or adjacent field within the APE. In addition, there would be no substantial risk to life or property due to the Proposed Project being located on expansive soils. No septic tanks or alternative wastewater disposal systems are proposed as part of the Proposed Project. There would be no impact to geology and soils.

The APE studied is approximately five acres, with the construction footprint considerably less than that (approximately one acre). The new pump station would be within the canal and the culverts within existing roadways. More than one acre of ground disturbance triggers the requirement of a SWPPP. Currently, it is unknown whether the construction footprint will exceed one acre. If the footprint ends up being one acre or more, then the project proponents will acquire a SWPPP. As part of the SWPPP, Tranquillity ID would employ best management practices to protect the topsoil.

There are no wetlands or waters of the U.S. in the Proposed Project site area or its surroundings.

Cumulative Impacts

No cumulative adverse impacts are anticipated to Geology and Soils.

3.1.7 Hazards and Hazardous Materials

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site 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 for people residing or working in the Project area?	☐	☐	☐	☒
f) For a Project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Affected Environment

The Proposed Action/Project area does not involve land that is listed as a hazardous materials site pursuant to Government Code Section 65962.5 and is not included on a list compiled by the Department of Toxic Substances Control (California Department of Toxic Substances Control 2007). EnviroStor is the Department of Toxic Substances Control's data management system for tracking cleanup, permitting, enforcement, and investigation efforts at hazardous waste facilities, and sites with known contamination, or sites where there may be reasons to investigate further.

Geotracker is the Water Boards' data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater. Geotracker contains records for sites that require cleanup, such as Leaking Underground Storage Tank Sites, Department of Defense Sites, and Cleanup Program Sites. Geotracker also contains records for various unregulated projects as well as permitted facilities including: Irrigated Lands, Oil and Gas production, operating Permitted USTs, and Land Disposal Sites. The nearest municipal airport is the William Robert Johnston airport in Mendota located approximately 12.5 miles northwest of the Proposed Project site.

Environmental Consequences

No Action

Under the No Action alternative, there would be no potential impact from hazards or hazardous materials as conditions would remain the same as existing conditions.

Proposed Action

The Proposed Action/Project does not involve the generation of any hazardous emissions or the transport, use, storage, or disposal of any hazardous materials and would not create a significant hazard to the public or the environment or accident conditions involving the release of hazardous materials into the environment. The pump station would not have any impact on an airstrip or create a safety hazard for people residing or working in the Proposed Project area.

Cumulative Impacts

No cumulative adverse impacts from hazards are anticipated.

3.1.8 Hydrology and Water Quality

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐
e) 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?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Affected Environment

The Proposed Action/Project area consists of the construction footprint within the Tranquillity ID Slough Canal and surrounding roadways and disturbed areas. The closest Federal Emergency Management Act Flood zone (Figure 4) is located approximately 1.75 miles away.

Tranquillity ID receives water supplies from several sources (Table 7) and serves agricultural water supplies to about 213 turnouts or connections. Tranquillity ID does not receive nor deliver State water, upslope drain water, or reclaimed water. While no municipal or industrial water supply is provided using surface water sources, Tranquillity ID owns, maintains, and operates the domestic/drinking water system for the local Community of Tranquillity and throughout the rural areas of the District, as well as the community park. The demand for these urban water uses is provided by groundwater pumping from M&I-only wells located within the community. Due to the small number of drinking water connections (about 350 +/-), Tranquillity ID is not deemed an urban water supplier. The District's surface water sources are used solely for agricultural irrigation. Tranquillity ID relies on both surface and groundwater for irrigation demands.

Table 7 Tranquillity ID Annual Water Supply Sources

Water Source	Total acre-feet/year
Federal agricultural water	Up to 13,800
San Joaquin River Riparian Water ("Rights Water", Schedule 2	Up to 20,200
Local/other (Kings River High Flow)	Varies from 0-40,000
Tranquillity ID groundwater	3,2721[1]
Total	Typically 26,867[1]

Source: Funding Application submitted by Tranquillity ID (January 2017)

The Kings River is impounded by Pine Flat Dam. In the 64 years since the dam was constructed (1955-2019), there have been 21 water years with high flow releases in the North Fork of the Kings River and water has flowed past the James Bypass Gaging Station (Fresno Slough Bypass), downstream of Placer Road. Tranquillity ID is the only entity entitled to any of these flows downstream of James Irrigation District.

Environmental Consequences

No Action

Under the No Action alternative, the current bottleneck in the Slough Canal, where it passes under the two roads, would not be addressed. Tranquillity ID has the need/demand to move

[1] Average for 2000 through 2009.

more than what it is currently capable of moving, which is 50 cfs. The current pump station and culverts limit the amount of water Tranquillity ID can move. Without the Proposed Project, Tranquillity ID is limited on how much water it can use, causing a negative impact to the farmers and their crops in the area.

Proposed Action

During construction, approximately 5,000 gallons of water per day could be needed for dust control for culvert installation. This water would come from other canal alignments within the District. Construction would occur during low demand and shutdown periods. Water would be diverted around the construction area during low demand season so not to impact customers. The shutdown period is when canals are dry because no irrigation deliveries are being made. This happens annually when the crops are dormant, and the growers are not irrigating the fields. Water quality would not be altered during construction due to the bypass conveyance method of the proposed temporary pipeline.

Tranquillity ID has the ability to divert and use Kings River high flows, but the current bottleneck at Lift #3 limits how much water it can use. With the Proposed Project, the diversion capacity would increase from 50 cfs to 100 cfs. The approximate water savings amounts to 50 cfs over a 36-day period during each year or about 3,600 acre-feet/year. There is sufficient demand in the area served by Lift Pump Station #3 to use this water. The Proposed Project would have beneficial impacts to water supplies within Tranquillity ID.

Cumulative Impacts

The Proposed Project would not interfere with water deliveries, facility operation, or cause substantial adverse changes to the conveyance facilities. Construction would occur during low demand and shutdown periods. Water would be diverted around the construction area during low demand season so not to impact customers. The Proposed Project would not trigger other water service actions and does not contribute to cumulative effects to physical resources when added to other water service actions. The Proposed Project would have beneficial impacts on water resources and agricultural; and therefore, would not contribute to adverse cumulative impacts on these resources areas.

Figure 4 FEMA Flood Zone Map

3.1.9 Land Use and Planning

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the General Plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Affected Environment

The Proposed Action/Project area is the existing canal and Lift #3. The surrounding lands are currently used to grow cotton. Lands in the Proposed Project area are classified by the California Department of Conservation as prime farmland, Farmland of Local Importance, and Unique Farmland. The Proposed Project site and its surroundings are zoned AE-20.

Environmental Consequences

No Action

Under the No Action alternative, there would be no impact to land use as conditions would remain the same as existing conditions.

Proposed Action

Construction of the District's pump station and culverts would not change existing land uses as the new infrastructure would be placed inside existing infrastructure. Under the Proposed Action/Project, construction of the Proposed Project would not require the removal of any agriculture and no new lands would be brought into agricultural production. The Proposed Action/Project would maintain current land uses and would have no adverse impacts to land use.

Cumulative Impacts

In recent years, land use changes within the San Joaquin Valley have involved the urbanization of agricultural lands. These types of changes are typically driven by economic pressures and are as likely to occur with or without the Proposed Action/Project. The Proposed Project will improve existing infrastructure in order to move more water to meet existing demands. The Proposed Project also creates new infrastructure (SCADA) to improve data collection, water efficiency and management. These are all improvements that would allow continued land uses in the District. Accordingly, no cumulative adverse impacts to land use are anticipated as a result of the Proposed Action/Project.

3.1.10 Mineral Resources

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
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?	☐	☐	☐	☒

Affected Environment

There are no known mineral resources at the Proposed Project site. The Proposed Project site is not classified as a Mineral Resource Zone according to the Fresno County General Plan.

Environmental Consequences

No Action

Under the No Action alternative, there would be no impact to mineral resources as conditions would remain the same as existing conditions.

Proposed Action

The Proposed Action/Project does not have the potential to impact the availability of any known mineral resources or mineral resource recovery sites as there are none in the Proposed Project area. There would be no impact.

Cumulative Impacts

There would be no cumulative impacts to mineral resources as there are none in the Proposed Project area.

3.1.11 Noise

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☒	☐
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 expose people residing or working in the Project area to excessive noise levels?				

Affected Environment

The proposed pump station site is comprised of existing canal structures and agricultural land. The closest residence (noise receptor) is approximately 0.20 miles away (Figure 5).

Environmental Consequences

No Action

Under the No Action alternative, there would be no potential noise impacts as conditions would remain the same as existing conditions.

Proposed Action

The Proposed Action/Project operation would generate some noise from the new pump station, however it would not be significantly louder that the current pump station and noise levels in the area from farming activities would be similar. Overall, there would not be a significant increase in noise in the area. Construction activities would involve temporary noise sources that are anticipated to last approximately six months during construction of the Proposed Project. Typical construction equipment would include an excavator, backhoe/loader, concrete truck, concrete pumper, and miscellaneous equipment (e.g. pneumatic tools, generators and portable air compressors).

The Fresno County General Plan Noise Element (2000) sets the standard noise threshold of 60 decibels (dBA) at the exterior of nearby residences; however, it does not identify a short-term construction-noise-level threshold. The distinction between short-term construction noise impacts and long-term operational noise impacts is a typical one in both CEQA documents and local noise ordinances, which generally recognize the reality that short-term noise from construction is inevitable and cannot be mitigated beyond a certain level. Thus, local agencies frequently tolerate short-term noise at levels that they would not except for permanent noise sources (Table 8). The closest residence is approximately 0.20 miles from the Proposed Project site. The noise impact is less than significant.

Table 8 Noise Levels in dBA

Construction Equipment Noise Source	**dBA at 50 ft**	**dBA at 100 ft**	**dBA at 1.0 mile**
Pneumatic tools	85	79	45
Truck (e.g. dump, water)	88	82	48
Concrete mixer (truck)	85	79	45
Scraper	88	82	48
Bulldozer	87	81	47
Backhoe	85	79	45
Generator	76	70	36
Portable air compressor	81	75	41

Source: BASELINE Consulting 1999

Cumulative Impacts

The Proposed Project would not considerably increase cumulative adverse impacts on noise.

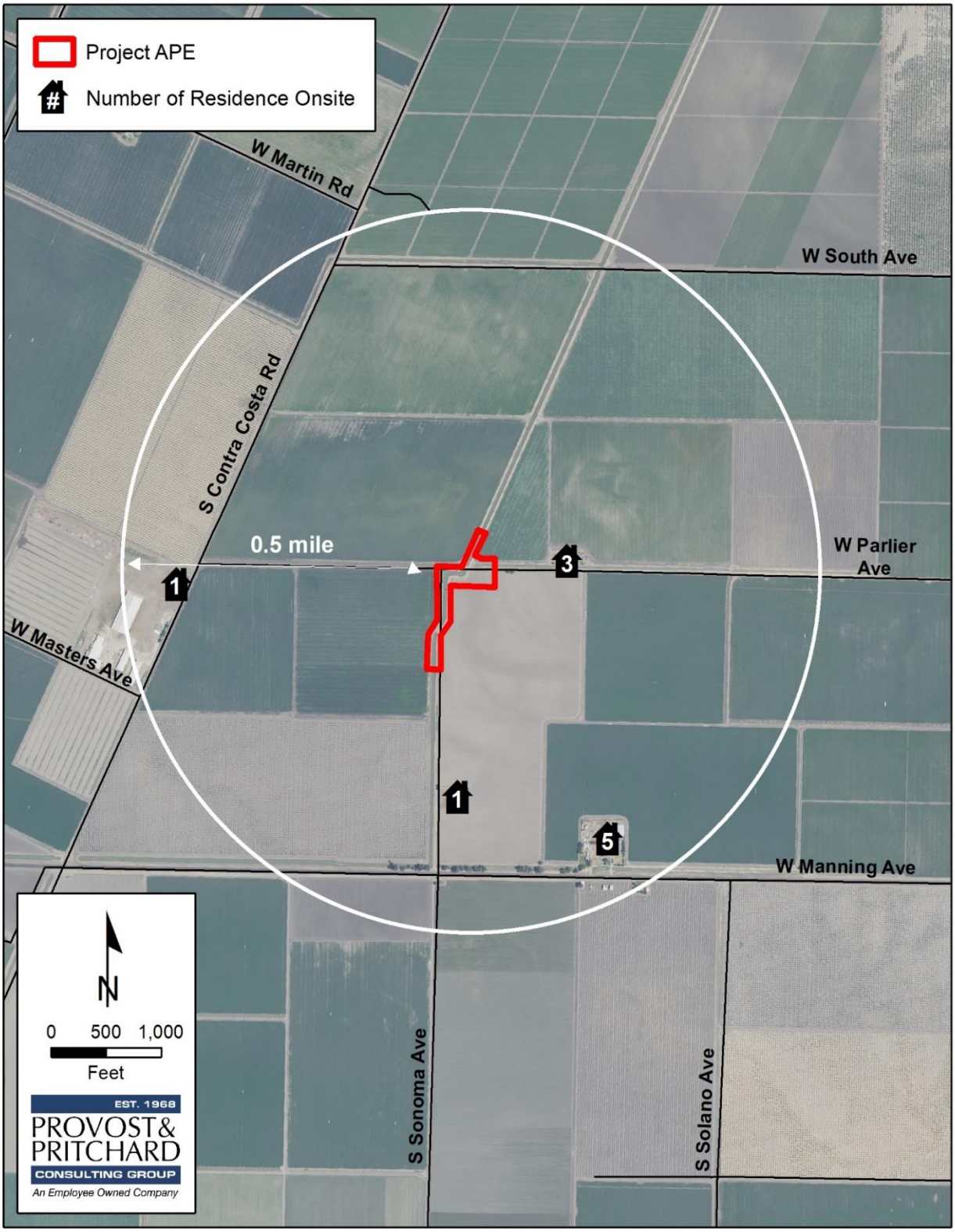

Figure 5 Sensitive Receptors Map

3.1.12 Population and Housing

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Affected Environment

The Proposed Action/Project site is comprised of an existing canal structure and agricultural land. The closest residence is approximately 0.20 miles away. The area is zoned AE-20.

Environmental Consequences

No Action

Under the No Action alternative, there would be no impact to population and housing as conditions would remain the same as existing conditions.

Proposed Action

The Proposed Action/Project does not include any features that would require the destruction or relocation of existing housing or the construction of replacement housing. In addition, the Proposed Project would not increase or decrease the number of available dwelling units in the area. The Proposed Project would not displace any people. The Proposed Project would assist in improving the efficiency and availability of water supplies to meet existing demands and would have no effect on population growth.

Cumulative Impacts

There would be no cumulative impacts to population and housing from this Proposed Project.

3.1.13 Public Services

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	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 following public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Affected Environment

The closest fire station is the Fresno County Fire Station #95 located approximately 2.25 miles north of the Proposed Project site. The Fresno County Sheriff, San Joaquin Office, is located approximately 3.10 miles east of the Proposed Project site. The closest school is the Tranquillity Elementary School located approximately 2.5 miles northeast of the Proposed Project site. The closest park/recreational area is the San Joaquin City Park located approximately three miles east of the Proposed Project site.

Environmental Consequences

No Action

Under the No Action alternative, there would be no impact to public services as conditions would remain the same as existing conditions.

Proposed Action

The Proposed Action/Project does not include any features or facilities that would require additional or unusual fire protection resources, enhanced levels of police protection, nor does it have the potential to increase or decrease the area's population and would therefore not result in a greater or lesser demand for schools or parks. The Proposed Action/Project would not result in adverse physical impacts associated with the provision of new or physically altered governmental facilities. No habitable structures would be constructed on the site that would require any public services. Tranquillity ID would be responsible for the operation and maintenance of the pumps, canals, and culverts.

Cumulative Impacts

There would be no cumulative impacts to public services from this Proposed Project.

3.1.14 Recreation

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
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?	☐	☐	☐	☒

Affected Environment

No habitable structures are proposed as part of this Proposed Project. There would not be an increase in the use of local parks due to the Proposed Project. The closest park is the San Joaquin City Park located approximately three miles east of the Proposed Project site.

Environmental Consequences

No Action

Under the No Action alternative, there would be no impact to recreation as conditions would remain the same as existing conditions.

Proposed Action

The Proposed Action/Project does not have the potential to increase or decrease the area's population and would, therefore, not result in increased or decreased use of parks or other recreational facilities. Additionally, the Proposed Action/Project does not include recreational facilities and would not require the construction or expansion of any recreational facilities.

Cumulative Impacts

There would be no cumulative impacts to parks and recreation from this Proposed Project.

3.1.15 Transportation and Traffic

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☒	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Result in inadequate parking capacity?	☐	☐	☐	☒
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

Affected Environment

The Proposed Action/Project site would be located where W. Parlier Avenue and S. Sonoma Avenue intersect at the Tranquillity ID Slough Canal, in an area known for agriculture. Access to this area is via W. Manning Avenue. The only traffic this Proposed Project would create is the occasional District worker visiting the site for maintenance.

Environmental Consequences

No Action

Under the No Action alternative, there would be no additional impact to existing traffic patterns in the area. Currently the existing roads adjacent to the canal allow for District vehicles to access the Tranquillity ID Slough Canal for maintenance. Conditions would remain the same as existing conditions.

Proposed Action

The Proposed Action/Project would not create any additional traffic. There would be no change in operations and maintenance. The new pump station would be located in the existing canal and could require a maximum potential of 14 annual vehicle trips to clean the trash rack in the canal. Tranquillity ID staff is already driving along the canal to clean the existing trash rack, therefore the Proposed Project is not causing any additional operational trips. Any monitoring and maintenance activities that would occur at the proposed turnout would be performed by Tranquillity ID, thereby consolidating trips for any maintenance situations. The Proposed Action/Project would not result in any impacts to transportation or traffic.

Cumulative Impacts

The Proposed Project, when added to other projects, would not contribute to significant road improvements or degradation in environmental conditions. The Proposed Project would not be precedent setting.

3.1.16 Utilities and Service Systems

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) 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?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Affected Environment

No habitable structures are a part of this Proposed Project and therefore no wastewater or solid waste disposal would be required for the Proposed Project.

Tranquillity ID currently receives electric power from PG&E and has a solar facility to power the District. A majority of the energy used by Tranquillity ID is to power the lift pumps and nine existing wells.

Environmental Consequences

No Action

Under the No Action alternative, there would be no impact to utilities and service systems as conditions would remain the same as existing conditions.

Proposed Action

The Proposed Project would not result in a substantial change to facilities or operations at existing wastewater treatment plants in the area, nor would it require additional water supplies or generate wastewater. The amount of runoff at the Proposed Project site would not increase, nor

would implementation of the Proposed Project generate any solid waste. There will be an increase in power usage/energy due to the increase from two to three pumps.

Cumulative Impacts

There would be no cumulative impacts to utilities and service systems from this Proposed Project.

3.1.17 CEQA Mandatory Findings of Significance

Would the Project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporation	Less than Significant Impact	No Impact
a) Does the Project have the potential to 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, 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 would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

The analysis conducted in this document results in a determination by Tranquillity ID that the Proposed Project would have a less than significant effect on the local environment. As described in the sections above, the potential for impacts to biological resources from the construction of the pump station would be less than significant with the incorporation of the mitigation measures in Table 1.

a) Accordingly, the Proposed Project would involve no potential for significant impacts through the degradation of the quality of the environment, the reduction in the habitat or population of fish or wildlife, including: endangered plants or animals, the elimination of a plant or animal community, or example of a major period of California history or prehistory.

b) As discussed above, the Proposed Project would result in less than significant impacts to biological and cultural resources, with mitigation incorporation listed in Table 1 Mitigation/Environmental Protection Measures and described in Section 3.1.4 Biological Resources, as well as Section 3.1.5 Cultural Resources of this environmental document. Proposed Project operations and maintenance would not require any on-site personnel. It is anticipated that there would be a maximum of 14 annual trips to the Proposed Project site.

As such, the Proposed Project would generate minimal Proposed Project related vehicle trips as a result of implementation. The replacement of an instream lift-pump station and two road culverts would not result in ongoing impacts that are individually limited or cumulatively considerable. The implementation of the identified Proposed Action/Project-specific mitigation measures, and compliance, with applicable codes, ordinances, laws and other required regulations would reduce the magnitude of any impacts associated with construction activities to a less than significant level.

c) The Proposed Project would not result in substantial adverse effects on human beings, either directly or indirectly. The implementation of the identified mitigation measures would reduce the Proposed Action/Project's potential environmental effects on the public and the environment to less than significant levels. No additional mitigation measures would be required. Adverse effects on human beings resulting from implementation of the Proposed Action/Project would be less than significant. The Proposed Project is environmentally superior to the No-Project alternative, because being able to use more surface water reduces groundwater pumping and raises the water level, which then decreases depletion of the aquifer. This, in turn, reduces costs associated with groundwater pumps and the energy required to power those pumps.

3.2 Global Climate Change

3.2.1 Affected Environment

Climate change refers to significant change in measures of climate (e.g., temperature, precipitation, or wind) lasting for decades or longer. Many environmental changes can contribute to climate change [changes in sun intensity, ocean circulation, deforestation, urbanization, burning fossil fuels, etc.] (EPA 2014a).

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). Some GHG, such as CO_2, occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHG (such as fluorinated gases) are created and emitted solely through human activities. The principal GHG that enter the atmosphere because of human activities are: CO_2, methane (CH_4), nitrous oxide (NO_2), and fluorinated gasses (EPA 2014a).

During the past century, humans have substantially added to the amount of GHG in the atmosphere by burning fossil fuels such as coal, natural gas, oil and gasoline to power our cars, factories, utilities and appliances. The added gases, primarily CO_2 and CH_4, are enhancing the natural greenhouse effect, and likely contributing to an increase in global average temperature and related climate changes.

In 2006, the State of California issued the California Global Warming Solutions Act of 2006, widely known as Assembly Bill 32, which requires the California Air Resources Board (CARB) to develop and enforce regulations for the reporting and verification of statewide GHG emissions. CARB is further directed to set a GHG emission limit, based on 1990 levels, to be achieved by 2020.

In addition, the EPA has issued regulatory actions under the Clean Air Act, as well as other statutory authorities, to address climate change issues (EPA 2014c). In 2009, the EPA issued a

rule (40 CFR Part 98) for mandatory reporting of GHG by large source emitters and suppliers that emit 25,000 metric tons or more of GHG [as CO_2 equivalents per year] (EPA 2009). The rule is intended to collect accurate and timely emissions data to guide future policy decisions on climate change and has undergone and is still undergoing revisions (EPA 2014c).

Recently, the U.S. Global Research Program (USGRP) concluded in its Climate Science Special Report (2017) that, "Many lines of evidence demonstrate that it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century." The USGRP also concludes that, "Global climate is projected to continue to change over this century and beyond. The magnitude of climate change beyond the next few decades would depend primarily on the amount of greenhouse (heat trapping) gases emitted globally and on the remaining uncertainty in the sensitivity of the Earth's climate to those emissions (very high confidence)."

3.2.2 Environmental Consequences

No Action

Under the No Action alternative, there would be no increase from construction emissions. Growers would continue to pump groundwater, which would generate GHG associated with the energy usage. Therefore, no impacts or changes to climate change are anticipated under the No Action alternative.

Proposed Action

The Proposed Action/Project would involve minimal short-term impacts consisting of emissions during construction. The California Emissions Estimator Model (CalEEMod) estimates CO_2 output emissions are a total of 143.8 metric tons/year. Long-term Proposed Project emissions would be a result of an estimated 14 annual vehicle trips to the Proposed Project site for routine maintenance activities. Tranquillity ID is already driving along the canal and going to the Proposed Project site to clean the existing trash rack. Therefore, the Proposed Project will not cause any additional operational trips. Construction and operation under the Proposed Project would result in below *de minimis* impacts to the global climate. There would be a slight increase in GHG as a result of running three pumps instead of two.

Cumulative Impacts

GHG emissions are considered cumulatively significant; however, the estimated annual CO_2 emissions required to install and operate the proposed facility is well below the 25,000 metric tons per year threshold for reporting GHG. As a result, the Proposed Action/Project is not expected to contribute to cumulative adverse impacts to global climate change.

3.3 Federal Disclosure Requirements

Department of the Interior Regulations, Executive Orders, and Reclamation guidelines require a discussion of the following items when preparing environmental documentation:

3.3.1 Indian Sacred Sites

Sacred sites are defined in Executive Order 13007 (May 24, 1996) as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian

individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." The Proposed Project would not affect or prohibit access to and ceremonial use of Indian sacred sites as there are none in the Proposed Project area.

3.3.2 Indian Trust Assets

Indian Trust Assets are legal interests in assets that are held in trust by the United States for federally recognized Indian tribes or individuals. There are no Indian reservations, rancherias or allotments in the Proposed Project area. The nearest Indian Trust Asset is a public domain allotment about 34.1 miles to the south.

3.3.3 Environmental Justice

Executive Order 12898 requires each Federal agency to identify and address disproportionately high and adverse human health or environmental effects, including social and economic effects of its program, policies, and activities on minority populations and low-income populations. No changes in agricultural communities or practices would result from the Proposed Action/Project. Therefore, the Proposed Project would not have disproportionately negative impacts on low-income or minority individuals or populations within the Proposed Project area.

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Section 4 Consultation and Coordination

4.1 Public Review Period

Reclamation intends to provide the public with an opportunity to comment on the Draft Finding of No Significant Impact and Draft IS/EA (acting as Lead Agency for NEPA) during a 30-day public review period. Through the State Clearinghouse, Tranquillity ID (acting as Lead Agency for CEQA) would make the Draft IS/EA and the proposed adoption of a mitigated negative declaration available to the public.

4.2 List of Agencies and Persons Consulted

Reclamation and/or Tranquillity ID has consulted with the following regarding the Proposed Project:

- Big Sandy Rancheria of Western Mono Indians
- Cold Springs Rancheria
- North Fork Mono Tribe
- Santa Rosa Rancheria Tachi Yokut Tribe
- Table Mountain Rancheria
- Native American Heritage Commission
- State Historic Preservation Office

4.3 National Historic Preservation Act (Title 54 USC § 306108)

The NHPA, as amended (Title 54 USC § 306108), requires that federal agencies give the Advisory Council on Historic Preservation an opportunity to comment on the effects of an undertaking on historic properties and properties that are eligible for inclusion in the NRHP. The 36 CFR Part 800 regulations implement Section 106 of the NHPA. Compliance with Section 106 follows a series of steps that are designed to identify interested parties, determine the area of potential effects, conduct cultural resource inventories, determine if historic properties are present within the area of potential effects, and assess effects on any identified historic properties.

Reclamation determined that there would be no adverse effect to historic properties pursuant to 36 CFR § 800.5(b) and entered into consultation with the State Historic Preservation Officer in November of 2018, seeking their concurrence. A response from the State Historic Preservation Officer was received December 26, 2018 concurring with Reclamation on a finding of no historic properties affected (Appendix A).

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Section 5 Preparers and Reviewers

Bureau of Reclamation

Kathleen Linder, Natural Resources Specialist, SCCAO
Ned Gruenhagen, Wildlife Biologist, SCCAO
Kevin Palmer, Architectural Historian, MP-153
Rain L. Emerson, Environmental Compliance Branch Chief, SCCAO – reviewer
David E. Hyatt, Resources Management Division Chief, SCCAO – reviewer

Tranquillity Irrigation District

Rod Wade, District Assistant Manager
Lauren D. Layne, Baker Manock & Jensen, District Legal Counsel

Provost & Pritchard Consulting Group

Joe Hopkins, PE
Trelawney Bullis, EIT
Briza Sholars, Senior Planner
Brooke Fletcher, Assistant Planner
Mark Thompson, GIS
Jackie Lancaster, Project Assistant

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Section 6 References

BASELINE Consultant's Inc. website: http://www.baselineconsultants.com/

California Department of Resources Recycling and Recovery (CalRecycle) website: http://www.calrecycle.ca.gov/

California Department of Toxic Substances Control website: http://www.envirostor.dtsc.ca.gov/public/

California Department of Conservation's Farmland Mapping and Monitoring Program website: http://www.conservation.ca.gov

California Agricultural Land Evaluation and Site Assessment Model website: https://www.conservation.ca.gov/dlrp/Pages/qh_lesa.aspx

California Department of Fish and Wildlife Natural Diversity Database website: https://www.wildlife.ca.gov/Data/CNDDB

California Emissions Estimator Model (CalEEMod), version 2013.2.2 website: http://www.caleemod.com/

California State Water Resources Control Board website: http://geotracker.waterboards.ca.gov/ and http://www.swrcb.ca.gov/water_issues/programs/stormwater/construction.shtml

Caltrans http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm

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Live Oak Associates. 2018. Tranquillity Irrigation District southeast service area water conservation and conveyance improvement Project Biological Evaluation, Fresno County, California. Live Oak Associates, Inc. 39pp. + Appendices. July, 2018.

San Joaquin Valley Air Pollution Control District website:
http://www.valleyair.org/aqinfo/attainment.htm

State Water Resources Control Board, Geotracker website: http://geotracker.waterboards.ca.gov/

Tranquillity Irrigation District. January 2017. Funding Application for the Southeast Service Area Water Conservation and Conveyance Improvement Project. Fresno County, CA. 70pp.

U.S. Fish & Wildlife Service National Wetlands Inventory website:
https://www.fws.gov/wetlands/

U.S. Global Research Program (USGRP). 2017. Executive summary. In: Climate Science Special Report: Fourth National Climate Assessment, Volume I [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC. pp. 12-34. Website:
https://science2017.globalchange.gov/chapter/executive-summary/.

Appendix A. Reclamation's Cultural Resources Determination

CULTURAL RESOURCES COMPLIANCE
Division of Environmental Affairs
Cultural Resources Branch (MP-153)

MP-153 Tracking Number: 17-SCAO-166.001

Project Name: Tranquility Irrigation District (TID) Southeast Service Area Water Conservation and Conveyance Improvement Project, Fresno County, California

NEPA Contact: Kate Connor, Natural Resource Specialist

EA Number: 17-04

MP 153 Cultural Resources Reviewer: Lex Palmer, Architectural Historian

Date: December 26, 2018

Reclamation proposes to issue Water and Energy Efficiency Grant funds to the TID for their Southeast Service Area Water Conservation and Conveyance Improvement Project. The TID proposes to improve water conveyance efficiency within the TID via the replacement of an existing instream lift-pump station, replacement of two existing road culverts, and the improvement of approximately 1,100 feet of canal channel. A new 100-CFS lift-pump station with three pumps and a discharge line would be installed upstream of West Parlier Avenue and may be located in the canal channel or integrated into the canal bank.

The use of Federal appropriations is an undertaking as defined in 36 CFR § 800.16(y) and is a type of activity that has the potential to cause effects on historic properties pursuant to 36 CFR § 800.3(a).

Based on historic properties identification efforts conducted by Applied Earthworks, Reclamation consulted with, and received concurrence from, the State Historic Preservation Officer (SHPO) on a finding of no historic properties affected, pursuant to 36 CFR § 800.4(d)(1). Consultation correspondence between Reclamation and the SHPO has been provided with this cultural resources compliance document for inclusion in the administrative record for this action.

This document serves as notification that Section 106 compliance has been completed for this undertaking. Please note that if project activities subsequently change, additional NHPA Section 106 review, including further consultation with the SHPO, may be required.

Attachments:

Letter: Reclamation to SHPO dated November 26, 2018
Letters: SHPO to Reclamation dated December 18, 2018

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, CA 95825-1898

IN REPLY REFER TO:

NOV 26 2018

MP-153
2.1.1.04

SPECIAL DELIVERY – HAND DELIVERED

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1715 23rd Street, Suite 100
Sacramento, CA 95816

Subject: National Historic Preservation Act (NHPA) Section 106 Consultation for the Tranquility Irrigation District (TID) Southeast Service Area Water Conservation and Conveyance Improvement Project, Fresno County, California (17-SCAO-166.001)

Dear Ms. Polanco:

The Bureau of Reclamation is initiating consultation under Title 54 USC § 306108, commonly known as Section 106 of the NHPA, and its implementing regulations found at 36 CFR Part 800, for the proposed issuance of Water and Energy Efficiency Grant funds to the TID for their Southeast Service Area Water Conservation and Conveyance Improvement Project (Enclosure 1: Figure 1). The use of Federal appropriations is an undertaking as defined in 36 CFR § 800.16(y) and is a type of activity that has the potential to cause effects on historic properties pursuant to 36 CFR § 800.3(a). We are entering into consultation with you on this undertaking and are notifying you of our finding of no historic properties affected, pursuant to 36 CFR § 800.4(d)(1).

The TID proposes to improve water conveyance efficiency within the TID via the replacement of an existing instream lift-pump station, replacement of two existing road culverts, and the improvement of approximately 1,100 feet of canal channel. A new 100-cubic foot per second lift-pump station with three pumps and a discharge line would be installed upstream of West Parlier Avenue and may be located in the canal channel or integrated into the canal bank. The new lift-pump station would be capable of reverse directional flow to permit water transfers into the TID service area. Channel improvements would include reshaping and lining the channel section and may include piping 900 feet of the canal reach. The two new replacement road crossings would each consist of two 72-inch culverts, or dual 4-foot by 5-foot box culverts. A new electrical power distribution and control panel with a telemetry antenna would also be installed. The project would resolve a bottleneck in the Slough Canal where it passes under West Parlier Avenue and South Sonoma Avenue. Staging and material stockpiling would take place along the canal prism.

Reclamation determined the area of potential effects (APE) includes all project-related activities as described above. The vertical APE would have a 6-foot maximum depth, and the horizontal APE would be 1,500 feet long with a width of 528 feet. The APE totals approximately 15 acres in size (Enclosure 1: Figure 2). Lands surrounding the project area are characterized by rural open space

and crop fields. The project area is located in Sections 20 and 21, T. 15 S., R. 16 E., Mount Diablo Base and Meridian, as depicted on the San Joaquin, California, 7.5 minute U.S. Geological Survey topographic quadrangle map.

Efforts to identify historic properties in the APE were conducted by Applied Earthworks on behalf of TID. The results of these efforts are documented in the enclosed cultural resources inventory report (Enclosure 1: Applied Earthworks, 2018). Applied Earthworks conducted background research, a records search at the Southern San Joaquin Valley Information Center at the California State University, Bakersfield, and a cultural resources inventory of the APE.

No historic properties were identified during the inventory. Applied Earthworks documented the Slough Canal, and recommended that the structure is ineligible for the National Register of Historic Places (National Register) under National Register criteria A, B, C, or D both on an individual basis or as a contributor to a potential Tranquility Irrigation District historic district. Reclamation agrees with the Applied Earthworks recommendation that the Slough Canal in the APE is ineligible for listing in the National Register.

Pursuant to the regulations at 36 CFR § 800.3(f)(2), Reclamation identified the Big Sandy Rancheria of Western Mono Indians, Cold Springs Rancheria, North Fork Mono Tribe, Santa Rosa Rancheria Tachi Yokut Tribe, and the Table Mountain Rancheria as Indian tribes who might attach religious and cultural significance to historic properties within the APE. Reclamation contacted these tribes by letter dated October 12, 2018, inviting their participation in the Section 106 process and requesting their assistance in the identification of sites of religious and cultural significance or historic properties that may be affected by the proposed undertaking, pursuant to 36 CFR § 800.4(a)(4). Reclamation did not receive any response to these letters. If any Native American concerns are raised, we will work to address them and notify your office, as appropriate.

Based on the information discussed above and in Enclosure 1, Reclamation reached a finding of no historic properties affected for the current undertaking, pursuant to 36 CFR § 800.4(d)(1). We invite your comments on the delineation of the APE and the appropriateness of the identification efforts. Reclamation also requests your concurrence with our National Register determination of eligibility for the Slough Canal and with our finding of no historic properties affected. If you have any questions or concerns regarding this project, please contact Mr. Lex Palmer, Architectural Historian, at 916-978-5213 or kpalmer@usbr.gov.

Sincerely,

Anastasia T. Leigh
Regional Environmental Officer

Enclosure

State of California • Natural Resources Agency Edmund G. Brown Jr., *Governor*

DEPARTMENT OF PARKS AND RECREATION Lisa Ann L. Mangat, *Director*
OFFICE OF HISTORIC PRESERVATION

Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
Telephone: (916) 445-7000 FAX: (916) 445-7053
calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

December 18, 2018 In reply refer to: BUR_2018_1127_001

VIA ELECTRONIC MAIL

Ms. Anastasia T. Leigh, Regional Environmental Officer
U.S. Bureau of Reclamation, Mid-Pacific Regional Office
2800 Cottage Way, Sacramento, CA 95825-1898

Subject: Section 106 Consultation: The Tranquility Irrigation District (TID) Southeast Service Area Water Conservation and Conveyance Improvement Project, Fresno County, California (17-SCAO-166.001)

Dear Ms. Leigh:

The State Historic Preservation Officer (SHPO) received your letter, on November 27 2018, initiating consultation on the above referenced undertaking to comply with Section 106 of the National Historic Preservation Act of 1966 (as currently amended) and its implementing regulations found at 36 CFR Part 800. The U.S. Bureau of Reclamation (Reclamation) proposes to issue Water and Energy Efficiency Grant funds to the TID for their Southeast Service Area Water Conservation and Conveyance Improvement Project. The project goals are to replace a lift-pump station, install a second lift pump, upgrade the related electrical systems, replace two concrete road culverts and improve about 1,100 feet of existing canal channel. Reclamation has reached a finding of *no historic properties affected* and seeks concurrence. Submitted documentation is:

- *Enclosure 1: Cultural Resource Inventory and Evaluation for the Tranquility Irrigation District Southeast Service Area Water Conservation and Conveyance Improvement Project, Fresno County, CA (17-SCAO-166.001); November 2018. [**By:** J. Jones, A. McCausland, R. Baloian, J. Kidwell & D. T. Dyste; Applied EarthWorks, Inc., Fresno, CA] [**For:** Provost & Pritchard Consulting Group, Fresno, CA]. [AE 2018]*

The TID proposes to improve water conveyance efficiency within the TID system via the work items listed above. In addition, channel improvements for the Slough Canal within the APE will include reshaping and lining the channel section and may include piping 900 feet of the canal reach. The project will resolve an existing water conveyance bottleneck in the Slough Canal where it passes under West Parlier Avenue and South Sonoma Avenue (AE 2018: p. 5: Figure 1-3- aerial view of APE).

Reclamation has determined the area of potential effects (APE) includes all project-related activities as described above. The vertical APE will be a 6-foot maximum depth, and the horizontal APE will be 1,500 feet long with a width of 528 feet, for about 15 acres in size. Staging and material stockpiling will take place along the canal prism. Lands surrounding the project area are characterized by rural open space and active crop fields.

Efforts to identify historic properties were conducted by Applied Earthworks on behalf of TID. The study included background research, a records search and a full cultural resources pedestrian survey on August 07 and October 05, 2018 with negative results for any visible indications of cultural resources, except the canal and its related equipment. A buried site probability geologic review concluded that the surrounding soils have always been marshy slough overflow lands for the river and 20th Century canal initial construction and then

realignment disturbed the APE soils. The Slough Canal section has been recorded on a California State Parks DPR 523 form (AE 2018: – Appendix D).

Reclamation identified the Big Sandy Rancheria of Western Mono Indians, Cold Springs Rancheria, North Fork Mono Tribe, Santa Rosa Rancheria Tachi Yokut Tribe, and the Table Mountain Rancheria as Indian tribes who might attach religious and cultural significance to historic properties within the APE. Reclamation contacted these tribes by letter dated October 12, 2018, inviting participation in the Section 106 process. To date, no responses have been received. Should any subsequent concerns arise, Reclamation will work to address them and make notifications as required.

No historic properties were identified during the study efforts. Applied Earthworks recorded the Slough Canal, and recommended that the structure is ineligible for the National Register of Historic Places (National Register) under Criteria A, B, C, or D, both on an individual basis or as a contributor to a potential Tranquility Irrigation District historic district. This evaluation is based on the TID being a small irrigation district, built using commonly available lift pump technology and main canal and lateral layouts that are standard throughout Fresno County and the Valley region. TID relinquished management of the canal system to Reclamation in 1961. Over time, major sections of the canal and laterals and equipment have been abandoned, replaced, realigned and newer canals and laterals constructed. The section of the Slough Canal in the APE was realigned twice starting in 1971, from a straight angle across the fields to two notched segments, edging the local roads in a southerly direction. Reclamation reviewed the report conclusions and has determined that neither the TID or the Slough Canal are National Register eligible.

Reclamation finds that the project is a *no historic properties affected* outcome and requests comment on the APE, efforts to identify historic properties, and seeks concurrence with its effect finding. After OHP documentation review, the following comments are offered.

- Pursuant to 36 CFR 800.4(a)(1), there are no objections to the APE as defined.
- Pursuant to 36 CFR 800.4(b), it is considered that Reclamation has made a reasonable and good faith effort to appropriately identify historic properties within the APE.
- Pursuant to 36 CFR 800.4(c)(2), **I do not object** that Reclamation has determined that the Tranquility Irrigation District (TID) and the Slough Canal, locally built, common-type structures lacking historic context, are not National Register eligible.
- Reclamation finds that the proposed undertaking will result in *no historic properties affected*. Pursuant to 36 CFR 800.4(d)(1), **I do not object**.

Please be advised that under certain circumstances, such as unanticipated discovery or a change in project description, Reclamation may have additional future responsibilities for this undertaking under 36 CFR Part 800 (as currently amended). Should you require further information, please contact Jeanette Schulz at Jeanette.Schulz@parks.ca.gov or her desk phone is: (916) 445-7031.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

Appendix B. Air Quality, CalEEMod Printout

TID- Lift 3

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	5.00	Acre	5.00	217,800.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2020
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 -

Land Use -

Construction Phase - 6 month construction period. No paving or architectural coating.

Off-road Equipment - Equipment changed per project description.

Off-road Equipment - Updated equipment per project description

Off-road Equipment - Updated equipment per project description

Off-road Equipment - Updated equipment per project description.

Demolition -

Construction Off-road Equipment Mitigation -

TID- Lift 3 - Fresno County, Annual

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	230.00	60.00
tblConstructionPhase	NumDays	8.00	20.00
tblConstructionPhase	NumDays	5.00	20.00
tblConstructionPhase	PhaseEndDate	12/21/2020	6/3/2020
tblConstructionPhase	PhaseEndDate	2/3/2020	3/11/2020
tblConstructionPhase	PhaseEndDate	1/22/2020	2/12/2020
tblConstructionPhase	PhaseStartDate	2/4/2020	3/12/2020
tblConstructionPhase	PhaseStartDate	1/23/2020	2/13/2020
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction

tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	UsageHours	7.00	8.00

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					
2019	0.0121	0.1115	0.0808	1.4000e-004	6.0800e-003	6.0800e-003	0.0122	9.8000e-004	5.7600e-003	6.7500e-003	0.0000	12.3580	12.3580	2.5300e-003	0.0000	12.4213
2020	0.1124	1.0174	0.7286	1.6300e-003	0.1104	0.0461	0.1565	0.0481	0.0434	0.0914	0.0000	143.8312	143.8312	0.0268	0.0000	144.5012
Maximum	**0.1124**	**1.0174**	**0.7286**	**1.6300e-003**	**0.1104**	**0.0461**	**0.1565**	**0.0481**	**0.0434**	**0.0914**	**0.0000**	**143.8312**	**143.8312**	**0.0268**	**0.0000**	**144.5012**

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					
2019	0.0121	0.1094	0.0808	1.4000e-004	3.0300e-003	6.0800e-003	9.1100e-003	5.2000e-004	5.7600e-003	6.2900e-003	0.0000	12.3580	12.3580	2.5300e-003	0.0000	12.4213
2020	0.1124	0.9898	0.7286	1.6300e-003	0.0674	0.0461	0.1135	0.0264	0.0434	0.0698	0.0000	143.8311	143.8311	0.0268	0.0000	144.5011
Maximum	**0.1124**	**0.9898**	**0.7286**	**1.6300e-003**	**0.0674**	**0.0461**	**0.1135**	**0.0264**	**0.0434**	**0.0698**	**0.0000**	**143.8311**	**143.8311**	**0.0268**	**0.0000**	**144.5011**

	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**	**2.63**	**0.00**	**0.00**	**39.51**	**0.00**	**27.29**	**45.04**	**0.00**	**22.49**	**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	12-19-2019	3-18-2020	0.8650	0.8583
2	3-19-2020	6-18-2020	0.3886	0.3657
		Highest	0.8650	0.8583

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	0.0186	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-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	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	**0.0186**	**0.0000**	**5.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

2.2 Overall Operational

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	0.0186	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-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	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	**0.0186**	**0.0000**	**5.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-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	Demolition	Demolition	12/19/2019	1/15/2020	5	20	
2	Site Preparation	Site Preparation	1/16/2020	2/12/2020	5	20	
3	Grading	Grading	2/13/2020	3/11/2020	5	20	
4	Building Construction	Building Construction	3/12/2020	6/3/2020	5	60	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Demolition	Excavators	1	8.00	158	0.38
Demolition	Concrete/Industrial Saws	2	8.00	81	0.73
Grading	Excavators	1	8.00	158	0.38
Demolition	Dumpers/Tenders	1	8.00	16	0.38
Site Preparation	Excavators	1	8.00	158	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cement and Mortar Mixers	1	8.00	9	0.56
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	2	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45
Building Construction	Dumpers/Tenders	1	8.00	16	0.38
Building Construction	Concrete/Industrial Saws	1	8.00	81	0.73

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
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	91.00	36.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2019

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					5.5400e-003	0.0000	5.5400e-003	8.4000e-004	0.0000	8.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0118	0.1113	0.0787	1.4000e-004		6.0800e-003	6.0800e-003		5.7600e-003	5.7600e-003	0.0000	11.8760	11.8760	2.5200e-003	0.0000	11.9389
Total	**0.0118**	**0.1113**	**0.0787**	**1.4000e-004**	**5.5400e-003**	**6.0800e-003**	**0.0116**	**8.4000e-004**	**5.7600e-003**	**6.6000e-003**	**0.0000**	**11.8760**	**11.8760**	**2.5200e-003**	**0.0000**	**11.9389**

3.2 Demolition - 2019

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	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
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	3.2000e-004	2.1000e-004	2.1000e-003	1.0000e-005	5.4000e-004	0.0000	5.4000e-004	1.4000e-004	0.0000	1.5000e-004	0.0000	0.4820	0.4820	1.0000e-005	0.0000	0.4824
Total	**3.2000e-004**	**2.1000e-004**	**2.1000e-003**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**5.4000e-004**	**1.4000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4820**	**0.4820**	**1.0000e-005**	**0.0000**	**0.4824**

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					2.4900e-003	0.0000	2.4900e-003	3.8000e-004	0.0000	3.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0118	0.1092	0.0787	1.4000e-004		6.0800e-003	6.0800e-003		5.7600e-003	5.7600e-003	0.0000	11.8760	11.8760	2.5200e-003	0.0000	11.9389
Total	**0.0118**	**0.1092**	**0.0787**	**1.4000e-004**	**2.4900e-003**	**6.0800e-003**	**8.5700e-003**	**3.8000e-004**	**5.7600e-003**	**6.1400e-003**	**0.0000**	**11.8760**	**11.8760**	**2.5200e-003**	**0.0000**	**11.9389**

3.2 Demolition - 2019

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	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
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	3.2000e-004	2.1000e-004	2.1000e-003	1.0000e-005	5.4000e-004	0.0000	5.4000e-004	1.4000e-004	0.0000	1.5000e-004	0.0000	0.4820	0.4820	1.0000e-005	0.0000	0.4824
Total	**3.2000e-004**	**2.1000e-004**	**2.1000e-003**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**5.4000e-004**	**1.4000e-004**	**0.0000**	**1.5000e-004**	**0.0000**	**0.4820**	**0.4820**	**1.0000e-005**	**0.0000**	**0.4824**

3.2 Demolition - 2020

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					6.7700e-003	0.0000	6.7700e-003	1.0200e-003	0.0000	1.0200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0134	0.1260	0.0951	1.7000e-004		6.7000e-003	6.7000e-003		6.3500e-003	6.3500e-003	0.0000	14.3363	14.3363	3.0300e-003	0.0000	14.4121
Total	**0.0134**	**0.1260**	**0.0951**	**1.7000e-004**	**6.7700e-003**	**6.7000e-003**	**0.0135**	**1.0200e-003**	**6.3500e-003**	**7.3700e-003**	**0.0000**	**14.3363**	**14.3363**	**3.0300e-003**	**0.0000**	**14.4121**

3.2 Demolition - 2020

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	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
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	3.6000e-004	2.3000e-004	2.2900e-003	1.0000e-005	6.6000e-004	0.0000	6.6000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.5709	0.5709	2.0000e-005	0.0000	0.5712
Total	**3.6000e-004**	**2.3000e-004**	**2.2900e-003**	**1.0000e-005**	**6.6000e-004**	**0.0000**	**6.6000e-004**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**0.5709**	**0.5709**	**2.0000e-005**	**0.0000**	**0.5712**

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					3.0500e-003	0.0000	3.0500e-003	4.6000e-004	0.0000	4.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0134	0.1234	0.0951	1.7000e-004		6.7000e-003	6.7000e-003		6.3500e-003	6.3500e-003	0.0000	14.3363	14.3363	3.0300e-003	0.0000	14.4121
Total	**0.0134**	**0.1234**	**0.0951**	**1.7000e-004**	**3.0500e-003**	**6.7000e-003**	**9.7500e-003**	**4.6000e-004**	**6.3500e-003**	**6.8100e-003**	**0.0000**	**14.3363**	**14.3363**	**3.0300e-003**	**0.0000**	**14.4121**

3.2 Demolition - 2020

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	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
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	3.6000e-004	2.3000e-004	2.2900e-003	1.0000e-005	6.6000e-004	0.0000	6.6000e-004	1.8000e-004	0.0000	1.8000e-004	0.0000	0.5709	0.5709	2.0000e-005	0.0000	0.5712
Total	**3.6000e-004**	**2.3000e-004**	**2.2900e-003**	**1.0000e-005**	**6.6000e-004**	**0.0000**	**6.6000e-004**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**0.5709**	**0.5709**	**2.0000e-005**	**0.0000**	**0.5712**

3.3 Site Preparation - 2020

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					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0282	0.2930	0.1611	2.8000e-004		0.0149	0.0149		0.0137	0.0137	0.0000	25.0278	25.0278	8.0900e-003	0.0000	25.2302
Total	**0.0282**	**0.2930**	**0.1611**	**2.8000e-004**	**0.0452**	**0.0149**	**0.0601**	**0.0248**	**0.0137**	**0.0386**	**0.0000**	**25.0278**	**25.0278**	**8.0900e-003**	**0.0000**	**25.2302**

3.3 Site Preparation - 2020

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	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
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	7.8000e-004	4.9000e-004	5.0000e-003	1.0000e-005	1.4400e-003	1.0000e-005	1.4500e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2455	1.2455	3.0000e-005	0.0000	1.2463
Total	**7.8000e-004**	**4.9000e-004**	**5.0000e-003**	**1.0000e-005**	**1.4400e-003**	**1.0000e-005**	**1.4500e-003**	**3.8000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.2455**	**1.2455**	**3.0000e-005**	**0.0000**	**1.2463**

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					0.0203	0.0000	0.0203	0.0112	0.0000	0.0112	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0282	0.2930	0.1611	2.8000e-004		0.0149	0.0149		0.0137	0.0137	0.0000	25.0278	25.0278	8.0900e-003	0.0000	25.2301
Total	**0.0282**	**0.2930**	**0.1611**	**2.8000e-004**	**0.0203**	**0.0149**	**0.0353**	**0.0112**	**0.0137**	**0.0249**	**0.0000**	**25.0278**	**25.0278**	**8.0900e-003**	**0.0000**	**25.2301**

3.3 Site Preparation - 2020

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	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
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	7.8000e-004	4.9000e-004	5.0000e-003	1.0000e-005	1.4400e-003	1.0000e-005	1.4500e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2455	1.2455	3.0000e-005	0.0000	1.2463
Total	**7.8000e-004**	**4.9000e-004**	**5.0000e-003**	**1.0000e-005**	**1.4400e-003**	**1.0000e-005**	**1.4500e-003**	**3.8000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.2455**	**1.2455**	**3.0000e-005**	**0.0000**	**1.2463**

3.4 Grading - 2020

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					0.0262	0.0000	0.0262	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0201	0.2218	0.1149	2.3000e-004		0.0101	0.0101		9.2700e-003	9.2700e-003	0.0000	20.6017	20.6017	6.6600e-003	0.0000	20.7683
Total	**0.0201**	**0.2218**	**0.1149**	**2.3000e-004**	**0.0262**	**0.0101**	**0.0363**	**0.0135**	**9.2700e-003**	**0.0227**	**0.0000**	**20.6017**	**20.6017**	**6.6600e-003**	**0.0000**	**20.7683**

3.4 Grading - 2020

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	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
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	6.5000e-004	4.1000e-004	4.1700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0379	1.0379	3.0000e-005	0.0000	1.0386
Total	**6.5000e-004**	**4.1000e-004**	**4.1700e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.0379**	**1.0379**	**3.0000e-005**	**0.0000**	**1.0386**

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					0.0118	0.0000	0.0118	6.0600e-003	0.0000	6.0600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0201	0.2218	0.1149	2.3000e-004		0.0101	0.0101		9.2700e-003	9.2700e-003	0.0000	20.6017	20.6017	6.6600e-003	0.0000	20.7683
Total	**0.0201**	**0.2218**	**0.1149**	**2.3000e-004**	**0.0118**	**0.0101**	**0.0219**	**6.0600e-003**	**9.2700e-003**	**0.0153**	**0.0000**	**20.6017**	**20.6017**	**6.6600e-003**	**0.0000**	**20.7683**

3.4 Grading - 2020

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	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
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	6.5000e-004	4.1000e-004	4.1700e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0379	1.0379	3.0000e-005	0.0000	1.0386
Total	**6.5000e-004**	**4.1000e-004**	**4.1700e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.0379**	**1.0379**	**3.0000e-005**	**0.0000**	**1.0386**

3.5 Building Construction - 2020

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	0.0331	0.2343	0.2488	4.0000e-004		0.0135	0.0135		0.0132	0.0132	0.0000	32.9952	32.9952	4.8200e-003	0.0000	33.1159
Total	**0.0331**	**0.2343**	**0.2488**	**4.0000e-004**		**0.0135**	**0.0135**		**0.0132**	**0.0132**	**0.0000**	**32.9952**	**32.9952**	**4.8200e-003**	**0.0000**	**33.1159**

3.5 Building Construction - 2020

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	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
Vendor	4.0400e-003	0.1338	0.0214	3.1000e-004	7.1600e-003	7.1000e-004	7.8700e-003	2.0700e-003	6.8000e-004	2.7500e-003	0.0000	29.1261	29.1261	3.6000e-003	0.0000	29.2161
Worker	0.0118	7.4700e-003	0.0759	2.1000e-004	0.0218	1.4000e-004	0.0220	5.8000e-003	1.3000e-004	5.9300e-003	0.0000	18.8899	18.8899	5.1000e-004	0.0000	18.9026
Total	**0.0158**	**0.1413**	**0.0973**	**5.2000e-004**	**0.0290**	**8.5000e-004**	**0.0298**	**7.8700e-003**	**8.1000e-004**	**8.6800e-003**	**0.0000**	**48.0160**	**48.0160**	**4.1100e-003**	**0.0000**	**48.1186**

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	0.0331	0.2093	0.2488	4.0000e-004		0.0135	0.0135		0.0132	0.0132	0.0000	32.9952	32.9952	4.8200e-003	0.0000	33.1158
Total	**0.0331**	**0.2093**	**0.2488**	**4.0000e-004**		**0.0135**	**0.0135**		**0.0132**	**0.0132**	**0.0000**	**32.9952**	**32.9952**	**4.8200e-003**	**0.0000**	**33.1158**

3.5 Building Construction - 2020

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	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
Vendor	4.0400e-003	0.1338	0.0214	3.1000e-004	7.1600e-003	7.1000e-004	7.8700e-003	2.0700e-003	6.8000e-004	2.7500e-003	0.0000	29.1261	29.1261	3.6000e-003	0.0000	29.2161
Worker	0.0118	7.4700e-003	0.0759	2.1000e-004	0.0218	1.4000e-004	0.0220	5.8000e-003	1.3000e-004	5.9300e-003	0.0000	18.8899	18.8899	5.1000e-004	0.0000	18.9026
Total	**0.0158**	**0.1413**	**0.0973**	**5.2000e-004**	**0.0290**	**8.5000e-004**	**0.0298**	**7.8700e-003**	**8.1000e-004**	**8.6800e-003**	**0.0000**	**48.0160**	**48.0160**	**4.1100e-003**	**0.0000**	**48.1186**

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
Other Non-Asphalt Surfaces	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
Other Non-Asphalt Surfaces	9.50	7.30	7.30	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
Other Non-Asphalt Surfaces	0.481390	0.032808	0.168621	0.127212	0.018382	0.004997	0.032622	0.122881	0.002369	0.001675	0.005261	0.001115	0.000667

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					
Other Non-Asphalt Surfaces	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**

5.2 Energy by Land Use - NaturalGas

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					
Other Non-Asphalt Surfaces	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			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	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	0.0186	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Unmitigated	0.0186	0.0000	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-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	tons/yr										MT/yr					
Architectural Coating	4.5400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0141					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	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Total	**0.0186**	**0.0000**	**5.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-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	tons/yr										MT/yr					
Architectural Coating	4.5400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0141					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	5.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	1.0000e-004
Total	**0.0186**	**0.0000**	**5.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**1.0000e-004**

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			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	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			
Other Non-Asphalt Surfaces	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			
Other Non-Asphalt Surfaces	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

Appendix C. Biological Resources Evaluation

LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

TRANQUILLITY IRRIGATION DISTRICT SOUTHEAST SERVICE AREA WATER CONSERVATION AND CONVEYANCE IMPROVEMENT PROJECT BIOLOGICAL EVALUATION FRESNO COUNTY, CALIFORNIA

Prepared by:

LIVE OAK ASSOCIATES, INC.

Austin Pearson, Director of Ecological Services
Jeff Gurule, Senior Project Manager, Wildlife/Wetlands/Plant Biologist

Prepared for:

Briza Sholars
Provost & Pritchard Consulting Group
286 W. Cromwell Avenue
Fresno, CA 93711

July 27, 2018 PN 2275-01

Oakhurst: P.O. Box 2697 • 39930 Sierra Way, Suite B • Oakhurst, CA 93644 • Phone: (559) 642-4880 • (559) 642-4883
San Jose: 6840 Via Del Oro, Suite 220 • San Jose, CA 95119 • Phone: (408) 224-8300 • Fax: (408) 224-1411
Truckee: 11050 Pioneer Trail, Suite 203 • Truckee, CA 96161 • Phone: (530) 214-8947
www.loainc.com

EXECUTIVE SUMMARY

Live Oak Associates, Inc. (LOA) conducted an investigation of the biological resources of the Tranquillity Irrigation District (TID) Southeast Service Area Water Conservation and Conveyance Improvement Project site in Fresno County, California and evaluated likely impacts to such resources resulting from project development. The project is located approximately 2.5 miles south of the community of Tranquillity and 3 miles west of the community of San Joaquin, centered on the Slough Canal near the intersection of Parlier and Sonoma Avenues. On June 19, 2018, LOA surveyed the project site for biotic habitats, the plants and animals occurring in those habitats, and significant habitat values that may be protected by state and federal law.

Habitats/land uses identified within the project site comprised agricultural fields, ruderal, irrigation canal, and orchard. Agricultural lands surround the project site and represent the dominant land use in the region. A short segment of the Slough Canal and SL2 lateral canal occur on the site. All portions of the project site are disturbed and of relatively low quality for most native wildlife.

The project has the potential to result in construction-related mortality of nesting loggerhead shrikes, white-tailed kites, and other migratory birds protected under California Fish and Game Code, nest abandonment of an onsite Swainson's hawk nest should construction occur within their nesting season, and construction mortality of burrowing owls should they occupy the site at the time of construction. Mortality of these protected avian species would be considered a significant impact of the project under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). By implementing the project outside of the avian nesting season as planned, avoiding active nests or burrowing owl roosts identified during preconstruction surveys, and providing for Swainson's hawk nest monitoring and project modification as necessary, the project applicant can reduce potential impacts to these avian resources to a less than significant level under CEQA and NEPA and ensure compliance with state law.

It is unclear whether the USACE would consider the Slough Canal and SL2 lateral canal to meet the USACE criteria of a water of the U.S. Regardless of the jurisdictional status of the canals, the small area of impacts proposed to potential waters of the U.S. are considered less than significant under CEQA and NEPA. However, if the canals are determined to be waters of the U.S. a Section 404 permit issued by the USACE may be required for project impacts to these canals. These canals would not fall under California Department of Fish and Wildlife jurisdiction.

The project will have no effect, as defined by CEQA and NEPA, on all locally occurring special status plant species, special status animal species that are absent from or unlikely to occur on site or that would use the site for foraging only, wildlife movement corridors, designated critical habitat and other sensitive habitats, waters of the U.S., and local policies and habitat conservation plans.

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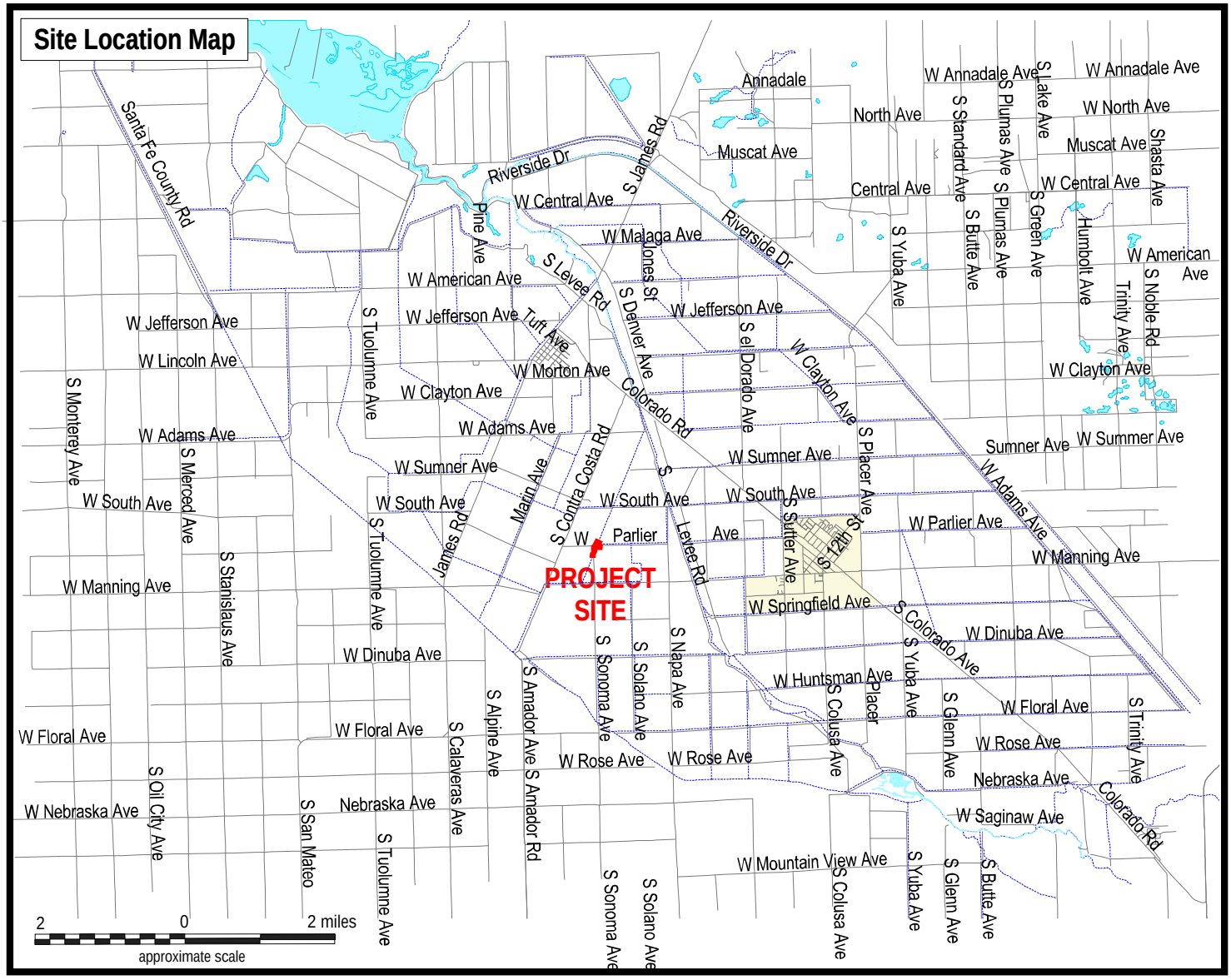
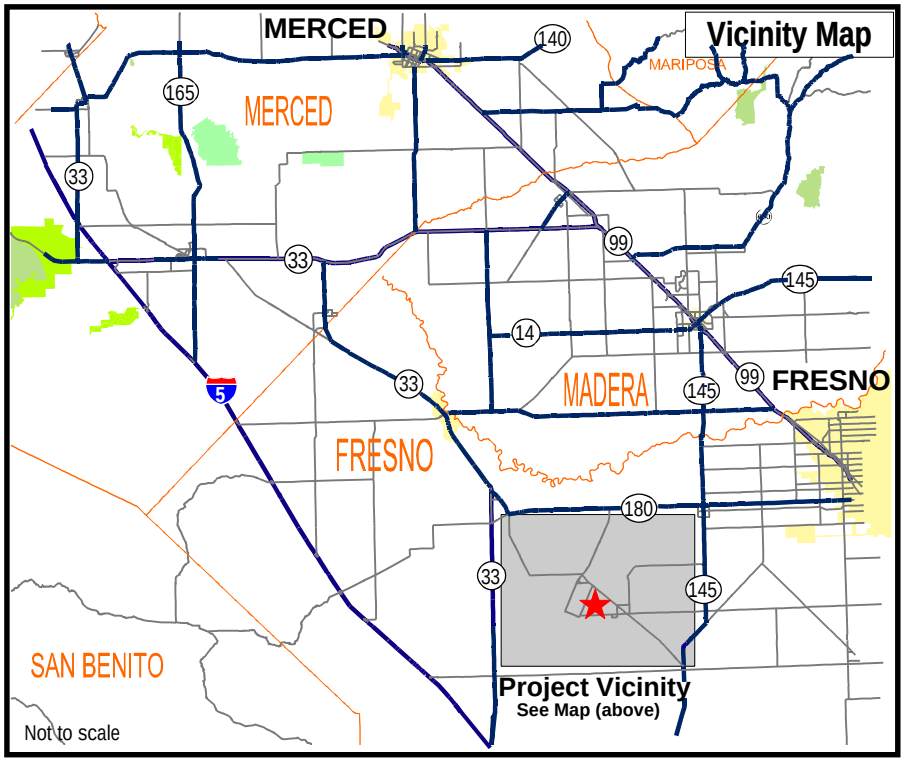
1.0 INTRODUCTION

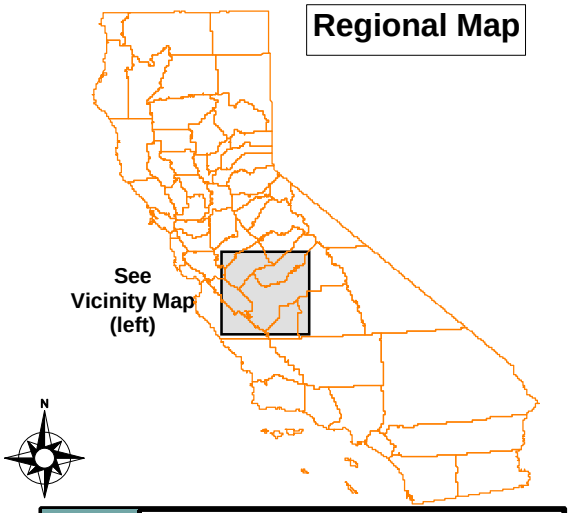
The technical report that follows describes the biotic resources of lands proposed for development (hereafter referred to as "project site") of the Tranquillity Irrigation District (TID or "District") Southeast Service Area Water Conservation and Conveyance Improvement Project ("project"). The project is located approximately 2.5 miles south of the community of Tranquillity and 3 miles west of the community of San Joaquin in western Fresno County, California. The proposed work area ("project site") is centered on the Slough Canal near the intersection of West Parlier Avenue and South Sonoma Avenue (Figure 1). The site can be found on the *San Joaquin* U.S. Geological Survey (USGS) 7.5-minute quadrangle in Sections 20 and 21 of Township 15 South, Range 16 East, Mt. Diablo Base and Meridian (Figure 2).

1.1 PROJECT DESCRIPTION

The project is the replacement of an existing instream lift-pump station, replacement of two existing road culverts, and the improvement of approximately 1,100 feet of canal channel within an Area of Potential Effect (APE) of approximately 15 acres. The replacement of the existing 50-cubic feet per second (CFS) lift-pump station and culverts is to resolve a bottleneck in the Slough Canal where it passes under West Parlier Avenue and South Sonoma Avenue. A new 100-CFS lift-pump station with three pumps and discharge line will be installed upstream of West Parlier Avenue, and may be located in the canal channel or integrated into the canal bank. The lift-pump station will be capable of reverse directional flow to permit water transfers to enter the District's service area. Channel improvements will include reshaping of the channel section and lining of the channel, and may include the piping of 900 feet of the canal reach. The two new replacement road crossings will each consist of two 72-inch diameter culverts or two 4-feet by 5-feet box culverts. It is anticipated the existing electrical utility service for the lift-pump station will need to be upgraded and relocated. A new replacement electrical power distribution and control panel will also be installed, along with a telemetry antenna. A suitable staging area, estimated at 1 acre in size, will be established in adjacent agricultural fields for the contractor's use during construction. Project facilities will be installed no deeper than existing infrastructure, which is approximately 10 feet deep.







Live Oak Associates, Inc.

Tranquility Irrigation District S.E. Service Area Water Conservation and Conveyance Improvement Project

Site / Vicinity Map

Date	Project #	Figure #
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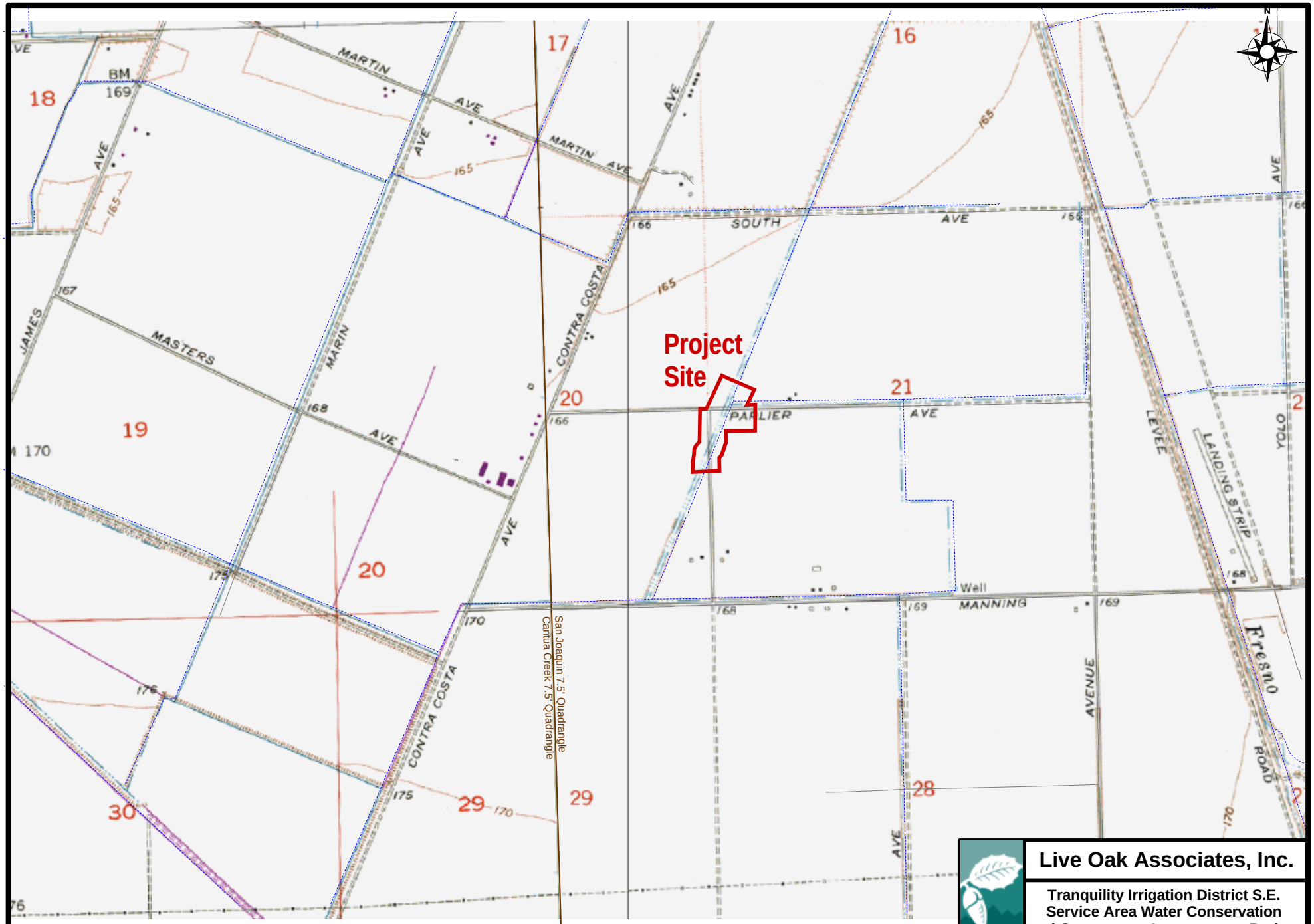

From USGS
Cantua Creek 7.5' Quadrangle 1984
San Joaquin 7.5' Quadrangle 1963

Live Oak Associates, Inc.

Tranquility Irrigation District S.E. Service Area Water Conservation and Conveyance Improvement Project
U.S.G.S. Quadrangle

Date	Project #	Figure #
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1.2 REPORT OBJECTIVES

Irrigation improvement projects such as the TID Southeast Service Area Water Conservation and Conveyance Improvement Project may damage or modify biotic habitats used by sensitive plant and animal species. In such cases, projects may be regulated by state or federal agencies, subject to provisions of the California Environmental Quality Act (CEQA) and/or National Environmental Policy Act (NEPA), and/or subject to local policies and ordinances. In the case of the TID Southeast Service Area Water Conservation and Conveyance Improvement Project, environmental review under both CEQA and NEPA is required.

This report addresses issues related to: 1) sensitive biotic resources occurring on the project site; 2) the federal, state, and local laws regulating such resources; and 3) mitigation measures that may be required to reduce the magnitude of anticipated impacts and/or comply with permit requirements of state and federal resource agencies. As such, the objectives of this report are to:

- Summarize all site-specific information related to existing biological resources.
- Make reasonable inferences about the biological resources that could occur on site based on habitat suitability and the proximity of the project site to a species' known range.
- Summarize all state and federal natural resource protection laws that may be relevant to project implementation.
- Identify and discuss project impacts to biological resources that may occur within the project site in the context of CEQA and NEPA guidelines and relevant state and federal laws.
- Identify avoidance and mitigation measures that would reduce the magnitude of project impacts in a manner consistent with the requirements of CEQA and NEPA and that are generally consistent with recommendations of the resource agencies regulating affected biological resources.

1.3 STUDY METHODOLOGY

A reconnaissance-level field survey of the project site was conducted on June 19, 2018 by Live Oak Associates, Inc. (LOA) biologist Jeff Gurule. The survey consisted of walking the site and immediately surrounding lands while identifying the principal land uses and biotic habitats of the

site and the plant and animal species encountered, and assessing the suitability of habitats on and adjacent to the site for special-status species.

LOA conducted an analysis of potential project impacts based on the known and potential biotic resources of the project site. Sources of information used in the preparation of this analysis included: (1) the *California Natural Diversity Data Base* (CDFW 2018), (2) the *Online Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2018), (3) the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) system (USFWS 2018), and (4) manuals, reports, and references related to plants and animals of the San Joaquin Valley region.

LOA's field investigation did not include a wetland delineation or focused surveys for special status species. The field survey was sufficient to generally describe those features of the project site that could be subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), and/or the Regional Water Quality Control Board (RWQCB), and to assess the significance of possible biological impacts associated with development of the project site.

2.0 EXISTING CONDITIONS

2.1 REGIONAL SETTING

The project site is located in the central San Joaquin Valley. This valley is bordered by the Sierra Nevada to the east, the Tehachapi Mountains to the south, the California coastal ranges to the west, and the Sacramento-San Joaquin Delta to the north.

Like most of California, the San Joaquin Valley (and the project site) experiences a Mediterranean climate. Warm dry summers are followed by cool moist winters. Summer temperatures commonly exceed 100 degrees Fahrenheit, and the relative humidity is generally very low. Winter temperatures rarely exceed 70 degrees Fahrenheit, with daytime highs often below 60 degrees Fahrenheit. Annual precipitation in the vicinity of the project is about 9 inches, almost 85% of which falls between the months of October and March. Nearly all precipitation falls in the form of rain.

The project site is situated within a matrix of agricultural lands dominated by alfalfa, row crops, and fallow fields. The nearest natural lands are the Mendota Wildlife Area and adjoining Alkali Sink Ecological Reserve, beginning approximately 4.6 miles to the northwest.

The principal drainage of the project vicinity is the Fresno Slough, which flows from southeast to northwest approximately one mile east of the project site. The Fresno Slough is a distributary of the Kings River, flowing approximately 50 miles from its origin at the North Fork Kings River south of Riverdale to its terminus at the San Joaquin River's Mendota Pool. Historically, the Fresno Slough also served as an outlet of Tulare Lake, channeling the lake's overflow to the San Joaquin River. Irrigation diversions have eliminated Tulare Lake and greatly diminished the flows in the Fresno Slough. The slough in the project vicinity is a straight engineered channel.

2.2 PROJECT SITE

The project site consists of highly disturbed lands that include the Slough Canal, SL2 Canal, roads, an immature almond orchard, tomato field, and cotton fields. The topography of the site is flat with a median elevation of 163 feet National Geodetic Vertical Datum (NGVD).

Soils within the site include two soil mapping units: Gepford clay, 0 to 1 percent slopes; and Tachi clay, 0 to 1 percent slopes. Both of these soil mapping units are considered hydric soils under natural conditions. Hydric soils have the propensity to pond water in depressions, forming vernal pools that can provide habitat for plant and animal species unique to this environment, including state and federally listed species. However, the soils of the site and surrounding lands have been subjected to decades of soil-disturbing activities associated with agricultural use and road and canal construction, and no longer maintain their native soil characteristics. Therefore, soil characteristics of the site are of no significance to rare or endangered plant or animal species within the region.

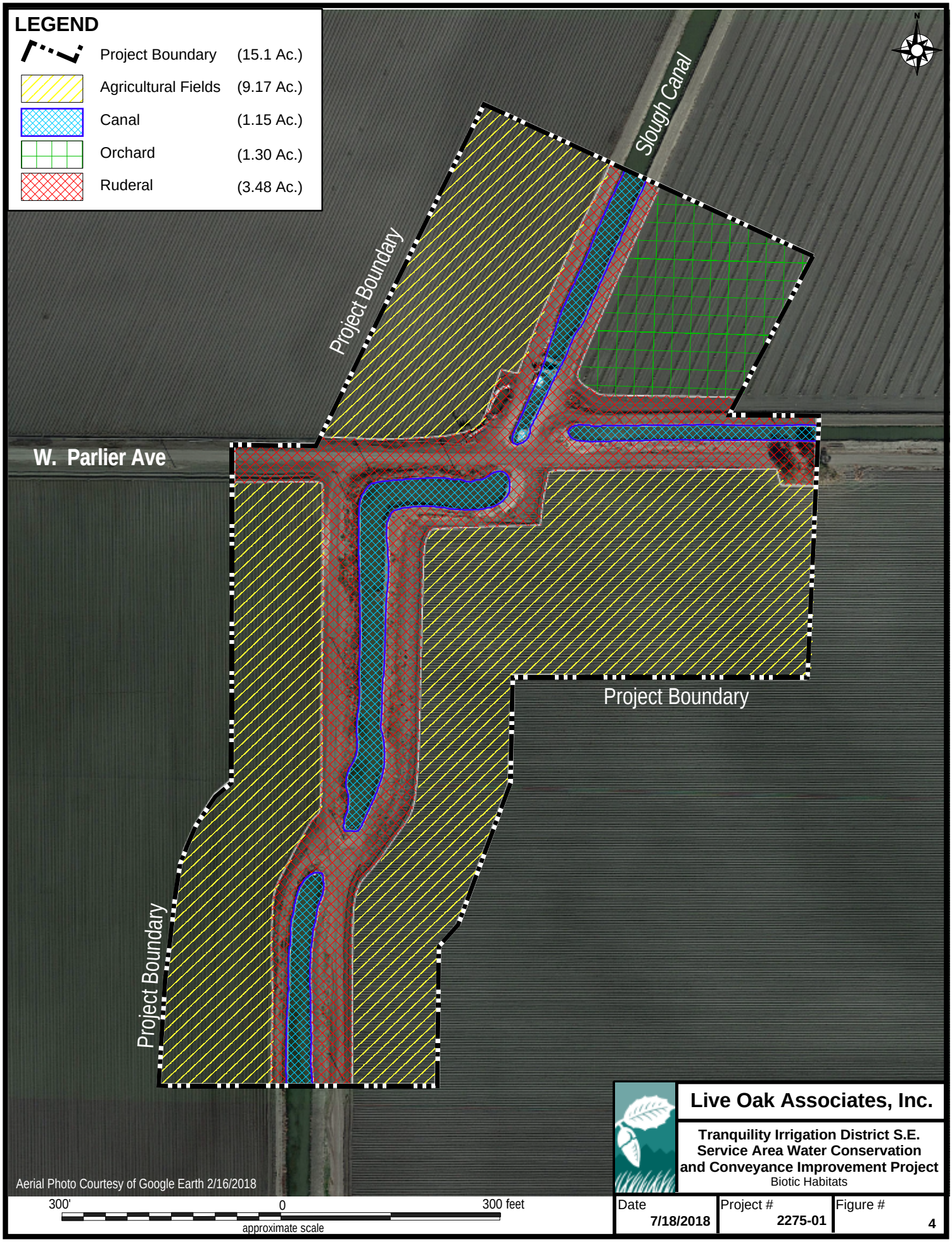
2.3 BIOTIC HABITATS/LAND USES

The project site encompasses four land use types: agricultural fields, ruderal, irrigation canal, and orchard (Figure 3). These land uses and their constituent plant and animal species are described in more detail below. A list of the vascular plant species observed within the project site and the terrestrial vertebrates using, or potentially using, the site's habitats are provided in Appendices A and B, respectively. Selected photographs of the project site are presented in Appendix C.

2.3.1 Agricultural Fields

Agricultural fields planted to tomatoes and cotton at the time of the June 2018 field survey occupy a majority of the APE. In addition to the planted crops, herbaceous weedy vegetation such as yellow nutgrass (*Cyperus esculentus*), pigweed amaranth (*Amaranthus albus*), and prostrate knotweed (*Polygonum aviculare*), was present within and at the margins of these fields.

Regular cultivation of the fields limits their value to wildlife; however, some wildlife species undoubtedly occur in or utilize these fields. Amphibian use of agricultural fields within the project site is expected to be low to absent; however, the Sierran tree frog (*Pseudacris sierra*) and western toad (*Bufo boreas*) have some potential to breed in the nearby canal and subsequently disperse into the fields. Reptiles that could occur in the fields include the side-blotched lizard (*Uta stansburiana*), Pacific gopher snake (*Pituophis catenifer catenifer*), and common kingsnake (*Lampropeltis getulus*).


LEGEND
Project Boundary (15.1 Ac.)
Agricultural Fields (9.17 Ac.)
Canal (1.15 Ac.)
Orchard (1.30 Ac.)
Ruderal (3.48 Ac.)
N
Slough Canal
Project Boundary
W. Parlier Ave
Project Boundary
Project Boundary
Aerial Photo Courtesy of Google Earth 2/16/2018
300' 0 300 feet
approximate scale
Live Oak Associates, Inc.
Tranquility Irrigation District S.E. Service Area Water Conservation and Conveyance Improvement Project
Biotic Habitats
Date 7/18/2018
Project # 2275-01
Figure # 4

Agricultural fields also provide foraging habitat for a number of avian species. Common resident species likely to forage in the agricultural fields of the project site include mourning doves (*Zenaida macroura*) and American crows (*Corvus brachyrhynchos*), as well as mixed flocks of Brewer's blackbirds (*Euphagus cyanocephalus*), brown-headed cowbirds (*Molothrus ater*), and European starlings (*Sturnus vulgaris*). Summer migrants that would be common in the agricultural fields of the project site include the western kingbird (*Tyrannus verticalis*), while common winter migrants include the savannah sparrow (*Passerella sandwichensis*) and American pipit (*Anthus rubescens*).

A few mammal species may also occur within the onsite fields. Small mammals such as deer mice (*Peromyscus maniculatus*) and California voles (*Microtus californicus*) would occur in fluctuating numbers depending on the season and crop selection. Botta's pocket gophers (*Thomomys bottae*) are expected to burrow in or at the edge the fields. Various species of bat may also forage over the fields for flying insects.

The presence of amphibians, reptiles, birds and small mammals is likely to attract foraging raptors and mammalian predators. Raptors such as red-tailed hawks (*Buteo jamaicensis*) and American kestrels (*Falco sparverius*) may forage over the field. Mammalian predators occurring in the agricultural fields of the project site would most likely be limited to raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), coyotes (*Canis latrans*), and red foxes (*Vulpes vulpes*), as these species are relatively tolerant of human disturbance.

2.3.2 Ruderal

Ruderal (disturbed) areas of the project site consist of roads and road margins. At the time of the field survey, the site's ruderal areas contained little to no vegetation. Plant species observed in these areas comprised non-native weed species such as prostrate pigweed (*Amaranthus blitoides*), puncture vine (*Tribulus terrestris*), foxtail barley (*Hordeum murinum spp. leporinum*), and Bermuda grass (*Cynodon dactyon*). Two roadside red gum (*Eucalyptus camaldulensis*) trees occurred in one of the project site's ruderal areas. These were the only trees on the project site.

The wildlife habitat value of the project site's ruderal lands is low. These lands are expected to be utilized very little by only a few native wildlife species such as side-blotched lizards, mourning doves, house sparrows, American crows, Brewer's blackbirds, California ground squirrels (*Otospermophilus beecheyi*), Botta's pocket gophers, and deer mice.

2.3.3 Irrigation Canal

The project site contains a segment of the Slough Canal and a segment of the SL2 lateral canal to the east of the Slough Canal. These canals are mostly earthen channels maintained and operated by the TID. A lift station occurs on the Slough Canal immediately north of Parlier Ave. At the time of the field survey, vegetation within the Slough Canal north of Parlier Ave was confined to the water's edge and consisted of sprangletop (*Leptochloa fusca*), bristly ox-tongue (*Helminthotheca echioides*), and common lippie (*Phyla nodiflora*), among others. The Slough Canal south of Parlier Ave and the lateral canal were more vegetated, with inundated areas containing small patches of emergent vegetation such as broadleaf cattail (*Typha latifolia*) and hardstem bulrush (*Schoenoplectus acutus*) and floating aquatic vegetation in the form of water primrose (*Ludwigia peploides*). The upper and outer banks of the canals supported sparse upland vegetation much the same as ruderal areas of the site.

Due to regular maintenance practices and the intensive agricultural setting, the onsite canals would be of limited value to native wildlife. However, the introduced bullfrog (*Lithobates catesbeianus*) was observed in the Slough Canal south of the lift station. While not observed during the field survey, Sierran tree frogs and western toads may find breeding opportunity in the canals, as well. These and other prey species may attract wading birds such as the great blue heron (*Ardea herodias*) and great egret (*Ardea alba*). While canal banks within agricultural areas often provide habitat for burrowing rodents such as the California ground squirrel, small mammal burrows were few at the time of the survey. Larger mammals such as raccoons, red fox, and coyotes may utilize the onsite canal for foraging or water.

2.3.4 Orchard

The project site contains an area of immature almond orchard. The understory of the orchard was nearly devoid of vegetation at the time of the field survey. The few plants occurring in this

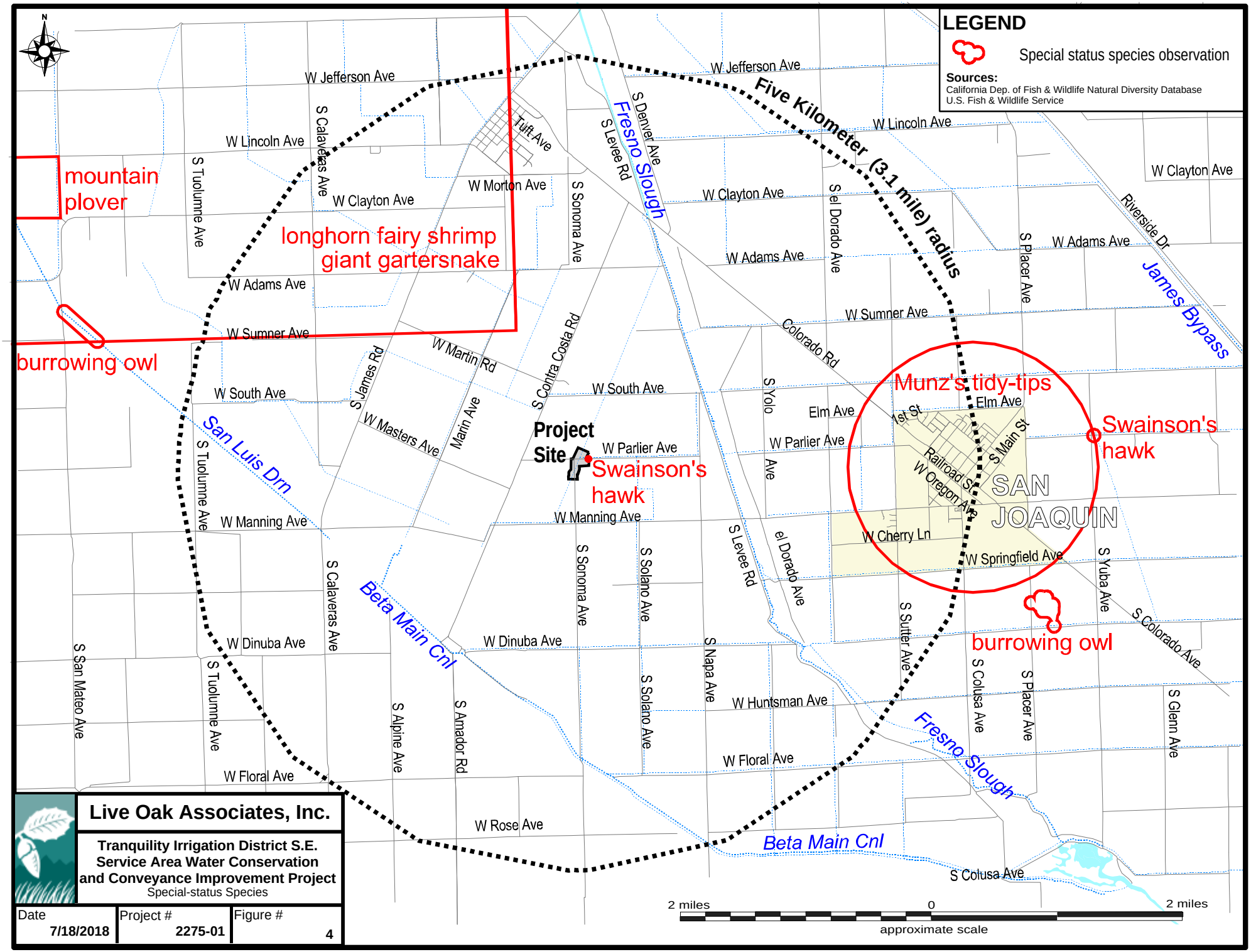
area were non-native agricultural weeds common to other areas of the project site. Due to the lack of vegetation, the small size of the orchard trees, and intensive agricultural disturbance within the orchard, this area is expected to provide low habitat value to native wildlife species. Wildlife use of the orchard would be much the same as the expected wildlife use of ruderal areas of the site.

2.4 SPECIAL STATUS PLANTS AND ANIMALS

Several species of plants and animals within the state of California have low populations and/or limited distributions. Such species may be considered "rare" and are vulnerable to extirpation as the state's human population grows and the habitats these species occupy are converted to agricultural and urban uses. As described more fully in Section 3.2, state and federal laws have provided the CDFW and USFWS with a mechanism for conserving and protecting the diversity of plant and animal species native to the state. A sizable number of native plants and animals have been formally designated as "threatened" or "endangered" under state and federal endangered species legislation. Others have been designated as candidates for such listing. Still others have been designated as "species of special concern" by the CDFW. The California Native Plant Society (CNPS) has developed its own set of lists of native plants considered rare, threatened, or endangered. Collectively, these plants and animals are referred to as "special status species."

The California Natural Diversity Data Base (CDFW 2018) was queried for special status species occurrences in the nine USGS 7.5 minute quadrangles containing and immediately surrounding the project site (*San Joaquin, Helm, Five Points, Westside, Tres Picos Farms, Cantua Creek, Tranquillity, Jamesan,* and *Kerman).* A species list was obtained using the USFWS IPaC system for federally listed species with the potential to be affected by the project (USFWS 2018) (Appendix D). These species, and their potential to occur within the project site, are listed in Table 1 on the following pages. Sources of information for this table included *California's Wildlife, Volumes I, II, and III* (Zeiner et. al 1988), *California Natural Diversity Data Base* (CDFW 2018), *the on-line version of California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2018), *eBird.org,* and *Calflora.org.*

Special status species occurrences within 3.1 miles (5 kilometers) of the project site are depicted in Figure 4.



Live Oak Associates, Inc.

Tranquility Irrigation District S.E. Service Area Water Conservation and Conveyance Improvement Project

Special-status Species

Date	Project #	Figure #
7/18/2018	2275-01	4

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

PLANTS (adapted from CDFW 2018 and CNPS 2018)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	*Occurrence on the Project Site
Palmate Bracted Salty Bird's Beak (*Chloropyron palmatum*)	FE, CE CNPS 1B.1	Occurs in chenopod scrub, valley and foothill grassland. Usually on Pescadero silty clay which is alkaline, with *Distichlis*, *Frankenia*, etc. Blooms June–Sept.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species. Furthermore, suitable soils are absent from the project site.
San Joaquin Woollythreads (*Monolopia congdonii*)	FE, CNPS 1B.2	Occurs in chenopod scrub and valley and foothill grassland, often on sandy soils. Blooms February–May.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species. Furthermore, suitable soils are absent from the project site.

Other special status plants listed by CNPS

Heartscale (*Atriplex cordulata var. cordulata*)	CNPS 1B.2	Occurs in cismontane woodland and valley and foothill grassland of the San Joaquin Valley; blooms April–October.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Lost Hills Crownscale (*Atriplex coronate var. vallicola*)	CNPS 1B.2	Occurs in chenopod scrub, valley and foothill grasslands, and vernal pools on alkaline soils. Blooms: April–August.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Brittlescale (*Atriplex depressa*)	CNPS 1B.2	Occurs in relatively barren areas with alkaline clay soils in chenopod scrub, playas, valley grasslands, and vernal pools of the Central Valley.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Lesser Saltscale (*Atriplex minuscula*)	CNPS 1B.1	Occurs in cismontane woodland and valley and foothill grassland of the San Joaquin Valley; blooms May–October.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Subtle Orache (*Atriplex subtilis*)	CNPS 1B.2	Occurs in valley and foothill grasslands of the San Joaquin Valley. Blooms August-October.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Recurved Larkspur (*Delphinium recurvatum*)	CNPS 1B.2	Chenopod scrub, cismontane woodlands, and alkaline soils of valley and foothill grasslands. Blooms March-May.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Hoover's Eriastrum (*Eriastrum hooveri*)	CNPS 4.2	Chenopod scrub, valley and foothill grassland, pinyon and juniper woodland. Blooms March-July.	**Absent.** Historic and current use of the site has rendered it unsuitable for this species.
Munz' Tidy-Tips (*Layia munzii*)	CNPS 1B.2	Occurs in chenopod scrub and valley and foothill grasslands on alkaline clay. Blooms: March–April.	**Absent.** Habitats of the site are unsuitable for this species.
Indian Valley Bush-Mallow (*Tropidocarpum capparideum*)	CNPS 1B.2	Occurs in granitic outcrops and sandy bare soil of cismontane woodland and chaparral.	**Absent.** Suitable habitat is absent from the project site and surrounding lands.
California Alkali Grass (*Puccinellia simplex*)	CNPS 1B.2	Seasonally moist areas within chenopod scrub, valley and foothill grasslands. Often associated with sinks, flats, and lake margins.	**Absent.** Suitable moist habitats are not present in the project site.
Sanford's Arrowhead (*Sagittaria sanfordii*)	CNPS 1B.2	Freshwater marshes, pond margins, sloughs, etc. of California's Central Valley and low Sierra Foothills.	**Absent.** A survey of the site during this species' blooming period found this species to be absent from the project site.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS (adapted from CDFW 2018 and USFWS 2018)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	*Occurrence on the Project Site
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT	Vernal pools of California's Central Valley.	**Absent.** Vernal pools required by this species are absent from the project site and surrounding lands.
Longhorn Fairy Shrimp (*Branchinecta longiantenna*)	FE	Primarily found in vernal pools of California's Central Valley.	**Absent**. Vernal pools required by this species are absent from the project site and surrounding lands.
Delta Smelt (*Hypomesus transpacificus*)	FT	This slender-bodied fish is endemic to the San Francisco Bay and Sacramento-San Joaquin Delta upstream through Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties.	**Absent.** Aquatic habitat suitable for this species is absent from the project site, and the site is well outside of the known distribution of this species.
California Red-Legged Frog (*Rana aurora draytonii*)	FT	Perennial rivers, creeks and stock ponds of the Coast Range and northern Sierra foothills with overhanging vegetation.	**Absent.** The project site does not provide suitable habitat for this species and is outside of its current known range.
Blunt-Nosed Leopard Lizard (*Gambelia silus*)	FE, CE, CFP	Frequents grasslands, alkali meadows and chenopod scrub of the San Joaquin Valley.	**Absent.** Historic and current use of the site and surrounding lands have eliminated habitat for this species. The closest documented occurrence is located approximately 9.5 miles northeast of the project site.
Giant Garter Snake (GGS) (*Thamnophis gigas*)	FT, CT	Habitat requirements consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter.	**Absent.** This species' distribution in the Tulare Basin is thought to be restricted to the Mendota Wildlife Area, located 5 miles to the north of the project site. The site's habitats are marginal, at best, for GGS. Emergent vegetation within the onsite canals is sparse, and surrounding uplands offer insufficient vegetation cover and few burrows for cover during winter dormancy. Due to the agricultural setting, food sources on and adjacent to the site are expected to be too scarce to support giant garter snakes. Significant barriers exist between the Mendota Wildlife Area and the site, further diminishing the probability of giant garter snake occurrence on the site. See Section 2.5.1 for a more detailed discussion.
Swainson's Hawk (*Buteo swainsoni*)	CT	Breeds in stands with few trees in juniper-sage flats, riparian areas, and in oak savannah. Requires adjacent suitable foraging areas such as grasslands or alfalfa fields supporting rodent populations. Winters in Central and South America.	**Present.** The onsite agricultural fields provide suitable foraging habitat for the Swainson's hawk. One of the two onsite eucalyptus trees immediately adjacent to W Parlier Ave contained an active Swainson's hawk nest during the June 2018 field survey.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS (adapted from CDFW 2018 and USFWS 2018)

Species Listed as Threatened or Endangered under the State and/or Federal Endangered Species Act

Species	Status	Habitat	*Occurrence on the Project Site
Tricolored Blackbird (*Agelaius tricolor*)	CCE	Breeds colonially near fresh water, primarily emergent wetlands, with tall thickets. Forages in grassland and cropland habitats.	**Possible.** Although the onsite canals contain sporadic patches of emergent wetland vegetation, this habitat is not extensive enough to support tricolored blackbird nest colonies. Observations of this species are rare in this part of Fresno County (eBird 2018, CDFW 2018). At most, this species may occasionally forage on the site.
Nelson's Antelope Squirrel (Ammospermophilus nelsoni)	CT	Frequents open shrublands and annual grassland habitats.	**Absent.** Habitats of the site provide unsuitable to very marginal habitat for this species. Furthermore, this diurnal species that spends a lot of time above ground was not observed during LOA's field survey. The nearest documented occurrence of this species is 9.5 miles to the southwest from 1932 (CDFW 2018).
Giant Kangaroo Rat (*Dipodomys ingens*)	FE, CE	Inhabits grasslands on gentle slopes of generally less than 10°, with friable, sandy-loam soils.	**Absent.** Habitats of the site provide unsuitable to extremely marginal habitat for this species. Furthermore, the project site is outside this species' known range, as it is not known to occur east of the California Aqueduct. The nearest documented occurrence of this species is 13 miles to the southwest from 1967 (CDFW 2018).
Fresno Kangaroo Rat (*Dipodomys nitratoides exilis*)	FE, CE	Occurs in alkali scrub and herbaceous habitats with scattered shrubs in the southwestern San Joaquin Valley.	**Absent.** Natural habitats suitable for this species are absent from the project site and surrounding lands. Due to recent unsuccessful research trapping efforts on natural lands north of the project site, this species is thought to be extirpated from the region (CDFW 2018).
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, CT	Frequents desert alkali scrub and annual grasslands and may forage in adjacent agricultural habitats. Utilizes enlarged (5 to 10 inches in diameter) ground squirrel burrows as denning habitat.	**Unlikely.** All open burrows on and adjacent to the site were investigated during LOA's field survey and no evidence of past or present kit fox occupation was found. The project site has been highly modified for agricultural use and, as a result, provides only marginal foraging and breeding habitat for the kit fox. There have only been two documented kit fox sightings within a ten mile radius of the project site, documented in 1997 and 1975. No populations of kit fox are known to occur in this portion of Fresno County. Therefore, kit foxes are extremely unlikely to occur on the site.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS – cont'd.

State Species of Special Concern or California Fully Protected

Species	Status	Habitat	*Occurrence on the Project Site
Western Spadefoot (*Spea hammondii*)	CSC	Primarily occurs in grasslands, but also occurs in valley and foothill hardwood woodlands. Requires vernal pools or other seasonal pools for breeding.	**Absent.** Suitable breeding habitat is absent from the project site and surrounding lands.
Western Pond Turtle (*Actinemys marmorata*)	CSC	Occurs in open slow-moving water or ponds with rocks and logs for basking and aquatic vegetation for food and cover. Nesting occurs in open areas, on a variety of soil types, and up to ¼ mile away from water. This species is almost extinct in the southern San Joaquin Valley.	**Unlikely.** Aquatic habitat associated with the onsite canals is marginal for this species due to the agricultural setting surrounding the canals. While some aquatic and emergent vegetation occurs within the reach of canals on the project site that may be used for cover and foraging, the many miles of upstream and downstream sections of connecting canals or more highly maintained and contain little to no vegetation. Pond turtles are not known to occur in the vicinity of the project with the nearest documented occurrence 6.5 miles to the northwest at the Mendota Wildlife Area (CDFW 2018).
Coast Horned Lizard (*Phrynosoma blainvillii*)	CSC	Inhabits open areas of arid grasslands, coniferous forests, woodlands, and chaparral, with loose sandy soil. Often found in lowlands along sandy washes with scattered shrubs and along dirt roads, and frequently found near ant hills.	**Absent.** Suitable habitat for this species is absent from the project site and surrounding lands.
Two-Striped Garter Snake (*Thamnophis hammondii*)	CSC	Highly aquatic; found in or near permanent fresh water, generally along streams with rocky beds and riparian growth.	**Absent.** Suitable habitat is absent from the project site and surrounding lands. Furthermore, this species is not known to occur in the San Joaquin Valley.
San Joaquin Coachwhip (*Masticophis flagellum ruddocki*)	CSC	Open, dry habitats with little or no tree cover. Found in valley grasslands and saltbush scrub in the San Joaquin Valley. Uses mammal burrows for refuge and oviposition.	**Unlikely.** Ruderal, agricultural, and canal habitats of the site and adjacent lands provide unsuitable to extremely marginal habitat for this species.
Mountain Plover (*Charadrius montanus*)	CSC	This winter migrant to California can be found in short grasslands, plowed fields, and sandy deserts.	**Possible.** Suitable foraging habitat for this species is present within onsite and adjacent agricultural fields. This species does not breed in California.
White-Tailed Kite (*Elanus leucurus*)	CFP	Open grasslands and agricultural areas throughout central California.	**Possible.** Foraging and nesting habitat for this species is present on the site.
Burrowing Owl (*Athene cunicularia*)	CSC	Frequents open, dry annual or perennial grasslands, deserts, and scrublands characterized by low growing vegetation. Dependent upon burrowing mammals, most notably the California ground squirrel, for nest burrows.	**Possible.** While suitably sized burrows required by this species for roosting and nesting were absent from the project site at the time of the field survey, this species may utilize future burrows that could become established prior to project activities. This species has been observed in similar habitats in the region by LOA biologists.

TABLE 1. LIST OF SPECIAL STATUS SPECIES THAT COULD OCCUR IN THE PROJECT VICINITY

ANIMALS – cont'd.

State Species of Special Concern or California Fully Protected

Species	Status	Habitat	*Occurrence on the Project Site
Loggerhead Shrike (*Lanius ludovicianus*)	CSC	Frequents open habitats with sparse shrubs and trees, other suitable perches, bare ground, and low herbaceous cover. Can often be found in cropland.	**Present.** This species was observed on the project site during LOA's field survey. Foraging habitat for this species is present on the site and nesting opportunity occurs on the site in the roadside eucalyptus trees.
Pallid Bat (*Antrozous pallidus*)	CSC	Roosts in rocky outcrops, cliffs, and crevices with access to open habitats for foraging. May also roost in caves, mines, hollow trees and buildings.	**Possible.** This species may forage over the site; roosting habitat is absent.
Western Mastiff Bat (*Eumops perotis* ssp. *californicus*)	CSC	Frequents open, semi-arid to arid habitats, including conifer, and deciduous woodlands, coastal scrub, grasslands, palm oasis, chaparral and urban. Roosts in cliff faces, high buildings, trees and tunnels.	**Possible.** This species may forage over the site; roosting habitat is absent.
Western Red Bat (*Lasiurus blossevillii*)	CSC	This mostly solitary bat roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Possible.** This species may forage over the site. Potential roosting habitat occurs in onsite eucalyptus trees.
American Badger (*Taxidea taxus*)	CSC	Found in drier open stages of most shrub, forest and herbaceous habitats with friable soils.	**Absent.** Suitable habitat for this species is absent. Furthermore, no sign of this species was observed during LOA's survey.

Occurrence Terminology:

Present: Species observed on the site at time of field surveys or during recent past.
Likely: Species not observed on the site, but it may reasonably be expected to occur there on a regular basis.
Possible: Species not observed on the site, but it could occur there from time to time.
Unlikely: Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient.
Absent: Species not observed on the site, and precluded from occurring there because habitat requirements not met.

STATUS CODES

FE	Federally Endangered	CE	California Endangered
FT	Federally Threatened	CT	California Threatened
FPE	Federally Endangered (Proposed)	CCE	California Endangered (Candidate)
FPT	Federally Threatened (Proposed)	CFP	California Fully Protected
FC	Federal Candidate	CSC	California Species of Special Concern

CNPS	California Native Plant Society Listing		
1A	Plants Presumed Extinct in California	2	Plants Rare, Threatened, or Endangered in California, but more common elsewhere
1B	Plants Rare, Threatened, or Endangered in California and elsewhere		

2.5 ENDANGERED, THREATENED, OR SPECIAL STATUS PLANT AND ANIMAL SPECIES MERITING FURTHER DISCUSSION

2.5.1 Giant Garter Snake (*Thamnophis gigas*). Federal Listing Status: Threatened; State Listing Status: Threatened

Ecology of the species. Endemic to wetlands in the Sacramento and San Joaquin Valleys, the giant garter snake (GGS) inhabits marshes, sloughs, ponds, small lakes, low-gradient streams, and occasionally agricultural wetlands such as irrigation canals and rice fields. The GGS requires four main habitat components: 1) sufficient water to maintain high densities of prey during its active season, typically recognized as May to October; 2) emergent wetland vegetation for escape and foraging habitat; 3) grassy banks or openings in streamside vegetation for basking; and 4) upland habitat for cover and refuge from floodwaters during the non-active season (USFWS 2017). GGS use small mammal burrows and soil crevices adjacent to aquatic habitats both for overwintering and, during the active season, to escape excessive heat. Although GGS generally remain close to waterways and wetlands, Wylie et al. (1997) documented GGS use of burrows as far as 165 feet from the marsh edge in the summer, and as far as 820 feet in the winter. The GGS feeds primarily on aquatic prey such as fish and amphibians, and has become increasingly reliant on introduced species (USFWS 2017).

Potential to occur onsite. GGS distribution in the San Joaquin Valley has been reduced to just two isolated populations, defined in USFWS (2017) as the San Joaquin Basin and Tulare Basin populations. The San Joaquin Basin population is currently limited to the North and South Grasslands region, a complex of protected wetlands in Merced County. The Tulare Basin population is currently limited to the Mendota Wildlife Area (WA) in Fresno County. Both populations are small and likely decreasing (Dickert 2003). The project site is situated approximately 6 miles southeast of the nearest GGS occurrence at the Mendota WA.

The only aquatic habitats of the project site that could potentially be used by the GGS are the Slough Canal and the SL2 lateral canal. While some aquatic and emergent vegetation that may be used for cover and foraging occurs within some areas of the canals on the project site, the many miles of upstream and downstream sections of connecting canals or more highly

maintained with little to no aquatic vegetation present. The only observed prey items on the project site were a few bullfrogs. No other amphibians or fish were observed during the field investigation and, if present at all, populations are expected to be low. The onsite canals appear to be perennially inundated; however, the flows in the Slough Canal are reversible and regulated by the TID, with summer flows pumped southward from the Fresno Slough and gravity flow in the rainy season northward into the Fresno Slough. Upland habitats adjacent to the canals consist of highly maintained agricultural production lands that are unsuitable for basking or overwintering by GGS due to the lack of vegetative cover and the presence of only a few small mammal burrows.

The GGS is considered absent from the project site for the following reasons. From areas of potentially suitable habitat within the Fresno Slough northwest of James Road, GGS would have to negotiate approximately 4 miles of the Slough Canal which lacks sufficient vegetative cover, appears to lack sufficient prey densities, and is surrounded by intensively farmed lands unsuitable for upland use by this species. In addition, any GGS occurring on site would have had to negotiate a 260-foot undergrounded section of the Slough Canal that crosses beneath Colorado Road, South Levee Road, and the Southern Pacific Railroad, immediately followed by a large lift station, a feat that is extremely unlikely. In the extremely unlikely event that a GGS ever made it to the project site, it would be met with insufficient prey, vegetative cover, and upland winter dormancy habitat, such that it would not be able to persist on site. As a result, GGS are considered absent from the project site.

2.6 JURISDICTIONAL WATERS

As will be discussed in greater detail in Section 3.2.5, the USACE has regulatory authority over certain rivers, creeks, lakes, ponds, reservoirs, wetlands, and in some cases irrigation canals ("waters of the U.S." or "jurisdictional waters"). The extent of USACE jurisdiction is defined in the Code of Federal Regulations and has been further clarified in federal courts. Generally, waters of the U.S. are navigable waters that cross state or national boundaries, are used in or somehow influence interstate or foreign commerce, or are impoundments or tributaries of such waters.

The project site contains a portion of the Slough Canal and a connecting lateral canal to the east. The USACE does not generally assert jurisdiction over agricultural ditches and canals unless the channel both receives and discharges into a water of the U.S. An analysis of a TID facilities map, aerial images, and USGS topographic maps indicate that the onsite canals are hydrologically connected to the Fresno Slough, a water of the U.S., and are interconnected with a number of other canals in the TID service area some of which, themselves also connect to the Fresno Slough. The purpose of the TID system is to distribute surface water from the Fresno Slough and pumped groundwater to agricultural lands within the TID service area, which is accomplished through a series of canals, pumps, lift-stations, and gates. Because of the complicated hydrologic regime of the TID system with multiple hydrologic connections to the Fresno Slough the jurisdictional status of the onsite canals is uncertain.

2.7 DESIGNATED CRITICAL HABITAT

The USFWS often designates areas of "critical habitat" when it lists species as threatened or endangered. Critical habitat is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Designated critical habitat is absent from the project site and surrounding lands.

3.0 IMPACTS AND MITIGATIONS

3.1 SIGNIFICANCE CRITERIA

NEPA

Federal projects are subject to the provisions of NEPA. The purpose of NEPA is to assess the effects of a proposed action on the human environment, assess the significance of those effects, and recommend measures that if implemented would mitigate those effects. As used in NEPA, a determination that certain effects on the human environment are "significant" requires considerations of both context and intensity (see 40 CFR 1508.27).

Context means that significance must be analyzed in terms of the affected environment in which a proposed action would occur. For the purposes of assessing effects of an action on biological resources, the relevant context is often local. The analysis requires a comparison of the action area's biological resources to the biological resources of the local area within which the action area is located. The analysis may, however, require a comparison of the action area's biological resources with the biological resources of an entire region.

Intensity refers to the severity of impact. In considering the intensity of impact to biological resources, it is necessary to address the unique qualities of wetlands and ecologically critical areas that may be affected by the action, the degree to which the action will be controversial, the degree to which the effects of the action will be uncertain, the degree to which the action will establish a precedent for future actions that may result in significant effects, and the potential for the action to result in cumulatively significant effects.

The effects of an action on some biological resources are generally considered to be "significant." Actions that adversely affect federally listed threatened and endangered species and waters of the United States are two examples. Other effects may, however, be considered significant as well. An action that impedes the migratory movements of fish and wildlife, for example, may be considered "significant." An action that substantially reduces the areal extent of fish and wildlife habitat may be considered "significant," especially if habitat loss occurs in

areas identified by state and federal governments as ecologically sensitive or of great scenic value.

NEPA requires disclosure of feasible mitigation measures for the effects of an action on the environment. Suitable measures include the following:

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

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the project.

(e) Compensating for the impact by replacing or providing substitute resources or environments.

This report identifies likely project impacts, identifies those that may be considered "significant" per the provisions of NEPA, and recommends mitigation measures that would avoid adverse effects to biological resources.

CEQA

General plans, area plans, and specific projects are subject to the provisions of CEQA. The purpose of CEQA is to assess the impacts of proposed projects on the environment before they are constructed. For example, site development may require the removal of some or all of its existing vegetation and animals associated with this vegetation could be destroyed or displaced. Disturbance-tolerant species adapted to humans, roads, buildings, pets, etc. may replace those species formerly occurring on a site. Plants and animals that are state and/or federally listed as threatened or endangered may be destroyed or displaced while sensitive habitats such as wetlands and riparian woodlands may be altered or destroyed. These impacts may or may not be considered significant. CEQA defines a "significant effect on the environment" as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and

objects of historic or aesthetic interest. Specific project impacts to biological resources may be considered "significant" if they will:

- 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 CDFW or USFWS.

- 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 CDFW or USFWS.

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, or coastal) through direct removal, filling, hydrological interruption, or other means.

- 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 areas. Impacts would also be significant if they reduce substantially the habitat of a fish or wildlife species, including causing a fish or wildlife population to drop below self-sustaining levels or threaten to eliminate an animal community.

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

- Conflict with the provisions of an adopted Habitat Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Furthermore, CEQA Guidelines Section 15065 states that a project may trigger the requirement to make "mandatory findings of significance" if: "the project has the potential to subsequently 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, reduce the number or restrict the range on an endangered, rare or threatened species, or eliminate important examples of the major periods of California history or prehistory."

3.2 RELEVANT GOALS, POLICIES, AND LAWS

3.2.1 General Plan Policies of Fresno County

In compliance with CEQA, the lead agency must consider conformance with applicable goals and policies of the General Plan of Fresno County. The Fresno County General Plan includes goals and policies designed to protect significant biotic resources of the Planning Area. The Open Space and Conservation Element of the Fresno County General Plan includes goals concerning the conservation of wetlands and riparian areas, fish and wildlife habitats, and valuable vegetation resources. These goals are supported by numerous policies and implementation programs. Relevant policies are summarized as follows: 1) the County shall support the "no-net-loss" wetlands policies of the USACE, USFWS, and CDFW, and shall require new development to fully mitigate the loss of regulated wetlands, 2) the County shall require new development to be designed in such a manner that pollutants and siltation do not significantly degrade the area, value, or function of wetlands, 3) the County shall require new developments to preserve and enhance native riparian habitat unless public safety concerns require removal of habitat, and shall require riparian protection zones around natural watercourses, 4) the County shall identify and conserve remaining upland habitat areas adjacent to wetland and riparian areas that are critically important to wildlife species associated with those wetland and riparian areas, 5) where practicable, the County shall support efforts to avoid the "net" loss of important wildlife habitat, and should preserve in a natural state those areas defined as habitats for rare and endangered animal and plant species, 6) if loss of important habitat for special status species or other valuable wildlife resources cannot be avoided, the County shall impose adequate mitigation, 7) the County shall require adequate buffer zones between construction activities and significant wildlife resources, 8) the County shall promote methods of pest control on croplands bordering sensitive habitats that do not place special status species at risk, e.g. the San Joaquin kit fox, 9) the County shall support the preservation of significant areas of natural vegetation, e.g. oak woodlands, riparian areas, and vernal pools, and 10) the County shall require that new developments preserve natural woodlands to the maximum extent possible.

3.2.2 Threatened and Endangered Species

In California, imperiled plants and animals may be afforded special legal protections under the California Endangered Species Act (CESA) and/or Federal Endangered Species Act (FESA). Species may be listed as "threatened" or "endangered" under one or both Acts, and/or as "rare" under CESA. Under both Acts, "endangered" means a species is in danger of extinction throughout all or a significant portion of its range, and "threatened" means a species is likely to become endangered within the foreseeable future. Under CESA, "rare" means a species may become endangered if their present environment worsens. Both Acts prohibit "take" of listed species, defined under CESA as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (California Fish and Game Code, Section 86), and more broadly defined under FESA to include "harm" (16 USC, Section 1532(19), 50 CFR, Section 17.3).

When state and federally listed species have the potential to be impacted by a project, the USFWS and CDFW must be included in the CEQA process. These agencies review the environmental document to determine the adequacy of its treatment of endangered species issues and to make project-specific recommendations for the protection of listed species. Similarly, NEPA projects that may impact federally listed species must include the USFWS in the environmental review process. Projects that may result in the "take" of listed species must generally enter into consultation with the USFWS and/or CDFW pursuant to FESA and CESA, respectively. In some cases, incidental take authorization(s) from these agencies may be required before the project can be implemented.

3.2.3 Migratory Birds

The Federal Migratory Bird Treaty Act (FMBTA: 16 USC 703-712) prohibits killing, possessing, or trading in any bird species covered in one of four international conventions to which the United States is a party, except in accordance with regulations prescribed by the Secretary of the Interior. The name of the act is misleading, as it actually covers almost all birds native to the United States, even those that are non-migratory. The FMBTA encompasses whole birds, parts of birds, and bird nests and eggs.

Although the USFWS and its parent administration, the U.S. Department of the Interior, have traditionally interpreted the FMBTA as prohibiting incidental as well as intentional "take" of birds, a January 2018 legal opinion issued by the Department of the Interior now states that incidental take of migratory birds while engaging in otherwise lawful activities is permissible under the FMBTA. However, California Fish and Game Code makes it unlawful to take or possess any non-game bird covered by the FMBTA (Section 3513), as well as any other native non-game bird (Section 3800), even if incidental to lawful activities.

3.2.4 Birds of Prey

Birds of prey are protected in California under provisions of the Fish and Game Code (Section 3503.5), which states that it is unlawful to take, possess, or destroy any birds in the order Falconiformes (hawks and eagles) or Strigiformes (owls), as well as their nests and eggs. The bald eagle and golden eagle are afforded additional protection under the federal Bald and Golden Eagle Protection Act (16 USC 668), which makes it unlawful to kill birds or their eggs.

3.2.5 Wetlands and Other "Jurisdictional Waters"

Natural drainage channels and adjacent wetlands may be considered "waters of the United States" or "jurisdictional waters" subject to the jurisdiction of the USACE. The extent of jurisdiction has been defined in the Code of Federal Regulations but has also been subject to interpretation of the federal courts. Jurisdictional waters generally include:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters including interstate wetlands:
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce;
- All impoundments of waters otherwise defined as waters of the United States under the definition;
- Tributaries of waters identified in paragraphs (a)(1)-(4) (i.e. the bulleted items above).

As determined by the United States Supreme Court in its 2001 *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (SWANCC) decision, channels and wetlands isolated from other jurisdictional waters cannot be considered jurisdictional on the basis of their use, hypothetical or observed, by migratory birds. Similarly, in its 2006 consolidated *Carabell/Rapanos* decision, the U.S. Supreme Court ruled that a significant nexus between a wetland and other navigable waters must exist for the wetland itself to be considered a navigable and therefore jurisdictional water.

The USACE regulates the filling or grading of Waters of the U.S. under the authority of Section 404 of the Clean Water Act. The extent of jurisdiction within drainage channels is defined by "ordinary high water marks" on opposing channel banks. All activities that involve the discharge of dredge or fill material into Waters of the U.S. are subject to the permit requirements of the USACE. Such permits are typically issued on the condition that the applicant agrees to provide mitigation that result in no net loss of wetland functions or values. No permit can be issued until the RWQCB issues a Section 401 Water Quality Certification (or waiver of such certification) verifying that the proposed activity will meet state water quality standards.

Under the Porter-Cologne Water Quality Control Act of 1969, the State Water Resources Control Board has regulatory authority to protect the water quality of all surface water and groundwater in the State of California ("Waters of the State"). Nine RWQCBs oversee water quality at the local and regional level. The RWQCB for a given region regulates discharges of fill or pollutants into Waters of the State through the issuance of various permits and orders. Discharges into Waters of the State that are also Waters of the U.S. require a Section 401 Water Quality Certification from the RWQCB as a prerequisite to obtaining certain federal permits, such as a Section 404 Clean Water Act permit. Discharges into all Waters of the State, even those that are not also Waters of the U.S., require Waste Discharge Requirements (WDRs), or waivers of WDRs, from the RWQCB. The RWQCB also administers the Construction Storm Water Program and the federal National Pollution Discharge Elimination System (NPDES) program. Projects that disturb one or more acres of soil must obtain a Construction General Permit under the Construction Storm Water Program. A prerequisite for this permit is the

development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Projects that discharge wastewater, storm water, or other pollutants into a Water of the U.S. may require a NPDES permit.

CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. Activities that may substantially modify such waters through the diversion or obstruction of their natural flow, change or use of any material from their bed or bank, or the deposition of debris require a Notification of Lake or Streambed Alteration. If CDFW determines that the activity may adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. Such an agreement typically stipulates that certain measures will be implemented to protect the habitat values of the lake or drainage in question.

3.3 POTENTIALLY SIGNIFICANT PROJECT IMPACTS/MITIGATION

As discussed in Section 1.0, the proposed project is the replacement of an existing instream lift-pump station, replacement of two existing road culverts, and the improvement of approximately 1,100 feet of canal channel. A small staging area, estimated at one acre, will be located in agricultural fields adjacent to the construction zone. Project construction will result in up to 15 acres of impacts to previously developed lands.

3.3.1 Swainson's Hawk

Potential Impacts. An active Swainson's hawk nest was observed in an onsite eucalyptus tree during LOA's June 2018 field investigation. Project activities that adversely affect the nesting success of Swainson's hawks would violate state laws (see Sections 3.2.3 and 3.2.4) and be considered a significant impact under CEQA and NEPA. The TID irrigation schedule necessitates project construction during the fall and winter months, a time in which Swainson's hawks are not nesting but wintering in Central and South America. Furthermore, the project applicant anticipates avoiding any impacts to the nest tree, which may be utilized by this species year after year. However, given that construction schedules are often subject to change,

avoidance and minimization measures are presented that will ensure compliance with state laws protecting the Swainson's hawk.

Although agricultural fields suitable as foraging habitat for the Swainson's hawk may be temporarily used for construction staging activities, no permanent impacts to the fields are anticipated. Loss of foraging habitat for this species is not considered to be a significant impact of the project under CEQA and NEPA.

Mitigation. The applicant will implement the following measures for the protection of nesting Swainson's hawks.

> ***Mitigation Measure 3.3.1a* (*Avoidance of Nest Tree*).** To ensure project activities will have no deleterious effects on the onsite Swainson's hawk nest tree, the project will maintain a minimum 50-foot buffer around the onsite eucalyptus trees throughout the course of construction. The buffer will be delineated with orange barrier fencing.
>
> ***Mitigation Measure 3.3.1b* (*Temporal Avoidance*).** In order to avoid impacts to nesting Swainson's hawks, construction activities will occur outside the nesting season, typically defined as March 1-September 15.
>
> ***Mitigation Measure 3.3.1c (Preconstruction Surveys).*** If construction activities are initiated between March 1 and September 15, a qualified biologist will conduct preconstruction nest surveys for Swainson's hawks on and within ½ mile of the project site within 30 days prior to the start of construction. The survey will consist of inspecting all accessible, suitable trees of the survey area for the presence of nests and hawks.
>
> ***Mitigation Measure 3.3.1d (Avoidance of Active Nests).*** Should any active Swainson's hawk nests be discovered within the survey area, an appropriate disturbance-free buffer will be established based on local conditions and agency guidelines. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until a qualified biologist has determined that the young have fledged and are capable of foraging independently.
>
> ***Mitigation Measure 3.3.1e (Biological Monitoring).*** If construction activities are initiated before March 1 but continue into March, a qualified biologist will monitor Swainson's hawk nesting activity at the onsite nest tree once a week beginning March 1. If Swainson's hawks begin nesting at the tree and project activities continue, monitoring will occur daily for two weeks to determine project effects on nesting behavior. If nesting behavior appears unaffected by project activities, monitoring will be reduced to once a week. If project activities appear to be having some effect on the nesting hawks, these activities will be stopped until CDFW is consulted.

Implementation of the above measures will reduce potential project impacts to the Swainson's hawk to a less than significant level under CEQA and NEPA, and will ensure that the project is in compliance with state laws protecting this species.

3.3.2 Project-related Mortality/Disturbance to Loggerhead Shrike, White-Tailed Kite and Other Nesting Birds

Potential Impacts. The project site provides nesting habitat for a number of avian species, including the loggerhead shrike (*Lanius ludovicianus*), a California Species of Concern, and the white-tailed kite (*Elanus leucurus*), a California fully protected species. At the time of the June field survey a loggerhead shrike was observed on the site and barn swallows (*Hirundo rustica*) were observed nesting on the existing lift station. Nearly all nesting birds are protected under California Fish and Game Code. If project construction occurs during the nesting season, birds nesting on or adjacent to the project site could be disturbed such that they would abandon their nests, or nests could be destroyed. Activities that cause mortality or nest abandonment of protected birds would be a violation of state law and would constitute a significant impact of the project under CEQA and NEPA.

Mitigation. In order to minimize construction disturbance to active bird nests, the applicant will implement the following measures:

> ***Measure 3.3.2a (Avoidance).*** If feasible, the project will be implemented outside of the avian nesting season, typically defined as February 1 to August 31.
>
> ***Measure 3.3.2b (Pre-construction Surveys*).** If construction is to occur between February 1 and August 31, a qualified biologist will conduct pre-construction surveys for active migratory bird nests within 14 days prior to the start of construction. If there is a lapse in construction of 14 days or more, preconstruction surveys would need to be repeated. Should any active nests be discovered in or near proposed construction zones, the biologist will identify a suitable construction-free buffer around the nest. This buffer will be identified on the ground with flagging or fencing, and will be maintained until the biologist has determined that the young have fledged and are capable of foraging independently.

Implementation of the above measures will reduce potential project impacts to loggerhead shrikes, white-tailed kites, and other nesting birds to a less than significant level under CEQA and NEPA and ensure compliance with state laws protecting these species.

3.3.3 Burrowing Owl

Potential Impacts. While no evidence of burrowing owl use of the site was observed and suitably sized burrows required by this species were absent, burrowing owls have been documented on similar lands in the region. Should burrows become established on the site and become occupied by burrowing owls prior to construction, individuals would be at risk of construction-related injury or mortality. These small raptors are protected under California Fish and Game Code. Mortality of individual burrowing owls would be a violation of state law, and would constitute a significant impact of the project under CEQA and NEPA.

Although agricultural fields suitable as foraging habitat for the burrowing owl may be temporarily used for construction staging activities, no permanent impacts to the fields are anticipated. Loss of foraging habitat for this species is not considered to be a significant impact of the project under CEQA and NEPA.

Mitigation. Prior to the start of construction, the applicant will implement the following measures for the burrowing owl.

> ***Mitigation Measure 3.3.3a (Take Avoidance Survey).*** A pre-construction "take avoidance" survey will be conducted by a qualified biologist for burrowing owls between 14 and 30 days prior to the onset of construction according to methods described in the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). The survey area will include all suitable habitat on and within 200 meters of project impact areas, where accessible.
>
> ***Mitigation Measure 3.3.3b (Avoidance of Active Nests).*** If project activities are undertaken during the breeding season (February 1-August 31) and active nest burrows are identified within or near project impact areas, a 200-meter disturbance-free buffer will be established around these burrows, or alternate avoidance measures implemented in consultation with CDFW. The buffers will be enclosed with temporary fencing to prevent construction equipment and workers from entering the setback area. Buffers will remain in place for the duration of the breeding season, unless otherwise arranged with CDFW. After the breeding season (i.e. once all young have left the nest), passive relocation of any remaining owls may take place as described below.
>
> ***Mitigation Measure 3.3.3c (Avoidance or Passive Relocation of Resident Owls).*** During the non-breeding season (September 1-January 31), resident owls occupying burrows in project impact areas may either be avoided, or passively relocated to alternative habitat. If the applicant chooses to avoid active owl burrows within the impact area during the non-breeding season, a 50-meter disturbance-free buffer will be established around these burrows, or alternate avoidance measures implemented in

consultation with CDFW. The buffers will be enclosed with temporary fencing, and will remain in place until a qualified biologist determines that the burrows are no longer active. If the applicant chooses to passively relocate owls during the non-breeding season, this activity will be conducted in accordance with a relocation plan prepared by a qualified biologist.

Implementation of the above measures will reduce potential project impacts to the burrowing owl to a less than significant level under CEQA and NEPA, and will ensure that the project is in compliance with state laws protecting this species.

3.4 LESS THAN SIGNIFICANT PROJECT IMPACTS

3.4.1 Project Impacts to Special Status Plant Species

Potential Impacts. Thirteen (13) special status plant species have been documented in the project vicinity (see Table 1). These plant species are considered absent from the project site due to past and ongoing disturbance, the absence of suitable habitat, and, in the case of the Sanford's arrowhead, the fact that it was not found on site during its blooming period, when it is readily detectable. Therefore, the proposed project would have no effect on individuals or regional populations of these special status plant species.

Mitigation. Mitigation measures are not warranted.

3.4.2 Project Impacts to Special Status Animal Species Absent from, or Unlikely to Occur within, the Project site

Potential Impacts. Of the 25 special status animal species that potentially occur in the general vicinity of the site, 16 are considered absent or unlikely to occur within the project site due to past and ongoing disturbance of the project site and surrounding lands, the absence of suitable habitat, and/or the project site's being situated outside of the species' known distribution. These include the vernal pool fairy shrimp (*Branchinecta lynchi*), longhorn fairy shrimp (*Branchinecta longiantenna*), Delta smelt (*Hypomesus transpacificus*), California red-legged frog (*Rana draytonii*), blunt-nosed leopard lizard (*Gambelia silus*), giant garter snake, Nelson's antelope squirrel (*Ammospermophilus nelsoni*), giant kangaroo rat (*Dipodomys ingens*), Fresno kangaroo rat (*Dipodomys nitratoides exilis*), San Joaquin kit fox (*Vulpes macrotis mutica*), western

spadefoot (*Spea hammondii*), western pond turtle (*Actinemys marmorata*), coast horned lizard (*Phrynosoma blainvillii*), two-striped garter snake (*Thamnophis hammondii*), San Joaquin coachwhip (*Masticophis flagellum ruddocki*), and American badger (*Taxidea taxus*) (see Table 1). The project is expected to have no effect on these species through construction mortality/disturbance or loss of habitat because there is little or no likelihood that they are present.

Mitigation. Mitigation is not warranted.

3.4.3 Project Impacts to Special Status Species Potentially Occurring on the Site as Foragers Only

Potential Impacts. Four species may utilize the site for foraging but would nest and roost elsewhere. These species are the tricolored blackbird (*Agelaius tricolor*), mountain plover (*Charadrius montanus*), pallid bat (*Antrozous pallidus*), and western mastiff bat (*Eumops perotis* spp. *californicus*). Since these species are highly mobile, the project is not expected to result in construction related mortality of individuals that may occur on the site prior to or during construction. The project site does not represent unique or important foraging habitat for these species, with many square miles of similar habitat present in the region. Furthermore, upon project completion, habitat conditions will remain essentially unchanged from pre-project conditions. Therefore, project impacts to the tricolored blackbird, mountain plover, pallid bat, and western mastiff bat are considered less than significant under CEQA and NEPA.

Mitigation. Mitigation is not warranted.

3.4.4 Project Impacts to Western Red Bat

Potential Impacts. The western red bat (*Lasiurus blossevillii*), could potentially roost in onsite eucalyptus trees and forage across the site. Since this species is also highly mobile and onsite trees will be avoided, the project is not expected to result in construction related mortality of individuals that may occur on the site prior to or during construction. The project site does not represent unique or important foraging habitat for these species, with many square miles of similar habitat present in the region. Furthermore, upon project completion, habitat conditions

will remain essentially unchanged from pre-project conditions. Therefore, project impacts to the western red bat are considered less than significant under CEQA and NEPA.

Mitigation. Mitigation is not warranted.

3.4.5 Project Impacts to Wildlife Movement Corridors

Potential Impacts. While the Slough Canal may provide some movement opportunity for common terrestrial wildlife and non-native fish species, it would not be considered a regionally important movement corridor due to abundant movement opportunity within surrounding agricultural lands, the presence of lift stations that would impede the movement of aquatic animals, and the lack of native fish species anticipated in the canal. As a result, the project will not have a significant effect on wildlife movement corridors.

Mitigation. Mitigation is not warranted.

3.4.6 Project Impacts to Critical Habitat and Other Sensitive Habitat

Potential Impacts. The project will have no effect on designated critical habitat or other sensitive habitat because critical habitat and other sensitive habitat is absent from the project site and adjacent lands.

Mitigation. Mitigation is not warranted.

3.4.7 Potential Project Impacts to Waters of the U.S.

Potential Impacts. It is unclear whether the USACE would consider the Slough Canal and SL2 lateral canal to meet the USACE criteria of a water of the U.S. Regardless of the jurisdictional status of the canals, the small area of impacts proposed to potential waters of the U.S. are considered less than significant under CEQA and NEPA. However, if the canals are determined to be waters of the U.S. a Section 404 permit issued by the USACE may be required for project impacts to these canals.

Mitigation. Mitigation is not warranted.

3.4.8 Local Policies or Habitat Conservation Plans

Potential Impacts. Proposed project design appears to be consistent with the goals and policies of the Fresno County General Plan. No habitat conservation plans are known to pertain to the area containing the project site.

Mitigation. No mitigation is required.

3.5 SECTION 7 DETERMINATIONS FOR FEDERALLY LISTED SPECIES

The following table summarizes project effect determinations for Federally Listed Species found on the USFWS IPaC list generated for the project.

Table 2: Section 7 Determinations for Federally Listed Species

Species	Determination	Rational for the Determination
Palmate Bracted Salty Bird's Beak (*Chloropyron palmatum*)	***No effect***	• Habitat absent
San Joaquin Woollythreads (*Monolopia congdonii*)	***No effect***	• Habitat absent
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	***No effect***	• Habitat absent
Longhorn Fairy Shrimp (*Branchinecta longiantenna*)	***No effect***	• Habitat absent
Delta Smelt (*Hypomesus transpacificus*)	***No effect***	• Habitat absent • Project site out of species' range
California Red-legged Frog (*Rana aurora draytonii*)	***No effect***	• Habitat absent • Project site out of species' range
Giant Garter Snake (GGS) (*Thamnophis gigas*)	***No effect***	• Habitat marginal • Project site out of species' current known range • Significant barriers between areas of suitable habitat and project site
Blunt-Nosed Leopard Lizard (*Gambelia sila*)	***No effect***	• Habitat absent
Giant Kangaroo Rat (*Dipodomys ingens*)	***No effect***	• Habitat absent • Project site out of species' range
Fresno Kangaroo Rat (*Dipodomys nitratoides exilis*)	***No effect***	• Habitat absent • Project site out of species' current range
San Joaquin Kit Fox (SJKF) (*Vulpes macrotis mutica*)	***No effect***	• Habitat absent

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APPENDIX A: VASCULAR PLANTS OF THE PROJECT SITE

APPENDIX A: VASCULAR PLANTS OF THE PROJECT SITE

The vascular plant species listed below were observed within the project site during a site survey conducted by Live Oak Associates, Inc. on June 19, 2018. The U.S. Fish and Wildlife Service wetland indicator status of each plant has been shown following its common name.

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland
NR - No review
NA - No agreement
NI - No investigation

AMARANTHACEA – Amaranth Family		
Amaranthus albus	Pigweed Amaranth	FACU
Amaranthus blitoides	Prostrate Amaranth	FACU
Amaranthus retroflexus	Red Root Pigweed	FACU
ASTERACEAE - Sunflower Family		
Erigeron canadensis	Canada Horseweed	FACU
Helianthus annuus	Common Sunflower	FACU
Helminthotheca echioides	Bristly Ox-Tongue	FAC
Lactuca serriola	Prickly Lettuce	FACU
Sonchus oleraceus	Sow Thistle	UPL
BORAGINACEAE – Borage Family		
Amsinckia sp.	Fiddleneck	UPL
Heliotropium curassavicum	Heliotrope	FACU
BRASSICACEAE - Mustard Family		
Sisymbrium irio	London rocket	UPL
CHENOPODIACEAE – Goosefoot Family		
Atriplex semibaccata	Australian Saltbush	FAC
CONVOLVULACEAE – Morning Glory Family		
Convolvulus arvensis	Field Bindweed	UPL
Cressa truxillensis	Alkali Weed	FACW
CYPERACEAE – Sedge Family		
Cyperus esculentus	Yellow Nutgrass	FACW
Schoenoplectus acutus	Hardstem Bulrush	FACW
FABACEAE - Legume Family		
Medicago sativa	Alfalfa	UPL
MALVACEAE – Mallow Family		
Malvella leprosa	Alkali Mallow	FACU
MYRTACEAE – Bottlebrush Family		
Eucalyptus camaldulensis	Red Gum	FAC
ONAGRACEAE – Evening Primrose Family		
Ludwigia peploides	Water Primrose	OBL

POACEAE - Grass Family		
Avena sp.	Wild Oat	UPL
Cynodon dactylon	Bermuda Grass	FACU
Distichlis spicata	Salt Grass	FAC
Echinochloa crus-galli	Barnyard Grass	FACW
Hordeum murinum ssp. *leporinum*	Barnyard Barley	FACU
Leptochloa fusca	Sprangletop	FACW
Phalaris minor	Mediterranean Canarygrass	UPL
Polypogon monspeliensis	Rabbit's Foot Grass	FACW
POLYGONACEAE - Buckwheat Family		
Polygonum aviculare	Prostrate Smartweed	FAC
Rumex crispus	Curly Dock	FAC
POTAMOGETONACEAE – Pondweed Family		
Potamogeton nodosus	Long Leaved Pondweed	OBL
RUBIACEAE – Madder Family		
Cephalanthus occidentalis	Button Willow	OBL
VERBENACEAE - Verbena Family		
Phyla nodiflora	Common Lippia	FACW
TAMARICACEAE – Tamarisk Family		
Tamarix sp.	Tamarisk	FACW
TYPHACEAE – Cattail Family		
Typha latifolia	Broadleaf Cattail	OBL
ZYGOPHYLLACEAE – Caltrop Family		
Tribulus terrestris	Puncture Vine	UPL

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR ON THE PROJECT SITE

APPENDIX B: TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR ON THE PROJECT SITE

The species listed below are those that may reasonably be expected to use the habitats of the project site routinely or from time to time. The list was not intended to include birds that are vagrants or occasional transients. Terrestrial vertebrate species observed in or adjacent to the project site during the June 19, 2018 field survey have been noted with an asterisk.

CLASS: AMPHIBIA (Amphibians)
ORDER: SALIENTIA (Frogs and Toads)
FAMILY: BUFONIDAE (True Toads)
Western Toad (*Bufo boreas*)
FAMILY: HYLIDAE (Treefrogs and relatives)
Sierran Treefrog (*Pseudacris sierra*)
FAMILY: RANIDAE (True Frogs)
*****Bullfrog (*Lithobates catesbeianus*)

CLASS: REPTILIA (Reptiles)
ORDER: SQUAMATA (Lizards and Snakes)
SUBORDER: SAURIA (Lizards)
FAMILY: PHRYNOSOMATIDAE
Side-blotched Lizard (*Uta stansburiana*)
SUBORDER: SERPENTES (Snakes)
FAMILY: COLUBRIDAE (Colubrids)
Pacific Gopher Snake (*Pituophis catenifer catenifer*)
Common Kingsnake (*Lampropeltis getulus*)
Common Garter Snake (*Thamnophis sirtalis*)

CLASS: AVES (Birds)
ORDER: CICONIIFORMES (Herons, Storks, Ibises and Relatives)
FAMILY: ARDEIDAE (Herons and Bitterns)
Great Blue Heron (*Ardea herodias*)
Snowy Egret (*Egretta thula*)
Great Egret (*Ardea alba*)
ORDER: FALCONIFORMES (Vultures, Hawks, and Falcons)
FAMILY: CATHARTIDAE (American Vultures)
Turkey Vulture (*Cathartes aura*)
FAMILY: ACCIPITRIDAE (Hawks, Old World Vultures, and Harriers)
*Swainson's Hawk (*Buteo swainsoni*)
Red-tailed Hawk (*Buteo jamaicensis*)
FAMILY: FALCONIDAE (Caracaras and Falcons)
American Kestrel (*Falco sparverius*)
ORDER: GRUIFORMES (Cranes, Rails and Relatives
FAMILY: RALLIDAE (Rails, Gallinules, and Coots)

American Coot (*Fulica Americana*)

ORDER: CHARADRIIFORMES (Shorebirds, Gulls, and relatives)

FAMILY: CHARADRIIDAE (Plovers and relatives)

Killdeer (*Charadrius vociferus*)

ORDER: COLUMBIFORMES (Pigeons and Doves)

FAMILY: COLUMBIDAE (Pigeons and Doves)

*Mourning Dove (*Zenaida macroura*)

Eurasian Collared-Dove (*Streptopelia decaocto*)

ORDER: STRIGIFORMES (Owls)

FAMILY: TYTONIDAE (Barn Owls)

Barn Owl (*Tyto alba*)

FAMILY: STRIGIDAE (Typical Owls)

Great Horned Owl (*Bubo virginianus*)

Burrowing Owl (*Athene cunicularia*)

ORDER: APODIFORMES (Swifts and Hummingbirds)

FAMILY: TROCHILIDAE (Hummingbirds)

Black-chinned Hummingbird (*Archilochus alexandri*)

Anna's Hummingbird (*Calypte anna*)

Rufous Hummingbird (*Selasphorus rufus*)

ORDER: PICIFORMES (Woodpeckers and relatives)

FAMILY: PICIDAE (Woodpecker and Wrynecks)

Northern Flicker (*Colaptes chrysoides*)

ORDER: PASSERIFORMES (Perching Birds)

FAMILY: TYRANNIDAE (Tyrant Flycatchers)

Black Phoebe (*Sayornis nigricans*)

Say's Phoebe (*Sayornis saya*)

*Western Kingbird (*Tyrannus verticalis*)

FAMILY: LANIIDAE (Shrikes)

Loggerhead Shrike (*Lanius ludovicianus*)

FAMILY: CORVIDAE (Jays, Magpies, and Crows)

American Crow (*Corvus brachyrhynchos*)

Common Raven (*Corvus corax*)

FAMILY: ALAUDIDAE (Larks)

Horned Lark (*Eremophila alpestris*)

FAMILY: HIRUNDINIDAE (Swallows)

Cliff Swallow (*Hirundo pyrrhonota*)

*Barn Swallow (*Hirundo rustica*)

FAMILY: TURDIDAE

American Robin (*Turdus migratorius*)

Western Bluebird (*Sialia mexicana*)

FAMILY: MIMIDAE (Mockingbirds and Thrashers)

Northern Mockingbird (*Mimus polyglottos*)

FAMILY: STURNIDAE (Starlings)

European Starling (*Sturnus vulgaris*)

FAMILY: MOTACILLIDAE (Wagtails and Pipits)

American Pipit (*Anthus rubrescens*)

FAMILY: PARULIDAE (Wood Warblers and Relatives)
Yellow-rumped Warbler (*Dendroica coronata*)
FAMILY: EMBERIZIDAE (Sparrows and Relatives)
Savannah Sparrow (*Passerculus sandwichensis*)
White-crowned Sparrow (*Zonotrichia leucophrys*)
FAMILY: ICTERIDAE (Blackbirds, Orioles and Allies)
*Red-winged Blackbird (*Agelaius phoeniceus*)
Tricolored Blackbird (*Agelaius tricolor*)
Western Meadowlark (*Sturnella neglecta*)
Brewer's Blackbird (*Euphagus cyanocephalus*)
Great-Tailed Grackle (*Quiscalus mexicanus*)
Brown-headed Cowbird (*Molothrus ater*)
Bullock's Oriole (*Icterus bullockii*)
FAMILY: PASSERIDAE (Old World Sparrows)
*****House Sparrow (*Passer domesticus*)
FAMILY: FRINGILLIDAE (Finches)
House Finch (*Carpodacus mexicanus*)
Lesser Goldfinch (*Carduelis psaltria*)

CLASS: MAMMALIA (Mammals)
ORDER: DIDELPHIMORPHIA (Marsupials)
FAMILY: DIDELPHIDAE (Opossums)
Virginia Opossum (*Didelphis virginiana*)
ORDER: CHIROPTERA (Bats)
FAMILY: PHYLLOSTOMIDAE (Leaf-nosed Bats)
Southern Long-nosed Bat (*Leptonycteris curasoae*)
FAMILY: VESPERTILIONIDAE (Evening Bats)
Yuma Myotis (*Myotis yumanensis*)
California Myotis (*Myotis californicus*)
Western Pipistrelle (*Pipistrellus hesperus*)
Big Brown Bat (*Eptesicus fuscus*)
Pale Big-eared Bat (*Corynorhinus townsendii pallescens*)
Western Red Bat (*Lasiurus blossevillii*)
Pallid Bat (*Antrozous pallidus*)
FAMILY: MOLOSSIDAE (Free-tailed Bat)
Brazilian Free-tailed Bat (*Tadarida brasiliensis*)
Western Mastiff Bat (*Eumops perotis*)
ORDER: LAGOMORPHA (Rabbits, Hares, and Pikas)
FAMILY: LEPORIDAE (Rabbits and Hares)
Audubon's Cottontail (*Sylvilagus audubonii*)
ORDER: RODENTIA (Rodents)
FAMILY: GEOMYIDAE (Pocket Gophers)
*Botta's Pocket Gopher (*Thomomys bottae*)
FAMILY: MURIDAE (Old World Rats and Mice)
Western Harvest Mouse (*Reithrodontomys megalotis*)
Deer Mouse (*Peromyscus maniculatus*)

Norway Rat (*Rattus norvegicus*)
House Mouse (*Mus musculus*)
California Vole (*Microtus californicus*)

FAMILY: HETEROMYIDAE (Kangaroo Rats)

Heermann's Kangaroo Rat (*Dipodomys heermanni*)

ORDER: CARNIVORA (Carnivores)

FAMILY: CANIDAE (Foxes, Wolves, and relatives)

Coyote (*Canis latrans*)
Red Fox (*Vulpes vulpes*)

FAMILY: PROCYONIDAE (Raccoons and relatives)

Raccoon (*Procyon lotor*)

FAMILY: MEPHITIDAE (Skunks)

Striped Skunk (*Mephitis mephitis*)

APPENDIX C: SELECTED PHOTOGRAPHS OF THE PROJECT SITE

Photo 1: View of project site from Slough Canal looking east down Parlier Ave toward eucalyptus tree with active Swainson's hawk nest.

Photo 2: Lift station to be replaced.

Photo 3: View of project site south of Parlier Ave.

Photo 4: Likely location of staging area in corner of current cotton field.

Photo 5: View of the project site from north end of site. Existing lift station in the distance.

Photo 6: View of the project site from east end of the site looking down a lateral canal toward Slough Canal. Swainson's hawk nest in eucalyptus tree to left.

Photo 7: View of off-site Slough Canal lift station pumps at Colorado Road.

APPENDIX D: U.S. FISH AND WILDLIFE SERVICE SPECIES LIST

IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Fresno County, California

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building

2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. 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.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Fresno Kangaroo Rat Dipodomys nitratoides exilis There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5150	Endangered
Giant Kangaroo Rat Dipodomys ingens No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6051	Endangered
San Joaquin Kit Fox Vulpes macrotis mutica No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2873	Endangered

Reptiles

NAME	STATUS
Blunt-nosed Leopard Lizard Gambelia silus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/625	Endangered
Giant Garter Snake Thamnophis gigas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp Branchinecta lynchi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

THERE ARE NO MIGRATORY BIRDS OF CONSERVATION CONCERN EXPECTED TO OCCUR AT THIS LOCATION.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and

3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

- R5UBFx
- R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular

site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix D. Cultural Resources Inventory and Evaluation

Cultural Resource Inventory and Evaluation for the Tranquillity Irrigation District Southeast Service Area Water Conservation and Conveyance Improvement Project, Fresno County, California

(17-SCAO-166.001)

Jessica Jones, Annie McCausland, Randy Baloian,
Jasmine Kidwell, and Diana T. Dyste

Prepared By

Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

Prepared For
Provost & Pritchard Consulting Group
286 Cromwell Ave.
Fresno, CA 93711

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draft

USGS San Joaquin 7.5-minute quadrangle
5 acres
Keywords: Tranquillity Irrigation District, Slough Canal

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MANAGEMENT SUMMARY

Applied EarthWorks, Inc. (Æ) performed a cultural resources inventory and evaluation for the Tranquillity Irrigation District (TID) Southeast Service Area Water Conservation and Conveyance Improvements Project (Project) in Fresno County, California. The Project would increase the TID's existing water conveyance efficiency through targeted infrastructure improvements to a canal channel and lift-pump stations within the TID. The Project will be partially funded by a WaterSMART Water and Energy Efficiency Grant administered by the Bureau of Reclamation. The Project thus requires compliance with Section 106 of the National Historic Preservation Act (NHPA) and the California Environmental Quality Act (CEQA).

To meet state and federal standards, Æ conducted a cultural resource study under contract to Provost & Pritchard Consulting Group to determine whether cultural resources are present within the Area of Potential Effects (APE). The investigation included: (1) a records search at the Southern San Joaquin Valley Information Center of the California Historical Resources Information System to identify previously recorded cultural resources and prior studies in the 5-acre APE and in a 0.5-mile radius of the APE; (2) a search of the Native American Heritage Commission's (NAHC) Sacred Lands File to identify sacred resources as well as individuals and tribal representatives who may have information about the Project area; (3) an archaeological and built-environment pedestrian survey of the APE; (4) a buried site sensitivity study; and (5) the recordation and evaluation of the TID and the segment of the Slough Canal in the APE.

The SSJVIC records search did not reveal previously recorded cultural resources or prior investigations within the APE or 0.5-mile radius of the APE. A search of the NAHC's Sacred Lands File and outreach to local tribal representatives did not result in the identification of sacred or sensitive areas within the APE that are important to local tribes. Æ forwarded the NAHC results to the BOR, which is responsible for conducting formal consultation and outreach to local tribal representatives in accordance with Section 106 of the NHPA. A segment of TID's Slough Canal was recorded during Æ's pedestrian survey of the APE. The resource was evaluated by Æ and is recommended ineligible for listing in the National Register of Historic Places and California Register of Historical Resources. No additional cultural resources were identified during this inventory.

Consistent with federal statutes, Æ advises that in the event archaeological remains are encountered during Project development or ground-moving activities within any portion of the Project APE, all work in the vicinity of the find should be halted until a qualified archaeologist can identify the discovery and assess its significance. In addition, if human remains are uncovered during construction, the Fresno County Coroner is to be notified to arrange their proper treatment and disposition. If the remains are identified as Native American based on the archaeological context, age, cultural associations, or biological traits, the California Health and Safety Code 7050.5 and Public Resource Code 5097.98 require the County Coroner to notify the NAHC within 24 hours of discovery. The NAHC will then identify the Most Likely Descendent, who will be afforded the opportunity to recommend means for treatment of the human remains following protocols in California Public Resources Code 5097.98.

A copy of this report and the associated cultural resource records will be transmitted to the Southern San Joaquin Valley Information Center for inclusion in the California Historical Resources Information System. Field notes and photographs are on file at Æ's office in Fresno, California.

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1
INTRODUCTION

Applied EarthWorks, Inc. (Æ) performed a cultural resources inventory and evaluation for the Tranquillity Irrigation District (TID) Southeast Service Area Water Conservation and Conveyance Improvement Project (Project). The Project is approximately 2.5 miles south of the community of Tranquillity and 3 miles west of the community of San Joaquin in western Fresno County, California (Figure 1-1). The proposed Project is centered on TID's Slough Canal near the intersection of West Parlier Avenue and South Sonoma Avenue appearing in Sections 20 and 21 of Township 15 South, Range 16 East of the 1963 USGS San Joaquin 7.5-minute topographic quadrangle, Mount Diablo Base Meridian (Figure 1-2).

Because the Project is partially funded by a WaterSMART Water and Energy Efficiency Grant administered by the Bureau of Reclamation (BOR), the TID must comply with Section 106 of the National Historic Preservation Act (NHPA) as well as the California Environmental Quality Act (CEQA). Both the NHPA (36 Code of Federal Regulations [CFR] 800.1[a]) and the CEQA (Public Resources Code [PRC] 21000[g]) mandate that government agencies consider the impacts of their actions on the environment, which includes cultural resources.

1.1 PROJECT DESCRIPTION

The Project will improve water conveyance efficiency within the TID via the replacement of an existing in-stream lift-pump station, replacement of two existing road culverts, and the improvement of approximately 1,100 feet of canal channel. The replacement of an existing 50 cubic feet per second (CFS) lift-pump station and culverts will resolve a bottleneck in the Slough Canal where it passes under West Parlier Avenue and South Sonoma Avenue. A new 100-CFS lift-pump station with three pumps and a discharge line will be installed upstream of West Parlier Avenue. The lift-pump station may be located in the canal channel or integrated into the canal bank. The station will be capable of reverse directional flow to permit water transfers into the TID service area. Channel improvements will include reshaping and lining of the channel section and may include piping along 900 feet of the canal reach. The two replacement road crossings will each consist of two 72-inch-diameter culverts or dual 4 by 5 foot box culverts. An upgrade and relocation of existing electrical utilities for the lift-pump station is anticipated. An electrical power distribution and control panel with a telemetry antenna also will be installed. A suitable staging area for the contractor's use during construction will be provided within the Project area.

1.2 TERMINOLOGY

For the purposes of this report, a cultural resource is defined as a prehistoric or historical archaeological site, or a historical building, structure, or object. Consistent with 36 CFR 60.3, the term "historical" applies to archaeological artifacts and features as well as buildings, structures, or objects that are 50 years old or older. Exception to the 50-year criterion is rare, but does occur (see National Register Bulletin 15). The importance or significance of a cultural resource depends on whether it qualifies at the federal level for inclusion in the National Register of

Figure 1-1 Project vicinity in Fresno County, California.

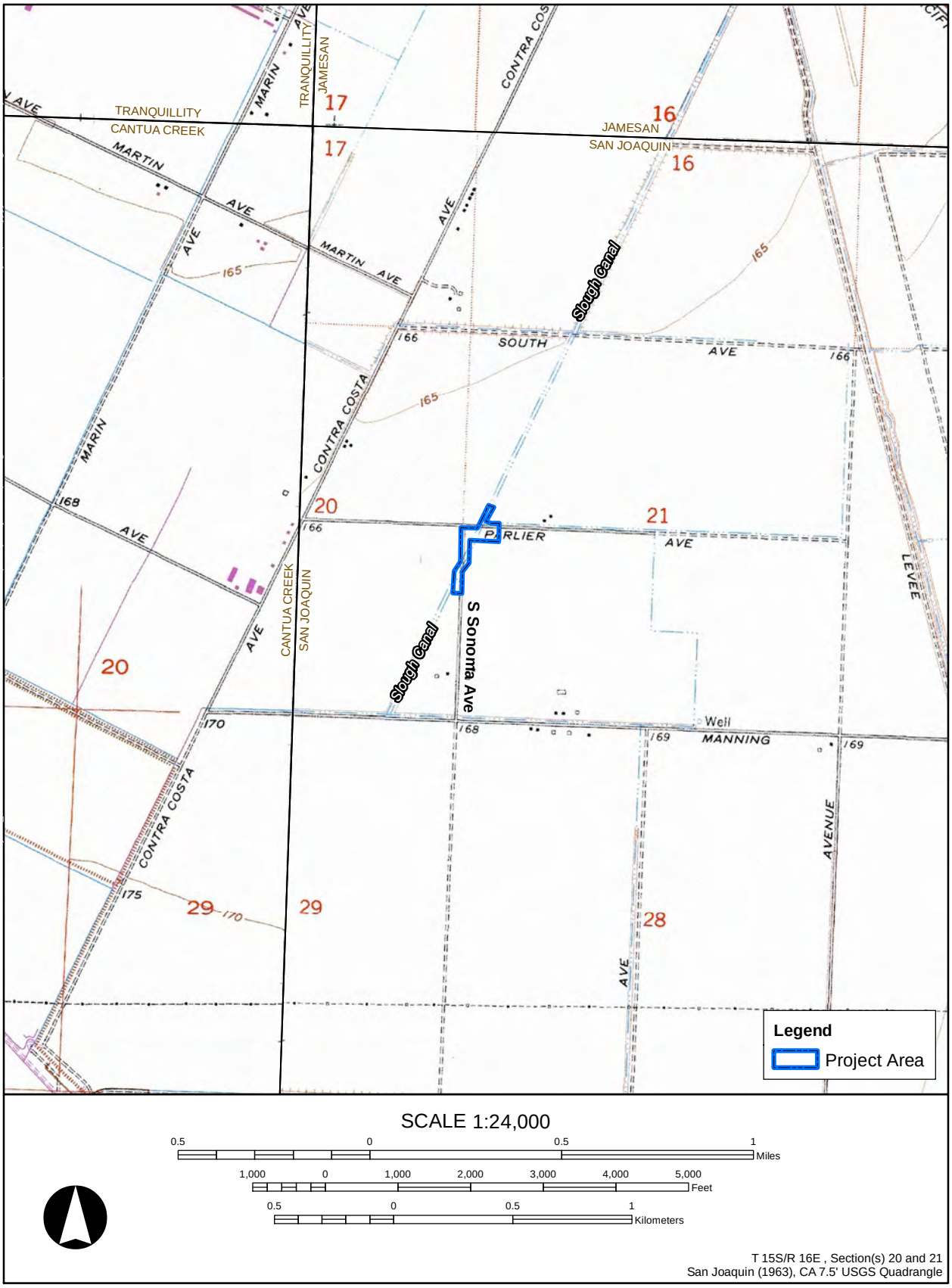

Figure 1-2 Project location on the USGS San Joaquin, CA 7.5-minute topographic quadrangle.

Historic Places (NRHP) or at the state or local level for inclusion in the California Register of Historical Resources (CRHR). Cultural resources determined eligible for inclusion in the NRHP are termed "historic properties," while those eligible for inclusion in the CRHR are called "historical resources" (36 CFR 800.16[l]; California Code of Regulations [CCR] 15064.5[a]). Under both statutes, the determination of eligibility for the NRHP or CRHR is based in part on the consideration of significance criteria as defined in 36 CFR 60.4 and 14 CCR 15064.5(a)(3), respectively. Significance criteria are discussed in further detail in Section 3.6.

To assist the TID with its compliance efforts, and under subcontract to Provost & Pritchard Consulting Group, Æ conducted a cultural resources inventory of the Project to determine whether cultural resources are present within the Project's Area of Potential Effects (APE). The APE is the three-dimensional geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, should they exist. The TID has defined the Project APE to include 15 acres that encompass all areas proposed for installation of project components as described above in Section 1.1 (Figure 1-3). The Project will not exceed a depth of 25 feet below the ground surface.

1.3 PROFESSIONAL QUALIFICATIONS

Æ Senior Archaeologist Diana T. Dyste (M.A.), a Registered Professional Archaeologist (RPA 39362477), served as project manager providing technical and administrative oversight for all aspects of the Project. Ms. Dyste meets the Secretary of the Interior's Standards for Professional Qualifications in Archaeology and Ethnography. Staff Archaeologist Jessica Jones (B.A.) performed the archaeological pedestrian survey, and Architectural Historian Annie McCausland (M.A.) conducted the built environment survey and completed an eligibility evaluation of the TID and Slough Canal with the assistance of Æ Historian Randy Baloian (M.A.). Résumés for key personnel are provided in Appendix A.

1.4 REPORT STRUCTURE

This technical report that has been prepared according to the California Office of Historic Preservation (1990) standards outlined in *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* and fulfills the requirements for a NHPA Section 106 compliant report as outlined by the Bureau of Reclamation in *Reclamation Managing Water in the West, Bureau of Reclamation, Mid-Pacific Region, General Scope of Work for Cultural Resources Investigation in California*, updated April 2012. Following this introduction, Chapter 2 describes the natural environment, prehistoric setting, and ethnography of the Project area, and includes a historic context. Chapter 3 details the methods used for the records search, archival research, outreach to Native American groups, the archaeological and built environment survey, and resource eligibility evaluations. Findings from Æ's inventory of the Project area are presented in Chapter 4, including results of a records search and background research; a search of the Sacred Lands File; an archaeological and built environment pedestrian survey of the APE; and a buried site sensitivity analysis. The NRHP and CRHR eligibility evaluation of the TID and a segment of the Slough Canal are presented in Chapter 5, followed by a summary of the inventory results and recommendations in Chapter 6. Reference cited throughout the document are provided in Chapter 7.

Figure 1-3 Aerial view of the APE.

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2
BACKGROUND

2.1 NATURAL ENVIRONMENT

The Project is in the San Joaquin Valley, the southern half of an elongated trough known as the Great Valley. The Great Valley is a 50-mile-wide lowland that extends approximately 500 miles south from the Cascade Range to the Tehachapi Mountains. The Great Valley is divided by two prominent hydrologic features, the Sacramento and San Joaquin Rivers that drain into San Francisco Bay. Between the Mesozoic and Cenozoic eras the Great Valley served as a shallow marine embayment containing numerous lakes, primarily within the San Joaquin Valley (Norris and Webb 1990:412). As a result, the upper levels of the Great Valley floor are composed of alluvium and flood material. Below these strata are layers of marine and nonmarine rocks, including claystone, sandstone, shale, basalt, andesite, and serpentine. Waters began to diminish about 10 million years ago, eventually dwindling to the drainages, tributaries, and small lakes that have characterized much of the Holocene Epoch (Hill 1984:28).

The San Joaquin Valley is bounded by the Sacramento–San Joaquin Delta to the north, the Sierra Nevada to the east, the Coast Ranges to the west, and the Tehachapi Mountains to the south. The San Joaquin Valley comprises two distinct hydrologic regions: the San Joaquin River and Tulare Lake (Department of Water Resources 2003). The San Joaquin hydrologic region is drained by the San Joaquin River. Before historic drainage projects and modern reclamation, seasonal flooding produced extensive wetlands. Lakes, marshes, and sloughs once covered more than 5,000 square kilometers in the San Joaquin Valley (Moratto 1984:168). The largest of these was ancient Tulare Lake, which occupied a structural basin formed by downwarping and spanned as much as 45 kilometers across from shore to shore (Davis et al. 1959). Along with Buena Vista Lake and Kern Lake farther to the south, Tulare Lake was also partially contained by geological features peculiar to the southern end of the valley. Alluvial fans extending from the Kings River on the east and Los Gatos Creek on the west coalesced long ago into a ridge separating the extreme southern end of the San Joaquin Valley from the north end (Rosenthal et al. 2007). The lands to the south were arid, and runoff often was not able to maintain a discharge through the alluvium. The resulting natural dam formed by these alluvial fans directed all drainages into the basins of Tulare, Buena Vista, and Kern lakes, contributing to the impoundment of these wetlands (Gifford and Schenck 1926:7; Rosenthal et al. 2007). At times of flood, Buena Vista and Tulare lakes formerly spilled into a single subbasin and, combined with waters from the Kern, Kaweah, and Kings rivers, flowed into the San Joaquin Valley hydrologic system (Oakeshott 1978; Wedel 1941). The size of Kern and Tulare lakes fluctuated greatly in response to paleoclimatic changes; however, as a result of historic drainage projects, both are now dry most of the time (Arguelles and Moratto 1983).

The Fresno Slough has historically served as the northern flood outlet of Tulare Lake and the Kings River. The Fresno Slough was also a flooded backwater swamp of the San Joaquin River. Prior to agricultural development and control of the natural waterways, the area between Tulare Lake and the San Joaquin River was a vast swampland. A historical account written by George

Derby, who circa 1850 aspired to travel up the slough that connected the San Joaquin River to Tulare Lake, reported:

> The ground between the lake and the San Joaquin entirely cut up by small sloughs which had overflown in every direction making the country a perfect swamp, which I found it a matter of great difficulty to cross [Yogi 1996:11].

In addition to draining the swampland, agriculture spurred the replacement of native plants and animals with domesticated species. Common native plants today include white, blue, and live oaks (*Quercus* sp.) as well as walnut (*Juglans* sp.), cottonwood (*Populus fremontii*), willow (*Salix* sp.), and tule (*Schoenoplectus* sp.). Also prominent is bulrush (*Schoenoplectus californicus*), cattail (*Typha* sp.), and various grasses, flowers, and saltbrush. The previously swampy valley floor once provided a lush habitat for a variety of animals, including mule deer (*Odocoileus hemionus*), tule elk (*Cervus* sp.), pronghorn (*Antilocapra americana*), grizzly bears (*Ursus arctos ssp.*), black bears (*Ursus americanus*), and mountain lions (*Puma concolor*) (Preston 1981:245–247). Mammals commonly noted today are the gray wolf (*Canis lupus*), valley coyote (*Canis latrans*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), kit fox (*Vulpes macrotis*), and rabbits. Birds in the area include American osprey (*Panidon* sp.), redwing blackbird (*Agelaius phoeniceus*), marsh hawk (*Circus cyaneus*), willow and Nuttall woodpeckers (Picidae), western meadowlark (*Sturnella neglecta*), and quail (Phasianidae). The lakes, rivers, and streams throughout the vicinity provide habitat for anadromous and freshwater fish, including Chinook salmon (*Oncorhynchus tshawytscha*), white sturgeon (*Acipenser transmontanus*), Sacramento perch (*Archoplites interruptus*), rainbow trout (*Oncorhynchus mykiss*), thick-tailed chub (*Gila crassicauda*), and Sacramento sucker (*Catostomidae* sp.) (Preston 1981:249).

2.2 PREHISTORIC SETTING

Relatively few research-oriented archaeological investigations have been conducted in the Central Valley south of the Stockton area, and thus synthesized information on prehistoric events in the area is sparse (Moratto 1984:189, 191–193, 512, 573; Rosenthal et al. 2007). Research in the Project vicinity is rarer still, although a handful of excavations in support of cultural resource management efforts have been performed (Baloian 2007; Baloian et al. 2011; Becker 2003a, 2003b; Dougherty et al. 1993; Lloyd et al. 2014). Although these studies are few in number, the results nonetheless provide valuable information for understanding early human habitation of this region. A summary of available information is presented below.

A cultural sequence for the Central Valley was first proposed in the 1930s after archaeologists from Sacramento Junior College and the University of California, Berkeley, excavated numerous sites in the Delta and lower Sacramento Valley, many of which were mound sites (Heizer 1936; Heizer and Fenenga 1938; Heizer and Krieger 1935–1936; Lillard and Purves 1936; Riddell and Riddell 1940; Wedel 1935). Through an intersite comparison of stratigraphically distinct cultural assemblages, a tri-period chronological sequence was developed for the Delta region that included the Early Horizon, Middle Horizon, and Late Horizon. This chronology was defined primarily in terms of mortuary patterns and ornamental artifacts (Lillard et al. 1939; Moratto 1984:181–183). Efforts to date this widely used Delta sequence were problematic due to the broad geographic and cultural range to which it was applied. More sophisticated dating techniques used by Ragir (1972), Bennyhoff (1972, as cited in Elsasser 1978), Fredrickson

(1974), and others allowed for an improved chronology (Moratto 1984). The prehistory of the mid Central Valley is better understood now in terms of the broad cultural "patterns" proposed by Fredrickson (1974) "which represent fundamental economic, technologic, and often social continuities over large areas and long intervals of time" (Moratto 1984:215).

The chronology presented in Table 2-1 is based on studies conducted in the 1960s along the eastern side of the Diablo Range, west of the Project area. From these studies a cultural sequence was developed that is broadly applicable to the region encompassing the Project area. Excavations conducted for the construction of several reservoirs, including San Luis (Olsen and Payen 1969; Riddell and Olsen 1965; Treganza 1960), Los Banos (Pritchard 1967, 1970), and Little Panoche (Olsen and Payen 1968), led to the development of four cultural complexes focused on the exploitation of the foothill-valley biotic zone (Table 2-1). Further refinement of the chronology is based on archaeological excavations of CA-MER-3, CA-FRE-128, and CA-MER-S-94 (Moratto 1984:189–193).

Table 2-1
Culture Phases in the Western San Joaquin Valley
(adapted from Moratto 1984:191–193)

Phase	Dates	Common Artifacts and Features
Positas Complex	ca. 3300–2600 B.C.	Shaped mortars, short cylindrical pestles, milling stones, perforated flat cobbles, spire-lopped *Olivella* beads
Pacheco B Complex	ca. 2600–1600 B.C.	Foliate bifaces, rectangular *Haliotis* ornaments, rectangular *Olivella* beads
Pacheco A Complex	ca. 1600 B.C.–A.D. 300	Multiple types of *Olivella* beads (often in interments), *Haliotis* disk beads and ornaments, perforated canine teeth, bone awls, whistles, grass saws, large stemmed and side-notched projectile points, milling stones, mortars, and pestles
Gonzaga Complex	A.D. 300–1000	Extended and flexed burials, bowl mortars and shaped pestles, squared and taper-stemmed projectile points, bone awls and grass saws, *Haliotis* ornaments, multiple types of *Olivella* wall beads
Undefined	A.D. 1000–1500	Archaeological sites in the region demonstrate an approximate 500-year hiatus in which there appears to be little to no evidence of cultural occupation during this time.
Panoche Complex	A.D. 1500–1850	Large circular structures; flexed burials; cremations; few milling stones; multiple types of mortars and pestles; bone awls, saws, whistles, and tubes; side-notched arrowheads; clamshell disk beads; *Haliotis* epidermis disk beads; *Olivella* wall beads

Archaeological evidence currently suggests that the earliest occupants of the San Joaquin Valley settled mostly in lakeshore and streamside environments, including Tulare Lake and Lake Buena Vista south of the Project area, and used the foothills seasonally. Early "Paleoindian" sites, typified by fluted points, stemmed dart points, scrapers, and flaked stone crescents, indicate that occupation occurred possibly as early as 11,000 years ago (Fredrickson and Grossman 1977; Sampson 1991). Unfortunately, archaeological data for the Project area and adjacent areas is lacking; therefore, archaeological evidence has been derived from sites to the south, typically near ancient Tulare, Buena Vista, and Kern lakes, and to the north in Merced County.

The ancient shores of Tulare Lake, located southeast of the Project area, has yielded numerous early projectile point styles, including fluted Clovis-like specimens associated with human occupation dating to the late Pleistocene–early Holocene transitions 11,000 or more years ago (Riddell and Olsen 1969). Specifically, excavations at the Witt Site (CA-KIN-32) on the southwest shore, contains fluted projectile points as well as a procession of later types, suggesting continual occupation of the basin until historic contact (Fenenga 1993; Moratto 1984:81–82). The Tulare lakeshore has also yielded various scrapers, flaked stone crescents, Lake Mojave projectile points, and other stone artifacts typical of the Lake Mojave Period, which is presumed to have begun 9500 years before present (B.P.) and lasted to perhaps 7000–6500 B.P. (Hall 1993; Moratto 1984). Thus, the evidence, albeit scant, indicates that the area was frequented at an early date by bands of hunters preying on large herds of game animals. More recent analyses have revaluated these artifacts by examining the changing environmental conditions at the time and considering the mobility and adaptability of the inhabitants (Dillon 2002; Holliday and Miller 2014; Negrini et al. 2006).

In the foothills of the Sierra Nevada to the east of the Project area, investigations at CA-FRE-1671 produced data indicating a Yokuts presence in the San Joaquin Valley by A.D. 1300. Although the site has an earlier component dating between 700 B.C. and A.D. 300, an association with Yokuts is unclear (Price 1992). Earlier excavations at CA-FRE-64 indicate a Yokuts presence in the valley as early as A.D. 1100–1200 (Wallace et al. 1989).

Approximately 36 miles southeast of the Project area near the community of Dos Palos, excavations at CA-MER-323 (Dougherty et al. 1993) revealed a cemetery and intermittent habitation dating to the Pacheco A Complex (1600 B.C.–A.D. 300). The site appears to have been used by small mobile bands that relied on seeds and acorns as well as large game animals, such as elk and deer. Investigations at this site found a very high proportion of ground stone relative to flaked stone artifacts. *Olivella* shell beads were found exclusively in burial contexts, suggesting that these imported coastal beads served a special function within the local culture. The site's constituents were dispersed broadly across an agricultural field, and only systematic testing provided a sufficient amount of data to accurately characterize the site (Dougherty et al. 1993). Two mound sites in the Project vicinity, CA-MER-53 and CA-FRE-42, once contained burials, ground and flaked stone artifacts, and *Olivella* and clay beads (Massey and Hewes 1939; McGeein 1950). Both have been either entirely or partially leveled for agricultural use; however, the brief descriptions on the site records suggest that they are similar to CA-MER-323.

Æ identified a buried prehistoric site (CA-FRE-3529) northwest of the Project area that was dominated by vertebrate faunal remains, flaked and ground stone tools (i.e., handstones, obsidian biface fragments, patterned flake tools), and debitage. Other materials that were present but less frequent include freshwater shell and unmodified quartz crystals (Baloian et al. 2011). The site lies south of the San Joaquin River on the north bank of a remnant slough channel. Excavations yielded limited temporal material; however, radiocarbon dating provided a calibrated (cal) date range circa 2500–550 cal B.C., placing occupation within the Pacheco A and B phases. This period is marked by a distinct adaptive pattern reflecting the emergence of logistically organized subsistence practices and increasing residential stability along river corridors of the Sacramento and San Joaquin valleys.

During investigations for a wetlands reserve near Helm, Æ recorded several prehistoric archaeological sites and 22 prehistoric isolated artifacts along the Fresno Slough and remnant water channels (Baloian 2007). The larger sites contained a rich artifact assemblage, suggesting seasonal occupation by inhabitants engaged in hunting, gathering, and food processing activities. Artifacts indicating ritual or ceremonial activities (e.g., crystals, charmstones) also were observed. Few temporally diagnostic artifacts were discovered to indicate the age of occupation; however, those observed suggest occupation along the slough between 500 and 8,000 years ago.

The impression gained from investigations in the Central Valley and neighboring foothills is one of highly mobile foragers who gradually adapted their technology, settlement patterns, and social structure in response to a changing natural environment. The shift in resource procurement from small animals and hard seeds toward acorns and larger game suggests humans were intensifying their use of food resources while concurrently developing more specialized uses of local resources over time.

2.3 ETHNOGRAPHY

The Project is in the ancestral and ethnographic territory of the Valley Yokuts (Golla 2011:149; Wallace 1978a:462). At the time of first contact with Spanish missionaries, the Yokuts people, which also includes southern valley and foothill groups, collectively inhabited the San Joaquin Valley as well as the eastern foothills of the Sierra Nevada from the Fresno River southward to the Kern River (Kroeber 1976). The Yokuts language belongs to the broader Penutian family, which subsumes a relatively diverse linguistic assemblage including Miwok, Costanoan, Maiduan, Takelma, Klamath-Modoc, Wintuan, and Utian groups (Silverstein 1978). Compared to other Penutian languages, however, Yokuts shows considerable internal linguistic homogeneity despite the vast number of dialects recorded for the language group, especially given the extent of its geographic distribution (Golla 2011:148). Dialects differ minimally and were mutually intelligible, at least among speakers of contiguous groups. This is largely because differences across dialects was lexical rather than phonological, and thus while vocabulary may have differed, sounds and speech patterns largely remained the same (Golla 2011:147–148). This relative lack of linguistic differentiation suggests that ancestors of the Yokuts entered California after the arrival and subsequent radiation of the more linguistically diverse Penutian groups such as the Miwok and Costanoan (Moratto 1984:554).

Native American inhabitants who lived near the Project area would have depended on the rich and varied array of food and material resources available along the banks of the San Joaquin River and nearby Fish Slough. In addition, these river-based groups likely accessed resources via exchange with residents living near the Tulare Lake basin 40 miles southeast of the Project area, and the Fresno Slough to the east. Neighboring Northern Valley Yokuts groups included the Hoyima, Wakichi, and Hewchi, while neighboring Southern Valley Yokuts included the Apyachi (also Apichi), Nutunutu, Tachi, and Chunut (Golla 2011:149; Latta 1977:248; Wallace 1978b:448, 462). There are no known ethnohistoric villages recorded for the Valley Yokuts near the Project area. The nearest recorded villages are *Tape*, located at the great bend of the San Joaquin River and *Wewayo* approximately 20 miles southeast of the Project area, which was occupied by the Southern Valley Yokuts Apyachi tribe (Wallace 1978b:448). Numerous other villages were located around the periphery of Tulare Lake.

Native Americans living in the region relied on the plentiful supply of lacustrine, riparian, and land food resources. The diet included clams, fish, waterfowl, elk, antelope, jackrabbits, small seeds, grass nuts, and tule seeds and roots. Wild seeds and acorns were harvested in the early summer and fall, respectively, and stored for use throughout the year. Controlled seasonal burning was used to enhance the productivity of vegetable foods (Latta 1977). Differences in resource availability and abundance within the home range of each tribe formed the basis for exchange among the Yokuts. For instance, Kroeber (1976:523) pointed out that the rarity of oaks in the areas occupied by Southern Valley Yokuts perhaps explains "the permanent association and commingling of the majority of these tribes with their foothill neighbors." Similarly, ecological differentiation underlay the economic reciprocity that existed among the tribes of the Tulare Lake basin. Lake-dwelling Yokuts possessed an abundant and perennial stock of fish and other lake resources, but often lacked a sufficient supply of seeds and acorns. To the southeast where oaks and grasses are more plentiful, marsh- and channel-dwelling Yokuts, such as the Apyachi, enjoyed a predictable supply of acorns and seeds, but the availability of fish was limited to the windfall of salmon that was harvested during the spawning season (Wallace 1978a:450). The exchange of resources between lake- and channel-dwelling tribes was accomplished not only via trade but through the sharing of home ranges among adjacent groups (Kroeber 1976:484).

Tribal groups living near the San Joaquin River were unlike Southern Valley Yokuts in that they had few permanent dwellings except those that were elevated above the highest flood levels. Families resided in temporary oblong houses made of wood or tule poles and covered with tule mats. Other common structures included sweathouses or ceremonial gathering coverings. Tules were used to manufacture a wide variety of items, including baskets, floor mats, sun shades, curtains, boats, baby cradles, and even women's skirts (Latta 1977). Deer and rabbit skin were used to craft body coverings, and although males infrequently used natural plant dyes for tattoing, women often possessed tattoos consisting of lines, zig-zags, and dots down the chin and extending from the mouth corners.

The basic unit of Yokuts society is the nuclear family; family and kin relations are organized around a totemic moiety system that extended to neighboring tribes. This system included two halves of society in which descendants primarily identified within a patrilineal system (Wallace 1978a:466). The basic political unit was the tribe or tribelet, which encompassed a single village or several settlements. Population figures for villages tend to agree upon 200–300 individuals, while smaller hamlets consisted of 2–3 family units cohabiting (Wallace 1978a:466). The Northern Valley Yokuts were organized under a single leader who at times had an assistant that served the role of messenger or herald (Wallace 1978a:466).

The serial incursion of Spanish, Mexican, and finally northern European settlers irrevocably changed the lifeways of the Yokuts and ultimately led to the near-complete displacement of Native Americans from the valley. With the founding of Mission San Juan Bautista in 1797, Native Americans inhabiting the western portion of the San Joaquin Valley were forcibly recruited to serve at the mission. Latta (1999) writes that virtually all Yokuts living west of the San Joaquin River had been taken to the Spanish missions and that those remaining Indians who survived into the Mexican Period (1821–1846) perished in an 1833 epidemic. However, there are several Yokuts tribal groups that have survived into the present time that have developed language apprenticeship programs and early childhood education centers to serve tribal

members, including the Wukchumne of the Tule-Kaweah near Porterville, Choynimni speakers of the Kings River tribes, Chukchansi at the Picayune and Table Mountain Rancherias near Fresno, and Yawelmani speakers of the Tule River Reservation (Golla 2011:154). Several Yokuts tribal groups are governed by an elders' council and operate auxiliary departments that serve local tribal populations in areas of healthcare, education, and cultural resource management.

2.4 HISTORIC CONTEXT

2.4.1 Western Fresno County Cattle Barons, Irrigation Districts, and Electrical Pumps (1898–1939)

Much like land developers elsewhere in Fresno County, cattle barons on the west side of the San Joaquin Valley, such as Henry Miller and Jefferson James, understood that the value of land in the valley, no matter how large the tract, was limited without control of water. In the mid-1870s, Miller and his partner Charles Lux acquired controlling interest in the San Joaquin & Kings River Canal & Irrigation Company (SJ&KRC&IC) and its voluminous Main Canal; additionally, they built the Chowchilla Canal in 1872 (in conjunction with the California Pastoral and Agricultural Company) and the Aliso Canal in 1899 (Mead 1901:246–247). The Miller & Lux Company's riparian water rights were among the oldest on the San Joaquin River and largely the source of its wealth in the valley. Not surprisingly, the company spent much time and expense in court defending those rights from individuals and entities attempting to establish an appropriative right or preemptive right along the river (Miller 1993:39–66). Some corporations, like the San Joaquin Light and Power Company, did gain legal access to the river's flow, but only after they had struck a deal with the cattle company and acknowledged the primacy of its water rights.

In 1898 when Jefferson G. James, owner of the James Ranch, constructed the Enterprise Canal, with its head above that of the SJ&KRC&IC's Main Canal, it was only a question of time before the two competing interests faced-off in court. James, who owned as much as 70,000 acres, was in the process of converting his pastureland into agricultural land and selling the plots as many other land developers had done in the county (Miller 1993:84–86). Unlike his earlier canals (Table 2-2), which tapped the Fresno Slough, James built the head gate of the Enterprise Canal on the south bank of the San Joaquin River. Presumably the river offered a more abundant and consistent supply of water. The legal battle began in 1899 and persisted through multiple rounds of appeals. In 1915 the California Supreme Court delivered the final ruling in favor of the Miller & Lux Company and the SJ&KRC&IC (Pomeroy 1916:415–447). Despite a plethora of conflicting decisions and convoluted arguments, the protracted dispute did clarify the extent of riparian rights. Throughout the proceedings, James claimed a portion of the river's flow through his purported riparian rights—an assertion which usually trumped appropriative rights. However, his property flanked the Fresno Slough and not the San Joaquin River. As the court determined, even though the slough typically receives a portion of flow from the river, the landowner can only draw those waters that border his property; to rule otherwise would create a chaotic scramble of "every riparian proprietor to go as far up the stream as possible to get water" (Pomeroy 1916:444).

Table 2-2
Fresno Slough and Lower Kings River Canals (Grunsky 1898:58; Mead 1901:305–312)

Name	Head/Source	Year Built	Acreage Irrigated*	Length (mi)*	Comments
Liberty Canal	Cole Slough/Lower Kings River	1882	5,000	15	Early irrigation resulted in alkali leeching; irrigates area north of Riverdale
North Millrace Canal	Murphy Slough/ Lower Kings River	1882	<3,000	12	Irrigates Riverdale area.
Reed Ditch	Murphy Slough/ Lower Kings River	Pre-1886	<2,000	4	Irrigates Elkhorn area
Burrell Ditch	Murphy Slough/ Lower Kings River	1875	?	6	Irrigates Riverdale area
Calamity Ditch	Bough Slough/ Fresno Slough	1894	1,500	6	Irrigates Summit Lake area; water available only from May through July; owners served by canal
Crescent Canal (P-10-044703; P-16-000118)	Bough Slough/ Fresno Slough	1887	9,400	8	Irrigates area west of Fresno Slough; owners served by canal
Stinson Canal (and branches)	Bough Slough/ Fresno Slough	1889	14,000	>10	Irrigates area west of Fresno Slough; owners served by canal
Hite Ditch	Stinson Canal/ Fresno Slough	1889?	500	<5	Former branch of Stinson Canal
James East Side Canal	Murphy Slough/ Fresno Slough	1892–1893	5,000	15	Irrigates area east of Fresno Slough; property of James Ranch
James West Side Canals (No. 1 and No. 2)	Fresno Slough	1889; 1892–1893	>2,000	10 (both)	Irrigates area west of Fresno Slough (wheat and corn); property of James Ranch

*In 1901 (all figures approximate).

Although the Enterprise Canal was eventually abandoned, James did succeed in converting his ranch into agricultural subdivisions and even received some vindication when he bested the SJ&KRC&IC in a later and unrelated trial that solidified his riparian rights along the Fresno Slough (Miller 1993:86). In its advertisements, the James Land Company promoted the fertility of the land for the cultivation of numerous crops, including alfalfa, which could be readily sold for cash to the area's dairies (Clough 1986:135). Specifically, his efforts as well as those of his successors resulted in the following developments and transactions:

- Channelization of the northern reaches of the Fresno Slough by 1901 (Mead 1901:Plate XXIV);
- Dredging of the Fresno Slough and construction of levees by 1906 (Clough 1986:135);
- Subdivision of the Tranquillity Colony by 1909 (Guard 1911:21);

- Continued colonization of the land by the James Land Company following James's death in 1910 (Clough 1986:135; Vandor 1919:253,272);

- Platting of the town of Tranquillity by 1911 (Guard 1911:21);

- Purchase of the James's estate by the Graham Farm Lands Company (owned Benjamin Graham) in 1912, followed in the same year by the acquisition of the former James Ranch by the San Joaquin Valley Farm Land Company (SJVFLC) (Clough 1986:136; Poor's Publishing Co. 1922: 360);

- Organization of and issuance of bonds ($600,000) for Reclamation District No. 1606 by the Fresno County Board of Supervisors in 1914 and 1915, which led to the construction of the James (Fresno Slough) Bypass and levees (Engh 1920:193; James Irrigation District [JID] 2010:1; Walker 1920:57);

- Abandonment of the original James East Side Canal and construction of the current James Main Canal in 1918 by the SJVFLC (JID 2010:1–2);

- Realignment, consolidation, and renaming of the James West Side Canals (No. 1 and No. 2) into the Beta Main Canal, which appears in the 1920 atlas of Fresno County (Adams 1929:233–237; Progressive Map Service 1920:35);

- Drilling of wells for irrigation water by the SJVFLC in the late 1910s and later by the James Irrigation District (JID 2012:2);

- Acquisition of the SJVFLC canal system, including the Main Canal and the Beta Main Canal, by the Tranquillity Irrigation District (established 1918) and the James Irrigation District (established 1920) (Adams 1929:234, 237); and

- Sale of 18,000 acres of SJVFLC subdivisions by 1922 to 475 different buyers, who improved their land with houses, barns, and other structures (Poor's Publishing Co. 1922:360).

No doubt spurred by James's land colony, the Hanford & Summit Lake Railway Company built a line through the heart of his estate, which went into operation sometime around 1912 (Robertson 1998:126). The new 42-mile railroad began in Ingle (in the north part of the study vicinity) and passed through Riverdale before terminating at Hardwick in Kings County. In 1917 the Southern Pacific Railroad acquired the Hanford & Summit Lake line. Similar to the San Pablo and Tulare Railroad from the previous century, some stops along this railroad, namely Tranquillity and San Joaquin, eventually grew into small west side communities. For a time during the early and mid-twentieth century, the Helm and Burrell stations were each surrounded by several buildings, but they never matured into permanent towns. Caldwell stop, which appears on the 1925 USGS San Joaquin quadrangle (but not on the subsequent 1963 version), was a short-lived station with a grocery store (Clough 1986:136).

As discussed above, because James and other farmers did not have access to the Fresno Canal and Irrigation Company (FCIC) system, they were continually looking for novel ways to bring more water (and value) to their property. In this regard, Mead's 1901 report on irrigation

devoted a short section on the use of pumps along the Fresno Slough (Mead 1901:313–314). Four stations—the Whiteside Pump, the Mitchler Pump, the Lee Pump, and the Borland Pump—operated along both sides of the Fresno Slough by the turn of the century. From the descriptions, the pumps were extremely modest machines: they were run by either 150- or 160-horsepower stationary engines or 40-horsepower portable engines that raised water 4–10 feet from the slough and emptied it into a ditch. These simple pumps each irrigated thousands of acres at only 20–35 cents per acre.

Indeed, the irrigation pump was the future of valley agriculture. Its use was particularly suited to the west side of the valley, where water from aboveground canals could be intermittent in availability, less than sufficient in volume, and sometimes expensive. The most common application of the pump was the extraction of water from the underground aquifer through a well. The machine-driven pump worked according to the same physics as the nineteenth century windmill but was capable of achieving much greater capacity and pulling water from greater depths. Also of some commercial importance on the west side was the use of the pump to lift aboveground water from a lower to a higher elevation, enabling canals to irrigate more acreage.

The first two decades of the twentieth century saw the replacement of steam-driven pumps with devices run by other sources of power. At the time, petroleum was a cheap source of fuel and was available in immense quantities from the Coalinga area. Certainly, well pumps were and still are fueled by gasoline, yet most farmers found an even better alternative in hydroelectricity from the waterways flowing from the Sierra Nevada.

The San Joaquin Light and Power Company (SJLPC) originated in 1896 when its precursor, the San Joaquin Electric Company, built the first hydroelectric plant on the San Joaquin River. The company traveled a rocky financial road until 1902 when it was reorganized as the San Joaquin Power Company, which incorporated as the SJLPC in 1910 (Coleman 1952). General Manager Albert G. Wishon was key to the early hydroelectric development of the central Sierra Nevada. His education in electrical and mechanical engineering complemented his business acumen. As with any commercial endeavor, the success of the SJLPC depended on the demand for its product. While working for the Mt. Whitney Power Company in 1899, Wishon convinced an otherwise skeptical group of Lindsay farmers that pumps powered by hydroelectricity were a viable and inexpensive means of extracting groundwater for irrigation (Coleman 1952:204). Wishon's understanding of what the hydroelectric industry could mean to agriculture turned out to be a great boon for the SJLPC. In 1914, the company provided power for the irrigation of 100,000 acres—about one-third of the irrigated lands—in Fresno, Kern, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties. Increasingly more farmers turned to electric pumps to draw groundwater in the following years (INFOTEC Research, Inc. and Theodoratus Cultural Research, Inc. 1985:149). Up to 1930, when PG&E gained controlling interest in the SJLPC, the agricultural sector accounted for the largest portion of the power company's revenue.

As revolutionary as it was for valley agriculture, irrigation by pump did not replace the traditional aboveground conveyance, although canal construction did slow after 1920. Except for government-sponsored structures, privately financed canals of any consequence were rarely built after this time.

Perhaps just as revolutionary in Fresno County was the advent of the irrigation district, which was introduced in the county relatively late in valley history. By 1920 when the Fresno Irrigation District (FID) was founded, the Modesto Irrigation District and the Turlock Irrigation District not only had been delivering irrigation water for two decades but had integrated electrical power generation into their operations. Despite being incorporated more than 30 years later, the FID arose from an outcry for public water and owners' discontent with private canal companies. In 1917 the FCIC reincorporated into the Fresno Canal and Land Corporation, which sold water to farmers at a rate of $0.625 per acre (first- and second-class rights) under a contract regulated by the State Railroad Commission (Adams 1929:205). By this time the nearly 50-year-old FCIC infrastructure was showing its age, and prior to its contract's expiration in 1921, the irrigation company requested that the commission approve a substantial increase in rates to $3.40 per acre. As was usually the case in such negotiations between utilities and their regulating bodies, the Fresno Canal and Land Corporation claimed that along with meeting expenses, it required greater revenue to ensure a fair investment return to its stockholders. Realizing what a 540 percent rate hike would mean to their bottom line, nearly 800 area farmers quickly took matters into their own hands and successfully petitioned the Fresno County Supervisors for the formation of an irrigation district. With ample capitalization from a bond issue, the FID purchased the canal system in May 1921 and immediately set out to replace the old weirs, gates, and other water-control mechanisms with modern devices and structures. Comparison of the original routes of the FCIC canals with their undated paths suggests that the FID additionally rechannelized stretches of the alignment, presumably to improve flow. By and large, however, the courses of the old FCIC canals have remained remarkably consistent for the past 140 years.

Based on Frank Adams (1929:223–238) account of irrigation districts in California, the TID (established 1918) actually preceded the FID by 2 years. Again, dissatisfaction with the service of the private canal company was the primary reason for district creation. Other districts within western Fresno County founded after or at the time of the FID, include the Riverdale Irrigation District (1920), the Laguna Irrigation District (1920), the James Irrigation District (1920), the Stinson Irrigation District (1921), and the Crescent Irrigation District (1925). At the time of Adams' report, the Crescent, Stinson, James, and Tranquillity districts were members of the Kings River Water Association (KRWA), founded in 1927.

2.4.2 Tranquillity Colony

The colony of Tranquillity was once the location of Jefferson James's ranch. His ranch was along the Fresno Slough, a northern flood outlet of the Kings River and a flooded backwater swamp of the San Joaquin River (Tranquillity Irrigation District 2011:2). Being so close to the Fresno Slough, this land was prone to flooding. Small levees and rudimentary irrigation systems were installed to control water flow (Adams 1929:236).

James was able to secure riparian rights to the Fresno Slough for his adjacent land holdings, including the future Tranquillity Colony. With land, water rights, and the beginnings of an irrigation system, James founded the James Canal Company. He acquired the Beta Canal, which had been constructed in 1899 by tenants on the ranch, and established a steam-powered pumping plant along the Fresno Slough. The irrigation water and an irrigation system allowed James to subdivided his land into agricultural colonies and sell plots within these colonies to land developers and farmers. One of these is the Tranquillity Colony.

The Tranquillity Colony was founded in 1909 as a subdivision of the James Land Company as illustrated in 1907 and 1913 maps shown in Figure 2-1. The most notable change within this 6-year period was the reclamation and subdivision of the land for agricultural purposes. The wide watercourse shown in the center of 1913 image is the Fresno Slough, which by 1901 had been channelized and resembled its current linear course (Mead 1901:Plate XXIV). The train station at "Gravesboro," shown on the 1913 map, was previously known as "Graham" and later by its present-day name San Joaquin (Clough 1986:135).

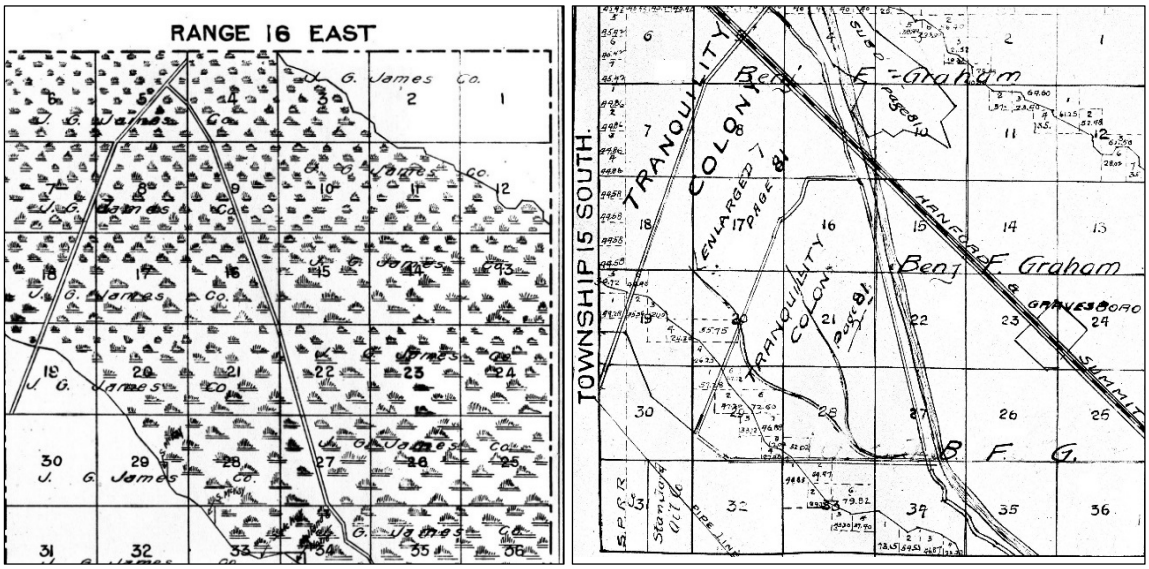

Figure 2-1 Comparison of Township 15 South, Range 16 East from Harvey's (1907:38) atlas of Fresno County (left) and the same area depicted in Guard's (1913:37) atlas (right).

The SJVFLC purchased a large portion of the Tranquillity Colony in 1912 (Adams 1929:236) and also acquired the James Canal Company and its water rights. The proximity of the slough made Tranquillity an ideal location for small-scale farming. Differences in the types of crops, in turn, related directly to the structure of landownership in the area. Grain cultivation and raising livestock typically require large parcels for commercial success, while premium crops were profitably grown on irrigated parcels as small as 5 acres. One of the most popular crops farmed in the area was cotton, which is still grown within the Project area today.

Lots 9, 10, 21, and 20 in Subdivision No. 8 of the Tranquillity Colony

The Project area includes sections of Lots 9, 10, 20, and 21 of Subdivision No. 8 of the Tranquillity Colony. Subdivision No. 8, Parlier Avenue, and Sonoma Avenue were established circa 1910, as shown on the 1911 Fresno County atlas (Figure 2-2; Guard 1911). In 1913, J. H. Stricklin owned Lot 9 (90.5 acres) and Lot 10 (60.45 acres). N. Clausen owned Lot 20 (40.30 acres), and J. P. Jorgenson owned Lot 21 (40.31 acres) as shown in Figure 2-3. In 1920, Lots 9 and 10 were subdivided into smaller lots (Progressive Map Service 1920). Lot owners included J. H. Stricklin, J. P. Caldeia, M. S. Lopes, E. M. Farland, San Joaquin Valley Farm Lands Company (SJVFLC), and R. Pylo. E. B. Brown owned Lot 20 and J. R. Jorgensen and SJVFLC owned Lot 21 (Figure 2-4).

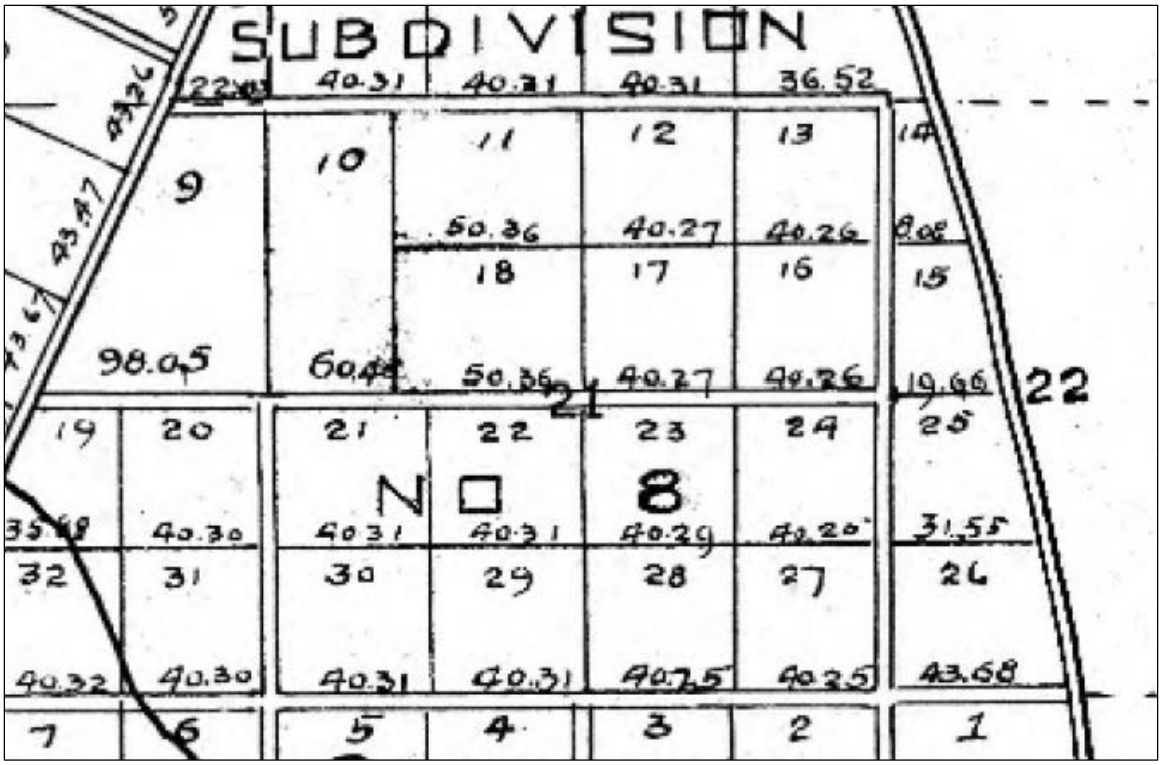

Figure 2-2 **Subdivision No. 8, Parlier Avenue, and Sonoma Avenue as shown in the 1911 Fresno County atlas (Guard 1911).**

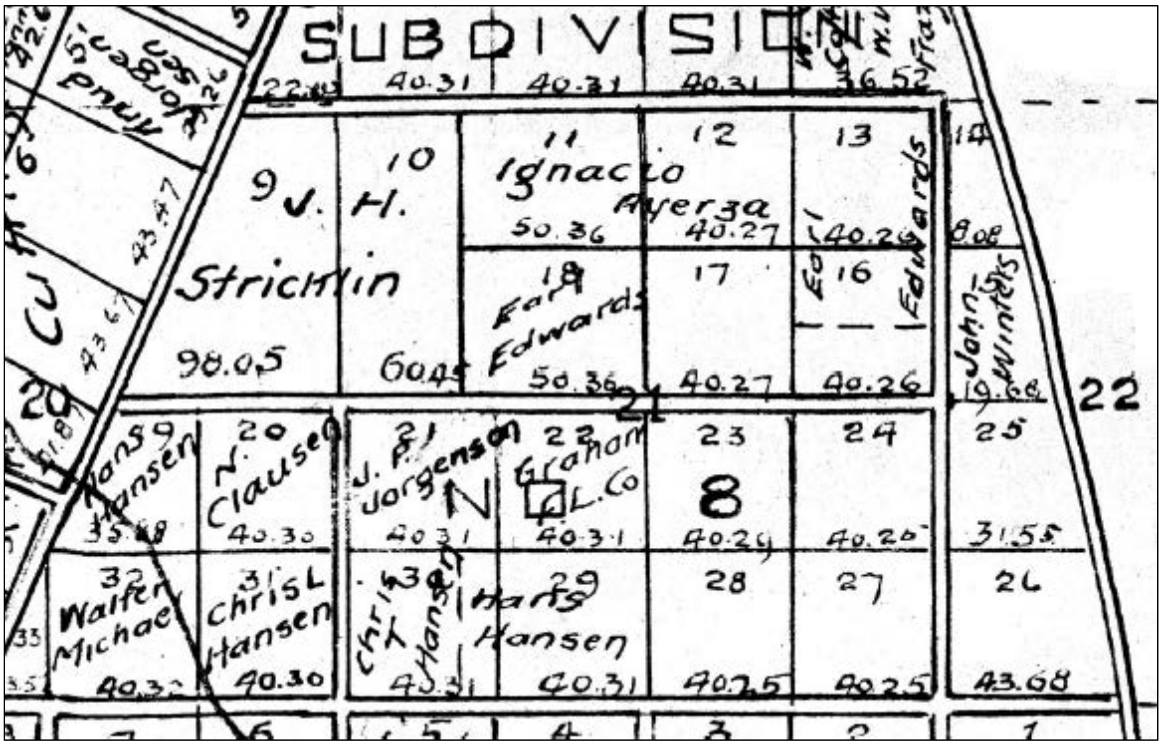

Figure 2-3 **Lots 9, 10, 20, and 21 of Subdivision 8 within the Tranquillity Colony in 1913 (Guard 1913).**

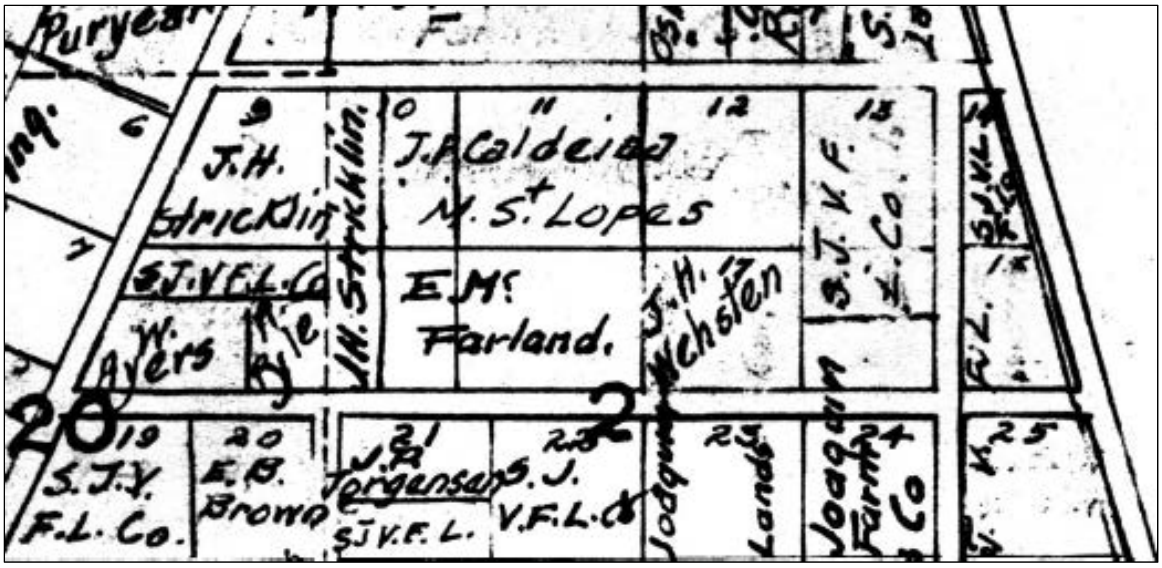

Figure 2-4 Lots 9, 10, 20, and 21 of Subdivision 8 within the Tranquillity Colony in 1920 (Progressive Map Service 1920).

2.4.3 Tranquillity Irrigation District

The TID was created in 1918 as result of consumer dissatisfaction with the ditch maintenance and service of the James Canal Company, a privately owned irrigation subsidiary of the SJVFLC. There were approximately 300 consumers who irrigated about 11,000 acres within the Tranquillity community (Barnes 1920: 92). Their plan was to take over the James Canal Company's ditches and water rights, including the pumping plant on the Fresno Slough. They filed a petition to take over the company in 1917. The TID was founded on January 22, 1918, making it one of the earliest public water districts in Fresno County (Tranquillity Irrigation District 2011). In 1919 the James Canal Company transferred all of its irrigation facilities within and around Tranquillity. The TID was managed by an elected board of directors comprised of local farmers, politicians, and businessmen. C. F. Goodrich was a director of the TID in 1919 (Vandor 1919:1364). In early 1920, the TID awarded a $260,000 contract to J. E. Johnston for construction of new ditches as well as reconstruction of older ones (Southwest Builder and Contractor 1920).

Integral to the construction and operation of the TID system was the expansion of the electrical grid of the Fresno-based SJLPC. In 1920 the SJLPC constructed an electrical substation on SJVFLC land, a high-voltage electric power transmission line of about 5,000 volts from a station near the city of Fresno, and another 11,000-volt transmission line connecting the new substation to a TID pumping plant. Distribution lines were installed within the TID service area (State of California Railroad Commission 1922:300–303). Prior to the arrival of SJLPC electricity, pumps were driven by steam power. The new electrical infrastructure provided the TID with a more reliable and inexpensive source of power to run its pumps and other machinery. Moreover, electricity was necessary to power the district's larger "lift" pumps, which were apparently an important component of the district's operation from the beginning. As early as the 1910s, lift technology provided valley irrigators with the means to convey water up the gradient (i.e., from a

lower to higher elevation), thereby bringing water to otherwise unirrigated plots and expanding their areas of service.

Comparison of the 1920 Fresno County atlas, plotted prior to TID construction, with later USGS topographic maps, plotted just after (or during) the initial construction episode, indicates that most of the district's early conveyances were built in 1920–1921. Moreover, the linear alignments and uniform spacing of the TID canals and laterals—a common spatial pattern found in lift systems—strongly suggests that they were built together as an integrated network at that time. There is no evidence that they were previously stand-alone canals and ditches that were recast and incorporated into the district's system. One exception was the Beta Main Canal. Built in 1899, this gravity-flow canal followed a meandering course along the southwest boundary of the TID (Baloian 2015). The TID acquired two-thirds interest in the Beta Main Canal from the James Canal Company following the district's creation; the other third eventually passed from the canal company to the neighboring James Irrigation District (Adams 1929:234, 237; California Public Utilities Commission 1919:311–313). Adams' (1929:236–238) report of the system from the late 1920s indicates that the TID employed newer lift technology alongside the more conventional use of pumps to draw, convey, and regulate irrigation water; at the time, sources included the Fresno Slough, ground water, and the Beta Main Canal.

In the 1950s, the BOR constructed the Delta-Mendota Canal, which terminates at the Mendota Pool. The pool provides a storage reservoir at the confluence of the San Joaquin River and the Fresno Slough. BOR acquisition of the water rights of various local irrigators helped quell litigation over water use and brought much needed stability to the local irrigation industry. The TID turned over its water rights to the BOR in 1963. In exchange the TID received a large quantity of water and the opportunity to purchase supplemental water. The TID also negotiated its Kings River water rights with other users to make more efficient use of the river water. In exchange, Kings River water constituents help fund the TID's supplemental water purchases from the BOR (Tranquillity Irrigation District 2011:2).

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3
METHODS

Æ consulted various sources as part of the background studies prior to engaging in pedestrian survey of the Project area. Æ synthesized records and literature housed at the at the Southern San Joaquin Valley Information Center (SSJVIC) of the California Historical Resources Information System (CHRIS) as well as consulted archival and literary resources pertaining to the prehistory, ethnography, and history of the Project APE and 0.5-mile surrounding vicinity. In addition, as part of general Best Practices in cultural resources management, Æ contacted the Native American Heritage Commission (NAHC) and conducted nongovernmental tribal outreach. Methods related to these efforts is summarized below. The chapter concludes with a description of methods used during fieldwork and evaluation of the TID and Slough Canal.

3.1 RECORDS SEARCH

Æ requested a records search of the CHRIS from the SSJVIC at California State University, Bakersfield, on July 9, 2018. The records search encompassed the APE and all land within a 0.5-mile radius of the APE. Sources consulted included archaeological site and survey base maps; reports of previous investigations; cultural resource records; and the listings of the Historic Properties Directory of the Office of Historic Preservation, Archaeological Determinations of Eligibility and the California Inventory of Historic Resources (Appendix C). The objective of this records search was twofold: (1) to identify prior cultural resource investigations completed in or near the APE and (2) to identify previously recorded prehistoric or historical cultural resources within the Project APE.

3.2 ARCHIVAL RESEARCH

The purpose of archival research for archaeological and built environment studies is to provide information regarding the potential for historical deposits to exist within a project APE. The investigation compiled information from several sources, including:

- Map Aerial Locator Tool (MALT), Henry Madden Library, California State University, Fresno (http://malt.lib.csufresno.edu/MALT/);
- Various online resources for historical maps and documents;
- Applied EarthWorks' in-house library, which includes maps and local histories; and
- Historical records and literature housed at the CHRIS South Central Coastal Information Center on the campus of California State University, Fullerton.

Information on irrigation districts within Fresno County and an overall historic context for western Fresno County was extracted from *Cultural Resources Inventory and Evaluation for the Central Valley Power Connect Project* (Asselin et al. 2016). Æ's architectural historian gathered information specific to the history and development of the Tranquillity Irrigation District from *Water Management Plan: 2005–2009* (Tranquillity Irrigation District 2011) and several state

bulletins including, *Use of Water from Kings River, California, 1918* (Barnes 1920) and *Irrigation Districts in California* (Adams 1929), and *Decisions of the Railroad Commission* (State of California 1922).

3.3 NATIVE AMERICAN OUTREACH

On July 9, 2018, Æ sent an e-mail to the Native American Heritage Commission (NAHC) requesting a search of its Sacred Lands File and contact information for local Native American representatives who may have an interest in sharing information about the Project APE and 0.5-mile surrounding area. The NAHC responded on July 23, 2018, with its findings and attached a list of Native American tribal representatives who are culturally affiliated with the Project area. Æ included the results of the Sacred Lands File search in Chapter 5 (see next chapter) and forwarded the NAHC results to the BOR on July 31, 2018. The BOR is responsible for conducting government-to-government tribal consultation in accordance with NHPA Section 106.

3.4 ARCHAEOLOGICAL AND BUILT ENVIRONMENT SURVEY

On August 7 and October 5, 2018, Æ Staff Archaeologist Jessica Jones conducted an archaeological survey of the 15-acre APE. The archaeological survey was completed using parallel zig-zag transects spaced 5–10 meters apart and covered the entire APE. Jones photographed the area using an Olympus TG-860 digital camera and recorded observations on Survey Field Record forms. Associate Architectural Historian Annie McCausland completed the built environment survey of the 15-acre APE. The built environment survey focused on recording one known historical built environment structure—the Slough Canal. McCausland documented the resource on the appropriate Department of Parks and Recreation (DPR) 523 series forms (see Appendix D). All photographs, field notes, and resource records are on file at Æ's Fresno office.

3.5 BURIED SITE SENSITIVITY ANALYSIS

Æ Geoarchaeologist Jasmine Kidwell conducted a geologic review of the APE to identify the potential for buried cultural resources. She consulted geological maps, historical maps, geologic/sediment databases, geoarchaeological studies, and soil surveys documenting areas within the APE. These sources provided information regarding the natural watercourses in the area as well as data about local soils and sediments, parent rock formations, and historical vegetation. This information was used to estimate the age of the sediments surrounding the APE, consider the hydrologic and geologic forces that created and placed these sediments, and assess the probability of encountering buried cultural resources during Project activities. References used in completing the analysis are cited in Chapter 4.

3.6 NATIONAL REGISTER AND CALIFORNIA REGISTER EVALUATION

To determine if management considerations to mitigate adverse effects are necessary for the proposed Project, the TID and a segment of its Slough Canal recorded within the APE must first be evaluated for eligibility to be listed in the NRHP or CRHR. If the resource qualifies as a historic property/historical resource, the potential for the Project to cause an adverse effect or significant adverse change to the qualities of the resource that make it eligible will require

assessment and the effects may be subject to mitigation. Cultural resources that are not eligible for the NRHP or CRHR do not require such consideration. The National Park Service (NPS) has established a process for identifying, evaluating, and assessing effects to cultural resources. Practically speaking, determinations made within a federal regulatory context are almost always universally accepted for purposes of identifying, evaluating, and assessing impacts under CEQA.

The first threshold in this process is to ascertain whether a site or built environment property within the Project APE is old enough to be considered a cultural resource and, accordingly, eligible for federal and/or state registers. Consistent with 36 CFR 60.4, to be eligible for the NRHP, an archaeological or built environment resource must be 50 years old or older. Except under exceptional circumstances (National Park Service [NPS] 2002:25–43), sites and properties less than 50 years old are dismissed from further consideration. If a cultural resource is found to meet this age criterion, the following sequential steps apply:

- Classifying the resource as a district, archaeological site, building, structure, or object;
- Determining the theme, context, and relevant thematic period of significance with which the resource is associated;
- Determining whether the resource is historically important under a set of significance criteria; and
- If significant, determining whether the resource retains integrity.

In California, cultural resources are usually classified according to *Instructions for Recording Historical Resources*, published by the California Office of Historic Preservation in 1995. This handbook contains listings of resource categories for historical and prehistoric sites as well as standing structures. For built environment resources, it is additionally helpful to define a property's economic dimensions (e.g., commercial vs. residential, urban vs. rural, agricultural vs. industrial). In this regard, *Historical Context and Archaeological Research Design for Agricultural Properties* (California Department of Transportation 2007) is a useful guide for categorizing rural resources.

The historic context establishes the framework within which decisions about significance are based (NPS 2002:9). The evaluation process essentially weighs the relative importance of events, people, and places against the larger backdrop of history. Within this process, the context provides the comparative standards and/or examples as well as the theme(s) necessary for this assessment. According to the NPS (2002:9), a theme is a pattern or trend that has influenced the history of an area for a certain period. A theme is typically couched in geographic (i.e., local, state, or national) and temporal terms to focus and facilitate the evaluation process.

Significance is based on how well a subject resource represents one or more themes through its associations with important events or people and/or through its inherent qualities. A resource must demonstrate more than just association with a theme; it must be a good representative of the theme, capable of illustrating the various thematic elements of a particular time and place in history. In order to be included in the NRHP and thus be considered a historic property per 36 CFR 800.16(l), 36 CFR 60.4 defines four criteria for evaluation:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Similarly, according to the CEQA Guidelines, in order for a resource to be eligible for the CRHR, it must meet at least one of the criteria defined in California PRC 5024.1(c):

> (1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
>
> (2) Is associated with the lives of persons important in our past.
>
> (3) 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.
>
> (4) Has yielded, or may be likely to yield, information important in history or prehistory.

To be included in the NRHP and CRHR, a resource must not only possess historical significance but also the physical means to convey such significance—that is, it must possess integrity. Integrity refers to the degree to which a resource retains its original character. To facilitate this assessment, the NPS (2002:44–45) provides the following definition of the seven aspects of integrity.

1. Location is the place where the historic property was constructed or the place where the historic event occurred;

2. Design is the combination of elements that create the form, plan, space, structure, and style of a property;

3. Setting is the physical environment of a historic property;

4. Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property;

5. Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;

6. Feeling is a property's expression of the aesthetic or historic sense of a particular period of time; and,

7. Association is the direct link between an important historic event or person and a historic property.

Assessing integrity of a significant historical resource depends on an understanding of the components or features that give it significance. For this reason, the issue of integrity is addressed only after significance has been established. Moreover, cultural resources that are not significant per NRHP and CRHR criteria are by definition not eligible to either register and do not require an integrity assessment.

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4
RESULTS

4.1 RECORDS SEARCH

On July 24, 2018, the SSJVIC responded to Æ's records search request (Records Search File No. 18-299) and stated that there have been no previously identified cultural resources or previous cultural resource studies in the APE or within a 0.5-mile radius of the APE. A copy of the SSJVIC response is provided in Appendix B.

4.2 ARCHIVAL RESEARCH

In order to obtain information on historical developments within the Project area, Æ Architectural Historian Annie McCausland conducted archival research. She examined historical maps, including the San Joaquin, CA (1925, 1946, 1963), 7.5-minute USGS quadrangle maps and maps in various Fresno County atlases (1909, 1911, 1913, 1920), to identify historical structures and property ownership within the Project area. McCausland also reviewed aerial photographs dating from 1946, 1958, 1962, 1971, 1998, 2005, 2009, 2010, 2012, and 2014 to identify historical land use of the area and changes within the built environment (NETROnline 2018). Historical maps illustrate that the Project area and general vicinity have comprised agricultural properties since at least 1911. Historical aerial photographs demonstrate the land within the Project area has been under agricultural cultivation since at least 1946 (NETROnline 2018). Three buildings are visible on the 1925 USGS quadrangle map near the Project area (USGS 1925). The building illustrated east of the canal is an extant early twentieth-century dwelling. The dwelling is outside the APE. Established in 1918, the TID began construction of its facilities in 1920. The Slough Canal was built from 1920 to 1921 as one of TID's early conveyances intended to irrigate these agricultural properties (Progressive Map Service 1920; USGS 1925).

4.3 NATIVE AMERICAN OUTREACH

In its July 23, 2018, response to Æ's request, the NAHC stated that a search of the Sacred Lands File did not indicate the presence of resources in the immediate Project APE (see Appendix C); however, the NAHC cautioned that the absence of specific site information in the Sacred Lands File does not indicate the absence of tribal cultural resources in the Project area. The NAHC suggested contacting other sources who might have specific knowledge regarding Native American use of the Project area and provided contact information for 12 Native American representatives, including:

- Chairperson Elizabeth Kipp, Big Sandy Rancheria of Western Mono Indians
- Chairperson Carol Bill, Cold Springs Rancheria
- Chairperson Robert Ledger Sr., Dumna Wo-Wah Tribal Government
- Chairperson Dick Charley, Dunlap Band of Mono Indians

- Stan Alec, Choinumni Farm Tribe
- Chairperson Ron Goode, North Fork Mono Tribe
- Chairperson Rueben Barrios Sr., Santa Rosa Indian Community of the Santa Rosa Rancheria
- Chairperson Leanne Walker-Grant, Table Mountain Rancheria of California
- Cultural Resources Director Bob Pennell, Table Mountain Rancheria of California
- Chairperson David Alvarez, Traditional Choinumni Tribe
- Rick Osborne, Traditional Choinumni Tribe
- Chairperson Kenneth Woodrow, Wuksache Indian Tribe/Eshom Valley Band

On July 31, 2018, Æ transmitted the results to the BOR, which is responsible for conducting all outreach and consultation with tribal representatives.

4.4 ARCHAEOLOGICAL AND BUILT ENVIRONMENT SURVEY

On August 7, 2018, Æ Staff Archaeologist Jessica Jones and Architectural Historian Annie McCausland conducted pedestrian archaeological and built environment surveys of the 5-acre APE. Jones intensively surveyed the area for prehistoric and historic-era archaeological resources, and McCausland surveyed the area for built environment resources over 50 years old. The survey area includes portions of Assessor's Parcel Nos. (APN) 03022030, 03021033S, and 03022013 (Figure 4-1). Jones returned to the area on October 5, 2018, to complete an intensive archaeological survey of a portion of the APE that was inaccessible during the initial field visit. At the time of survey the parcels were cultivated for tomatoes, cotton, and almonds. The TID's Slough Canal vertically bisects the APE; its lateral (SL2), which is roughly perpendicular to the canal and extends to the east, is also within the APE.

Ground visibility within the APE ranged from poor (less than 5 percent) to excellent (100 percent). The canal berms, shoulders of South Sonoma and West Parlier avenues, dirt access roads, and almond orchards within the APE provided excellent ground visibility (Figure 4-2). Ground visibility within the western and southern margins of the APE was generally poor due to the presence of dense tomato and cotton crops (Figure 4-2). Soils within the APE are light brown clay interspersed with gravels and small cobbles.

4.5 FINDINGS

No prehistoric or historic-period archaeological resources were encountered within the Project APE during the field survey. However, Æ identified one historic-era built environment resource, a segment of the TID Slough Canal (Figure 4-3). DPR cultural resource record forms for the TID Slough Canal segment are included in Appendix D.

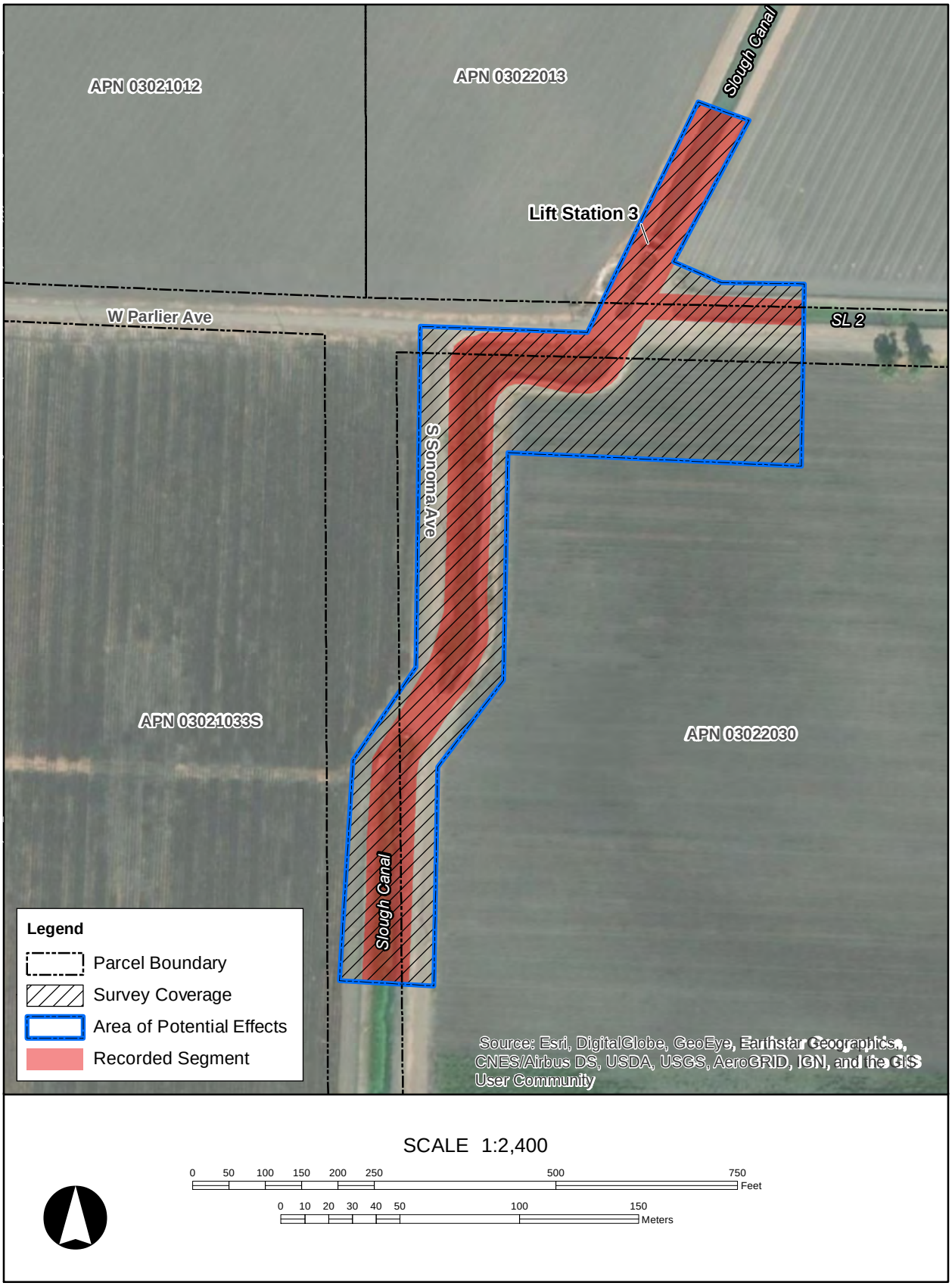

Figure 4-1 Aerial view of survey coverage and recorded segment of the TID Slough Canal.

Figure 4-2 **Representative overview of ground visibility within almond orchards and road shoulders (left) and within cotton and tomato fields (right).**

Figure 4-3 **Slough Canal showing vertical lift pump system, concrete lining, and turnouts, facing north.**

4.5.1 Tranquillity Irrigation District Slough Canal

The Slough Canal is an earthen canal within the TID measuring approximately 25,344 feet long (Tranquillity Irrigation District 2011). The main branch of the canal flows generally southward from its head on the Fresno Slough in the center of Township 15 South, Range 16 East, Section 9 to the northwest quarter of Section 29 (see Appendix D). Six laterals (designated as SL1, SL2, etc. on the district map) radiate from the main branch to deliver water to individual properties. The main branch and laterals include four in-line lift stations and three off-line lift stations. The TID Slough Canal also receives water from the neighboring James Irrigation District when needed.

Located in proximity to in-line Lift Station 3 and the intersection of Parlier and Sonoma avenues, the recorded segment of the main branch of the Slough Canal measures approximately 1,418 feet long and 35–45 feet wide from bank to bank. The segment also includes a portion of SL2 measuring approximately 201 feet long and 18 feet wide from bank to bank; this lateral flows due east from the main branch. Lift Station 3 is north of Parlier Avenue. The station features a metal grate debris filter, two vertical pumps set in a concrete foundation, a concrete block splash wall, and a metal walkway with railing across the canal. Immediately south of the pumps the canal is lined with concrete and has four concrete posts with attached beams that span the width of the canal. The vertical concrete-lined lift segment is approximately 122 feet long. The lined portion of the Slough Canal also features three turnouts on the east side. A concrete culvert diverts the canal under Parlier Avenue. Another concrete culvert diverts the canal under Sonoma Avenue. South of Sonoma Avenue there is a turnout on the west side. The earthen portions of the canal contains heavy vegetation growth.

The Slough Canal is visible on the 1925 USGS San Joaquin topographic map (Figure 4-4). The map, which was surveyed in 1923, shows the location of the recorded segment. SL2 does not appear on the 1925 map but does appear on the 1963 version.

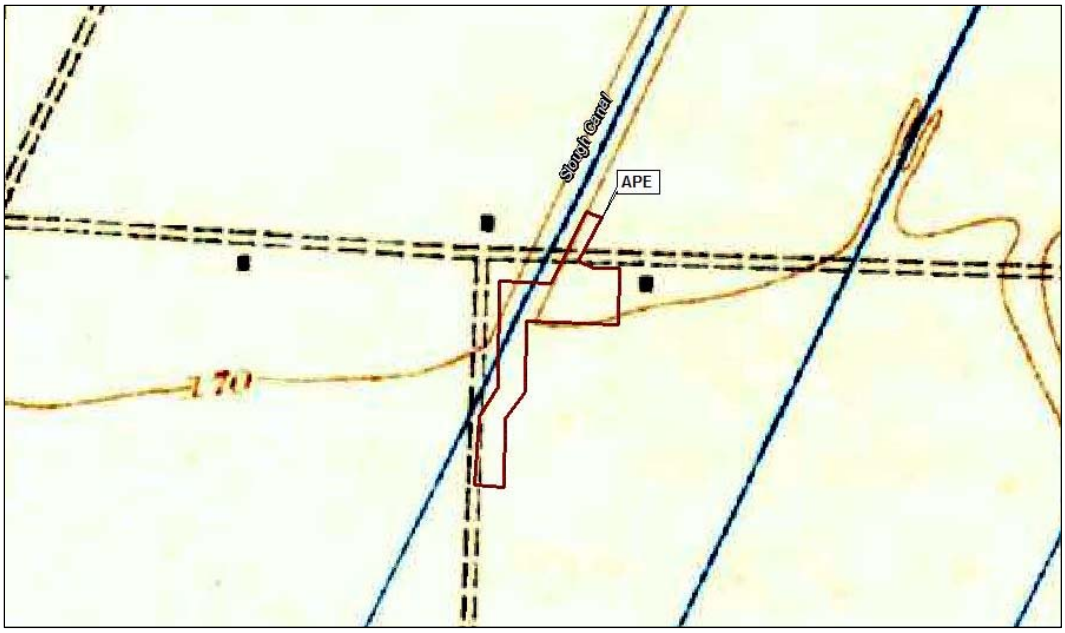

Figure 4-4 Canal alignment depicted on the USGS 1925 topographic quadrangle.

Historical maps and aerial photographs available on NETROnline reveal that the section of Slough Canal immediately south of Parlier Avenue has been reoriented by 1971 from its original diagonal path to a north–south alignment along Sonoma Avenue. By 1998 the entire segment of the canal south of Parlier Avenue was also reoriented to a north–south alignment south to Manning Avenue (Figure 4-5). The vertical lift system and concrete lining within this segment of the canal had been constructed by 1962 (NETRonline 2018). The extant vertical pumps (Figure 4-3) were installed sometime in the early 2000s according to TID Assistant General Manager Rodney Wade.

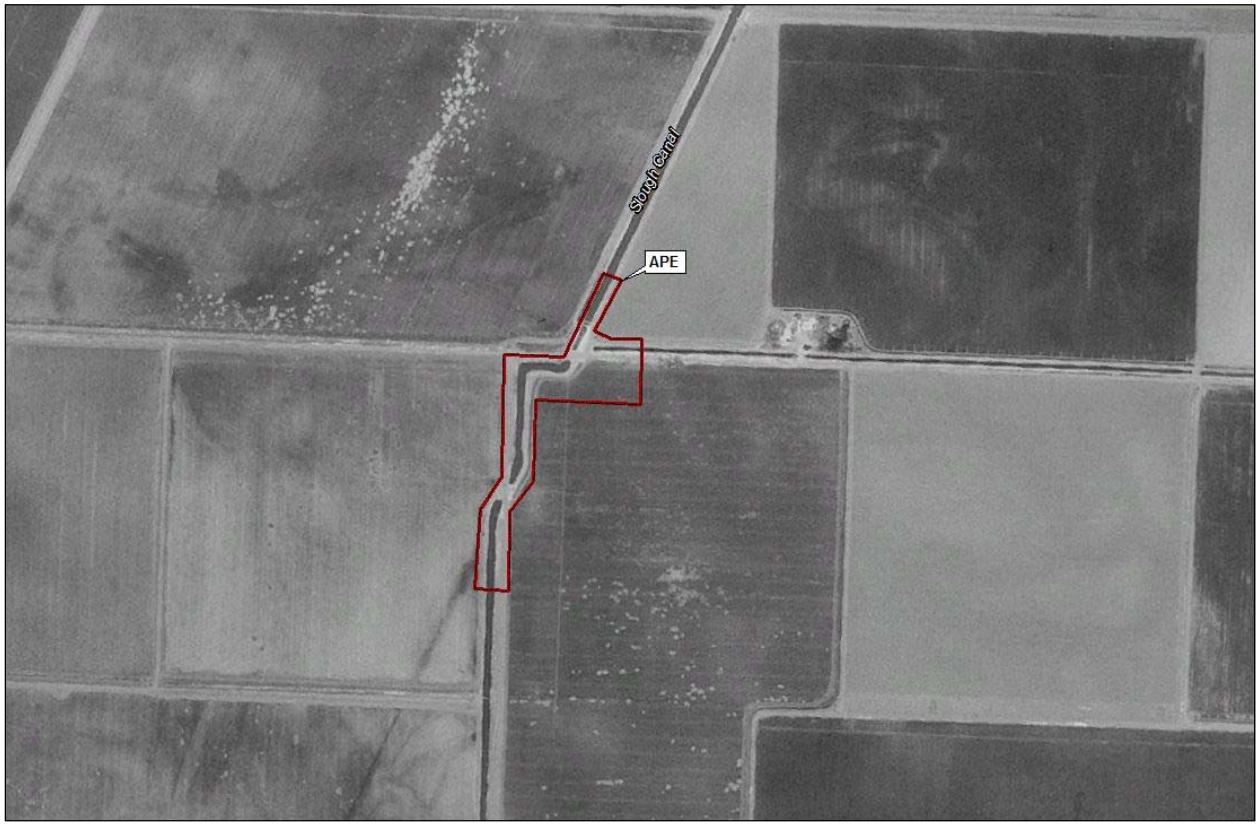

Figure 4-5 Canal alignment shown on a 1998 aerial photograph (Google Earth).

4.6 BURIED SITE SENSITIVITY ANALYSIS

4.6.1 Geomorphic Context

The APE is within the San Joaquin Valley in Central California, bound by the Sierra Nevada to the east and California Coastal Ranges to the west. Sedimentation in the valley is dominated by cycles of erosion from the high mountains, producing granitic parent material deposited within the floor of the valley below, forming vast alluvial fans and piedmont landforms. Local hydrology moves granitic sediments throughout the valley and deposits these sediments into existing basins. During periods of high effective moisture, rivers overflow and deposit fine-grained, often organic-rich, sediments across the valley floodplain. The accumulation of these fine organic sediments along with periods of stability resulted in a soil-rich region, making the San Joaquin Valley a prime landscape for agriculture. The Fresno Slough, east of the Project

area, is a tributary of the San Joaquin River and is an important part of the valley hydrologic system. Tributaries such as the Fresno Slough provided a reliable water source that could be channeled, accessed, and divided amongst the early homesteaders within Tranquillity and surrounding communities.

4.6.2 Landscape Chronology

The valley floor is largely composed of older Pleistocene (more than 25,000 cal B.P.) alluvial fan deposits originating from the Sierra Nevada, forming a large piedmont to the east where the valley margins join the Sierra Nevada. These margins have undergone episodes of stability as well as erosion by channel incision, which is later redeposited and results in an accumulation of buried deposits within the center of the valley. Smaller alluvial fans are present along the western margins of the valley, but the bulk of these landforms are buried by younger deposits dating from 31,340 and 26,352 cal B.P. (Meyers et al. 2010).

During the glacial conditions of the late Pleistocene (approximately 25,000–15,000 cal B.P.), the valley experienced a period of landscape stability, allowing soils to form, with continued channel incision from 25,000 to 20,000 cal B.P. during episodes of glacial outwash. After 20,000–19,000 cal B.P., channels and streams began to exceed their carrying capacity, resulting in the infilling of channels and existing basins. Infilling was then followed by a lateral spread of sediments across existing alluvial fans and throughout the floodplain. The entrainment, transportation, and deposition of these glacial sediments appears to cease between 18,500 and 16,500 years ago. Landforms of late Pleistocene-age are small, often isolated, and are far less prevalent than older Pleistocene landforms within the valley (Meyers et al. 2010).

The transition to nonglacial conditions during the latest Pleistocene (15,000–11,500 cal B.P.) brought on pronounced changes in hydrologic, geomorphic, and biotic systems. During this time, the environment experienced rapid climatic fluctuations, most notably during the onset of the Younger Dryas (12,900–11,500 cal B.P.) when the climate abruptly, yet briefly, returned to glacial conditions. The latest Pleistocene was a period of greater climatic variability compared to prior time periods, and the subsequent disequilibrium is evident in the stratigraphic deposits. The increased variability and rapidly fluctuating conditions led to an increase in both erosion and deposition throughout the valley. As such, landforms generated during this period of environmental instability are more prevalent today than late Pleistocene-age landforms (Meyers et al. 2010).

The early Holocene (11,500–7000 cal B.P.) saw more stable conditions than the latest Pleistocene, with a warmer and dryer climate. A reduction in effective moisture promoted stabilization of existing landforms, continued soil development, and confinement of erosion and transport to existing channels. The most notable example of landscape stability during this time is seen in the alluvial landforms along the valley's western margins where well-developed early Holocene soils are present (Meyers et al. 2010).

Early Holocene stability was followed by pronounced climatic variability in the middle Holocene (7000–4000 cal B.P.). Middle Holocene landforms within California are typically rare. There is a lack of consensus surrounding whether the climatic conditions of the middle Holocene were markedly warmer and dryer than today or cooler and wetter. Although there is a gap in the middle Holocene stratigraphic record throughout California, this is not the case for the San

Joaquin Valley, as buried soils of this age have been documented within alluvial fans, floodplains, and basins within the valley with dates ranging from 6400 to 4500 cal B.P. These middle Holocene deposits sometimes bury early Holocene surfaces within the confines of the valley; however, the middle Holocene surfaces are still the least prevalent when compared to the abundance of landforms from other periods (Meyers et al. 2010).

The cooler and wetter conditions of the late Holocene (4000–2000 cal B.P.) are characterized by episodes of increased precipitation and runoff. Multiple episodes of deposition can been seen in the alluvial fans and floodplains of the valley. The increase in wetness allowed vegetation to flourish, stabilizing new deposits as well as existing landforms and slowing the rate of landscape change prior to 2000 cal B.P. These late Holocene surfaces are best observed on the east and west margins of the valley (Meyers et al. 2010).

The onset of the latest Holocene (2000–150 cal B.P.) brought increased shifts in rainfall, episodic droughts, and the Little Ice Age. This increase in variability contributed to rapid and extensive landscape modification, which is observable on exposed landforms. Large-scale flooding led to large-scale deposition. The majority of the valley is capped by these vast latest Holocene alluvial deposits. The climate oscillations between wet and dry also contributed to the destabilization of large portions of the landscape, leading to the widespread deposition that spans the valley floor (Meyers et al. 2010).

The Historic and Modern (150–0 cal B.P.) period is characterized by extensive landscape development and erosion due to agriculture, logging, livestock grazing, dredging, mining, quarrying, irrigation, and landscape reclamation throughout the valley. Changes in vegetation from native to nonnative species as well as a reduction in ground cover due to drought and livestock grazing fueled erosion. Large expanses of western Fresno County were used in the early historic period for grazing until the late 1800s when canals and levees were constructed to prevent flooding and to transport water for farming. Additionally, portions of the landscape were subjected to artificial cut and fill episodes to support modern urbanization and development. Much of the natural topography (e.g., mounds and natural levees) that may have harbored prehistoric archaeological sites was truncated and destroyed by this development. Modern deposits continue to form within the valley, but these are human-made deposits resulting from continued landscape modification (Meyers et al. 2010).

4.6.3 Buried Site Assessment

In general, past conditions such as the presence of wetlands, grasslands, or a desert as well as sediment age are highly observable based on soil and sediment characteristics. By understanding soil age, depositional setting, and environmental conditions, predictions about the potential for constituent sediments to bury archaeological sites can be made. For example, fine-grained Holocene-aged soils within a floodplain will have a higher potential for buried cultural materials. These types of deposits are generally close to water, deposited during the time of human occupation, and deposited with moderate to low energy that limits erosion and preserves sites. On the other hand, soils formed in river wash or high-energy areas have low sensitivity as the depositional environment is conducive to the destruction of site features and artifact provenience (Waters 1992).

In the Project area, the majority of the mapped soils are of the Gepford series and the Tachi series, both poorly drained vertisols, with smaller quantities of Lillis, Armona, and Lethent soils (Soil Survey Staff 2018). Gepford soils form on floodplains, basin floors, and basin rims on slopes of less than 2 percent. Gepford series soils within the Project area are found on landforms historic to modern in age that are no greater than 150 years old (Meyers et al. 2010:385). These vertisols have gray clay-rich Ap horizons and gleyed clay-rich Bk horizons overlying buried, gleyed, clay-rich Bk horizons that have been truncated by erosion. The parent material consists of mixed alluvium derived from granitic rock and has been influenced by lacustrine sediments (Soil Survey Staff 2018). The Tachi series soils are vertisols with gray clay-rich Ap horizons and very deep gleyed clay-rich Bk horizons. The parent material consists of alluvium derived from igneous and/or sedimentary rocks. These soils form on surfaces with 0–1 percent slope and are very poorly drained.

Buried deposits of the latest Pleistocene would contain cultural deposits of California's earliest Native American occupants; however, these latest Pleistocene deposits are not found within the immediate vicinity of the APE based on predictive modeling conducted by Meyers et al. (2010). Rather, these models predict the potential for stratigraphic deposits containing the latest Holocene and historic and modern-era archaeological deposits (Meyers et al. 2010:Appendix G). Both Gepford and Tachi soils exhibit gleyed and redoximorphic properties with concentrations of manganese (Mn) and iron (Fe), indicating a high or perched water table (Birkeland 1999:134). These modern saturated soils would have made poor surfaces for long-term residential use, but certainly could have been utilized short-term for resource procurement such as hunting, fishing, or processing.

4.6.4 Sensitivity

Review of the geologic and soils literature for the area indicates that the APE exhibits moderate sensitivity for buried soils containing archaeological resources (Meyers et al. 2010:Appendix G) within a "natural" context (i.e., undisturbed by modern agricultural practice). Predicted sensitivity areas are weighted based on distance to water, landform slope, and the distribution and age of geological deposits present at modern ground surface. Given this level of sensitivity, there was potential for intact buried archaeological sites on the aggrading floodplain adjacent to the remnant Slough Canal at one time; however, extensive earthwork within the APE have most likely destroyed stratigraphic deposits containing in situ archaeological resources.

Historic landscape modification, specifically the rerouting and modernization of the Slough Canal, has likely disturbed any potential archaeological deposits. According to the USGS San Joaquin topographic quadrangle maps, the historic course of the Slough Canal was rerouted between 1947 and 1963 (USGS 1946, 1963). Modifications include the elimination of dog legs northeast and southeast of the Project area and then condensing the Slough Canal from three divided tributaries/dog legs to a singular course paralleling local roads. Aerial imagery currently depicts the Slough Canal as a channelized well-maintained earthen-lined drainage. The historic routes to the northeast and southeast are no longer visible on aerial imagery and have presumably been filled in during the modern routing of the Slough Canal.

Modern disturbances and historic rerouting of the Slough Canal suggest that any remaining archaeological deposits near the surface (less than 1 meter below ground surface) are likely to be

within a highly disturbed context. Ground disturbance during slough modification and maintenance, extensive agricultural practices, and livestock grazing as well as blading and grading prior to the construction of the modern roads have all occurred within the APE.

While the low-energy depositional environment within the APE is ideal for site preservation, the wetland paleoenvironment would not have been ideal for long-term habitation sites. Small opportunistic locales related to resource procurement such as hunting, fishing, or processing may be present but, due to their ephemeral nature and low-density artifact yields, may not be observable or present within the APE. Larger habitation sites were present but typically on natural mounds above the marshy valley floor. Today, few mounds remain as many were destroyed and used to fill remnant sloughs for agricultural purposes or truncated to level the land for farming. There are no remaining natural high spots or mounds in the APE. Intact habitation sites may be found in buried deposits along the valley margins as suitable habitation areas would have been available on elevated terraces and piedmont rather than the marshy poorly drained valley interior.

4.6.5 Conclusions

Due to the prevailing paleoenvironmental conditions within the valley prior to historic occupation, the marshy landscape associated with the local sloughs would not have been favorable for substantial seasonal or long-term habitation within the APE. The likelihood of encountering buried soils with extensive in situ cultural deposits throughout the vertical and horizontal APE is low. The extent of previous disturbance throughout the APE is high and the proposed undertaking will have little impact on intact deposits, if present. As such, additional archaeological subsurface testing or the presence of an archaeological monitor during construction is not recommended.

5
NRHP AND CRHR EVALUATION OF THE TRANQUILLITY IRRIGATION DISTRICT

Under the guidelines of the Office of Historic Preservation (1995), the TID Slough Canal is recorded as a linear resource. This category also includes transmission lines, roadways or networks, railroads, gas lines, and similar structures stretching long distances. The canals, laterals, and other components of the TID were generally built and operated as an integrated system. Their historical significance (or lack thereof) is intimately tied to that of the TID as a whole. For this reason, the TID system—and not the canals and laterals themselves—is the primary unit of resource designation and evaluation. The evaluation below employs the NPS (2002) criteria and guidelines in evaluating the district's historical significance and also considers the CRHR evaluation criteria.

5.1 CRITERION A/1

Three historical trends or subthemes within the broader theme of agriculture/irrigation discussed in the historic context (Section 2.4) are relevant in evaluating the historical significance of the TID: the growth of irrigation as a function of agricultural colonization; the replacement of private canal companies by publicly owned irrigation districts; and the advent of lift irrigation technology.

In terms of significance under this criterion, the TID system fares poorly when considered under these subthemes. Although the district's history is obviously connected to these economic, political, and technological trends in valley agriculture, it cannot be consider a "good representative" under NPS (2002) guidelines. Agricultural colonization in what would become the Tranquillity area began with the efforts of cattle baron Jefferson James in the late 1890s and was continued by James's successor, the SJVFLC, into the 1920s. Such land development shadowed earlier and more substantial colonization around the Fresno area. Although necessary to the Tranquillity Colony and other subdivisions, conveyances on the west side of the valley, such as the Beta Main Canal, had neither the capacity nor geographical reach of the more voluminous and expansive FCIC system. Even more importantly, the creation of the TID postdated colonization, and its economic effect appears to have been limited. As Adams (1929:232–233) describes, the SJVFLC efforts to sell its properties during the 1920s were hampered by financial difficulties and were far from being a resounding success.

Being the first of its kind often garners historical significance under Criterion A/1, but the distinction of the TID as one of the first water districts in Fresno County cannot be taken at face value in this case. In looking at the larger picture of valley irrigation, irrigation districts began replacing private companies as far back as the late 1880s. Here again, the formation of the TID was simply a continuation of an already established trend. In this regard, the circumstances under which the TID was created (i.e., customer dissatisfaction) are wholly consistent with the creation of other valley districts and do not stand out as a good example under this theme.

Consistent with other evaluations of lift systems of the west side of the valley, the TID lift facilities at the time of their initial construction do not exemplify a significant event in the history of this technological/engineering development (e.g., Baloian and Lloyd 2013). Built about 10 years after construction of the Patterson lift system, TID's adoption of lift technology similarly represents the continuation of an already established trend.

For these reasons, the TID and its components are not considered historically significant under Criterion A/1.

5.2 CRITERION B/2

Jefferson G. James, who was the founder of the Tranquillity Colony and the James Canal Company and held riparian water rights to the Fresno Slough, is arguably an important individual in the early history of Fresno County. From the late 1800s to the time of his death in 1910, James owned the land that was eventually acquired by the SJVFLC. Although he appears to have set in motion the process that converted his pastureland to farm colonies, he is not directly tied to the construction of the TID system, which postdates his death by several years. Research did not identify other persons of historical import associated with the TID system. For these reasons, it is not considered historically significant under Criterion B/2.

5.3 CRITERION C/3

Distinctive architecture and/or unique or innovative engineering design or construction methods commonly accrue significance under Criterion C/3. The TID's reliance on pumps is an interesting aspect of the system, but cannot be considered historically significant by any means. Research found no references in contemporary agricultural/irrigation journals that suggest that the TID's use of lift technology was notable from an engineering perspective. Thus the system is not significant under Criterion C/3.

5.4 CRITERION D/4

This criterion is most relevant for archaeological sites, but it can be applied to built environment resources if further study has the potential to yield information that cannot be obtained from other sources. However, historical information about irrigation systems is prevalent, and further study would clearly not add any new information. The TID and its components are not considered significant under Criterion D/4.

5.5 INTEGRITY

Because the TID system is not considered historically significant under any of the four criteria, formal assessment of integrity is not necessary; however, section 4.5.1 discusses how a segment of this canal has been modified since its construction in the early 1920s.

5.6 CONCLUSION

Due to a lack of significance, the TID irrigation system is not considered eligible for inclusion in the NRHP or CRHR.

6
SUMMARY AND RECOMMENDATIONS

Æ performed a cultural resources inventory and evaluation for the TID Southeast Service Area Water Conservation and Conveyance Improvement Project. The proposed Project is centered on TID's Slough Canal near the intersection of West Parlier Avenue and South Sonoma Avenue in western Fresno County. The Project will improve water conveyance efficiency within the TID via the replacement of an existing in-stream lift-pump station, replacement of two existing road culverts, and the improvement of approximately 1,100 feet of canal channel.

As a subconsultant to Provost and Pritchard Consulting Group, Æ conducted a cultural resource inventory of the 5-acre Project APE to determine whether historic properties/historical resources are present. The investigation included: (1) a records search at the SSJVIC of the CHRIS to identify previously recorded cultural resources and prior studies in the APE and in a 0.5-mile radius of the APE, (2) a search of the NAHC's Sacred Lands File for known sacred resources and a request for contact information for individuals and tribal representatives who may have information about the Project area, (3) an archaeological and built environment pedestrian survey of the APE, (4) a buried site sensitivity study, and (5) the recordation and CRHR and NRHP evaluation of the TID represented by the Slough Canal and lateral segment in the Project APE.

The SSJVIC records search did not reveal previously recorded cultural resources or prior investigations within the APE or within a 0.5-mile radius of the APE. A search of the NAHC's Sacred Lands File and outreach to local tribal representatives did not result in the identification of sacred or special sites within the APE. Æ forwarded the NAHC results to the BOR, which is responsible for conducting formal consultation and outreach to local tribal representatives. A segment of TID's Slough Canal was recorded during Æ's pedestrian survey of the APE. After, evaluation of resource significance, it is Æ's recommendation that the TID system is ineligible for listing in the NRHP and CRHR. No additional cultural resources were identified during this inventory.

Æ's geoarchaeological assessment of the vertical APE revealed that the sedimentology and soils have low potential for harboring well-preserved archaeological deposits. The extent of modern development and disturbance across the Project APE further reduces the probability of encountering archaeological deposits in primary context. Buried site testing is not recommended.

Consistent with federal and state statutes, Æ advises that in the event archaeological remains are encountered during Project development or ground-moving activities within any portion of the APE, all work in the vicinity of the find should be halted until a qualified archaeologist can identify the discovery and assess its significance. In addition, if human remains are uncovered during construction, the Fresno County Coroner is to be notified to arrange their proper treatment and disposition. If the remains are identified—on the basis of archaeological context, age, cultural associations, or biological traits—as those of a Native American, California Health and Safety Code 7050.5 requires that the coroner notify the NAHC within 24 hours of discovery. The NAHC will then identify the Most Likely Descendent, who will be afforded the opportunity to

recommend means for treatment of the human remains following protocols in California Public Resources Code 5097.98.

7
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APPENDIX A

Personnel Qualifications

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RANDY BALOIAN

Associate Historian

Areas of Expertise

- Historical research
- Architectural and archaeological survey and site evaluation
- Field logistics
- Statistical analysis
- Biological anthropology

Years of Experience

- 16

Education

M.A., Anthropology, University of California, Davis, 1989

B.A., Anthropology, California State University, Fresno, 1986

B.S., Business Administration, California State University, Fresno, 1986

Permits/Licensure

Field Director, California BLM Statewide Cultural Resources Use Permit CA-15-29

Professional Experience

2001–	Associate Historian, Applied EarthWorks, Inc., Fresno, California

Technical Qualifications

Mr. Baloian conducts historical research, evaluates architectural and archaeological resources, performs statistical analyses, prepares reports, and assists with various administrative tasks including budget and proposal preparation. He has evaluated numerous historical resources in the Central Valley and Sierra Nevada foothills, including residences, ranch complexes, commercial structures, mining sites, recreational camps and parks, and agricultural properties. Through his efforts as a historian, Mr. Baloian has amassed a considerable archive on the topic of irrigation, and he maintains the library and site record archives at Applied EarthWorks' Fresno office. He has authored numerous evaluation reports on irrigation canals on both sides of the Central Valley, and his research on the history of the Central Valley also supports archaeological investigations in that region. In addition to his duties as historian and archivist, Mr. Baloian routinely performs archaeological surveys and has participated in site testing and data recovery fieldwork. He has completed the Advisory Council on Historic Preservation course on National Historic Preservation Act Section 106 compliance. Mr. Baloian's academic studies focused on paleoanthropology, primatology, human genetics, statistical analysis, and the genetic and cultural manifestations of ethnicity.

DIANA TERESA DYSTE

Senior Archaeologist

Areas of Expertise

- Cultural resource management
- Ethnography
- Tribal consultation
- Zooarchaeological, paleoethnobotanical, and lithics analysis

Years of Experience

- 18

Education

Ph.D., Anthropology/Feminist Studies, University of California, Santa Barbara, 2018

M.A., Anthropology (Archaeology/ Cultural Resource Management emphasis), University of California, Santa Barbara, 2010

B.A., Anthropology, University of California, Santa Barbara, 2002

A.A., Liberal Arts and Sciences, Ventura College, 1999

Registrations/Certifications

- Registered Professional Archaeologist 39362477

Professional Affiliations

- American Anthropological Association
- American Cultural Resources Association
- Santa Barbara Museum of Natural History
- Society for American Archaeology
- Society for California Archaeology
- World Archaeological Congress

Professional Experience

2018–	Senior Archaeologist, Applied EarthWorks, Inc., Fresno, California
2015–2018	Interim Cultural Resources Supervisor and Senior Archaeologist/Ethnographer, Aspen Environmental Group
2007–2009	Archaeologist (GS-9), U.S. Department of Agriculture, Los Padres National Forest
2005–2007	Archaeologist (GS-7), U.S. Department of Agriculture, Los Padres National Forest
2004–2005	Archaeological Contractor, Padre, Inc., Ventura, California
2000–2005	Archaeologist (GS-4/5), U.S. Department of Agriculture, Los Padres National Forest

Technical Qualifications

Ms. Dyste has 18 years of experience in cultural resources management and meets the Secretary of the Interior's qualification criteria as an archaeologist and ethnographer. She has extensive experience preparing environmental documents and managing complex projects pursuant to applicable federal, state, and local regulations. Her work includes senior review or prime authorship of cultural resources documents for National Historical Preservation Act Section 106, National Environmental Policy Act, and California Environmental Quality Act compliance, including public and tribal comment and response; development of research designs; design and implementation of cultural resources plans. Ms. Dyste is qualified to conduct archaeological survey, including the supervision of small to large sized field crews, as well as zooarchaeological, paleoethnobotanical, lithics, and ethnographic analyses. She is able to analyze cultural spatial patterns via use of Total Station and Geographic Information Systems software. Ms. Dyste's Assembly Bill 52 and NHPA Section 106 tribal consultation services are informed by her knowledge and training in Native American jurisprudence, cultural sensitivity training, and graduate seminars in Native American environmental law, indigenous research methodologies, and community-based Participatory Action Research with tribal and special interest groups. She has project experience in coastal, highlands, grasslands, desert, and remote mountain settings across the state of California, although her academic region of specialty is in central and southern California with a focus on Salinan, Esselan, northern/interior/coastal Chumash prehistoric and modern political tribal groups. Ms. Dyste is a native Spanish speaker and assists clients with the translation of English to Spanish signage and public notices.

JESSICA JONES

GIS Technician/Staff Archaeologist

Areas of Expertise

- Geographic Information Systems (GIS) in archaeology
- Computer-generated maps and graphics
- Archaeological survey and excavation

Years of Experience

- 5

Education

B.A., Anthropology, California State University, Sacramento, 2013

Archaeological Technician Certificate, Anthropology Department, Fresno City College, Fresno, California, 2011

Professional Experience

2015–	Geographic Information Systems (GIS) Technician/Staff Archaeologist, Applied EarthWorks, Inc., Fresno, California
2012–2013	Laboratory Technician (volunteer), Archaeological Research Center, California State University, Sacramento
2009–2010	Laboratory Technician (volunteer), Fresno City College, Fresno, California

Technical Qualifications

As a staff archaeologist, Ms. Jones performs archival research, pedestrian archaeological and built environment survey, site recordation, and excavation on projects throughout the Central Valley and Sierra Nevada foothills. She also is a primary author or contributor for cultural resource inventory reports and is familiar with the preparation of California Department of Parks and Recreation cultural resource record forms (DPR 523 series) and California Department of Transportation documents. In her role as a GIS technician, Ms. Jones serves as cartographer and has participated in large and small projects involving both prehistoric and historic-era cultural resources. Using ESRI ArcGIS software, she has prepared maps and illustrations for documentation and technical reports encompassing archaeological and built environment resources for a variety of projects in California and Oregon. Additionally, she assists in the management and maintenance of the company's GPS data/units and cultural resources database system. She has extensive experience volunteering in archaeological repositories and is well versed in laboratory methodology related to the processing, cataloging, and management of archaeological collections.

JASMINE KIDWELL

Staff Archaeologist

Areas of Expertise

- Cultural resource management
- Archaeological fieldwork
- GIS analysis
- Geoarchaeological analysis
- Prehistory and history of California and the Southwest

Years of Experience

- 12

Education

M.A., Anthropology and Applied Archaeology, Eastern New Mexico University, Portales, 2018

B.A., Anthropology, University of California, Santa Barbara, California, 2007

Permits/Licensure

- Permitted to serve as Crew Chief for State Lands in New Mexico, issued by the Cultural Properties Review Committee of the New Mexico Historic Preservation Division

Professional Affiliations

- Society for American Archaeology
- New Mexico Archaeological Society

Professional Experience

2018–	Staff Archaeologist/GIS Technician, Applied EarthWorks, Inc., San Luis Obispo, California
2017–2018	Archaeologist, Bureau of Land Management, Carlsbad, New Mexico
2011	Archaeological Field School, Oregon State University, Cooper's Ferry Site, Cottonwood, Idaho
2008–2009	Cultural Resources Intern, Student Conservation Association, Vandenberg Air Force Base, Lompoc, California
2008–	Projects for the following firms throughout the U.S.: • Applied EarthWorks, Inc., Lompoc, California • Office of Contract Archaeology, Albuquerque, New Mexico • Versar, Inc., Roosevelt County, New Mexico • William and Self Associates, Pike County, Arkansas • Ecosystems Management, Inc., Navajo and Apache Counties, Arizona • SWCA Inc., Doña Ana County, New Mexico
2006–	Seasonal archaeologist for the following federal agencies throughout the U.S.: • United States Forest Service, Apache-Sitgreaves National Forest, Springerville, Arizona • United States Forest Service, Humbolt-Toyabe National Forest, Bridgeport, California • United States Forest Service, Humbolt-Toyabe National Forest, Carson City, Nevada • Bureau of Land Management, Cañon City, Colorado

Technical Qualifications

Ms. Kidwell has served as a field technician, crew chief, and regulatory archaeologist in both the private and public sectors throughout the Southwest, Great Basin, and California. Her archaeological experience includes pedestrian survey, site recording, artifact analysis, site evaluation testing, excavation, technical report writing and production, GIS analysis, and crew leadership. In the public sector, she worked closely with industry representatives by providing NEPA consultation, treatment and management recommendations, and compliance decisions while reviewing cultural resource projects. As a graduate student, her thesis research investigated the Paleo-Indian stratigraphic deposits of a stream channel to assess the changing hydrologic conditions during the Late Pleistocene/Holocene Transition at Blackwater Locality No. 1, the Clovis-type site of North America. She has presented her research at state and national archaeological meetings.

ANNIE L. MCCAUSLAND

Architectural Historian

Areas of Expertise

- Architectural history
- California history
- Archival research
- Public history
- Oral history
- Project management
- Technical writing

Years of Experience

- 5

Education

M.A., Arts in Public History, California State University Sacramento, 2015

B.A., Arts in History, Chapman University, Orange, California, 2010

Professional Affiliations

- California Council for the Promotion of History
- American Association for State and Local History
- National Council on Public History
- California Preservation Foundation
- Los Angeles Conservancy
- Society of Architectural Historians

Professional Experience

2017–	Associate Architectural Historian, Applied EarthWorks, Inc., Hemet, California
2016–2017	Archivist and Collections Registrar, Sonoma Valley Historical Society, Sonoma, California
2016	Park Aide, California State Parks, Bodie State Historic Park, California
2015–2016	Architectural Historian, Sapphos Environmental, Inc., Pasadena, California
2015	Museum Registration and Collections Management Intern, Academy of Motion Picture Arts and Sciences, Los Angeles, California
2014	Corporate Archives and Production Collections Intern, NBCUniversal, Universal City, California
2013–2014	Archives and Museum Collections Intern, Placer County Museum Archives and Research Center, Auburn, California
2010–2013	Volunteer Historian, California State Parks, Orange Coast District, San Clemente, California

Technical Qualifications

Ms. McCausland specializes in California history and architecture and has served as architectural historian for projects in California and she meets the Secretary of the Interior Professional Qualification Standards for Architectural History and History. Her expertise includes inventory, research, and significance evaluations, and she has completed numerous studies of residential, agricultural, commercial and industrial properties. Ms. McCausland has prepared technical reports for historical built environment resources to satisfy compliance requirements under National Historic Preservation Act Section 106 and the California Environmental Quality Act and to support preparation of both programmatic and project-specific environmental impact reports. She also has documented and evaluated built environment resources following California Department of Transportation (Caltrans) guidelines. Ms. McCausland has performed architectural surveys and significance evaluations on behalf of Los Angeles County Department of Parks and Recreation; other federal, state, and local agencies; and private-sector clients. Additional skills include archives and collections management, oral history, Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) documentation, agency consultation, exhibit curation, interpretation, and heritage tourism.

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APPENDIX B

Records Search Results

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California Historical Resources Information System

Fresno
Kern
Kings
Madera
Tulare

Southern San Joaquin Valley Information Center
California State University, Bakersfield
Mail Stop: 72 DOB
9001 Stockdale Highway
Bakersfield, California 93311-1022
(661) 654-2289
E-mail: ssjvic@csub.edu
Website: www.csub.edu/ssjvic

7/24/2018

Mary Baloian
Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

Re: TID Southeast Service Area Project
Records Search File No.: 18-299

The Southern San Joaquin Valley Information Center received your record search request for the project area referenced above, located on the Cantua Creek and San Joaquin USGS 7.5' quads. The following reflects the results of the records search for the project area and the 0.5 mile radius:

As indicated on the data request form, the locations of resources and reports are provided in the following format: ☐ custom GIS maps ☐ shapefiles ☐ hand-drawn maps

Resources within project area:	None
Resources within 0.5 mile radius:	None
Reports within project area:	None
Reports within 0.5 mile radius:	None

Resource Database Printout (list):	☐ enclosed	☐ not requested	☒ nothing listed
Resource Database Printout (details):	☐ enclosed	☐ not requested	☒ nothing listed
Resource Digital Database Records:	☐ enclosed	☐ not requested	☒ nothing listed
Report Database Printout (list):	☐ enclosed	☐ not requested	☒ nothing listed
Report Database Printout (details):	☐ enclosed	☐ not requested	☒ nothing listed
Report Digital Database Records:	☐ enclosed	☐ not requested	☒ nothing listed
Resource Record Copies:	☐ enclosed	☐ not requested	☒ nothing listed
Report Copies:	☐ enclosed	☒ not requested	☐ nothing listed
OHP Historic Properties Directory:	☐ enclosed	☐ not requested	☒ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☐ not requested	☒ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☐ not requested	☒ nothing listed

Caltrans Bridge Survey: Not available at SSJVIC; please see http://www.dot.ca.gov/hq/structur/strmaint/historic.htm

Ethnographic Information: Not available at SSJVIC

Historical Literature: Not available at SSJVIC

Historical Maps: Not available at SSJVIC; please see http://historicalmaps.arcgis.com/usgs/

Local Inventories: Not available at SSJVIC

GLO and/or Rancho Plat Maps: Not available at SSJVIC; please see http://www.glorecords.blm.gov/search/default.aspx#searchTabIndex=0&searchByTypeIndex=1 and/or http://www.oac.cdlib.org/view?docId=hb8489p15p;developer=local;style=oac4;doc.view=items

Shipwreck Inventory: Not available at SSJVIC; please see http://www.slc.ca.gov/Info/Shipwrecks.html

Soil Survey Maps: Not available at SSJVIC; please see http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Invoices for Information Center services will be sent under separate cover from the California State University, Bakersfield Accounting Office.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Celeste M. Thomson
Coordinator

APPENDIX C

Native American Outreach

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NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

July 23, 2018

Diana Dyste
Applied Earth Works

Sent by Email: ddyste@appliedearthworks.com
Number of Pages: 2

RE: TID Southeast Service Area, San Joaquin, Fresno County

Dear Ms. Dyste:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results**. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.**

I suggest you contact all of those listed, if they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. **By contacting all those on the list, your organization will be better able to respond to claims of failure to consult.** If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: Sharaya.Souza@nahc.ca.gov.

Sincerely,

Sharaya Souza
Staff Services Analyst
(916) 573-0168

Native American Heritage Commission
Native American Consultation List
7/23/2018

Big Sandy Rancheria of Western Mono Indians
Elizabeth D. Kipp, Chairperson
PO. Box 337 37387 Auberry Mission Rd.
Auberry , CA 93602
lkipp@bsrnation.com
(559) 374-0066
(559) 374-0055
Western Mono

Cold Springs Rancheria
Carol Bill, Chairperson
P.O. Box 209
Tollhouse , CA 93667
(559) 855-5043
(559) 855-4445 Fax
Mono

Dumna Wo-Wah Tribal Goverment
Robert Ledger SR., Chairperson
2191 West Pico Ave.
Fresno , CA 93705
ledgerrobert@ymail.com
(559) 540-6346
Dumna/Foothill Yokuts
Mono

Dunlap Band of Mono Indians
Dick Charley, Chairperson
Box 44
Dunlap , CA 93621
(559) 338-2545
Mono

Kings River Choinumni Farm Tribe
Stan Alec
3515 East Fedora Avenue
Fresno , CA 93726
(559) 647-3227 Cell
Foothill Yokuts
Choinumni

North Fork Mono Tribe
Ron Goode, Chairperson
13396 Tollhouse Road
Clovis , CA 93619
rwgoode911@hotmail.com
(559) 299-3729 Home
(559) 355-1774 - cell
Mono

Santa Rosa Rancheria Tachi Yokut Tribe
Rueben Barrios Sr., Chairperson
P.O. Box 8
Lemoore , CA 93245
(559) 924-1278
(559) 924-3583 Fax
Tache
Tachi
Yokut

Table Mountain Rancheria
Leanne Walker-Grant, Chairperson
P.O. Box 410
Friant , CA 93626
(559) 822-2587
(559) 822-2693 Fax
Yokuts

Table Mountain Rancheria
Bob Pennell, Cultural Resources Director
P.O. Box 410
Friant , CA 93626
rpennell@tmr.org
(559) 325-0351
(559) 325-0394 Fax
Yokuts

Traditional Choinumni Tribe
David Alvarez, Chairperson
2415 E. Houston Avenue
Fresno , CA 93720
dave@davealvarez.com
(559) 217-0396 Cell
Choinumni

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Code, or Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American Tribes for the proposed:
TID Southeast Service Area, San Joaquin, Fresno County.

Native American Heritage Commission
Native American Consultation List
7/23/2018

Traditional Choinumni Tribe
Rick Osborne, Cultural Resources
2415 E. Houston Avenue
Fresno , CA 93720
(559) 324-8764
lemek@att.net

Choinumni

Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow, Chairperson
1179 Rock Haven Ct.
Salinas , CA 93906
kwood8934@aol.com
(831) 443-9702

Foothill Yokuts
Mono
Wuksache

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Code, or Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American Tribes for the proposed:
TID Southeast Service Area, San Joaquin, Fresno County.

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APPENDIX D

Cultural Resource Records

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State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings
Review Code | Reviewer | Date

 Resource Name or # Tranquillity Irrigation District (Slough Canal segment)

P1. Other Identifier: Tranquillity Irrigation District

*P2. **Location: a. County:** Fresno County ☐ **Not for Publication** ☒ **Unrestricted**
b. USGS 7.5′ Quad: San Joaquin **Date:** 1963 T15S, R16E; Secs. 20 and 21 Mount Diablo **B.M.**
c. Address:
d. UTM: NAD 83 Zone 10N; 746625 **mE /**4055149 **mN** (Recorded Segment of Slough Canal)
e. Other Locational Data: The district surrounds the community of Tranquillity.

***P3a. Description:** Covering 10,750 acres around the community of Tranquillity, the Tranquillity Irrigation District includes about 40 miles of canals, pipelines, two major lift-pump stations, and various other lift and regulating structures. The district draws water from the Fresno Slough by pump and from the underground aquifer via wells. These structures operate and were built as an integrated system; for this reason, they are recorded as parts of a single resource designated as the Tranquillity Irrigation District (TID). Established in 1918, the TID began construction of its facilities in 1920. As one of the district's early conveyances, the Slough Canal was built in 1920–1921.

***P3b. Resource Attributes:** HP20 Canal; HP16 Water Conveyance

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other:

***P5a. Photograph or Drawing:**

P5b. Description of Photo: Slough Canal vertical lift-pump system, concrete lining, and turnouts, facing north.

***P6. Date Constructed/Age and Sources:** Circa 1920–1921 (*Southwest Builder and Contractor* 1920; USGS 1923)
☐ Prehistoric ☒ Historic ☐ Both

***P7. Owner and Address:**
Tranquillity Irrigation District
25390 W. Silvieria St.
Tranquillity, CA 93668

***P8. Recorded By:** Annie McCausland
Applied EarthWorks, Inc.
1391 W. Shaw Ave., Suite C
Fresno, CA 93711

***P9. Date Recorded:** August 7, 2018

***P10. Survey Type:** ☒ Intensive
☐ Reconnaissance ☐ Other
Describe:

***P11. Report Citation:** Jessica Jones, Annie McCausland, Randy Baloian, Jasmine Kidwell, and Diana T. Dyste 2018 *Cultural Resource Inventory and Evaluation for the Tranquillity Irrigation District Southeast Service Area Water Conservation and Conveyance Improvement Project, Fresno County, California*. Applied EarthWorks, Inc. Fresno, California. Prepared for Provost & Pritchard Consulting Group, Fresno, California.

***Attachments:**
☐ NONE
☒ Building, Structure, and Object Record
☐ Photograph Record
☒ Location Map
☐ Archaeological Record
☐ Milling Station Record
☐ Other (list):
☐ Sketch Map
☐ District Record
☐ Rock Art Record
☒ Continuation Sheet
☒ Linear Feature Record
☐ Artifact Record

B1. Historic Name: Tranquillity Irrigation District

B2. Common Name: Tranquillity Irrigation District

B3. Original Use: Irrigation system **B4. Present Use:** Same

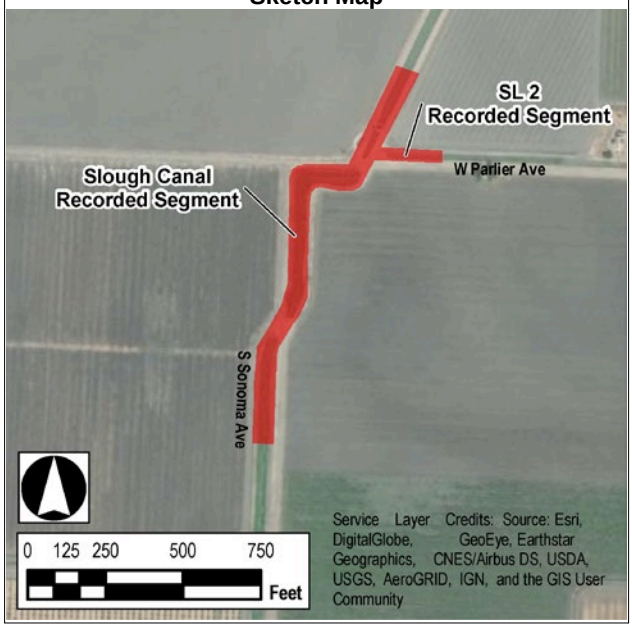
***B5. Architectural Style:** N/A

***B6. Construction History (construction date, alterations, and dates of alterations):** The Tranquillity Irrigation District (TID) was created in 1918 as result of consumer dissatisfaction with the ditch maintenance and service of the James Canal Company, a privately owned irrigation subsidiary of the San Joaquin Valley Farm Lands Company (SJVFLC). There were approximately 300 consumers who irrigated about 11,000 acres within the Tranquillity community (Barnes 1920:92). Their plan was to take over the James Canal Company's ditches and water rights, including the pumping plant on the Fresno Slough. They filed a petition to take over the company in 1917. The TID was founded on January 22, 1918, making it one of the earliest public water districts in Fresno County (Tranquillity Irrigation District 2011). In 1919, the James Canal Company transferred all of its irrigation facilities within and around Tranquillity to the TID. The district was managed by an elected board of directors comprised of local farmers, politicians, and businessmen. C. F Goodrich was a director of the Tranquillity Irrigation District in 1919 (Vandor 1919:1364). In early 1920, TID awarded a $260,000 contract to J. E. Johnston for construction of new ditches as well as reconstruction of older ones (*Southwest Builder and Contractor* 1920).

Integral to the construction and operation of the TID system was the expansion of the electrical grid of the Fresno-based San Joaquin Light and Power Corporation (SJLPC). In 1920 the SJLPC constructed an electrical substation on SJVFLC land, a high-voltage electric power transmission line of about 5,000 volts from a station near the city of Fresno, and another 11,000-volt transmission line connecting the new substation to a TID pumping plant. Distribution lines were installed within the TID service area (State of California Railroad Commission 1922:300–303). Prior to the arrival of SJLPC electricity, pumps were driven by steam power. The new electrical infrastructure provided the TID with a more reliable and inexpensive source of power to run its pumps and other machinery. Moreover, electricity was necessary to power the district's larger "lift" pumps, which were apparently an important component of the district's operation from the beginning. As early as the 1910s, lift technology provided valley irrigators with the means to convey water up the gradient (i.e., from a lower to higher elevation), thereby bringing water to otherwise unirrigated plots and expanding the area of service.

Comparison of the 1920 Fresno County atlas plotted prior to TID construction with later USGS topographic maps plotted just after (or during) the initial construction episode indicates that most of the district's early conveyances were built in 1920 and 1921. Moreover, the linear alignments and uniform spacing of the TID canals and laterals—a common spatial pattern found in lift systems—strongly suggests that they were built together as an integrated network at that time. There is no evidence that they were previously stand-alone canals and ditches that were recast and incorporated into the district's system. One exception was the Beta Main Canal. Built in 1899, this gravity-flow canal followed a meandering course along the southwest boundary of the TID (Baloian 2015a). The TID acquired two-thirds

Sketch Map



This space reserved for official comments.

***B6. Construction History (continued):** interest in the Beta Main Canal from the James Canal Company following the district's creation; the other third eventually passed from the canal company to the neighboring James Irrigation District (Adams 1929:234, 237; California Public Utilities Commission 1919:311–313). Adams's (1929:236–238) report of the system from the late 1920s indicates that the TID employed newer lift technology along with more conventional use of pumps to draw, convey, and regulate irrigation water. At the time, sources included the Fresno Slough, ground water, and the Beta Main Canal.

In the 1950s, the Bureau of Reclamation (BOR) constructed the Delta-Mendota Canal, which terminated at the Mendota Pool. The pool provided a storage reservoir at the confluence of the San Joaquin River and the Fresno Slough. BOR acquisition of water rights from various local irrigators helped quell litigation over water use and brought much-needed stability to the local irrigation industry. The TID turned over its water rights to the BOR in 1963. In exchange, the TID received a large quantity of water and the opportunity to purchase supplemental water. The TID also negotiated its Kings River water rights with other users to make more efficient use of the river water. In exchange, Kings River water constituents help fund the TID's supplemental water purchases from the BOR (Tranquillity Irrigation District 2011: 2). The TID Slough Canal currently receives water from the Fresno Slough and aquifer as well as from the JID when needed.

Since its construction in the early 1920s, the original conveyances of the TID have been realigned or abandoned, as newer canals and laterals were constructed. For an example of such changes, see the attached Linear Feature Record of the TID Slough Canal.

***B7. Moved?:** ☒ No ☐ Yes ☐ Unknown Date:
Original Location:

***B8. Related Features:** Unknown

B9. a. Architect: N/A **b. Builder:** Original canal builder(s) unknown.

***B10. Significance:** Theme: Agriculture/Irrigation Area: Fresno County/San Joaquin Valley
Period of Significance: See below. Property Type: Irrigation system Applicable Criteria: N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Under the guidelines of the Office of Historic Preservation (1995), canals are recorded as linear resources; this category also includes transmission lines, roads, railroads, and similar structures. The canals, laterals, and other components of the TID system were generally built and operated as an integrated system. With the exception of the Beta Main Canal, they do not appear to have ever been stand-alone conveyances. (Note: the Beta Main Canal has been recorded and evaluated as a stand-alone canal [Baloian 2015a].) Their historical significance (or lack thereof) is intimately tied to that of the district. For this reason, the TID irrigation system—and not the canals and laterals themselves—is the primary unit of resource designation and evaluation. The evaluation below employs the NPS (2002) criteria and guidelines in evaluating the district's historical significance.

Historic Context

Three historical trends or sub-themes within the broader theme of agriculture/irrigation are relevant in evaluating the historical significance of the TID: the growth of irrigation as a function of agricultural colonization; the replacement of private canal companies by publically owned irrigation districts; and the advent of lift irrigation technology.

Generally speaking, agricultural colonization is essentially a real estate strategy whereby a large raw tract of land (640 acres or more) is acquired by a land developer; subdivided into 20-, 10-, or 5-acre parcels; improved with basic infrastructure; then marketed and sold to individual farmers at lucrative prices. This brand of land development commonly occurred throughout the San Joaquin Valley in the late nineteenth century but was particularly prevalent in the Fresno area where the town's city limits were surrounded on all sides by various agricultural colonies (Clough and Secrest 1984:120). Indeed, colonization not only shaped Fresno County agriculture but helped make the town of Fresno the valley's commercial hub and largest city. Mainly because the smaller lots could only be feasibly planted with premium crops like vineyards, tree fruit, and citrus, irrigation was a necessary infrastructure to the success of any colony. Without access to irrigation, a rural property of any size was limited in both its agricultural productivity and commercial value. Beginning in the early 1870s, three historically significant irrigation networks built by privately owned canal companies were initiated mainly to serve the needs of Fresno's agricultural subdivisions: the Fresno Canal and Irrigation Company system; the Kings River and Fresno Canal Company system; and the Enterprise Canal Company system. All three directly or indirectly tap the waters of the Kings River. In 1885, a

court ruling left the three systems in the sole hands of the Fresno Canal and Irrigation Company (Willison 1980). Construction of these systems underlay the enormous agriculture wealth produced by Fresno County in the late nineteenth and early twentieth centuries; they still remain a necessary component of modern agri-business. Consistent with other canal evaluations in the area, the period of significance for this theme in Fresno County agricultural history is given as 1871 to 1900, a nearly 30 year interval beginning with groundbreaking on the first bulk canals and concluding with the end of the century when the three irrigation systems had more or less arrived at their modern alignment.

Mainly because the interests of private canal companies were often tied to, if not the same, as those of land development, the priorities of how irrigation should be distributed and regulated clashed between canal and land companies on the one hand and farmers on the other. To the former, water was a commodity that could be acquired through riparian or appropriative rights and sold for profit; to the latter, water represented a public good that should be made available to all users at reasonable prices. Dissatisfaction with California's early water legislation, which resoundingly favored property in water, pervaded most San Joaquin Valley growers, leading eventually to the passage of the 1887 Wright Act that provided the legal basis for the creation of public irrigation/water districts. This chapter in valley agriculture is best illustrated by the trials and tribulations of the Turlock Irrigation District and Modesto Irrigation District, both organized in the wake of the Wright Act. In fact, it wasn't until the turn of the century when these Stanislaus County districts had survived legal challenges and gained sufficient financial traction that they could operate as viable entities. Encompassing the period between the mid-1880s to the mid-1910s, the evolution of the irrigation district in California involved parallel developments in the state's politics, legislation, and judiciary as much (if not more) than corresponding development in agriculture.

Improvements in technology and engineering methods over the past 125 years have largely accounted for the transformation of the crude ditches of the late nineteenth century into today's state-of-the-art water conveyance structures. While the Delta Mendota Canal and other components of the Central Valley Project are classic examples of this kind of progress, the growth of the San Joaquin Valley's electrical grid—most notably by the SJLPC—gave local valley irrigators an alternative to conventional gravity-flow conveyance. As described above, a lift system employs powerful pumps to "lift" irrigation water from lower to higher elevations, thus increasing the potential area of irrigation. It is an irrigation method particularly suited to the valley's West Side, where the western reach of gravity-flow canals is often restricted due to the region's hydrology and terrain. In valley history, the first and perhaps best historical example of this kind of system is illustrated by the Patterson Lift Irrigation system in Stanislaus County (Lloyd et al. 2014). Completed in 1910, this system represented a breakthrough in water conveyance and was reported as such in contemporary engineering journals. In ensuing decades, the Patterson system appears to have validated this method of irrigation, serving as the impetus for construction of other lift systems.

In assessing significance, particularly under criteria A/1 and B/2 below, it is important to distinguish events and people that established economic trends from those that merely represent continuations of such trends.

Significance Evaluation

Criterion A/1. In terms of significance under this criterion, the TID system as a historical resource fairs poorly against the three subthemes discussed in the historic context. Although the district's history is obviously connected to these economic, political, and technological trends in valley agriculture, it cannot be consider a "good representative" under NPS (2002) guidelines. Agricultural colonization in what would become the Tranquillity area began with the efforts of cattle baron Jefferson James in the late 1890s and were continued by James's successor, the SJVFLC, into the 1920s. Such land development shadowed earlier and more substantial colonization around the Fresno area. Though necessary to the Tranquillity Colony and other subdivisions, West Side conveyances like the Beta Main Canal had neither the capacity nor geographical reach of the more voluminous and expansive FCIC system. Even more importantly, the creation of the TID postdated colonization, and its economic effect appears to have been limited. As Adams (1929:232–233) describes, the SJVFLC efforts to sell its properties during the 1920s met with financial difficulties and were far from being a resounding success.

Being the first of its kind often garners historical significance under Criterion A/1, but the distinction of the TID as one of the first water districts in Fresno County cannot be taken at face value in this case. In looking at the larger picture of valley irrigation, irrigation districts began replacing private companies as far back as the late 1880s. Here again, the formation of the TID was simply a continuation of an already established trend. In this regard, the

circumstances under which the TID was created (i.e., customer dissatisfaction) are wholly consistent with the creation of other valley districts and do not stand out as a good example under this theme.

Consistent with other evaluations of lift systems on the west side of the San Joaquin Valley, the TID lift facilities at the time of their initial construction do not exemplify a significant event in the history of this technological/ engineering development (e.g., Baloian and Lloyd 2013). Built about 10 years after construction of the Patterson lift system, the TID's adoption of lift technological similarly represents the continuation of an already established trend.

For these reasons, the TID and its components are not considered historically significant under Criterion A/1.

Criterion B/2. Jefferson G. James—the founder of the Tranquillity Colony, the ripariant water rights to the Fresno Slough, and the James Canal Company—is arguably an important individual in the early history of Fresno County. From the late 1800s to the time of his death in 1910, James owned the land that was eventually acquired by the SJVFLC. Although he appears to have set in motion the process that converted his pasture land to farm colonies, he is not directly tied to the construction of the TID irrigation system, which post-dates his death by several years. Research identified no other persons of historical import associated with the TID irrigation system. For these reasons, it is not considered historically significant under Criterion B/2.

Criterion C/3. Distinctive architecture and/or unique or innovative engineering design or construction methods commonly accrue significance under Criterion C/3. The TID's reliance on pumps is an interesting aspect of the system but by no means can it be considered historically significant. Research found no references in contemporary agricultural/irrigation journals that suggest that the TID's use of lift technology was notable from an engineering perspective. The system thus is not significant under Criterion C/3.

Criterion D/4. This Criterion is most relevant for archaeological sites, but it can be applied to built-environment resources if further study has the potential to yield information that cannot be obtained from other sources. However, historical information about irrigation systems is prevalent, and further study would clearly not add any new information. The TID and its components are not considered significant under Criterion D/4.

Integrity. Because the TID irrigation system is not considered historically significant under any of the four criteria, formal assessment of integrity is not necessary. However, the reader is referred to the attached Linear Feature Record of the Slough Canal for a discussion of how a segment of this canal has been modified since its construction in the early 1920s.

Conclusion

Due to a lack of significance, the TID system and its contributing components, such as the Slough Canal, are not considered eligible for inclusion in the NRHP or CRHR.

B11. Additional Resource Attributes (list attributes and codes): None.

***B12. References:**

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1946 *San Joaquin, Calif.*, 1:24,000 scale. U.S. National Geologic Map Database, accessed August 13, 2018.

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1919 *History of Fresno County, California, with Biographical Sketches: The Leading Men and Women of the County Who Have Been Identified with Its Growth and Development from the Early Days to the Present*, Vol. 2. Historic Record Company, Los Angeles, California

Willison, Paul H.
1980 *Past, Present, and Future of the Fresno Irrigation District*. Fresno Irrigation District, Fresno, California.

B13. Remarks: The findings of this evaluation are consistent with Applied EarthWorks' evaluation of the neighboring JID system (Baloian 2015b).

***B14. Evaluator:** Annie McCausland and Randy Baloian
Date of Evaluation: August 20, 2018

L1. Historic and/or Common Name: Slough Canal

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:**

b. Location of point or segment: 746625 **mE /** 4055149 **mN**

L3. Description: The Slough Canal is an earthen canal within the Tranquillity Irrigation District (TID) measuring approximately 25,344 feet long (Tranquillity Irrigation District 2011). The main branch of the canal generally flows in a southward direction from its head on the Fresno Slough in the center of Section 9 (T15S, R16E) to the northwest quarter of Section 29 (T15S, R16E). Six laterals (designated as SL1, SL2, etc. on the district map) radiate from the main branch to deliver water to individual properties. The main branch and laterals include four in-line lift stations and three off-line lift stations. The TID Slough Canal also receives water from the neighboring James Irrigation District when needed.

The recorded segment of the main branch of the Slough Canal is approximately 1,418 feet long and 35–45 feet wide from bank to bank and includes in-line Lift Station 3 in the vicinity of the intersection of Parlier and Sonoma avenues. Also recorded was a portion of SL2, which measures approximately 201 feet long and 18 feet wide from bank to bank. This lateral flows due east from the main branch. Lift Station 3 is north of Parlier Avenue. The station features a metal grate debris filter, two vertical pumps set in a concrete foundation, a concrete block splash wall, and a metal walkway with railing across the canal. Immediately south of the pumps, the canal is lined with concrete and has four concrete posts with attached beams that span the width of the canal. The vertical lift segment is approximately 122 feet long. The lined portion of the canal also features three turnouts on the east side. A concrete culvert carries the canal under Parlier Avenue. Another concrete culvert carries the canal under Sonoma Avenue. South of Sonoma Avenue there is a turnout on the west side. The earthen portions of the canal contain heavy vegetation growth.

L4. Dimensions:

Slough Canal

L4e. Sketch or Cross Section ☐ attached **Facing:** ☒ none

a. Top Width: 35–45 feet
b. Bottom Width: Unable to observe due to high flows
c. Height or Depth: Unable to observe due to high flows
d. Length of Segment: Approximately 1,418 feet

SL2

Sketch or Cross Section ☐ attached **Facing:** ☒ none

a. Top Width: Approximately 18 feet
b. Bottom Width: Unable to observe due to high flows
c. Height or Depth: Unable to observe due to high flows
d. Length of Segment: Approximately 201 feet

L5. Associated Resources: Unknown

L6. Setting: Agricultural properties currently producing almonds, tomatoes, and cotton.

L7. Integrity Considerations: The 1925 USGS San Joaquin, CA, topographic map, which was surveyed in 1923, shows the Slough Canal, including the recorded segment. SL2 does not appear on the 1925 map but does appear on the 1963 version.

Historical maps and aerial photographs reveal that the section of the Slough Canal immediately south of Parlier Avenue was reoriented by 1971 to a north–south alignment along Sonoma Avenue. By 1998 the entire segment of the canal south of Parlier Avenue also was reoriented to a north–south alignment along Sonoma Avenue down to Manning Avenue. The vertical lift system and concrete lining within this segment of the canal was constructed by 1962. The extant vertical pumps were installed sometime in the early 2000s according to TID Assistant General Manager Rodney Wade.

L8. Photo, Map, or Drawing: See Primary Record, Sketch Map, and Continuation Sheets.

L9. Remarks:

L10. Form Prepared By: Annie McCausland

L11. Date: August 20, 2018

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

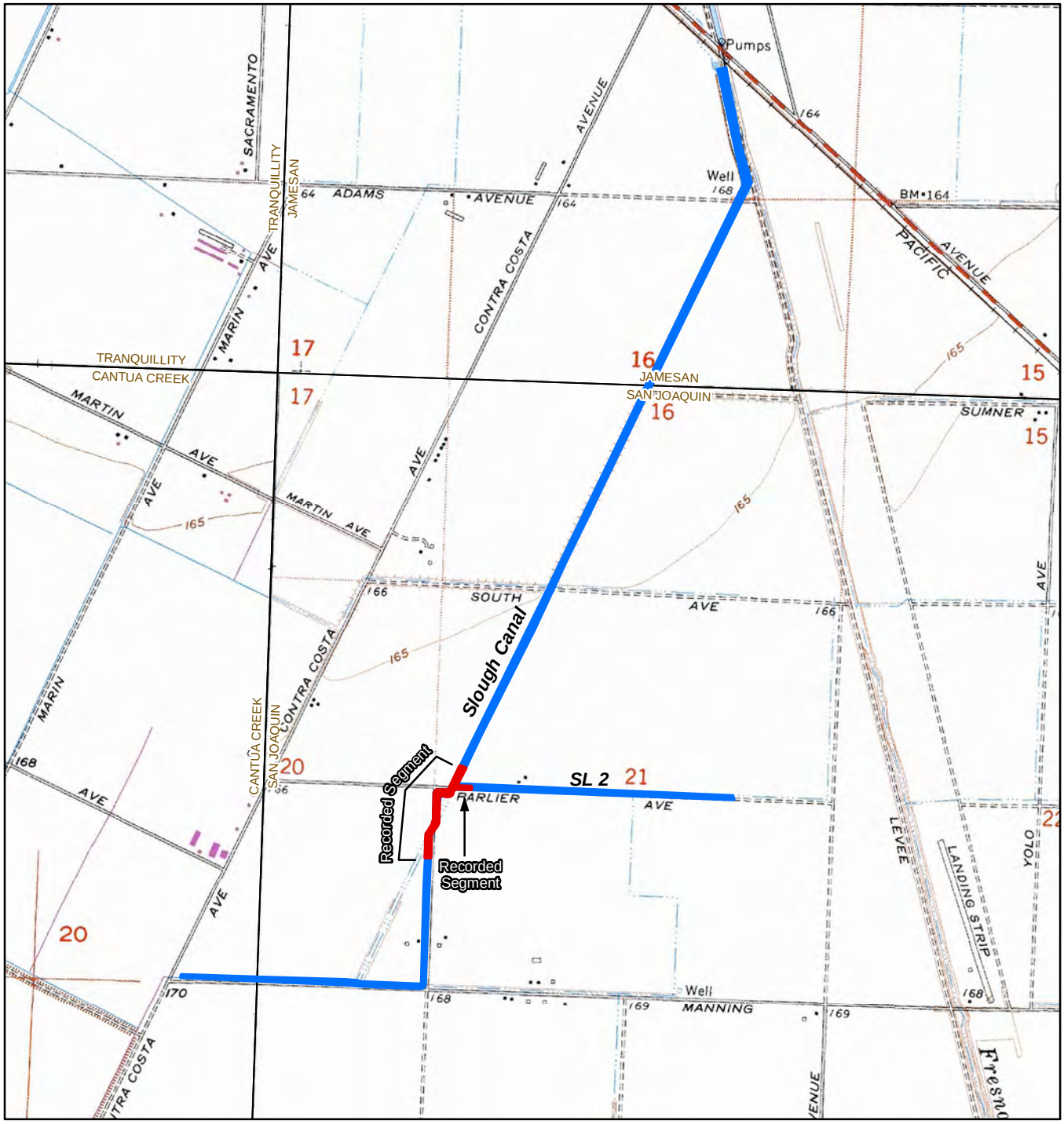
Primary #
HRI#
Trinomial

Resource Name or #: Tranquillity Irrigation District (Slough Canal segment)

Scale: 1:24,000

Map Name: San Joaquin, CA, USGS 7.5' quadrangle

Date: 1963



SCALE 1:24,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

TRUE NORTH

Vertical lift pumps and turnouts, looking west.

TID Slough Canal, unlined, north of vertical lift pumps, looking northwest.

Metal grate debris filter, metal walkway, and vertical lift pump system of TID Slough Canal, looking south.

Concrete culvert under Parlier Avenue, looking north.

TID Slough Canal, eastern branch north of Parlier Avenue, looking east.

Concrete culvert at Sonoma Avenue, looking southwest.

Concrete culvert at Sonoma Avenue, looking northwest.

TID Slough Canal and turnout, looking west.