RECLAMATION DISTRICT 1500

RD 1500 FLOOD CONTROL AND FLOOD SAFETY REHABILITATION PROJECT

DRAFT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

SUTTER COUNTY, CA
JUNE 2026

PREPARED FOR:
Reclamation District 1500
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APPENDICES

Appendix A – Air Quality and Greenhouse Gas Model
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ACRONYMS & ABBREVIATIONS

AB---------- Assembly Bill
APE ---------- Area of Potential Effect
APN---------- Assessor's Parcel Number
BMP ---------- Best Management Practices
BE---------- Biological Evaluation
CalEEMod---------- California Emissions Estimator Modeling (software)
CARB ---------- California Air Resources Board
CASQA ---------- California Stormwater Quality Association
CBC---------- California Building Code
CCAA---------- California Clean Air Act
CCR---------- California Code of Regulations
CDFW ---------- California Fish and Wildlife
CEQA---------- California Environmental Quality Act
cfs ---------- cubic feet per second
CH_4 ---------- Methane
CHRIS ---------- California Historical Resources Information System
CNDDB---------- California Natural Diversity Database
CNPS ---------- California Native Plant Society
CO ---------- Carbone Monoxide
CO_2 ---------- Carbon dioxide
County---------- Sutter County
CRHR---------- California Register of Historical Resources
CWA---------- Clean Water Act
District---------- Reclamation District No. 1500
DOC ---------- Department of Conservation
DTSC ---------- Department of Toxic Substances Control
EIR ---------- Environmental Impact Report
EIS ---------- Environmental Impact Statement
FEMA ---------- Federal Emergency Management Agency
FMMP ---------- Farmland Mapping and Monitoring Program
GHG ---------- Greenhouse Gas
GIS---------- Geographic Information System
GSA---------- Groundwater Sustainability Agency
GSP ---------- Groundwater Sustainability Plan
GWP---------- Global Warming Potential
HUC ---------- Hydrologic Unit Code
IS---------- Initial Study
IS/MND---------- Initial Study/Mitigated Negative Declaration
MBTA ---------- Migratory Bird Treaty Act
MMRP ---------- Mitigation Monitoring and Reporting Program
MND ---------- Mitigated Negative Declaration
NAAQS---------- National Ambient Air Quality Standards
NAHC ---------- Native American Heritage Commission
ND ---------- Negative Declaration
NEIC---------- Northeast Information Center
NEPA ---------- National Environmental Policy Act
NO_2---------- Nitrogen dioxide
NOx---------- Oxides of nitrogen

NRCS ---------- Natural Resources Conservation Service
NRHP ---------- National Register of Historic Places
O_3 ---------- Ozone
Pb ---------- Lead
PG&E ---------- Pacific Gas & Electric Company
PM_{10} ---------- particulate matter 10 microns in size
ppm ---------- parts per million
Project ---------- RD 1500 Flood Control and Flood Safety Rehabilitation Project
RD 1500 ---------- Reclamation District 1500
ROG ---------- Reactive Organic Gases
ROW ---------- Right of Way
RWQCB ---------- Regional Water Quality Control Board
SB ---------- Senate Bill
SGMA ---------- Sustainable Groundwater Management Act
SJVAB ---------- San Joaquin Valley Air Basin
SO_2 ---------- Sulfur Dioxide
SR ---------- State Route
SWPPP ---------- Storm Water Pollution Prevention Plan
SWRCB ---------- State Water Resources Control Board
TPY ---------- tons per year
USACE ---------- United States Army Corps of Engineers
USC ---------- United States Code
USDA ---------- United States Department of Agriculture
USEPA ---------- United States Environmental Protection Agency
USFWS ---------- United States Fish and Wildlife Service
USGS ---------- United States Geological Survey
µg/m3 ---------- micrograms per cubic meter
WDR ---------- Waste Discharge Requirements

CHAPTER 1 INTRODUCTION

Provost & Pritchard Consulting Group (Provost & Pritchard) has prepared this Initial Study/Mitigated Negative Declaration (IS/MND) on behalf of Reclamation District 1500 (RD 1500 or District) to address the environmental effects of the RD 1500 Flood Control and Flood Safety Rehabilitation Project (Project). This document has been prepared in accordance with the California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq. The District is the CEQA lead agency for this Project.

The site and the Project are described in detail in Chapter 2 Project Description.

1.1 REGULATORY INFORMATION

An Initial Study (IS) is a document prepared by a lead agency to determine whether a project may have a significant effect on the environment. In accordance with California Code of Regulations Title 14 (Chapter 3, Section 15000, *et seq.*)-- also known as the CEQA Guidelines -- Section 15064 (a)(1) states that an environmental impact report Environmental Impact Report (EIR) must be prepared if there is substantial evidence in light of the whole record that the project under review may have a significant effect on the environment and should be further analyzed to determine mitigation measures or project alternatives that might avoid or reduce project impacts to less than significant levels. A negative declaration (ND) may be prepared instead if the lead agency finds that there is no substantial evidence in light of the whole record that the project may have a significant effect on the environment. An ND is a written statement describing the reasons why a proposed project, not otherwise exempt from CEQA, would not have a significant effect on the environment and, therefore, why it would not require the preparation of an EIR (CEQA Guidelines Section 15371). According to CEQA Guidelines Section 15070, a ND or *mitigated* ND (MND) shall be prepared for a project subject to CEQA when either:

a. The IS shows there is no substantial evidence, in light of the whole record before the agency, that the proposed project may have a significant effect on the environment, or
b. The IS identified potentially significant effects, but:
    1. Revisions in the project plans or proposals made by or agreed to by the applicant before the proposed MND and IS is released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur is prepared, and
    2. There is no substantial evidence, in light of the whole record before the agency, that the proposed project as revised may have a significant effect on the environment.

1.2 DOCUMENT FORMAT

This IS/MND contains six chapters Chapter 1 Introduction, provides an overview of the Project and the CEQA process Chapter 2 Project Description, provides a detailed description of proposed Project components and objectives. Chapter 3 Determination, the Lead Agency's determination based upon this initial evaluation. Chapter 4 Environmental Impact Analysis presents the CEQA checklist and environmental analysis for all impact areas, mandatory findings of significance, and feasible mitigation measures. If the Project does not have the potential to significantly impact a given issue area, the relevant section provides a brief discussion of the reasons why no impacts are expected. If the Project could have a potentially significant impact on a resource, the issue area discussion provides a description of potential impacts, and appropriate mitigation measures and/or permit requirements that would reduce those impacts to a less than significant level. Chapter 5 Mitigation, Monitoring, and Reporting Program (MMRP), provides the proposed mitigation measures, implementation timelines, and the entity/agency responsible for ensuring implementation. details the documents and reports this document relies upon to provide its analysis.

The Air Quality and Greenhouse Gas Emissions Model, Biological Resources Information, and Cultural Resources Information, are provided as technical Appendix A, Appendix B, and Appendix C, respectively, at the end of this document.

CHAPTER 2 PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

2.1.1 LEAD AGENCY NAME AND ADDRESS

Reclamation District 1500
15094 Cranmore Rd.,
Robbins, CA 95676

2.1.2 CONTACT PERSON AND PHONE NUMBER

Roger Cornwell
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(530) 738-4423

2.1.3 CEQA CONSULTANT

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2.1.4 PROJECT LOCATION

The Project is located in Sutter County in Northern California, approximately 3.5 miles southeast of Knights Landing, 6.5 miles southeast of Robbins, 25 miles south of Yuba City, and 17.5 miles northwest of downtown Sacramento (see Figure 2-1 and Figure 2-2). The Project is located in an area of low-lying land protected by levees between the Sacramento and Feather Rivers, commonly known as the Sutter Basin. The Project would include construction, improvements, and staging on several Assessor's Parcel Numbers (APN), including APN 034-170-012, -022, -030, and -031 (Project Site). The centroid of the Project site is 38° 47' 4.92" N, 121° 39' 18.36" W. A topographic map of the area is included in Figure 2-3.

2.1.5 GENERAL PLAN DESIGNATION AND ZONING

The Sutter County General Plan designates the Project site is Agriculture – 80 acre minimum (AG-80) west of the Sutter Bypass Levee (the levee) and Open Space (OS) east of the levee (see Figure 2-4). Additionally, Sutter County has designated the Project site as zoned Agriculture (AG) (see Figure 2-5).

2.1.6 DESCRIPTION OF THE PROJECT

2.1.6.1 PROJECT BACKGROUND AND PURPOSE

The purpose of this Project is to provide reliable and long-term flood control and damage reduction for the Sutter Basin and to protect public safety and emergency access. The need for this Project is to provide at least the current level of flood protection to the Sutter Basin that is provided by the existing Karnak Drainage Facility, which is over 100 years old and nearing the end of its useful life, to maintain protection of the social and economic activities in the benefitted area, including local housing and industry, agriculture and transportation across a critical evacuation route. Flooding can be catastrophic to an area while burdening a large recovery cost. Flood control facilities and operations in the watershed must be reliable and consistent to reduce the risk of catastrophic flooding and associated damage, now and in the future.

The Reclamation District 1500 (RD 1500) service area is situated in a low-lying area between leveed river and flood control bypass systems. RD 1500 has provided flood protection and drainage service to the area for over 100 years through its drainage system and existing Karnak Drainage Facility, however, the existing Karnak Drainage Facility is nearing the end of its useful life and is subject to frequent and potentially extended breakdowns due to lack of available parts resulting in increasingly frequent equipment outages and repairs, which greatly impair the existing Facility from providing its intended purpose of drainage control and flood management in the area. The aging infrastructure and lack of parts availability puts all land within the RD 1500 service area at risk in the event of a significant rainfall event. Without adequate and reliable flood control, millions of dollars in agricultural products would be at risk, a designated emergency access route would be in jeopardy of flood closures, and substantial damage and potential loss of life are possible in the community of Robbins and surrounding areas.

RD 1500 entered into a Watershed Program Cooperative Agreement with the United States Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS) to complete initial planning needed to support identification and development of an effective flood management solution within the RD 1500 service area. The RD 1500 service area, which is the benefitted area, lies entirely within the approximately 75,630 acre McGriff Lakes-Sutter Basin subwatershed (Hydrologic Unit Code [HUC] 180201041102). Watershed planning is authorized under the Watershed Protection and Flood Prevention Act of 1954, as amended, (Public Law 83-566) and the Flood Control Act of 1944 (Public Law 78-534). NRCS funding requirements stipulate that RD 1500, the local sponsor, must complete a PL 83-566 Watershed Plan-Environmental Assessment (EA) or Watershed Plan-Environmental Impact Statement (EIS) that supports identification and development of an effective flood management solution for the Watershed area. The proposed Project would be eligible for federal funding under PL 83-566 requirements under Authorized Project Purpose (i) Flood Prevention (Flood Damage Reduction) due to the proposed Project's purpose and need of providing reliable and long-term flood control and damage reduction for the Sutter Basin and improve public safety and emergency access. Estimated federal funds required for the construction of the proposed action will exceed $25 million and the proposed action will therefore require congressional approval per the 2018 Agriculture Appropriations Action amending funding threshold. In accordance with 7 Code of Federal Regulations (CFR) 650.7(a)(2), an EIS is required for projects requiring congressional approval regardless of the environmental impacts. The McGriff Lakes-Sutter Basin Watershed Flood Control and Flood Safety Rehabilitation Project Watershed Plan–EIS (Watershed Plan-EIS) identifies and evaluates several project alternatives for providing critical flood protection benefits to the RD 1500 service area and identifies the preferred alternative with supporting economic and environmental impact analysis. The preferred alternative was identified as modernizing the existing Karnak Drainage Facility.

The RD 1500 service area, comprising an area of approximately 67,850 acres, was reclaimed for farming as part of the Sutter Basin Reclamation Project in the early part of the 20th Century and is located between the Sacramento River on the west and south, the Tisdale Bypass on the north, and the Sutter Bypass and Feather River on the east. RD 1500 is located in the central part of the Sacramento River Flood Control System. The entire RD 1500 service area boundary is leveed to prevent flooding from the nearby river systems, however, during large rainfall events the area acts as a bathtub filling up from precipitation that falls within its boundaries. In addition, water levels in the nearby river systems are often higher than the ground surface in the Sutter Basin, causing seepage that is captured by the RD 1500 drainage system and must be removed from the low-lying area. The Sutter Basin is a closed basin with no natural outlet because of the extensive levee system, so impounded surface water and drainage water must be pumped out of the basin, currently by the existing Karnak Drainage Facility, to keep the area dewatered.

The largest drainage flows discharged at the existing Karnak Drainage Facility occur in the winter months of wet years, with the majority of pumped water in the winter months being rainwater that collects in the closed basin. Water seeping into the low-lying area from the adjacent river systems also contributes to the

drainage flows all year long. Precipitation and drainage discharge data from water year 2017, one of the wettest years on record in the area, was analyzed as part of the Watershed Plan-EIS to compare the daily volume of water pumped out of the basin by the existing Karnak facility for the months of January, February, and March 2017 to the daily precipitation recorded at the nearby Verona weather station. The analysis indicated there is a daily base flow even when there is no precipitation as a result of river seepage coming into the Sutter Basin, however, pumping records show that the drainage discharge ramped up and then slowly dropped back down after each storm event as a result of the delay in runoff flowing through the complex network of farm fields, ditches, and drainage canals.

Discharge data from water year 2017 showed that a total of nearly 97,800 acre-feet of water was discharged out of the Sutter Basin by the existing Karnak pumping facility during the three-month period of January through March 2017. The precipitation received from January 2017 through March 2017 in downtown Sacramento was the second highest for the January through March period in 144 years of precipitation records received in downtown Sacramento (longest available source of nearby reliable precipitation data), indicating an exceedance percentage of 1.4% or a recurrence interval of nearly once every 75 years. During that period the existing Karnak facility was barely able to keep up with providing the required drainage service and avoid flooding of the area. If the Karnak Drainage Facility was not in operation in 2017, the nearly 100,000 acre-feet of water discharged out of the basin from January-March 2017 would have flooded approximately 31,200 acres of prime farmland within the Sutter Basin and the community of Robbins would have been under 5-6 feet of water, completely cutting off access to State Route (SR) 113, a designated evacuation route. Figure 2-6 indicates the area that would have been flooded from the approximately 75-year storm events in 2017 if the existing Karnak Drainage Facility had not been operational to evacuate nearly 100,000 acre-feet of water from the Sutter Basin. If drainage service had not been provided and the water remained in the closed Sutter Basin, this amount of water would have completely flooded the community of Robbins and cut-off evacuation and emergency access routes that are vitally important.

All social and economic activities in the protected area, including local housing and industry, agriculture and transportation across a critical evacuation route, are premised on the continuation of approximately this level of flood protection indefinitely. There is a pressing need to assure the current level of flood protection, and loss of this assurance would lead to very expensive adaptations or serious economic and public safety risks, and the risk of loss increases over time as operation of the current facility becomes more difficult, possibly accelerated by a projected change in the local rainfall regime over the next several decades as discussed in the Watershed Plan-EIS. Without intervention, the existing Karnak Drainage Facility will eventually fail and no flood protection would be provided, potentially resulting in the flooding of over 31,000 acres of prime farmland and the inundation of the community of Robbins.

The goals of the multi-benefit Project include:

- Provide reliable and long-term flood control in the Sutter Basin;
- Prevent future flooding of homes and other infrastructure in the community of Robbins and surrounding rural areas;
- Protect over 60,000 acres of prime farmland from flooding and prevent the loss of over 31,000 acres of crops and farmland revenue;
- Protect emergency response and evacuation routes, specifically SR 113 that bisects the RD 1500 service area, a designated emergency evacuation route for over 160,000 residents in the Yuba City-Marysville metropolitan area;
- Avoid potential direct and indirect revenue losses to the regional Sutter Basin economy from a major flood event if flood protection is not provided as a result of:
    - Loss of crops and/or farm revenue;

  - Damage to structures and community infrastructure;
  - Damage to industry and local businesses;
  - Disruption of electrical service if main transmission lines in the basin are damaged from flooding;
  - Elimination of evacuation and emergency response routes;
  - Displacement of people and livestock;
- Maintain current discharge flow regime, which is beneficial for existing fish and wildlife habitat;
- Maintain rice production in the RD 1500 service area and enhance the associated environmental benefits through reliable, improved water management; and
- Maintain agricultural drainage on lands that have been drained by gravity and where pumping plants have historically removed the water from the closed basin to avoid ponded water.

2.1.6.2 PROJECT DESCRIPTION

The Project would rehabilitate and modernize the existing Karnak Drainage Facility to continue to provide flood protection for the Sutter Basin similar to current operations. The Project's Area of Potential Effects (APE) for modernizing the existing Karnak Drainage Facility is shown in Figure 2-2. The APE is approximately 7.6 acres in size.

The existing Karnak Drainage Facility discharges water from the Sutter Basin into the Sacramento Slough and consists of three antiquated pump stations that have been well maintained but much of the equipment is nearing the end of its useful life. Pumping Plant 1 (PP1) on the north bank of the drainage canal was constructed in 1914 and provides the ability to discharge 1,200 ± cubic feet per second (cfs) of drain water out of the Sutter Basin utilizing six centrifugal pumps during above normal winters and large storm events. Pumping Plant 2 (PP2) was constructed in 1929 and has never operated correctly and is not utilized. PP3 is located adjacent to PP2 and has been in operation since 1952 and is used in day-to-day operations to remove excess precipitation in the winter months and seepage water during the entire year, utilizing four vertical pumps with a capacity of 700 ± cfs. These pumping plants have no automatic controls or a backup power system. All three pumping plants have concrete pump houses and have existing culverts through the flood control levee that discharge the water into the Sacramento Slough.

The Project would overhaul and modernize the existing drainage and flood protection facility to increase reliability and efficiency, leveraging to the extent possible, the existing facilities that RD 1500 already owns. The Project would also result in the installation of a backup power source and increased pumping capacity to provide redundancy and provide for anticipated climate change impacts. Project design would result in maintaining the PP1 building and discharge culverts but modernizing the pumping equipment and electrical system; removing the existing PP2 building and equipment; constructing a gravity outlet structure with fish barrier that utilizes the existing PP2 culverts for gravity drainage; and the removal of the existing Pumping Plant 3 (PP3) building and equipment and constructing a slightly larger, new Pumping Plant 4 (PP4) with submersible pumps that utilizes the existing PP3 discharge culverts. Electrical equipment would be located above the base flood elevation. Fill would be added onto a portion of the outer levee slope to make an equipment pad to facilitate installation of an engine generator set above the base flood elevation to serve as a backup power source. The Project would provide a long-term flood management solution by efficiently and reliably continuing current operations.

An inflatable bladder cofferdam, or comparable watertight barrier, will be used temporarily during construction to isolate the discharge culvert outlets in the Sacramento Slough to prevent water from obstructing the installation of protective liners and flowmeters in the discharge culverts and installation of new flap gates on the existing culvert outlets. Construction activities in the Sacramento Slough would occur when the water level is at its lowest stage, likely in the summer and fall months.

In developing the Project design, a preliminary structural evaluation of the existing Karnak Drainage Facility pump station buildings was conducted by a licensed California structural engineer to determine their suitability for continued use. Initial Structural Evaluation reports for all three of the existing buildings at the Karnak site are contained in the Watershed Plan-EIS, with the findings summarized below:

- The PP1 pump house building (PH1) is impressively sized and reinforced, and it appears the building has performed well and is currently performing in general conformance to the original intent of the design. However, there exist some issues that are recommended for further evaluation to determine if remedial efforts are needed and/or if structural strengthening would be beneficial for further long-term use of the structure.
- While not currently being used, the PP2 pump house building (PH2) has significant geometric characteristics of the structure that cause a high level of concern for the structure to resist moderate to major seismic event forces.
- The PP3 pump house building (PH3) appears to be performing in general conformance to the original intent of the design, however, similar to the PH2 building, the structure has significant geometric characteristics that cause a high level of concern for the structure to resist moderate to major seismic event forces.

It is anticipated at this time that Pacific Gas & Electric Company (PG&E), the local electrical utility, will want to discontinue providing the existing 2300V electrical service to the facility once the modernization has been complete, and that PG&E will want to bring in 4160V or higher voltage to serve the site in the future, although this assumption needs to be verified with PG&E during the final design process. The Project design can accommodate the upgraded PG&E service by installing District owned transformers to step the voltage down to 480V to power the new submersible pumps at the new pump station as well as the rebuilt motors on the existing centrifugal pumps at PP1.

The Project has been divided into four Measures that correspond to the major work items. Table 2-1: below presents the various components of each measure of the Project and a schematic of the works of improvement is contained as Figure 2-7.

Table 2-1: Modernization Alternative Project Activities Summary

Measure 1 - Modernize Existing Pumping Plant 1 (PP1)
• Installation of permanent sheet piling near PP1 to construct a foundation pad for a new electrical control building and area adjacent to the new gravity outlet structure.
• Construction of a new, larger, and slightly higher platform structure near PP1 with the installation of a new air-conditioned electrical control building.
• Refurbish the six existing 200 cfs centrifugal pumps.
• Rebuild the six existing centrifugal pump 800 Hp motors for 480V service.
• Modify the existing centrifugal pump priming system for easier operation.
• Replacement of valves and actuators on pump discharges.
• Install protective liner and add flow measurement inside all 3 existing discharge culverts.
• Replacement of existing flap gates and slide gates on discharge culverts in existing access chamber.
• Rehabilitate existing PP1 building by sealing concrete cracks and recoating roof.
• Remove all electrical equipment that serves PP1 from the existing platform structure.
• Installation of all new electrical equipment, switchgear, and motor controls for PP1.
• Installation of step-down transformers adjacent to the control building on the elevated platform to reduce PG&E high-voltage down to 480V to power the pumping equipment.

Measure 2 – Utility Upgrade
• Construction of an elevated platform for new transformers.
• Installation of new PG&E high-voltage electrical transformers.
Measure 3 – Construct Gravity Outlet Structure
• Relocation of powerlines serving the existing PP3 station (which currently cross the existing PP2 building).
• Installation of a temporary cofferdam in the drainage canal to facilitate dewatering the area around the existing PP2 building.
• Removal of all equipment and demolition of the existing PP2 building.
• Removal of existing concrete stopblocks and sediment lodged in discharge culverts.
• Construction of a concrete gravity outlet structure and fish barrier, consisting of: o reorientation of discharge culvert inlets; o slide gates on culvert inlets; o pleated long-crested weir for level control in the drainage canal, outlet measurement, and prevention of juvenile fish from migrating into the drainage canal during gravity flow operations; o fish barrier screen to prevent migration of adult fish into the drainage canal during gravity flow operations; o bypass slide gates in long-crested weir if drainage canal needed to be drained; o installation of a water level sensor; and o maintenance hoist to clean the fish barrier screen.
• Installation of protective liner inside all 3 discharge box culverts.
• Replacement of flap gates on discharge culvert outlets.
Measure 4 – Construct New Pumping Plant 4 (PP4)
• Installation of a temporary cofferdam in the drainage canal to facilitate dewatering the area around the existing PP3 building.
• Removal of all PP3 equipment and demolition of the existing PP3 building.
• Construction of a new concrete PP4 pump structure.
• Installation of protective liner and flow measurement inside all four existing PP3 box culverts.
• Replacement of slide gates inside access chamber on existing PP3 discharge culverts.
• Replacement of flap gates on the existing PP3 discharge box culvert outlets.
• Construct pad for backup generator on a portion of the outer levee, with fill material installed on the levee.
• Installation of permanent sheet piling between the PP4 pump structure and the gravity discharge structure.
• Miscellaneous grading around structures and approach roads.
• Installation of six submersible VFD (variable-frequency drive) controlled pumps with a discharge capacity of approximately 1,000± cfs.
• Installation of electrical controls inside the air-conditioned control building at PP1.
• Installation of a SCADA (Supervisory Control and Data Acquisition) system for automated operation and monitoring of the pump stations.
• Installation of backup generator on outer levee to power PP4 in the event PG&E power is lost.

Construction of the Project would need to be conducted in phases since drainage service must continue to be provided at the Karnak Facility at all times. Construction would likely need to occur in the following sequence:

Year 1 (PP3 operational)

- Installation of new elevated platform, control building and electrical system at PP1, keeping power to existing PP3 station
- Modernization of pumping equipment at PP1 and rehabilitation of existing PP1 discharge culverts while PP3 is still operational
- Installation of new PG&E high-voltage transformers on elevated platform
- Demolition of PP2 building, renovation of PP2 discharge culverts for gravity drainage, and construction of gravity outlet structure with fish barrier while PP3 is still operational

Year 2 (PP1 and gravity drainage operational)

- Demolition of PP3 building, rehabilitation of existing PP3 discharge culverts, and construction of a new PP4 pump station
- Installation of backup generator on a portion of the outer levee
- Installation of a SCADA system

Modernization of the existing facility meets the purpose and need of the Project, provides safety and protection for the community of Robbins and surrounding area, protects farmland and emergency access roads, maintains the local economy, maintains environmental benefits, and is the most logistically reasonable option for maintaining flood protection for the Sutter Basin.

2.1.7 SITE AND SURROUNDING LAND USES AND SETTINGS

Table 2-2: Existing Uses, General Plan Designation, & Zone Districts of Surrounding Properties

Direction from Project Site	Existing Use	General Plan Designation	Zone District
NORTH	Agriculture	OS, AG-80	AG
EAST	Open Space, Agriculture	OS	AG
SOUTH	Agriculture	OS, AG-80	AG
WEST	Agriculture	AG-80	AG

2.1.8 OTHER PUBLIC AGENCIES WHOSE APPROVAL MAY BE REQUIRED

NRCS will consult with all federal agencies pursuant to the Watershed Plan-EIS process. Agencies whose approval may be required as a part of the CEQA process include:

- *United States Army Corps of Engineers*
- *United States Environmental Protection Agency*
- *California Department of Fish and Wildlife*
- *California Office of Historic Preservation*
- *State Water Resources Control Board*
- *State Lands Commission*
- *California Department of Water Resources*
- *Central Valley Flood Protection Board*
- *Central Valley Regional Water Quality Control Board*
- *Feather River Air Quality Management District*
- *Sutter County*

2.1.9 CONSULTATION WITH CALIFORNIA NATIVE AMERICAN TRIBES

Public Resources Code Section 21080.3.1, *et seq. (codification of Assembly Bill [AB] 52, 2013-14)*) requires that a lead agency, within 14 days of determining that it will undertake a project, must notify in writing any California Native American Tribe traditionally and culturally affiliated with the geographic area of the project if that Tribe has previously requested notification about projects in that geographic area. The notice must briefly describe the project and inquire whether the Tribe wishes to initiate request formal consultation. Tribes have 30 days from receipt of notification to request formal consultation. The lead agency then has 30 days to initiate the consultation, which then continues until the parties come to an agreement regarding necessary mitigation or agree that no mitigation is needed, or one or both parties determine that negotiation occurred in good faith, but no agreement will be made.

While RD 1500 has not formally received any written correspondence from a Tribe pursuant to Public Resources Code Section 21080.3.1 requesting notification of proposed Project, the United Auburn Indian Community of the Auburn Rancheria and Estom Yumeka Maidu Tribe of the Enterprise Rancheria have expressed interest in the Project and its potential to affect tribal cultural resources within the sacred land. As a result, RD 1500 sent the two tribes an AB 52 letter on March 2, 2026 (see Appendix C).

Figure 2-1: Regional Location Map

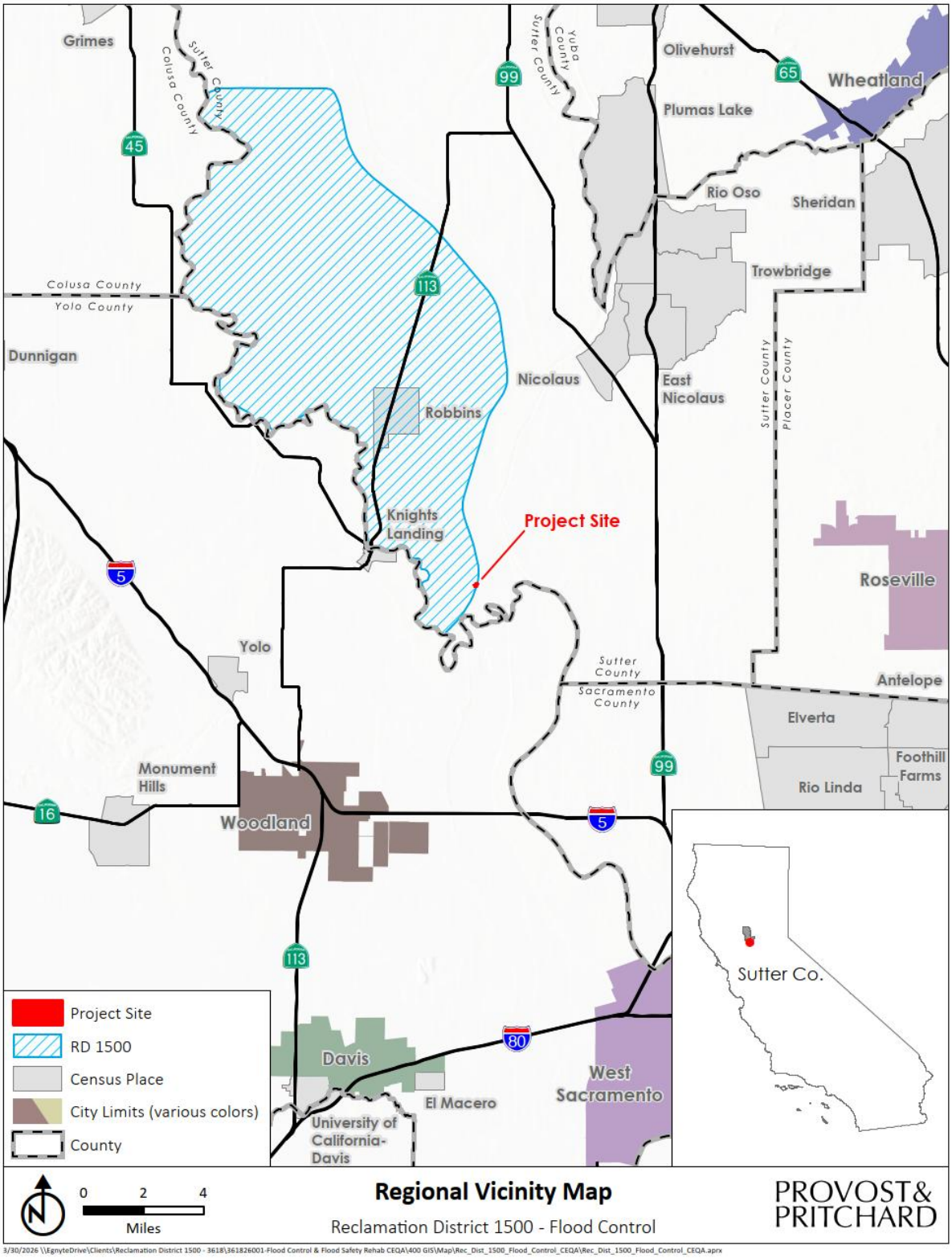


Figure 2-2: Aerial Site Map



Figure 2-3: Topo Quad Map

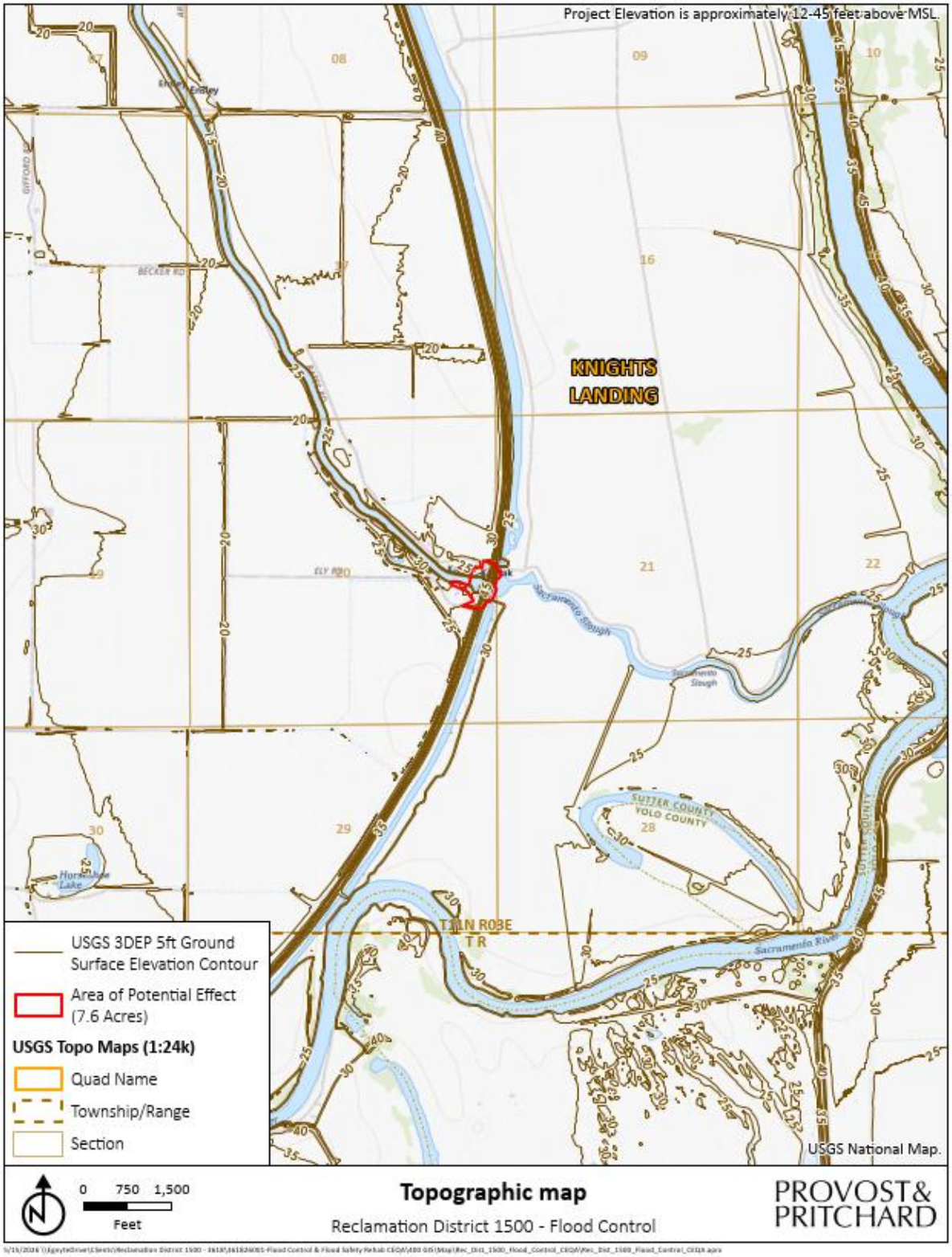


Figure 2-4: General Plan Land Use Designation Map

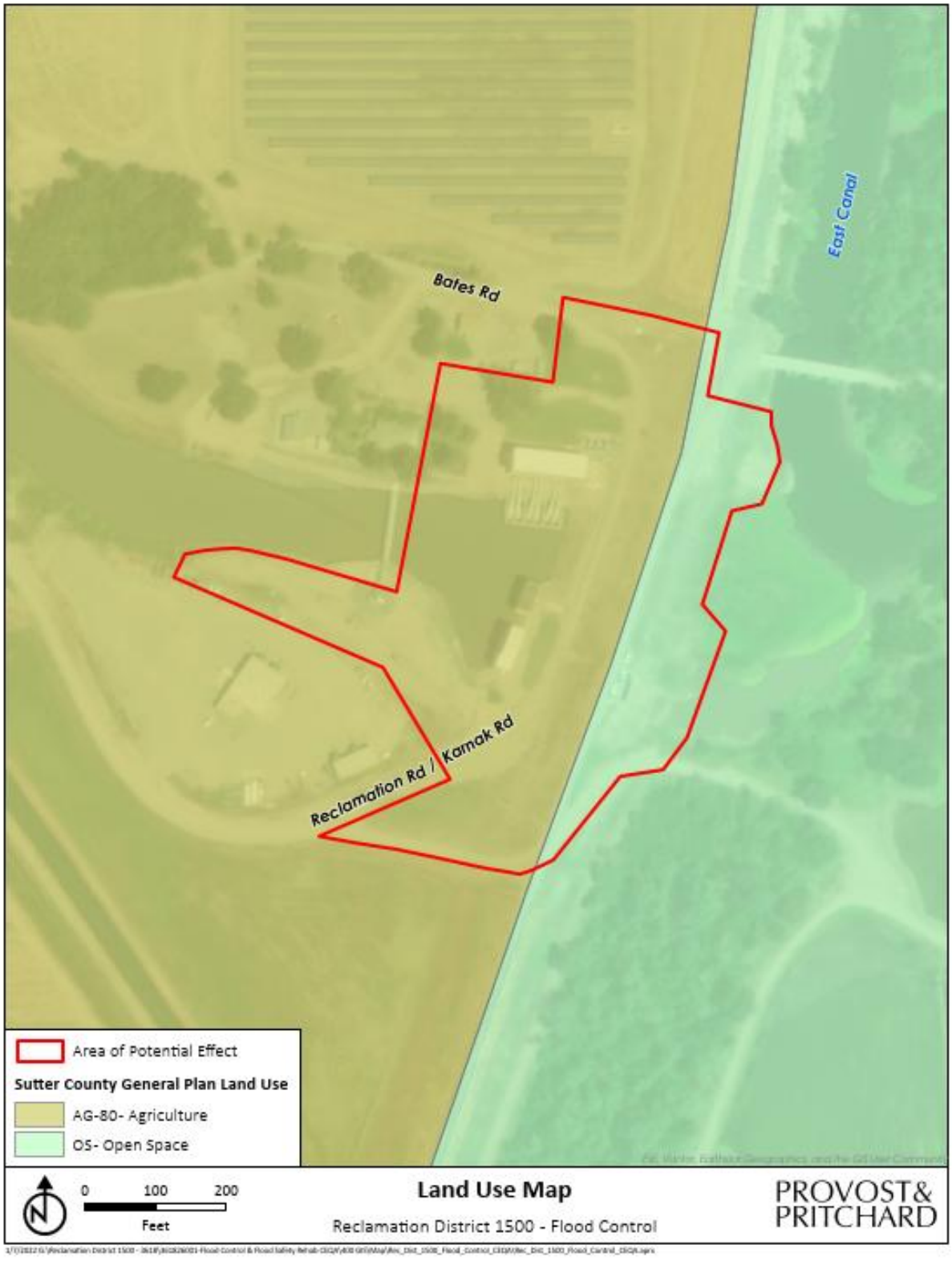


Figure 2-5: Zone District Map



Figure 2-6: Flooded Area 100,000 AF Scenario

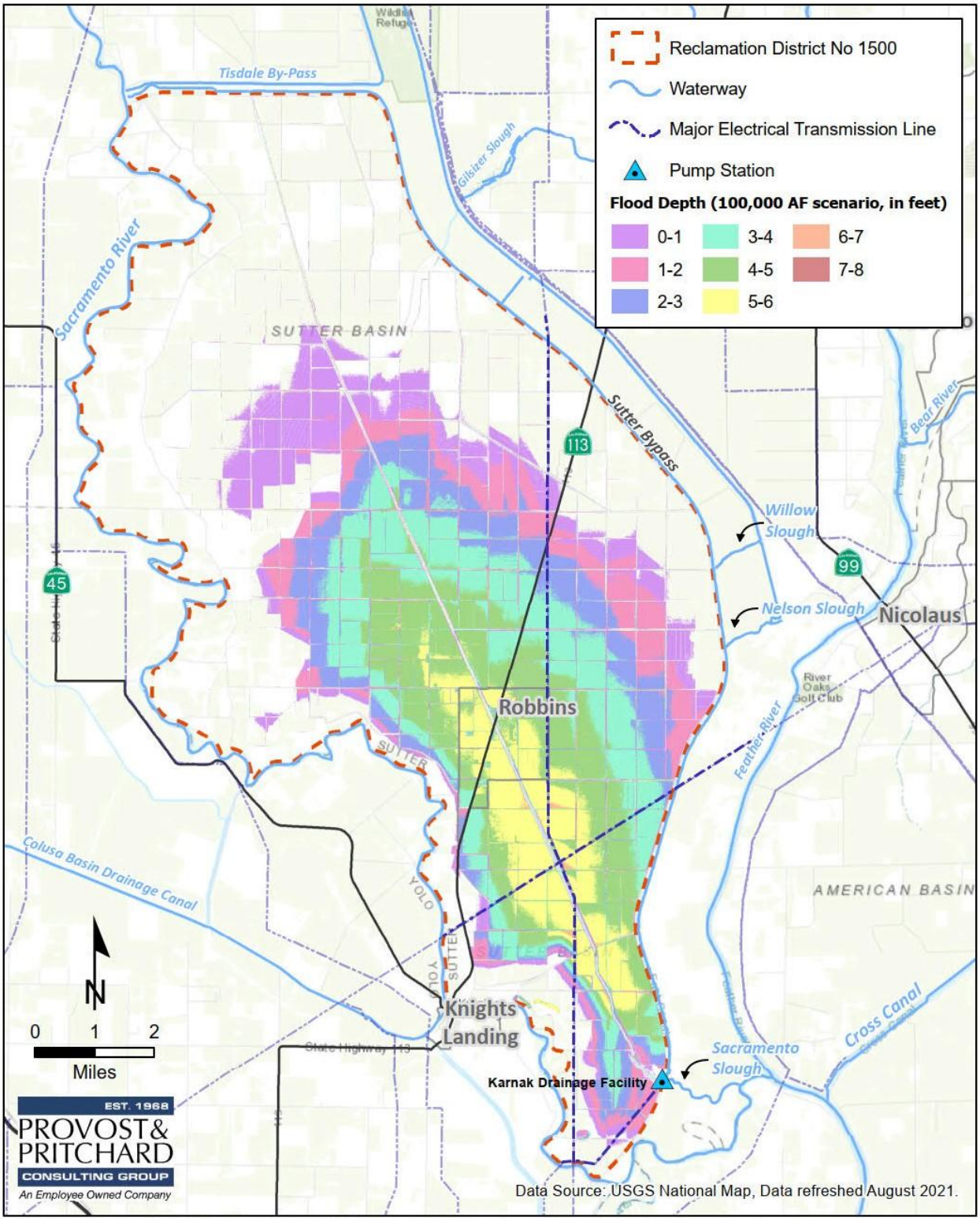
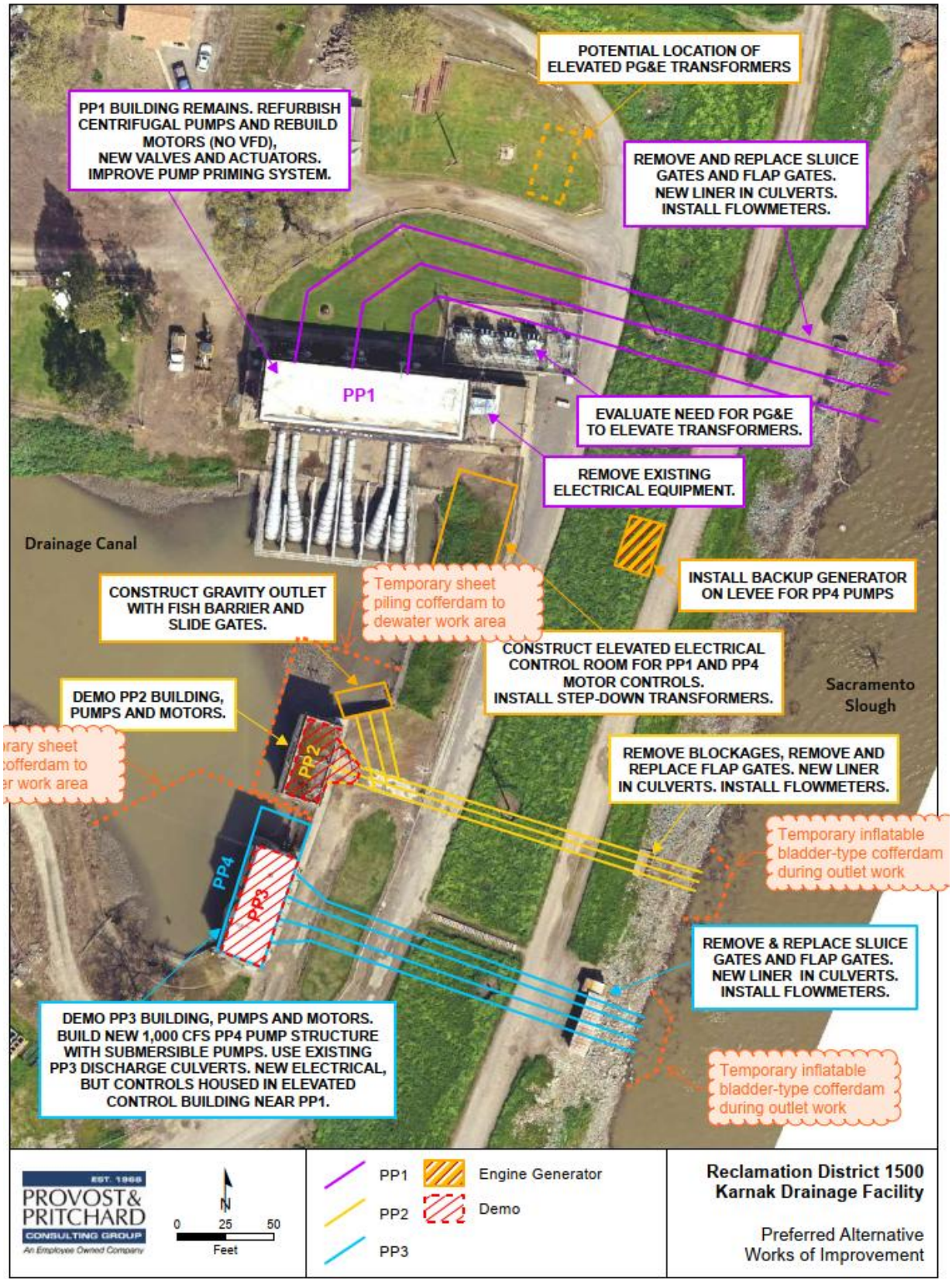


Figure 2-7: Project Works of Improvement Schematic



CHAPTER 3 DETERMINATION

3.1 POTENTIAL ENVIRONMENTAL IMPACTS

As indicated by the discussions of existing and baseline conditions, and impact analyses that follow in this Chapter, environmental factors not checked below would have no impacts or less than significant impacts resulting from the project. Environmental factors that are. checked below would have potentially significant impacts resulting from the project. Mitigation measures are recommended for each of the potentially significant impacts that would reduce the impact to less than significant.

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

The analyses of environmental impacts in Chapter 4 Environmental Impact Analysis result in an impact statement, which shall have the following meanings.

Potentially Significant Impact. This category is applicable if there is substantial evidence that an effect may be significant, and no feasible mitigation measures can be identified to reduce impacts to a less than significant level. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

Less than Significant with Mitigation Incorporated. This category applies where the incorporation of mitigation measures would reduce an effect from a "Potentially Significant Impact" to a "Less than Significant Impact." The lead agency must describe the mitigation measure(s), and briefly explain how they would reduce the effect to a less than significant level (mitigation measures from earlier analyses may be cross-referenced).

Less than Significant Impact. This category is identified when the proposed Project would result in impacts below the threshold of significance, and no mitigation measures are required.

No Impact. This category applies when a project would not create an impact in the specific environmental issue area. "No Impact" answers do not require a detailed explanation if they are adequately supported by the information sources cited by the lead agency, which show that the impact does not apply to the specific project (e.g. the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

3.2 DETERMINATION

On the basis of this initial evaluation (to be completed by the Lead Agency):

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

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

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

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

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

Roger Cornwell
Signature

6/15/2026
Date

Roger Cornwell / General Manager
Printed Name/Position

CHAPTER 4 ENVIRONMENTAL IMPACT ANALYSIS

4.1 AESTHETICS

Table 4-1: Aesthetics Impacts

Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Have 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) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

4.1.1 BASELINE CONDITIONS

The Project site is located in Sutter County in Northern California, approximately 3.5 miles southeast of Knight's Landing (see Figure 2-2) and consists of the existing Karnak Pump Station drainage facility. The existing facility pumps water from the RD 1500 Canal into the "East Canal" which feeds into the Sacramento River approximately 1.25 miles east of the Project site. In addition to the three existing pump station buildings, the Project site includes one employee housing residence. These existing facilities have lighting sources that are utilized for operational and maintenance activities. As discussed in section 4.5 Cultural Resources, the Karnak Drainage Facility is considered a historic property due to its age and is eligible for listing in the National Register of Historic Places (NRHP) due to its age.

The visual character in the immediate vicinity of the Project site is a rural, agricultural environment, with an agricultural storage area located immediately to the southwest of the Project's APE. The only scenic vista designated by the Sutter County General Plan are the Sutter Buttes, a mountain range approximately 30 miles to the northwest of the Project site that stands out due to their isolation from other topographic reliefs.[1] Views of agricultural areas and rivers throughout Sutter County are also generally regarded as aesthetic resources. According to the Caltrans State Scenic Highway System Map and the United States Department of the Interior Wild and Scenic Rivers map, there are no designated scenic highways or scenic

[1] (Sutter County, 2011)

rivers near the Project site.[2] [3] The Project site and its surrounding area are relatively flat, with the nearest topographic reliefs being the Sutter Buttes 30 miles northwest, Berryessa peak 27 miles southwest, and Iron Mountain 31 miles to the southeast.

4.1.2 APPLICABLE REGULATIONS

Federal

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act protects more than 13,400 miles of rivers and streams in the United States. The Forest Service is involved in managing over 5,000 of those wild and scenic river miles. Congress has added these waterways to the National Wild and Scenic Rivers System due to their scenic, recreational, geological, fish and wildlife, and historic values.

State

California Scenic Highway Program

Caltrans maintains the California Scenic Highway Program to protect scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to those highways. The Caltrans Scenic Highway program allows local jurisdictions to officially designate a scenic highway to ensure protection of the visual resources along its corridor. Caltrans identifies highways as eligible for the program, and the local jurisdiction applies to be officially designated. The status of a proposed State scenic highway changes from eligible to officially designated when the local governing body applies to Caltrans for scenic highway approval, adopts a Corridor Protection Program, and receives notification that the highway has been officially designated a scenic highway. Protection of visual resources for the designated corridor includes regulating land use and development, outdoor advertising, landscaping, and building design.

California Building Code

The California Building Code (CBC), Part 2 of Title 24 in the California Code of Regulations (CCR), is based on the International Building Code and combines three types of building standards from three different origins:

- *Building standards that have been adopted by State agencies without change from building standards contained in the International Building Code;*
- *Building standards that have been adopted and adapted from the International Building Code to meet California conditions;*
- *Building standards, authorized by the California legislature, that constitute extensive additions not covered by the International Building Code that have been adopted to address particular California concerns.*

Local

Sutter County General Plan

The Sutter County General Plan establishes the following policies aimed at guiding development in a manner that preserves aesthetic resources within the County:

[2] (California State Scenic Highway System Map, 2018)
[3] (United States Department of the Interior, 2026)

Land Use Policies:

- *LU 1.16 - Views from Rural Roadways and Highways. Prohibit new projects and activities that would obscure, detract from, or negatively impact the quality of views from the County's rural roadways and highways. Limit off-site advertising along County roadways and highways.*

Environmental Resources Policies:

- *ER 7.1 - Scenic Resources. Protect views of Sutter County's unique scenic resources including the Sutter Buttes, wildlife and habitat areas, the Sacramento, Feather, and Bear Rivers, and other significant resources. (ER 7-A)*
- *ER 7.3 - Visually Complimentary Development. Require new development adjacent to the County's scenic resources to be sited and designed to visually complement the natural environment, topography, and aesthetic viewsheds. (ER 7-A)*
- *ER 7.4 - New Development. Apply design, development, and landscaping standards to new industrial and commercial developments to ensure a quality visual appearance. Screening of parking, ancillary features, storage yards, and other similar elements shall be required*
- *ER 7.5 - Lighting. Support practices that reduce light pollution and preserve views of the night sky including the design and sighting of light fixtures to minimize glare and light on adjacent properties. (ER 7-A)*

4.1.3 IMPACT ANALYSIS

a) Have substantial adverse effect on a scenic vista?

No Impact. The Project would not have a substantial effect on a designated scenic vista. The nearest designated scenic vista to the Project site is the Sutter Butte's about 30 miles to the north. These mountains are not visible from the Project site. Agricultural areas and rivers are also generally considered scenic resources in Sutter County. While the Project site is located in an area adjacent to agricultural lands and the Sacramento Slough, the Project would upgrade and modernize an existing facility, not create a new one. Any expansion of the existing footprint would be minimal and would not cause a significant impact to aesthetic resources. Additionally, the facility is not viewable from a public street, nor are there any existing private residences within the vicinity of the facility whose viewshed could be impacted. Therefore, there would be no impact.

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

No Impact. The Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historical buildings within a State scenic highway. The nearest scenic highway to the site is SR 160, located approximately 23.5 miles to the southeast of the site.[4] As a result, the Project would not have the potential to alter any scenic resource within a State scenic highway. The Project site currently operates as a drainage facility and would continue to do so following completion of the improvements associated with the proposed Project. Therefore, there would be no impact.

c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

[4] (California State Scenic Highway System Map, 2018)

No Impact. The Project is located in a non-urbanized area and would not substantially degrade the existing visual character or quality of public views of the site and its surroundings. The roads by which the Project is accessible by are not publicly used roads, and would only be utilized by RD 1500 maintenance workers, and adjacent property owners. The Project would result in the modernization of the existing drainage facility located at the Project site. Improvements proposed would not substantially expand the footprint of the existing facility and would not significantly obstruct or conflict with existing aesthetic resources in the area. Therefore, there would be no impact.

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

Less than Significant Impact. The modernization of the existing facility could introduce additional light sources to those currently serving the facility. Any lighting used for operation by the facility and materials that could provide glare would not be viewable by the general public. Any potential for lighting or glare to affect passerby's would be minimal and would not cause significant impacts. Therefore, impacts would be less than significant.

4.2 AGRICULTURE AND FORESTRY RESOURCES

Table 4-2: Agriculture and Forest Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	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?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

4.2.1 BASELINE CONDITIONS

The Project site is located in a rural, agricultural area 3.5 miles southeast of Knight's Landing, California. The proposed Project would upgrade an existing drainage pump station that is already in operation. The Project site is surrounded by land that is designated for agricultural use to the west of the "East Canal" and by land designated for open space to the East of the "East Canal" by the Sutter County General Plan. As demonstrated in Figure 4-1, the Farmland Mapping and Monitoring Program (FMMP) shows that the Project site is located on land designated as "other land" and would not be in conflict with land designated for Prime Farmland, Farmland of Statewide Importance, or Unique Farmland.

The nearest property designated as Williamson Act property is located approximately 4,000 feet to the southeast of the Project site. According to the California Department of Conservation (DOC), Williamson Act contracts are agreements between landowners and local governments to specify lands for agricultural or open space use over a length of time. [5] The agreement locks land use for the length of the contract and landowners receive property tax assessments that are much lower because they agree to use the space for uses below market value. While the Project site is not a Williamson Act land, the surrounding area is zoned for agricultural and open space use.

[5] (California Department of Conservation, 2026)

4.2.2 APPLICABLE REGULATIONS

State

Williamson Act

The California Land Conservation Act of 1965, also known as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value.[6] This program is administered by local governments with assistance from the California DOC. Within the District boundaries, there are approximately 5,237 acres, or 72 parcels, under Williamson Act.[7]

Farmland Mapping and Monitoring program (FMMP)

The FMMP produces maps and statistical data used for analyzing impacts to California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status; the best quality land is called Prime Farmland. The maps are updated every two years with the use of a computer mapping system, aerial imagery, public review, and field reconnaissance.

The California DOC 2022 FMMP is a non-regulatory program that produces "Important Farmland" maps and statistical data used for analyzing impacts on California's agricultural resources. The Important Farmland maps identify eight land use categories, five of which are agriculture related: prime farmland, farmland of statewide importance, unique farmland, farmland of local importance, and grazing land – rated according to soil quality and irrigation status. Each is summarized below:

- PRIME FARMLAND (P): Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- FARMLAND OF STATEWIDE IMPORTANCE (S): Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- UNIQUE FARMLAND (U): Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include non- irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
- FARMLAND OF LOCAL IMPORTANCE (L): Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
- GRAZING LAND (G): Land on which the existing vegetation is suited to the grazing of livestock. The minimum mapping unit for Grazing Land is 40 acres.
- URBAN AND BUILT-UP LAND (D): Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, institutional, public administrative purposes, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
- OTHER LAND (X): Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water

[6] (USDA Farm Service Agency, No date)
[7] (California Department of Conservation, 2024)

bodies smaller than 40 acres. Vacant and non-agricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.

- WATER (W): Perennial water bodies with an extent of at least 40 acres.

Local

Sutter County General Plan

The Sutter County 2030 General Plan contains the following policies, and implementation measures relevant to the preservation and protection of agricultural resources:

Agricultural Lands Policies:

- *AG 1.1 - Agricultural Land Preservation. Preserve and maintain agriculturally designated lands for agricultural use and direct urban/suburban and other nonagricultural related development to the cities, unincorporated rural communities, and other clearly defined and comprehensively planned development areas.*
- *AG 1.5 - Agricultural Land Conversion. Discourage the conversion of agricultural land to other uses unless all of the following findings can be made:*
  - *a. The net community benefit derived from conversion of the land outweighs the need to protect the land for long-term agricultural use.*
  - *b. There are no feasible alternative locations for the proposed use that would appreciably reduce impacts upon agricultural lands.*
  - *c. The use will not have significant adverse effects, or can mitigate such effects, upon existing and future adjacent agricultural lands and operations (AG 1-A).*
- *AG 1.9 - Williamson Act. Promote the use of the California Land Conservation Act (Williamson Act) on agricultural lands throughout the County provided the State continues to fund the subvention program to offset the loss of property taxes.*

4.2.3 IMPACT ANALYSIS

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

No Impact. The Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP, to non-agricultural use (see Figure 4-1). The Project site is designated as "other land" and "Urban and Built-Up Land" by the DOC. The Project site is an existing water pumping facility and would remain a water pumping facility. The Project does not propose altering any area that is designated as farmland, and would only alter the existing facility, which has already been disturbed. Therefore, there would be no impact.

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

No Impact. The Project would not conflict with existing zoning for agricultural use, or a Williamson Act contract. The Project site is an existing water pump facility and would continue to be used as a water pump facility. Additional land acquisition would not be required as part of Project activities. While lands within a mile of the site are Williamson Act participants, the Project site is not and would not require any change to one of the Williamson Act properties in the surrounding area. As a result, the proposed improvements on the Project site would not conflict with existing zoning or with any Williamson Act contracts within the area. Therefore, there would be no impact.

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

No Impact. The Project would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production. The Sutter County General Plan has not designated the Project site or surrounding areas as Forest Land, Timberland, or timberland zoned for Timberland Production.[8] The Project site is an existing pump station that sits on already disturbed land, not near a forest or timberland environment. Therefore, there would be no impact.

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

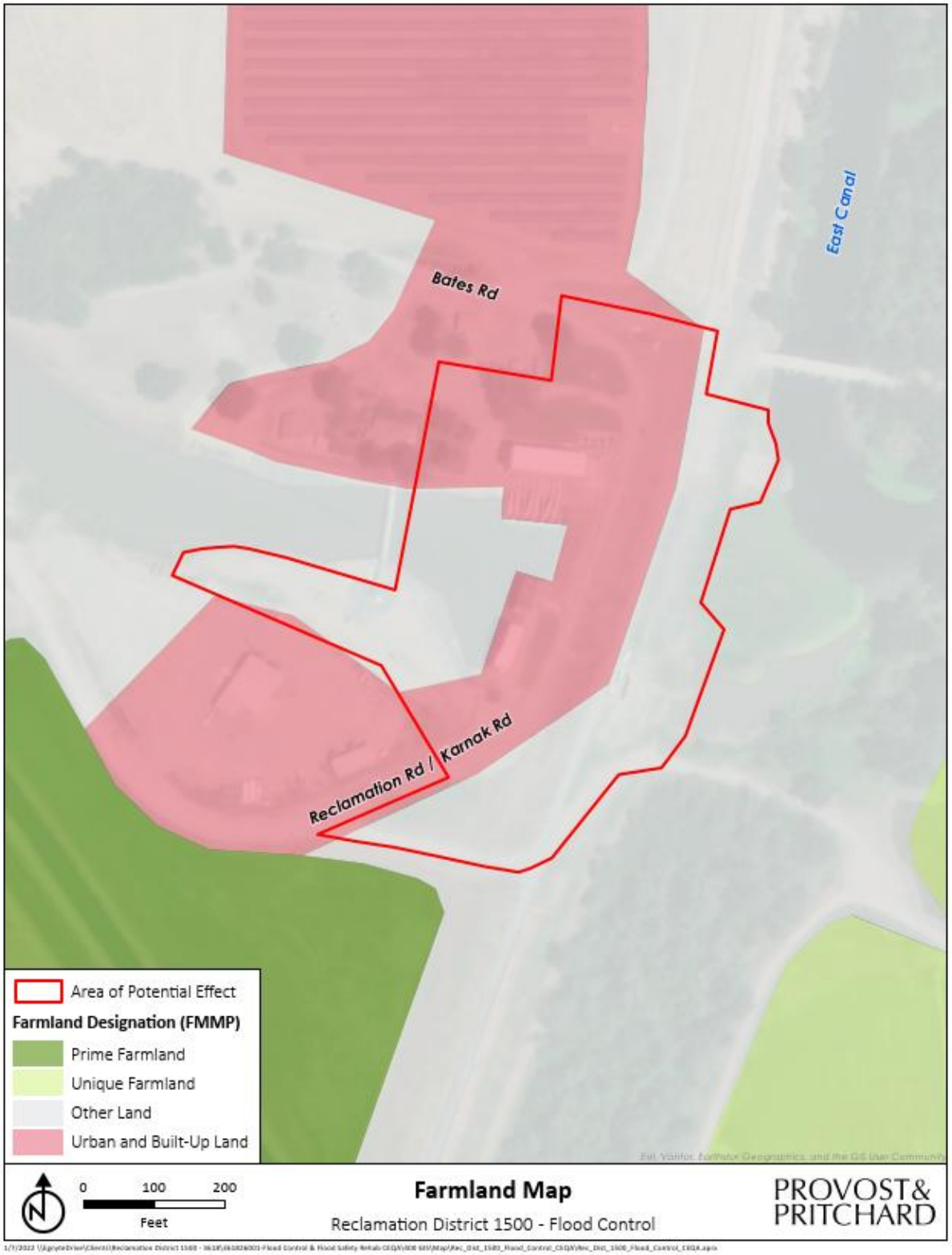
No Impact. The Project would not result in the loss of forest land or conversion of forest land to non-forest use. The Project site is surrounded by rural agricultural and open spaces and is planned and zoned as such. The Project site is an existing drainage facility that would be modernized as a part of the Project and would remain as such after completion of the Project. Therefore, there would be no impact.

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

No Impact. The Project would not involve changes in the existing environment that could cause the conversion of agricultural or forest lands. Project activities involve the modernization of an existing drainage facility and would not result in conversion of farmland to a non-agricultural use or the conversion of forest land to a non-forest use. Therefore, there would be no impact.

[8] (Sutter County, 2011)

Figure 4-1: Farmland Designation Map



4.3 AIR QUALITY

Table 4-3: Air Quality Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

4.3.1 BASELINE CONDITIONS

The Project lies within the Sacramento Valley Air Basin (SVAB) and is managed by Feather River Air Quality Management District (FRAQMD). The SVAB is bounded on the west by the Coastal Mountain Range, on the north by the Cascade Range, on the east by the Sierra Nevada, and on the south by the San Joaquin Valley Air Basin (SJVAB). The intervening terrain is flat and is approximately 25 feet above sea level. The SVAB consists of the counties of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba and portions of Placer and Solano Counties.

Air quality in Sutter County is influenced by a variety of factors, including topography and local and regional meteorology. Sutter County generally experiences two types of inversions, both of which are accompanied by air quality issues due to poor dispersion. In the warm summer months, subsidence inversion is common, in which sinking air forms a "lid" over the region, contributing to photochemical smog problems by confining pollution to a shallow layer near the ground. In the cool winter months, radiative inversion occurs because the surrounding mountains create a barrier to airflow which traps pollutants in the valley. Air near the valley floor cools by radiative processes, while the upward air remains warm. Absence of surface wind leads to poor dispersion which can create localized air pollution "hot spots" near emission sources. Because these inversions occur more frequently during summer and winter, the air quality is generally better by comparison during the spring and fall seasons.

Regulatory Attainment Designations

Under the California Clean Air Act (CCAA), the California Air Resources Board (CARB) is required to designate areas of the State as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data does not support either an

attainment or nonattainment designation. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The United States Environmental Protection Agency (USEPA) designates areas for O_3, CO, and NO_2 as "does not meet the primary standards," "cannot be classified," or "better than national standards." For Sulfur Dioxide (SO_2), areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, the CARB terminology of attainment, nonattainment, and unclassified is more frequently used. The USEPA uses the same subcategories for nonattainment status: serious, severe, and extreme. In 1991, USEPA assigned new nonattainment designations to areas that had previously been classified as Group I, II, or III for particulate matter 10 microns in size (PM_{10}) based on the likelihood that they would violate national PM_{10} standards. All other areas are designated "unclassified."

According to the USEPA, Sutter County was in non-attainment for one pollutant concentration, with 8-hour Ozone (2008) in Sacramento Metro as Severe 15, 8-hour Ozone (2015) in Sacramento Metro as Serious, and 8-hour Ozone (2015) in Sutter Buttes as Marginal as of April 3, 2026.[9]

4.3.2 APPLICABLE REGULATIONS

Federal

U.S. Environmental Protection Agency

At the federal level, the Environmental Protection Agency (U.S. EPA) has been charged with implementing national air quality programs. The U.S. EPA's air quality mandates are drawn primarily from the Clean Air Act (CAA), which was signed into law in 1970. Congress substantially amended the CAA in 1977 and again in 1990.

Clean Air Act (CAA)

The CAA required the U.S. EPA to establish National Ambient Air Quality Standards (NAAQS) and set deadlines for their attainment. Two types of NAAQS have been established: primary standards, which protect public health, and secondary standards, which protect public welfare from non-health-related adverse effects, such as visibility restrictions.

The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The CAA Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The U.S. EPA has responsibility to review all state SIPs to determine conformance with the mandates of the CAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If the U.S. EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area that imposes additional control measures.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) first authorized the U.S. EPA to regulate asbestos in schools and Public and Commercial buildings under Title II of the law, which is also known as the Asbestos Hazard Emergency Response Act (AHERA). AHERA requires Local Education Agencies (LEAs) to inspect their schools

[9] (United States Environmental Protection Agency, 2026)

for ACBM and prepare management plans to reduce the asbestos hazard. The Act also established a program for the training and accreditation of individuals performing certain types of asbestos work.

National Emission Standards for Hazardous Air Pollutants

Pursuant to the CAA of 1970, the U.S. EPA established the National Emission Standards for Hazardous Air Pollutants (NESHAP). These are technology-based source-specific regulations that limit allowable emissions of HAPs.

State

California Air Resources Board

The California Air Resources Board (CARB) is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the CCAA of 1988. Other CARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control districts and air quality management districts, establishing California Ambient Air Quality Standards (CAAQS), which in many cases are more stringent than the NAAQS, and setting emissions standards for new motor vehicles. The emission standards established for motor vehicles differ depending on various factors including the model year, and the type of vehicle, fuel and engine used.

California Clean Air Act (CCAA)

The CCAA requires that all air districts in the state endeavor to achieve and maintain CAAQS for O_3, CO, SO2, and NO2 by the earliest practical date. The CCAA specifies that districts focus particular attention on reducing the emissions from transportation and area-wide emission sources, and the act provides districts with authority to regulate indirect sources. Each district plan is required to either (1) achieve a five-percent annual reduction, averaged over consecutive 3-year periods, in district-wide emissions of each non-attainment pollutant or its precursors, or (2) to provide for implementation of all feasible measures to reduce emissions. Any planning effort for air quality attainment would thus need to consider both state and federal planning requirements.

Local

Feather River Air Quality Management District

FRAQMD is a bi-county District that was formed in 1991 to administer local, State, and federal air quality management programs for Yuba and Sutter Counties within the Sacramento Valley Air Basin. The goal of FRAQMD is to improve air quality in the region through monitoring, evaluation, education and implementing control measures to reduce emissions from stationary sources, permitting and inspection of pollution sources, enforcement of air quality regulations and by supporting and implementing measures to reduce emissions from motor vehicles.

FRAQMD adopted its Indirect Source Review guidelines document for assessment and mitigation of air quality impacts under CEQA in 1998. The guide contains criteria and thresholds for determining whether a project may have a significant adverse impact on air quality, and methods available to mitigate impacts on air quality. FRAQMD updated its Indirect Source Review Guidelines to reflect the most recent methods recommended to evaluate air quality impacts and mitigation measures for land use development projects in June 2010. This analysis uses guidance and thresholds of significance from the 2010 FRAQMD Indirect Source Review Guidelines to evaluate the Proposed Project's air quality impacts.

Sutter County General Plan

The Sutter County General Plan establishes the following policies aimed at guiding development in a manner that limits the impact of air quality emissions within Sutter County:

Environmental Resources Policies:

- *ER 9.1 - Ambient Air Quality Standards. Work with the California Air Resources Board and the Feather River Air Quality Management District (FRAQMD) to meet state and federal ambient air quality standards.*
- *ER 9.3 - Ambient Air Quality Standards. Implement, as appropriate, the reduction measures in the Climate Action Plan targeted to reduce air quality emissions. Such measures may include: adopting a trip reduction ordinance; adopting a comprehensive parking program that facilitates the use of alternative modes and carpooling; providing incentives for carpooling at the workplace; providing a comprehensive system of facilities for non-motorized transportation; developing transit infrastructure; and expanding the use of renewable fuels and low emission vehicles.*

4.3.3 THRESHOLDS

Thresholds of Significance

Air pollutant emissions have regional effects and localized effects. This analysis assesses the regional effects of the Project's criteria pollutant emissions in comparison to FRAQMD thresholds of significance for short-term construction activities and long-term operation of the Project. Localized emissions from Project construction and operation are also assessed using concentration-based thresholds that determine if the Project would result in a localized exceedance of any ambient air quality standards or would make a cumulatively considerable contribution to an existing exceedance.

The primary pollutants of concern during Project construction and operation are ROG (reactive organic gases), NO_X, PM_{10}, and $PM_{2.5}$. The FRAQMD Indirect Source Review Guidelines, adopted in 2010, contains thresholds for ROG, Nitrogen Oxides (NO_X), and Particulate Matter less than 10 microns (PM_{10}).

Ozone is a secondary pollutant that can be formed miles away from the source of emissions through reactions of ROG and NO_X emissions in the presence of sunlight. Therefore, ROG and NOx are termed ozone precursors. The SVAB often exceeds the State and national ozone standards. Therefore, if the Project emits a substantial quantity of ozone precursors, the Project may contribute to an exceedance of the ozone standard.

The FRAQMD adopted significance thresholds for construction-related and operational ROG, NO_X, and PM_{10}, are included in Appendix A.

Table 4-4: Summary of Ambient Air Quality Standards and Attainment Designation

Pollutant	Averaging Time	State Standard	Federal Standard	State Attainment Status	Federal Attainment Status
O_3	1 hour	0.09 ppm	N/A	Nonattainment/ Severe	N/A
O_3	8 hours	0.070 ppm	0.070 ppm (4th highest in 3 years)	Nonattainment	Nonattainment/ Extreme
CO	1 hour	20 ppm	35 ppm	Attainment/ Unclassified	Attainment/ Unclassified
CO	8 hours	9.0 ppm	9 ppm	Attainment/ Unclassified	Attainment/ Unclassified
PM_{10}	24 hours	50 µg/m³	150 µg/m³ (expected number of days above standard < or equal to 1)	Nonattainment	Attainment
PM_{10}	Annual	20 µg/m³	N/A	Nonattainment	N/A
$PM_{2.5}$	24 hours	N/A	35 µg/m³	N/A	Nonattainment
$PM_{2.5}$	Annual	12 µg/m³	12.0 µg/m³	Nonattainment	Nonattainment
NO_2	1 hour	0.18 ppm	0.100 ppm	Attainment	Attainment/ Unclassified
NO_2	Annual	0.030 ppm	0.053 ppm	Attainment	Attainment/ Unclassified
SO_2	1 hour	0.25 ppm	0.075 ppm (99th percentile over 3 years)	Attainment	Attainment/ Unclassified
SO_2	3 hours	N/A	0.5 ppm	N/A	Attainment/ Unclassified
SO_2	24 hours	0.04 ppm	0.14 ppm	Attainment	Attainment/ Unclassified
SO_2	Annual	N/A	0.030 ppm	N/A	Attainment/ Unclassified
Pb	Monthly	1.5 µg/m³	N/A	Attainment	N/A
Pb	Rolling 3-month average	N/A	0.15 µg/m³	N/A	Attainment/ Unclassified
Sulfates	24 hours	25 µg/m³	N/A	Attainment	N/A
H_2S	1 hour	0.03 ppm	N/A	Unclassified	N/A
Visibility Reducing Particles (VRP)	8 hours	Visibility of 10 miles or more at relative humidity less than 70 %	N/A	Unclassified	N/A
Vinyl Chloride	24 hours	0.01 ppm	N/A	Attainment	N/A

** For more information on standards visit: https://ww3.arb.ca.gov/research/aaqs/aaqs2.pdf*
*** No Federal 1-hour standard. Reclassified extreme nonattainment for the Federal 8-hour standard April 3, 2026.*
****Secondary Standard*

Table 4-5. Feather River Air Quality Management District Thresholds of Significance[10]

Feather River Air Quality Management District Thresholds of Significance		
Pollutant	Construction and Operational Emissions (lbs/day)	Construction and Operational Emissions (tons/yr)
ROG	25	4.5
NO_X	25	4.5
CO	---	---
SO_X	---	---
PM_{10}	80	---
$PM_{2.5}$	---	---

[10] (Feather River Air Quality Management District, 2010)

4.3.4 IMPACT ANALYSIS

Construction Generated Emissions

Construction of the Project is assumed to be completed over approximately 14 months, split over two years. Within the first year it is anticipated that construction would occur between May and October, with construction occurring between April and November in year 2. For the purposes of calculating anticipated emissions of the Project, emissions were assumed to occur over a 14-month consecutive basis, between May of 2030 and June of 2031. Emissions associated with the Project were calculated using the CalEEMod Air Quality Model, Version 2022.1.1.41 (California Emissions Estimator Modeling). The emissions modeling includes emissions generated by offroad equipment, haul trucks, and worker commute trips. Emissions were quantified based on anticipated construction schedules and the default parameters contained in the model. Localized air quality impacts associated with the Project would be minor and were qualitatively assessed. Modeling assumptions and output files are included in Appendix A.

Short-Term Construction Generation Emissions

Estimated construction-generation emissions are summarized in Table 4-6.

Table 4-6:Unmitigated Short-Term Construction Generated Emissions of Criteria Air Pollutants

Source	Annual Emissions (Tons per Year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Maximum Annual Project Construction Emissions	0.23184	0.93043	1.29948	0.00228	0.08976	0.05547
FRAQMD Threshold	*4.5*	*4.5*	--	--	--	--
Threshold Exceeded?	No	No	N/A	N/A	N/A	N/A

Long-Term Operational Generated Emissions

Estimated operational-generated emissions are summarized in Table 4-7.

Table 4-7: Unmitigated Long-Term Operational Generated Emissions of Criteria Air Pollutants

Source	Annual Emissions (Tons per Year)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Maximum Annual Project Operational Emissions	0.20021	0.12729	0.66203	0.00187	0.15230	0.04244
FRAQMD Threshold	*4.5*	*4.5*	--	--	--	--
Threshold Exceeded?	No	No	N/A	N/A	N/A	N/A

Maximum Daily Emissions of Criteria Air Pollutants

Daily construction and operational emissions generated by the Project are summarized in Table 4-8.

Table 4-8: Maximum Daily Emissions of Criteria Air Pollutants

Source	Daily Emissions Maximum (in pounds)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Construction – Summer	18.4092	24.3229	27.2666	0.04621	6.30668	3.62292
Construction – Winter	0.97187	8.53183	13.2726	0.02413	0.38714	0.27137
Operational – Summer	1.25145	0.70518	5.12310	0.01183	0.93942	0.26011
Operational – Winter	1.04752	0.76839	3.42741	0.01092	0.93764	0.25877
FRAQMD Threshold	*25*	*25*	--	--	*80*	--
Threshold Exceeded?	No	No	No	No	No	No

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The Project would not conflict with or obstruct implementation of any applicable air quality plan. The Project would not exceed any threshold for air quality emissions that has been set by the FRAQMD. Therefore, there would be no impact.

b) Would the project 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?

Less than Significant Impact. The Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment. As shown in Table 4-6, Table 4-7, and Table 4-8 the Project would not exceed an emissions threshold which has been set by the FRAQMD for construction or operational related emissions. Therefore, impacts would be less than significant.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact. As discussed above, the Project would not result in significant long-term operational emissions. Construction related emissions, shown in Appendix A and Table 4-7, would be temporary in nature and would cease upon Project construction. Short-term construction activities, however, could result in temporary increases in pollutant concentrations that could impact nearby sensitive receptors. Sensitive Receptors are groups that would be more affected by air, noise, and light pollution, pesticides, and other toxic chemicals than others. This includes infants, children under 16, elderly over 65, athletes, and people with cardiovascular and respiratory diseases. High concentrations of these groups would include daycares, residential areas, hospitals, elder care facilities, schools and parks. The Project would not be located within a mile of a sensitive receptor and would not expose any sensitive receptors to substantial pollutant concentrations. Therefore, impacts would be less than significant.

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

Less than Significant Impact. During construction activities, construction equipment exhaust and application of asphalt, structural coating and other construction applications would temporarily emit odors. Construction would be completed within rural Sutter County. The nearest residence from the Project site is over one mile away and would not be impacted during construction of the Project. Construction of the Project would be temporary, and odors would not remain after Project completion. Therefore, impacts would be less than significant.

4.4 BIOLOGICAL RESOURCES

Table 4-9: Biological Resources Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	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 Wildlife 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 Wildlife 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?	☐	☐	☐	☒

4.4.1 BASELINE CONDITIONS

The Project site is located in the Sacramento Valley, which is bordered by the Sierra Nevada mountain range to the east, the Sacramento-San Joaquin Delta to the south, the Northern Coast Ranges to the west, and the southern Siskiyou Mountains to the north. The Project site is surrounded by agricultural row crops, orchards, and rice fields. Like most of California, the area experiences a Mediterranean climate with warm dry summers followed by cool wet winters with an average annual precipitation of 18 inches.

The Project site is part of the McGriff Lakes-Sutter Basin subwatershed, which is located in the larger Sacramento-Stone Corral watershed. The convergence point of the Feather River and Sarmento River is

approximately 1.8 miles to the east of the Project site, and the Sacramento Slough borders the eastern boundary of the Project site. Other drainages in the vicinity include the Sutter Bypass, and various canals that flow into these larger waterways, including the RD 1500 Canal and East Canal. The Sacramento Slough directs water from the existing Karnak Drainage Facility and Sutter Bypass to the Sacramento River.

A reconnaissance-level field survey of the Project site and surrounding areas was conducted in January 2021, by Live Oak Associates. Following the survey a Biological Resources Evaluation (BE) was prepared. This BE was developed to support the Project's Watershed Plan prepared under the National Environmental Policy Act (NEPA). A Biological Memorandum serving as an addendum to the BE was prepared by Provost & Pritchard Consulting Group in February of 2026 to provide revisions to the original report based on updated information. Both documents are attached to the IS/MND as Appendix B. The results of the survey and report indicated there are three main habitat types that are present within the area: Ruderal, Canal, and Slough.

Database searches were completed to determine the likelihood of special status species being found within the APE. Table 4-10 and Table 4-11 below summarize the results of the database searches. The BE and its subsequent addendum describing these database searches in more detail are contained in Appendix B. According to these database searches, 3 special status plant species have the potential to be found within the APE, while 42 special status animal species have the potential to be found within the APE.

Table 4-10: List of Special Status Plant Species with Potential to Occur on the site and/or in the Vicinity

Species	Status	Habitat	Occurrence within the Site
Palmate-bracted Salty Bird's-beak (*Chloropyron palmatum*)	CE, FE CNPS 1B.1	California's Central Valley, from Colusa Co. south to Fresno Co., at 15 – 500 ft. in elevation. Occurs in alkaline grassland, alkaline flats, alkali sink scrub.	**Absent.** Alkaline habitats suitable for this species are absent from the APE.
Hartweg's Golden Sunburst (*Pseudobahia bahiifolia*)	CE, FE CNPS 1B.1	Occurs in grasslands of the western foothills of the Sierra Nevada in volcanic pumice soils. Often found in soils of the Rocklin series; blooms March to April.	**Absent.** Habitats and soils suitable for this species appear to be absent from Sutter Basin.
Alkali Milk-vetch (Astragalus tener var. tener)	CNPS 1B.2	Central California, including the Central Valley and San Francisco Bay Area, at 3 – 200 ft. in elevation. Occurs in alkaline playas, grasslands, and vernal pools.	**Absent.** Alkaline habitats suitable for this species are absent from the APE.
Brittlescale (*Atriplex depressa*)	CNPS 1B.2	California's Central Valley from Glenn Co. on the north to Tulare Co. on the south, at 0 to 1,000 ft. in elevation. Occurs in Chenopod Scrub, meadows, playas, valley and foothill grasslands.	**Absent.** Alkaline habitats suitable for this species are absent from the APE.
San Joaquin Spearscale (*Etriplex joaquiniana*)	CNPS 1B.2	Eastern Alameda, Contra Costa, and Solano Cos. (possibly others), at 3 to 2,740 ft. in elevation. Occurs in alkali sink	**Absent.** Alkaline habitats suitable for this species are absent from the APE.

Species	Status	Habitat	Occurrence within the Site
		scrub, playas, meadows and seeps, alkali grasslands.	
Woolly Rose-mallow (Hibiscus lasiocarpus var. occidentalis)	CNPS 1B.2	California's Central Valley from Butte Co. on the north to San Joaquin Co. on the south, at 0 to 400 ft. in elevation. Occurs in freshwater marsh, swamps, on riprap, and on the sides of levees.	Possible. The APE is likely to offer at least some suitable habitat for this species, in the form of earthen canal and slough banks. The nearest documented location of this species approx. 1 mile to the south on the Sacramento River (CDFW 2021).
Heckard's Pepper-grass (Lepidium latipes var. heckardi)	CNPS 1B.2	Primarily occurs in the Sacramento Valley from Glenn Co. on the north to Solano Co. on the south, at 6 to 660 ft. in elevation. Occurs on alkaline flats associated with seasonal wetlands.	Absent. Alkaline habitats suitable for this species appear to be absent from Sutter Basin.
Veiny monardella (*Monardella venosa)*	CNPS 1B.1	Occurs in heavy clay soil in cismontane woodland and valley and foothill grassland at 200 to 1,300 ft. in elevation.	Absent. Sutter Basin is well below the elevation range for this species.
California Alkali Grass (*Puccinellia simplex*)	CNPS 1B.2	Primarily occurs in the Central Valley from Glenn Co. on the north to Kern Co. on the south, at 6 to 3,050 ft. in elevation. Occurs on alkaline flats, alkali sink scrub, and vernal pools.	Absent. Alkaline habitats suitable for this species appear to be absent from Sutter Basin.
Sanford's Arrowhead (*Sagittaria sanfordii*)	CNPS 1B.2	Primarily occurs in the Central Valley from Shasta Co. on the north to Fresno Co. on the south, at 0 to 2,130 ft. in elevation. Occurs in freshwater marshes, swamps, ponds, and ditches.	Possible. This species could occur within the canal, slough, and wetland habitats within Sutter Basin.
Suisun Marsh Aster (*Symphyotrichium lentum*)	CNPS 1B.2	Primarily occurs in marshes and swamps (brackish and freshwater) up to 1,000 feet in elevation.	Possible. This species could occur within the canal, slough, and wetland habitats within Sutter Basin. One observation has been recorded within Sutter Basin that appears to be within an old agricultural canal (Calflora 2021).
Wright's Trichocoronis (Trichocoronis wrightii var. wrightii)	CNPS 2B.1	Primarily occurs in the Central Valley from Colusa Co. on the north to Merced Co. on the south, at 15 to 1,430 ft. in elevation. Occurs in alkaline meadows, seeps, marshes, riparian forest, and vernal pools.	Absent. Habitats required by this species are absent from the APE.

Species	Status	Habitat	Occurrence within the Site
Saline Clover (Trifolium hydrophilum)	CNPS 1B.2	Central California in several San Francisco Bay Area counties, as well as the lower Sacramento Valley, at 0 to 1,000 ft. in elevation. Occurs in marshes, swamps, mesic alkaline grasslands, and vernal pools.	Absent. Habitats required by this species are absent from the APE.

Table 4-11: List of Special Status Animal Species with Potential to Occur on the site and/or in the Vicinity

Species	Status	Habitat	Occurrence within the Site
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT	Valleys of the Siskiyou and Cascade Mtns., Central Valley, and San Francisco Bay Area at 35 to 5,600 ft. in elevation. Occurs in vernal pools, clear to tea-colored water in grass or mud-bottomed swales, basalt depression pools, or sandstone rock outcrops.	Absent. Habitats required by this species are absent from the APE.
Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)	FE	Occurs in vernal pool regions of California's Central Valley, at 20 to 350 ft. in elevation. Primarily found in large deep turbid or alkaline vernal pools.	Absent. Habitats required by this species are absent from the APE.
Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)	FT	The current range is thought to be limited to the Central Valley from Tehama County on the north to Merced County on the south. The blue elderberry (*Sambucus nigra*) is the obligate host of this species.	Unlikely. Habitats required by this species are marginal in the APE.
Green Sturgeon (Southern DPS) (Acipenser medirotris)	FT, CSSC	An anadromous fish commonly occurring in marine and estuarine waters as an adult but occurring in the Sacramento River and its tributaries to spawn in spring and early summer.	Unlikely. Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species and are therefore unlikely to be used. During outmigration, juveniles are unlikely to enter Sutter Basin.
Chinook Salmon (Central Valley spring-run ESU) (Oncorhynchus tshawytscha)	FT, CT	An anadromous fish occurring in the Sacramento River and its tributaries and in the Sacramento River/San Joaquin River delta.	Unlikely. Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species and are therefore unlikely to be used. During

Species	Status	Habitat	Occurrence within the Site
			outmigration, juveniles are unlikely to enter Sutter Basin.
Steelhead (Central Valley DPS) (Oncorhynchus mykiss irideus)	FT	Occurs in the Sacramento River and its tributaries and in the San Joaquin River and its tributaries south to the Merced River.	**Unlikely.** Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species and are therefore unlikely to be used. During outmigration, juveniles are unlikely to enter Sutter Basin.
Delta Smelt (Hypomesus transpacificus)	FT, CE	A euryhaline species occurring in San Francisco, San Pablo, Suisun and Grizzly Bays, the San Joaquin and Sacramento Delta to the east, and the lower San Joaquin and Sacramento Rivers and their tributaries.	**Unlikely.** At least one individual was caught in a rotary screw trap at Knights Landing, adjacent to Sutter Basin, but this individual was a waif. Breeding populations of this species do not appear to occur north of Verona, approximately 12 miles downriver from Knights Landing (Vincik et al. 2012).
Longfin Smelt (Spirnchus thaleichthys)	FC, CT	Longfin smelt are an anadromous fish occurring in the San Francisco Bay and Sacramento/San Joaquin River Delta. This species spawns in the Sacramento River generally south of Rio Vista but has been documented in the Sacramento River as far north as Colusa.	**Unlikely.** This species is not known to spawn this far up the Sacramento River.
Eulachon (Thaleichthys pacificus)	FT	Eulachon typically occur in rivers of coastal northern California. The southern-most spawning run of this species was in the Mad River of Humboldt County. One mature male eulachon was collected from a trap in the Sacramento River near Knights Landing.	**Unlikely.** One individual was caught in a trap in the Sacramento River a short distance up- stream from the Karnak Drainage Facility in 2006 (CDFW 2021). This species is presumed to be a waif occurring where eulachon does not typically occur. The observation of a single fish in trap near the Karnak Drainage Facility does not indicate a population of eulachon using the Sacramento River, Sacramento Slough, or Robbins Canal.
California Tiger Salamander (*Ambystoma californiense*)	CT, FT	Found primarily in annual grasslands; requires seasonal pools for breeding and rodent burrows for refuge.	**Unlikely.** Habitats required for this species are marginal within the Sutter Basin and there are no known occurrences of this species in the Sutter Basin.

Species	Status	Habitat	Occurrence within the Site
California Red-legged Frog (*Rana draytonii*)	FT	Occurs in permanent aquatic habitats such as creeks and ponds with emergent vegetation.	**Unlikely.** Habitats required for this species are marginal within the Sutter Basin and there are no known occurrences of this species in the Sutter Basin.
Giant Garter Snake (*Thamnophis gigas*)	CT, FT	This species currently occurs in the Central Valley in two disconnected geographic locations, one being an area from Butte/Glenn Cos. on the north to San Joaquin Co. on the south, and the other being in Merced, Madera and Fresno Cos. It occurs primarily in sloughs, drainage canals, and rice fields.	**Likely.** Robbins Canal, Sutter Bypass, and Sacramento Slough provide suitable habitat for this species, as do rice fields located within the Sutter Basin. The nearest observation occurs approximately 0.25 miles to the east of Sutter Basin, along the Feather River (CDFW 2021).
California Black Rail (Laterallus jamaicensis coturniculus)	CT, CFP	Occurs in saline, brackish, and fresh emergent wetlands in the San Francisco Bay area, Sacramento-San Joaquin Delta, Morro Bay, Salton Sea, and lower Colorado River area. In freshwater it is usually found in bulrushes, cattails, and saltgrass.	**Absent**. Habitat required by this species is absent from the APE.
Bald Eagle (Haliaeetus leucocephalus)	CE, CFP	Winters and sometimes nests near Central Valley reservoirs. Most observations made within the vicinity of Knights Landing have been in late fall, winter, and early spring. Individuals foraging in the area mostly feed on fish and winter waterfowl in large bodies of water or rivers.	**Possible.** This species likely flies over Sutter Basin, may forage within some of the aquatic features, and roost within trees of the APE.
Swainson's Hawk (*Buteo swainsoni*)	CT	Primarily a migrant species occurring in the Central Valley from mid-to late February through September. Forages in grasslands and fields; usually nests in large trees adjacent to suitable foraging habitat.	**Possible.** Swainson's hawks have been well documented around the border of the Sutter Basin. The APE is likely to provide possible nesting habitat in the form of large trees. Agricultural and unknown upland habitats of Sutter Basin are suitable for foraging.
Western Snowy Plover (Charadrius alexandrines nivosus)	FT, CSSC	This shorebird occurs at scattered locations throughout coastal Calif. and the Central Valley. It nests primarily on coastal beaches, however, an interior population nests on sparsely vegetated flats	**Unlikely.** Habitats required by this species are absent from the Sutter Basin, however this species may pass through or over Sutter Basin.

Species	Status	Habitat	Occurrence within the Site
		adjacent to alkali wetlands of the San Joaquin Valley.	
Willow Flycatcher (*Empidonax traillii*)	CE	Occurs throughout California during migration. Forages in dense willow- dominated riparian habitat, usually along rivers, streams, or other wetlands. Breeds at mid-high elevation in the Sierra.	**Unlikely.** This species may pass through or over the Sutter Basin during migration. It would not nest at the APE.
Bank Swallow (*Riparia riparia*)	CT	Localized breeding colonies along rivers and streams primarily in northern California. Nest locations are vertical banks or bluffs of friable soils suitable for burrowing.	**Possible.** Bank swallows have been well documented along the Sacramento River adjacent to the west and south boundaries of Sutter Basin (CDFW 2021). Breeding habitat is also likely present in the form of burrows along the vertical banks of canals, sloughs, and rivers. Terrestrial and aquatic habitat of the alternatives provide possible foraging habitat for this species.
Western Yellow-billed Cuckoo (Coccyzus americanus occidentalis)	FT, CE	Nesting habitat in California is limited to the northern Sacramento Valley, South Fork of the Kern River Valley, and the Colorado River Valley. Habitat suitable for nesting is riparian woodland encompassing at least 35 acres.	**Unlikely.** While this species may fly over the APE, foraging and nesting habitat is likely absent.
Tricolored Blackbird (*Agelaius tricolor*)	CT	Occurs widely through coastal and interior California west of the Sierra Nevada. This species typically nests in large colonies in marshes supporting emergent vegetation such as cattails and bulrushes, or in triticale or other grain fields. Forages in grassland and cropland areas; in the Sacramento Valley, a preferred fall foraging habitat is maturing rice fields.	**Possible.** While this species may forage over the APE, breeding habitat is absent.
White Sturgeon (Acipenser transmontanus)	CSSC	An anadromous fish commonly occurring in marine and estuarine waters as an adult but occurring in the Sacramento River and its tributaries to spawn in spring and early summer.	**Unlikely.** Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species and are therefore unlikely to be used. During outmigration, juveniles are

Species	Status	Habitat	Occurrence within the Site
			unlikely to enter Sutter Basin.
Sacramento Splittail (Pogonichthys macrolepidotus)	CSSC	This is an estuarine species occurring mainly in the Sacramento/San Joaquin Delta, with individuals also occurring in the San Joaquin River south to Merced. Co. At one time, the Sacramento splittail occurred as far up the Sacramento River as Redding (Moyle 2002), but the species is now largely absent from the upper Sacramento River.	**Unlikely.** This species is now largely absent from the upper Sacramento River.
Western Pond Turtle (*Emys marmorata*)	CSSC	Occurs in open, slow-moving water or ponds with rocks and logs for basking. Nesting occurs in open areas, on a variety of soil types, and up to ¼ mile away from water.	**Likely.** The Sacramento River and its tributaries provide habitat of moderate quality for western pond turtles, and potentially supports large populations of this species (Jennings and Hayes, 1994; Germano et. al., 2001). Robbins Canal, Sutter Bypass, and Sacramento Slough adjacent to, or within, the APE provide suitable habitat. This species may also utilize inundated rice fields within the Sutter Basin.
Golden Eagle (*Aquila chrysaetos*)	CFP	Typically frequents rolling foothills, mountain areas, sage-juniper flats and desert.	**Likely.** The APE likely provides roosting habitat for golden eagles in the form of large trees. This species has been documented in Knights Landing, adjacent to the Sutter Basin as recently as 2016 (eBird 2021). Golden eagles would be expected to forage over the ruderal/developed, agricultural field, and unknown upland habitats/land uses within the APE.
Northern Harrier (*Circus hudsonius*)	CSSC	Frequents meadows, grasslands, open rangelands, fresh-water emergent wetlands; nests on ground, generally in marshes, although grassland and pasture habitat may also be used.	**Possible.** The APE lacks nesting habitat and preferred foraging habitat is marginal, but this species may nevertheless forage over the APE from time to time.
White-tailed Kite (*Elanus caueruleus*)	CFP	Common in savannas, open woodlands, marshes, desert grasslands, partially cleared lands, and cultivated fields. They prefer to nest in open-	**Unlikely.** Nesting habitat within the APE is marginal, and this species is unlikely to forage over the APE.

Species	Status	Habitat	Occurrence within the Site
		country trees growing in isolation or at the edge of or within a forest.	
Peregrine Falcon (Falco peregrinus anatum)	CFP	Individuals breed on cliffs in the Sierra or in coastal habitats; occurs in many habitats of the state during migration.	**Possible.** This species may forage in the airspace over the APE, and roost in mature trees that may occur within the APE. Nesting habitat is absent.
Mountain Plover (*Charadrius montanus*)	CSSC	Forages in short grasslands and freshly plowed fields of the Central Valley. This species does not breed in California.	**Unlikely.** The ruderal/developed land use of the APE provides marginal foraging habitat for this species; however, this species may fly over the APE.
Modesto Song Sparrow (*Melospiza melodia*)	CSSC	Occurs below 200 feet in elevation in the Central Valley from Colusa County south to the northern San Joaquin Valley. Nests in emergent marshes and riparian forests.	**Possible.** This species may forage or fly over the APE, but is not expected to nest in the APE. This species was observed foraging in the APE during the field survey.
Lesser Sandhill Crane (*Grus canadensis canadensis*)	CSSC	The Pacific Flyway population winters primarily in the Central Valley of California from Butte Co. south to Kern Co. Preferred habitats include grasslands and fields of harvested grain crops. They do not nest within the Central Valley.	**Unlikely.** Habitats suitable for this species are absent from the APE; however, it may fly over the APE.
Long-eared Owl (*Asio otus*)	CSSC	A scarce and irregular breeder in the Central Valley. Nests in riparian forest providing cover, roosts, and nest platforms. Forages in adjacent open habitats such as grassland or shrubland.	**Possible.** Nesting habitat required by this species is likely absent from the APE, however this species may forage in or fly over the APE.
Short-eared Owl (*Asio flammeus*)	CSSC	Transient or occasional breeder in grasslands, marshes, and in some agricultural lands of the Sacramento Valley.	**Possible.** Habitats suitable for this species are absent from the APE; however, this species may occasionally forage or fly over the APE.
Burrowing Owl (*Athene cunicularia*)	CSSC	Found in open, dry grasslands, deserts, ruderal areas, and adjacent to agricultural fields. Requires suitable small mammal burrows for roosting and nesting.	**Possible.** This species may utilize small mammal burrows along the levees of the canal and slough habitats within the Sutter Basin. It would be expected to forage within open areas within ruderal/ developed, agricultural field, and unknown upland habitats/land uses.
Black Swift (*Cypeseloides niger*)	CSSC	Migrants and transients found throughout many habitats of	**Possible.** Nesting habitats required by this species are

Species	Status	Habitat	Occurrence within the Site
		state; often nests behind waterfalls in the Sierra.	absent from the APE; however, this species may forage or fly over the Sutter Basin from time to time.
Vaux's Swift (*Chaetura vauxi*)	CSSC	Migrants and transients move through the western Sierra foothills in spring and late summer; nests in conifer forest.	**Possible.** Nesting habitats required by this species are absent from the APE, however this species may forage or fly over the Sutter Basin from time to time.
Loggerhead Shrike (*Lanius ludovicianus*)	CSSC	Forages in a variety of open habitats including grasslands. Nests in large trees near open spaces.	**Likely.** Suitable nesting and foraging habitat is present within the ruderal/developed, slough, agricultural field, and unknown upland habitats/land uses that occurs in the APE.
Yellow Warbler (*Setophaga petechia*)	CSSC	Widely distributed throughout California during migration, this species typically nests in the Coast Ranges and Sierra Nevada. Preferred nesting habitat is riparian vegetation close to water. It rarely nests in the Central Valley.	**Possible.** This species rarely nests within the Central Valley; however, it may forage or fly over the Sutter Basin from time to time.
Townsend's Big-Eared Bat (*Corynorhinus townsendii*)	CSSC	Found throughout California. Roosts most frequently in caves and cave-like structures, but has also been reported to utilize bridges, buildings, rock crevices, and hollow trees.	**Possible.** This species may roost within bridges, buildings, and hollow trees potentially occurring within the ruderal/developed land use of the APE and hollow trees that may be present within the slough, agricultural field, unknown upland, and mixed riparian forest habitats/land uses of the APE. It may forage in flight over the APE.
Pallid Bat (Antrozous pallidus)	CSSC	Found in grasslands, chaparral, and woodlands, where it feeds on ground- and vegetation-dwelling arthropods. Roosts in crevices in rocky outcrops and cliffs, caves, mines, buildings, bridges, and sometimes, hollow trees.	**Possible.** This species may roost within bridges, buildings, and hollow trees potentially occurring within the ruderal/developed land use of the APE and hollow trees that may be present within the slough, agricultural field, unknown upland, and mixed riparian forest habitats/land uses of the APE. It may also use the APE for foraging.
Western Red Bat (*Lasiurus blossevillii*)	CSSC	Roosts in tree or shrub foliage, although will occasionally use caves.	**Likely.** This species likely roosts within shrubs and trees potentially occurring within ruderal/developed, slough,

Species	Status	Habitat	Occurrence within the Site
			agricultural field, unknown upland, and mixed riparian forest habitats/land uses in these alternatives. It may also use the APE for foraging.
Western Mastiff Bat (*Eumops perotis*)	CSSC	Found in open, arid to semi-arid habitats, where it feeds on insects in flight. Roosts most commonly in crevices in cliff faces, but may also use high buildings, trees, and tunnels.	**Possible.** Roosting habitat is marginal within the Sutter Basin; however, this species may forage within the area.
American Badger (*Taxidea taxus*)	CSSC	Found in drier open stages of most shrub, forest and herbaceous habitats with friable soils.	**Unlikely.** The habitats within the APE are marginal for this species; however, this species may cross through the APE in route to more suitable habitats.
Crotch's bumble bee (Bombus crotchii)	CCE	Occurs throughout coastal California, as well as east to the Sierra Nevada-Cascade crest, and south into Mexico. Food plant genera include snapdragons, scorpionweeds, primroses, poppies, and buckwheats. Nests are often located underground in abandoned rodent nests, or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees. This species overwinters under leaf litter or soft soil.	**Unlikely.** There was marginal to low overwintering habitat as no leaf litter was present and only a few small mammal burrows occurred. Habitats within the site were generally disturbed from ongoing activities and included compacted roads. If an individual were foraging in the area, it would be expected to fly away during Project activities. The nearest recorded observation of this species was 1.5 miles southeast of the site along the Sacramento River in 2021.
Monarch butterfly (Danaus plexippus)	FPT	Roosts in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Larval host plants consist of milkweeds. Winter roost sites extend along the Pacific Coast from northern Mendocino to Baja California, Mexico.	**Unlikely.** The APE is not in range for overwintering habitat for this species. Additionally, there was marginal to no host plants and habitats within the site were generally disturbed from ongoing activities and included compacted roads. If an individual were foraging in the area, it would be expected to fly away during Project activities. There are no recorded observations of this species on California Natural Diversity Database (CNDDB) within the regional vicinity of the Project.
Northwestern pond turtle (Actinemys marmorata)	FPT, CSSC	An aquatic turtle of ponds, marshes, slow-moving rivers, streams, and irrigation ditches	**Possible.** The APE appears to provide suitable habitat for this species. While the Project would

Species	Status	Habitat	Occurrence within the Site
		with riparian vegetation. Requires adequate basking sites and sandy banks or grassy open fields to deposit eggs.	maintain and/or increase suitable habitat for this species, there is the potential for this species to be injured or killed during Project activities. The nearest recorded observation of this species was 1.5 miles south of the site along the Sacramento River in 2014.
Western spadefoot (Spea hammondii)	FPT, CSSC	The majority of the time this species is terrestrial and occurs in small mammal burrows and soil cracks, sometimes in the bottom of dried pools. Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Vernal or seasonal pools, that hold water for a minimum of three weeks, are necessary for breeding.	**Absent.** Suitable habitat is absent from the APE, and this species would not be expected to occur in the site. There are no recorded observations of this species on CNDDB within the regional vicinity of the Project.

OCCURRENCE DESIGNATIONS AND STATUS CODES

Present: Species observed on the site at time of field survey 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 due to absence of suitable habitat

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 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		

4.4.2 APPLICABLE REGULATIONS

Federal

Endangered Species Act

Permits may be required from the United States Fish and Wildlife Service (USFWS) if activities associated with a Project have the potential to result in the "take" of a species listed as threatened or endangered under the Endangered Species Act (ESA). The ESA provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The law requires federal agencies, in consultation with the USFWS and/or the National Oceanic and Atmospheric Administration Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes the "taking" of any listed species of endangered fish or wildlife. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (16 United States Code [USC], Section 1532(19), 50 CFR, Section 17.3). Likewise, import, export, interstate, and foreign commerce of listed species are all generally prohibited. The USFWS is a responsible agency under NEPA. The USFWS reviews NEPA documents in order to determine the adequacy of how the project will affect a species and to make project-specific recommendations for their conservation.

Designated Critical Habitat

When species are listed as threatened or endangered, the USFWS often designates areas of "Critical Habitat" as defined by section 3(5)(A) of the ESA. Critical Habitat is a term defined in the ESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical Habitat is a tool that supports the continued conservation of imperiled species by guiding cooperation with the federal government. Designations only affect federal agency actions or federally funded or permitted activities. Critical Habitat does not prevent activities that occur within the designated area. Only activities that involve a federal permit, license, or funding and are likely to destroy or adversely modify Critical Habitat will be affected.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) (MBTA: 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 bird's native to the United States, even those that are non-migratory. The MBTA encompasses whole birds, parts of birds, and bird nests and eggs. Additionally, California Fish and Game Code makes it unlawful to take or possess any non-game birds covered by the MBTA (Section 3513), as well as any other native non-game birds (Section 3800).

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668-668c) is a United States federal statute that protects two species of eagle. The act prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts (including feathers), nests, or eggs. Violators may be assessed a civil penalty by the Secretary of the Interior of not more than $5,000 for each such violation. The act also provides for fines and imprisonment for violators.

Wetlands and other "Jurisdictional Waters"

The definition of "waters of the United States" (WOTUS) often changes from one presidential administration to the next. The current definition, established under the Biden Administration that became effective on March 20, 2023 (i.e., "new rule"), has adopted much of the same WOTUS designations as the

pre-2015 rules, but has incorporated the most recent science and court case rulings. Traditional navigable waters, territorial seas, and interstate waters remain covered under the new rule. Natural drainage channels and adjacent wetlands may be considered "waters of the United States" or "jurisdictional waters" subject to the jurisdiction of the United States Army Corps of Engineers (USACE) if there is a "relatively permanent" surface water connection, or "significant nexus" to WOTUS. The extent of jurisdiction has been defined in the CFR but is also subject to interpretation by the federal courts. Jurisdictional waters generally include the following categories:

1) *Waters which are:*
    a. *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;*
    b. *The territorial seas; or*
    c. *Interstate waters, including interstate wetlands;*
2) *Impoundments of waters otherwise defined as WOTUS under this definition, other than impoundments of waters identified under item (5) of this section;*
3) *Tributaries of waters identified in items (1) or (2) of this section:*
    a. *That are relatively permanent, standing or continuously flowing bodies of water; or*
    b. *That either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in item (1) of this section;*
4) *Wetlands adjacent to the following waters:*
    a. *Waters identified in item (1) of this section; or*
    b. *Relatively permanent, standing or continuously flowing bodies of water identified in items (2) or (3)(i) of this section and with a continuous surface connection to those waters; or*
    c. *Waters identified in items (2) or (3) of this section when the wetlands either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in item (1) of this section;*
5) *Intrastate lakes and ponds, streams, or wetlands not identified in items (1) through (4) of this section:*
    a. *That are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in items (1) or (3)(i) of this section; or*
    b. *That either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in item (1) of this section.*

Prior exclusions have been consolidated under the new rule, which excludes from jurisdiction any feature that satisfies the following terms:

- *Waste treatment systems, including treatment ponds or lagoons;*
- *Prior converted cropland;*
- *Ditches excavated wholly in and draining only dry land and do not carry a relatively permanent flow of water;*
- *Artificially irrigated areas that would revert to dry land if irrigation ceased;*
- *Artificial lakes or ponds created by excavating or diking dry land for the use of stock watering, irrigation, settling basins or rice growing;*
- *Artificial reflecting or swimming pools;*
- *Waterfilled depressions created in dry land; and*
- *Swales and erosional features (ex. gullies and small washes) characterized by low volume, infrequent, or short duration flow.*

The new rule has incorporated the best available science, relevant United States Supreme Court cases, public comment, technical expertise, and experience gained from more than 45 years of implementing the pre-2015 "waters of the United States" framework to inform jurisdictional limits. One significant court case involves the U.S. Supreme Court in its *2001 Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers* decision. It was determined that 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 United States Supreme Court ruled that a significant nexus between a wetland and other navigable waters must exist for the wetland itself to be considered jurisdictional waters. The Supreme Court heard *Sackett v. United States Environmental Protection Agency* in May 2023, to determine governing standards of a significant nexus between waters of the United States and adjacent wetlands. The court decided that adjacent wetlands would be protected under the Clean Water Act (CWA) only if it maintained a continuous surface water connection with a federal water body. This decision has limited protection for networks of wetlands connected to navigable waters through subsurface flow.

The USACE regulates the filling or grading of waters of the United States under the authority of Section 404 of the CWA. 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 United States 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 results in no net loss of wetland functions or values. No permit can be issued until the Regional Water Quality Control Board (RWQCB) issues a Section 401 Water Quality Certification (or waiver of such certification) verifying that the proposed activity will meet State water quality standards.

State

Nesting Birds

In California, protection is afforded to the nests and eggs of all birds. California Fish and Game Code (Section 3503) states that it is "unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Breeding-season disturbance that causes nest abandonment and/or loss of reproductive effort is considered a form of "take" by the California Fish and Wildlife (CDFW).

California Endangered Species Act

Permits may be required from CDFW if activities associated with a Project have the potential to result in the "take" of a species listed as threatened or endangered under the California Endangered Species Act (CESA). The term "take" means "to hunt, pursue, catch, capture, kill, or attempt to hunt, pursue, catch, capture, or kill." (California Fish and Game Code, Section 86). The CESA states that "all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved." CDFW is a responsible agency under CEQA. CDFW reviews CEQA documents in order to determine the adequacy of how the project will affect a species and to make Project-specific recommendations for their conservation.

Birds of Prey

Birds of prey are protected in California under provisions of California 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), or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

Local

Sutter County General Plan

The Sutter County General Plan contains the following goals and policies for the protection of biological resources:

Environmental Resources Goals:

- *ER 1 - Support a comprehensive approach for the conservation, enhancement, and regulation of Sutter County's significant habitat and natural open space resources.*
- *ER 2 - Conserve, protect, and enhance Sutter County's significant natural wetland and riparian habitats.*

Environmental Resources Policies:

- *ER 1.3 - Conservation Efforts. Focus conservation efforts on areas identified as having very high and high habitat value as well as Sutter County's unique natural open space resources, including the Sutter Buttes, Sutter Bypass, Butte Sink, and the Sacramento, Feather, and Bear River corridors.*
- *ER 1.4 - Interconnected Habitat. Emphasize the preservation, enhancement, and creation of sustainable, interconnected habitat and open space areas that highlight unique resources and integrate educational and recreational opportunities as appropriate.*
- *ER 1.5 - Resources Assessment. Require discretionary development proposals that could potentially impact biological resources to conduct a biological resources assessment to determine if any resources will be adversely affected by the proposal and, if so, to identify appropriate measures to avoid or mitigate such impacts.*
- *ER 1.6 - Avoidance. Ensure that new development projects avoid, to the extent feasible, significant biological resources (e.g. areas of rare, threatened or endangered species of plants, riparian areas, vernal pools), except where such projects are identified as "Authorized Development" within an adopted Habitat Conservation Plan.*
- *ER 1.7 - Mitigation. Mitigate biological and open space effects that cannot be avoided in accordance with an applicable Habitat Conservation Plan and federal, State, and local regulations.*
- *ER 1.8 - Permits. Require that new development secure all necessary state and federal resource permits/approvals prior to any development activity.*
- *ER 1.9 - Buffers. Ensure that new development incorporates buffers and other measures adequate to protect biological habitats that have been preserved, enhanced, and created.*

Best Management Practices

The following general guidelines and BMPs will be followed during construction:

- The work window for work in the Sacramento Slough is July 1 – October 31.
- The pipes going through the levee will be sleeved, not replaced.
- The work in Sacramento Slough should take place in areas that have been dewatered through use of temporary coffer dams.
- Installation of a temporary coffer dam to the east of the current pump station to dry the area east of the levee for construction so no water is pumped into Sacramento Slough in areas of construction.

- All standard in-water construction Best Management Practices should be followed even though there is expectation that work will be on dry bank. This would include sediment curtains in the slough, equipment staging area away from water, spill prevention measures and cleanup kit, etc.
- Fish screens strongly recommended but not required.
- No permanent changes to current "habitat", i.e., no additional rip rap or other permanent materials.

4.4.3 IMPACT ANALYSIS

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

Less than Significant with Mitigation Incorporated. As discussed above and listed in Table 4-10 and Table 4-11, 3 special status plant and 42 special status animal species have the potential to occur within the APE. Construction of the Project could have potentially significant impacts on these species through habitat modification and mortality, if not properly mitigated. Implementation of mitigation measures BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, BIO-7, and BIO-8, discussed in detail below, would mitigate all potential significant impacts to a less than significant levels. Therefore, impacts would be less than significant with mitigation incorporated.

b) Would the project 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 Wildlife or U.S. Fish and Wildlife Service?

Less than Significant with Mitigation Incorporated. The Project has the potential to impact mixed riparian forest habitat during construction of the Project, as Great Valley Mixed Riparian Forest, a sensitive natural community, is known to exist within the Project area. To limit any potential for significant impacts to occur, the Project will implement mitigation measure BIO-11, discussed in detail below, reducing the potential impacts to less than significant. No other sensitive natural community with the potential to be significantly impacted by the Project is known to exist within the APE. Therefore, impacts would be less than significant with mitigation incorporated.

c) Would the project 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?

Less than Significant with Mitigation Incorporated. According to an Aquatic Resources Delineation prepared for the Watershed Plan-EIS in March of 2021 (See Appendix B) and the BE prepared for the Watershed Plan-EIS, the Project has the potential to have significant impacts to federally protected wetlands, waters of the United States, waters of the State, and other jurisdictional waters during construction of the Project. In order to reduce potential significant impacts to a less than significant level, the Project will implement mitigation measures BIO-9 and BIO-10, requiring an aquatic resources delineation be completed, required permits under the CWA be obtained, a Streambed Alteration Agreement be obtained, a Stormwater Pollution Prevention Plan (SWPPP) be prepared and hazardous materials be stored away from jurisdictional waters. BIO-9 and BIO-10 are discussed in detail below. Therefore, impacts would be less than significant with mitigation incorporated.

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?

Less than Significant with Mitigation Incorporated. Nesting swallows and roosting bat colonies could potentially utilize the APE as a wildlife corridor or nursery site. Mitigation measures BIO-7 and BIO-8, discussed in detail below, would reduce the potential for mortality to occur for nesting swallows and roosting bat colonies. These two mitigation measures would reduce potentially significant impacts to nesting swallows and roosting bat colonies from Project construction to a less than significant level. Therefore, impacts would be less than significant with mitigation incorporated.

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

No Impact. The Project would not conflict with any local policy or ordinance protecting biological resources. Potential impacts of the Project discussed throughout this section would be properly mitigated and would not conflict with Sutter County's General Plan or Municipal Code. Therefore, there would be no impact.

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?

No Impact. The Project site is not located within an area of designated critical habitat and there are no Habitat Conservation Plans or Natural Community Conservation Plans in effect for the area. Therefore, there would be no impact.

4.4.4 MITIGATION

BIO-1 The Project has the potential to impact special status plant species, including Wooly-Rose Marrow, Sanford's Arrow Head, and Suisun Marsh Aster. To avoid significant impacts to these species, the following mitigation measures will be implemented:

(**Rare Plant Surveys**) Prior to construction commencing for any portion of the Project, rare plant surveys shall be conducted during the appropriate blooming periods by a qualified biologist. Should Wooly-Rose Marrow, Sanford's Arrowhead, or Suison Marsh Aster be identified within the APE, the Project shall comply with the recommendations of the qualified biologist.

(**Avoidance**) If any special status plants are detected during the rare plant surveys, the Project should be designed to avoid direct (i.e. species removal) and indirect impacts to these populations. Avoidance of indirect impacts would entail establishing a suitable disturbance-free buffer of at least 25 to 50 feet from any special status plants.

(**Relocation**) If it is not possible to avoid populations of rare plants identified within construction zones, a qualified biologist will remove all individual plants to be impacted and relocate them to suitable habitat in the vicinity of the planning area.

BIO-2 The following mitigation measures will be implemented to mitigate potential impacts to green sturgeon, Chinook salmon, and white sturgeon:

(Avoidance) Peak outmigration of sturgeon juveniles occurs during the spring and early summer. Peak outmigration of salmon and steelhead smolts occurs during the spring. Few, if any juvenile sturgeon, salmon, or steelhead would be present in the Sacramento River or waters outside of Sutter Basin between August 15th and October 31st. Therefore, to the extent possible, all Project activities in the Sacramento River and waters outside of Sutter Basin will occur during that time frame, to avoid possible Project impacts to these species.

(Fish Rescue and Relocation) Should Project activities be required to be conducted between November 1 and August 14 in the Sacramento River or waters outside of the Sutter basin, a fish rescue and relocation plan shall be prepared and implemented in consultation with the National Marine Fisheries Service (NMFS) to minimize impacts to these species.

BIO-3 The following mitigation measures will be implemented to mitigate potential impacts to giant garter snakes:

(Pre-construction Surveys) If work will occur during the active season for giant garter snake (between May 1 and September 30), a qualified biologist will conduct two giant garter snake pre-construction surveys of the APE (including any accessible suitable habitat adjacent to the APE) with the first occurring within 15 days and the second occurring within 24-hours of the onset of construction. The information collected from this first pre-construction survey will serve primarily to alert the biologist and construction crews of the general level of giant garter snake activity at the site, and the second survey will serve to minimize potential for take of giant garter snakes.

(Education Program) Prior to any work occurring within the APE, an education program shall be prepared and delivered by a qualified biologist to all personnel working on the site. It shall include a description on the regulations protecting this species, implications for impacting this species, the biology of this species, and who to contact should personnel potentially observe this species.

(Exclusion) If work will occur during the inactive season for giant garter snake (between October 1 and April 30), an exclusion fence will be installed around the work areas prior to the start of the inactive season. The design of the fence will be approved by the CDFW and USFWS prior to installation. Fence installation will be supervised by a qualified biologist.

(Monitoring) A qualified biological monitor will inspect the exclusion fence each day to ensure it is functional for the intended purpose and monitor all in-water construction activities. The biologist will conduct a daily survey of the Project site (morning). The purpose of daily monitoring is to ensure that the exclusion fence remains in good repair as long as construction is occurring at the Project site. Any wildlife, including giant garter snakes, observed in the Project area will be allowed to passively leave the site.

(Vegetation Removal) Clearing of herbaceous vegetation (i.e., grasses and forbs) will be confined to the minimal area necessary to facilitate construction activities and preserve native vegetation.

BIO-4 The following mitigation measures will be implemented to mitigate potential impacts to western pond turtles:

(Pre-construction Survey) Within 24 hours of the start of construction activities, a qualified biologist will complete a preconstruction survey for western pond turtle.

(Avoidance) Should any western pond turtles be observed on the site, they shall be allowed to leave the Project on their own.

BIO-5 The following mitigation measures will be implemented to mitigate potential impacts to Swainson's hawks:

(Avoidance) In order to avoid Project-related "take" of Swainson's hawk, Project-related activities will occur, where possible, outside of the Swainson's hawk nesting season, or between September 16th and the end of February.

(Establish Buffers) Should any active Swainson's hawk nests be discovered within ½ mile of impact areas of the APE, the biologist will consult with CDFW to determine an appropriate construction setback distance. Construction-free buffers will be identified on the ground with flagging, fencing, or by other easily visible.

(Foraging Habitat Compensation) Should any active Swainson's hawk nests be discovered within ½ mile of impact areas of the APE, and the Project may remove any potential foraging habitat for Swainson's hawk (i.e. agricultural fields suitable for foraging or unknown upland habitats), an amount of habitat management land, to be determined in consultation with CDFW, shall be required to mitigate for loss of Swainson's hawk foraging habitat. The amount of habitat management land set aside for impacts to Swainson's hawk foraging habitat may range from 0.5 – 1.0 acres of habitat management for every acre of Swainson's hawk foraging habitat removed by the Project.

BIO-6 The following mitigation measures will be implemented to mitigate potential impacts to burrowing owls:

(Take Avoidance Surveys). Take avoidance surveys for burrowing owls shall be conducted by a qualified biologist within 30 days prior to the start of construction and activities involving ground disturbance. The surveys will be conducted according to methods described in the Staff Report on Burrowing Owl Mitigation (CDFG 2012). Each survey is to cover the work area(s) in question and adjacent lands within 200 meters, where potential nesting or roosting habitat is present ("survey area").

(Avoidance of Nest Burrows). If construction or ground-disturbing activities are to occur during the breeding season (February 1-August 31) and active nest burrows are identified within the survey area, a disturbance-free buffer will be established by a qualified biologist around each burrow, following the Staff Report on Burrowing Owl Mitigation (CDFG 2012). The buffers will be enclosed with temporary fencing to prevent encroachment by construction equipment and workers. Buffers will remain in place for the duration of the breeding season, unless otherwise arranged with CDFW. After the breeding season, passive relocation of any remaining owls may take place as described below.

(Avoidance or Passive Relocation of Resident Owls). During the non-breeding season (September 1-January 31), resident owls occupying burrows in work areas associated with construction or ground-disturbing activities may either be avoided, or passively relocated to alternative habitat. If the applicant chooses to avoid active owl burrows within the work area during the non-breeding season, a 50-meter disturbance-free buffer will be established around these burrows. 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.

BIO-7 The following mitigation measures will be implemented to mitigate potential impacts to Nesting Bank Swallow, Loggerhead Shrike and other Nesting Raptors and Migratory Birds:
(Avoidance) When possible, Project construction activities will occur outside of the February 1-August 31 avian nesting season such that Project activities will have no potential to disrupt active nests.

(Preconstruction Surveys) If Project construction activities must occur during the nesting season, a qualified biologist will conduct preconstruction surveys for active nests within 14 days of the onset of these activities. The survey will include the proposed work area(s) and surrounding lands within 500 feet. If no active nests are found within the survey area, no further mitigation would be required.

(Special Status Bird Nest Consultation, Nest Buffers, and other Minimization or Mitigation Measures) Should any active nests of federal or State threatened or endangered birds be discovered on or near proposed work areas, a qualified biologist will consult with the CDFW and/or USFWS (depending on their listing status) to determine an appropriate disturbance-free nest buffer and any other minimization or mitigation measures. Should any nests of nests of bird species of special concern be discovered near proposed work areas, a qualified biologist will determine an appropriate disturbance-free nest buffer and any other minimization or mitigation measures. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist has determined that the young have fledged.

(Other Nesting Raptor and Migratory Bird Nest Buffers) Should the active nests of any non-special-status birds or raptors be discovered near proposed work areas, a qualified biologist will determine appropriate no-disturbance nest buffers based on applicable CDFW guidelines and/or the biology of the affected species. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist has determined that the young have fledged.

BIO-8 The following mitigation measures will be implemented to mitigate potential impacts to Townsend's big-eared bat, pallid bat, western red bat, and other roosting bats:

(Preconstruction Survey) Prior to Project activities that will impact potentially suitable roosting habitat for special-status bats (e.g. removal or modification of buildings or bridges, removal of shrubs or trees) a qualified biologist will conduct preconstruction surveys within 14 days of the onset of these activities. The surveys will include inspecting any suitable roost sites for bat sign (guano, etc.) and completing an acoustic monitoring survey and evening emergence survey at

all locations suitable for bats, as determined by the qualified biologist. The bat acoustic monitoring survey will include setting up bat detectors adjacent to the suitable structures the afternoon before the emergence survey, which will be left in place for at least two nights, and will be used to determine which species are utilizing the area. The evening emergence surveys will include watching for bats emerging from suitable structures over two consecutive nights. If no emerging bats are found within the survey area, no further mitigation would be required.

(Avoidance, Consultation, and/or Establish Buffers) Should active roosts for special-status bats be observed, or active roosts for other bat species are observed during the bat winter roosting season (November 1 through April 15) or maternity roosting season (May 15 through August 15), these bat roosts will be avoided and buffers will be established. If any active special-status bat roosts are discovered near proposed work areas, the biologist will consult with CDFW to determine appropriate disturbance-free setback distances and other minimization measures. Should any other bat winter or maternal roosts be discovered near proposed work areas, the biologist will determine appropriate disturbance-free setback distances. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist and/or CDFW has determined the roost is no longer active.

(Exclusion) Should active roosts for bats be identified, bats may be excluded from occupied features outside of the bat winter roosting season (August 15-November 1) and maternity roosting season (April 15-May 15 and). An exclusion plan would be developed in consultation with CDFW for any special-status bat roosts, and may include compensation, exclusion methods, and roost removal methods to safely exclude roosting bats from the roosting structure to be removed, monitoring the roost during eviction, and a discussion of type, amount, and distance of suitable habitat near the habitat to be removed. Should any other bat winter or maternal roosts be discovered near proposed work areas, the biologist will develop the exclusion plan. Exclusion methods may include the use of one-way doors at roost entrances, or sealing roost entrances when a site can be confirmed to contain no bats.

BIO-9 The following mitigation measures will be implemented to mitigate potential impacts to waters of the United States and other jurisdictional waters and wetlands:

(Delineation) An aquatic resources delineation will be prepared for the Project area, to determine the boundaries of all potentially jurisdictional waters present.

(Minimization) Based on the results of the aquatic resources delineation, the Project will be designed to minimize impacts to potentially jurisdictional waters to the maximum extent practicable while still achieving its goal of flood control.

(Permits) If the final Project design requires impacts to areas of jurisdictional waters, permits under Section 404 and 401 of the Clean Water Act and a Streambed Alteration Agreement will be obtained for the Project, and the Project will adhere to all conditions of the permits, such as compensatory mitigation requirements, survey requirements, monitoring requirements, timing requirements and reporting requirements.

BIO-10 The following mitigation measures will be implemented to mitigate potential impacts related to the degradation of water quality in seasonal drainages and downstream waters:

(Preparation of a Storm Water Pollution Prevention Plan) The District will have a certified contractor prepare a Storm Water Pollution Prevention Plan (SWPPP) that includes erosion and sedimentation control Best Management Practices (BMP's) to protect water quality and measures to prevent contaminants from entering storm water. The plan would include, at a minimum, provisions that the limits of construction be defined and wattles or other appropriate erosion controls be placed downstream and/or downslope of areas where ground disturbance will occur, to prevent flows and/or surface runoff from causing erosion. The plan will also require all exposed graded slopes to be stabilized.

(Spill Containment and Material Storage) The contractor shall store fuel used for contractor equipment and hazardous materials away from the APE. When possible, the contractor shall not refuel construction equipment when working adjacent to potential waters of the United States or State. If refueling is necessary near potential waters of the United States or State, the contractor shall use portable spill containment equipment or maintain a spill containment kit during construction.

BIO-11 The following mitigation measures will be implemented to mitigate potential impacts to mixed riparian forest habitat:

(Vegetation Survey) Prior to Project construction, a qualified biologist will survey all mixed riparian forest habitat with the potential to be impacted by construction and will record the species, location, and diameter at breast height (DBH) of each tree and the general flora present within this habitat. Upon Project completion, a qualified biologist will survey the mixed riparian forest habitat again to determine if any of this habitat was impacted.

(Revegetation) The District will prepare a revegetation plan to provide compensation for removal of any riparian trees and associated riparian vegetation. It will include replacement tree plantings at a ratio of 3:1 for trees with a DBH between 4 and 24 inches, and at a ratio of 10:1 for trees with a DBH greater than 24 inches. Associated species of Great Valley mixed riparian forest will also be included in the revegetation plan. The revegetation plan will also detail the methods for planting, irrigating, and maintaining any replacement revegetation planted. All plantings will be monitored annually for a minimum of five years.

4.5 CULTURAL RESOURCES

Table 4-12: Cultural Resources Impacts

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

4.5.1 BASELINE CONDITIONS

4.5.1.1 CULTURAL RESOURCES EVALUATIONS AND HISTORIC PROPERTIES RECORDS SEARCH

In 2021, Kleinfelder conducted a study of the APE which included background and archival research, a records search, interested parties' consultation, a Native American Heritage Commission (NAHC) Sacred Lands File (SLF) search, and a cultural resources pedestrian survey. The study identified five built-environment resources with the APE: the Karnak Drainage Facility, the East Levee, the East Canal, the Reclamation District 1500 Canal, and the Reclamation District 1500 Historic District. In 2023 a Cultural Resources Evaluation and Finding of Effects Report was prepared to supplement the original study and to analyze the potential for significant effects under NEPA. Additionally, a Cultural Resources Identification Report was prepared by Kleinfelder in 2023. These reports are provided in Appendix C.

The Cultural Resources Evaluation and Finding of Effects Report was completed to evaluate the five cultural resources located with the APE identified in the original cultural resources inventory report. These studies consisted of a summary of the previous cultural resources study, evaluation of cultural resources within the APE, finding of effect, and mitigation recommendations for the APE.

Two historic properties/historical resources were identified within the APE: the Karnak Drainage Facility and the Reclamation District 1500 Historic District. Kleinfelder recommended a finding of Adverse Effects for both resources, which also constitute a potential significant impact under CEQA if not adequately mitigated.

On February 2, 2026, Provost & Pritchard requested a cultural resource records search from the Northeast Information Center (NEIC) of the California Historical Resources Information System (CHRIS) at California State University in Chico, California (see Appendix C). The purpose of this request was to identify and review prior cultural resource investigations completed in or near the Project site and identify any prehistoric or historical resources that had been previously recorded within the Project site and a 0.5-mile radius of the surrounding area. This records search also served to confirm that no new resources had been recorded within the area since the preparation of the Cultural Resources Evaluation and Finding of Effects Report and Cultural Resources Identification Report. NEIC staff researched topographic maps, reports of previous cultural resource investigations, archeological site and survey base maps, cultural resource records, as well as listings of the National Register of Historical Resources, California Register of Historical Resources, California Points of Historical Interest, California Inventory of Historic Resources, California Historical Landmarks, Archaeological Resource Directory, and Handbook of North American Indians, Volume 8.

According to the NEIC results, five resources have been recorded within one mile of the Project site (the same five as previously identified). The five identified resources include The Karnak Drainage Facility (RD1500-JN-03), Reclamation District 1500 Canal (RD1500-JN-04), East Levee of Reclamation District No. 1500 (RD1500-JN-02), East Canal (RD1500-JN-05), and Reclamation District (RD1500-JN-08). In addition to archeological resources, the NEIC did a search of the Built Environment Resources Directory (BERD). According to the BERD, there are no built environmental resources located within one mile of the Project site.

4.5.2 APPLICABLE REGULATIONS

Federal

National Historic Preservation Act

The National Historic Preservation Act (NHPA) established the Advisory Council on Historic Preservation, State Historic Preservation Officer (SHPO), the NRHP, and Section 106 review. The goal of the NHPA is to encourage federal agencies to act as responsible stewards of the nation's historic resources as far as their actions affect historic resources, meaning those listed on or eligible for listing on the NRHP. The NRHP recognizes buildings, structures, sites, districts, and objects equal to or greater than 50 years old that are determined to be significant in respect to American history, architecture, archaeology, engineering, or culture, and at the local, State, or national level. To be determined eligible for listing on the NRHP a resource must also retain integrity in terms of location, design, setting, materials, workmanship, feeling, and association. Resources determined eligible for, or which are listed on the NRHP, are afforded protection under Section 106 of the NHPA (as well as under CEQA). The Section 106 process serves to carry out the mission of the NHPA in that, when there is a federal or federally licensed action that has the potential to affect historic resources (i.e., those resources listed on or determined legible for listing on the NRHP), that agency is required to identify and assess the effects of its actions on historic resources.

State

California Register of Historical Resources

The importance or significance of a cultural resource depends on whether it qualifies for inclusion on the California Register of Historical Resources (CRHR). Cultural resources determined eligible for the CRHR are called "historical resources" (CEQA Guidelines Section 15064.5). In order to be considered a historical resource, a cultural resource must possess both historical significance and integrity according to the criteria defined in CEQA Guidelines Section 15064.5(a)(3).

The CRHR is an inventory of significant architectural, archaeological, and historical resources in the State of California. Important cultural resources can be listed in the CRHR through a number of methods, and listing requires approval from the State Historical Resources Commission. Properties can be nominated to the CRHR by local governments, private organizations, or citizens. State Historical Landmarks and National Register-listed properties gain automatic listing in the CRHR. The evaluative criteria used by the CRHR for determining eligibility are closely based on those developed by the National Park Service for the NRHP. In order for a cultural resource to be significant, or in other words eligible, for listing in the CRHR, it must reflect one or more criteria seen in PRC Section 5024.1c.

California Environmental Quality Act

CEQA requires that public agencies assess the effects of private and public projects on historical resources prior to approval of or determination to carry out those projects. Historical resources are defined as buildings, sites, structures, objects, areas, places, records, or manuscripts that the lead agency determines to have historical significance, including architectural, archaeological, cultural, or scientific significance. CEQA requires that if a project results in an effect that may cause a substantial adverse change in the significance of a historical resource, alternative plans or mitigation measures must be considered.

However, only significant historical resources need to be addressed. Therefore, before the assessment of effects or development of mitigation measures, the significance of cultural resources must be determined. The steps that are normally taken in a cultural resources investigation for CEQA compliance are as follows:

- Identify potential historical resources;
- Evaluate the eligibility of historical resources;
- Evaluate the effects of the project on all eligible historical resources.

In addition, properties that are listed in or eligible for listing in the NRHP are considered eligible for listing in the CRHR and thus are significant historical resources for the purposes of CEQA (PRC Section 5024.1(d)(1)).

According to CEQA, a project with an effect that may cause a substantial adverse change in the significance of a historical resource may have a significant impact on the environment (CEQA Guidelines Section 15064.5(b)). CEQA also states that a substantial adverse change in the significance of a resource means the physical demolition, destruction, relocation, or alteration of an historical resource or its immediate surroundings such that the significance of the resource would be materially impaired. Actions that would materially impair the significance of a historical resource are any actions that would demolish or materially and adversely alter the physical characteristics of a historical resource that convey its historical significance and qualify or justify its eligibility for inclusion in the CRHR or in a local register or survey that meet the requirements of PRC Sections 5020.1(k) and 5024.1(g).

Significant Historical Resources under CEQA Guidelines

In completing an analysis of a project under CEQA, it must first be determined if the project site possesses a historical resource. A site may qualify as a historical resource if it falls within at least one of four categories listed in CEQA Guidelines Section 15064.5(a):

1. A resource listed in or determined to be eligible by the State Historical Resources Commission for listing in the CRHR (PRC Section 5024.1, Title 14 CCR, Section 4850 et seq.).
2. A resource included in a local register of historical resources, as defined in Section PRC Section 5020.1(k) or identified as significant in an historical resource survey meeting the requirements of PRC Section 5024.1 (g), shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3. Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR (PRC Section 5024.1; Title 14 CCR, Section 4852). These conditions are related to the eligibility criteria for inclusion in the CRHR (PRC Sections 5020.1[k], 5024.1, 5024.1[g]). A cultural resource may be eligible for inclusion in the CRHR if it:
    a. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
    b. Is associated with the lives of persons important in our past;
    c. Embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values; or

d. Has yielded, or may be likely to yield, information important in prehistory or history.

4. The fact that a resource is not listed in or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to PRC Section 5020.1(k)), or identified in an historical resources survey (meeting the criteria in PRC Section 5024.1(g)) does not preclude a lead agency from determining that the resource may be an historical resource as defined in PRC Sections 5020.1(j) or 5024.1.

A lead agency must consider a resource that has been listed in or determined to be eligible for listing in the CRHR (Category 1) as an historical resource for CEQA purposes. In general, a resource that meets any of the other three criteria listed in CEQA Guidelines Section 15064.5(a) is also considered to be a historical resource unless "the preponderance of evidence demonstrates" that the resource is not historically or culturally significant."

Health and Safety Code

The discovery of human remains is regulated according to California Health and Safety Code (HSC) Section 7050.5, which states, "If human remains are encountered, no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The County Coroner must be notified to the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the NAHC, which will determine and notify Most Likely Descendant (MLD). With the permission of the landowner or his or her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 24 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials."

Local

Sutter County General Plan

The Sutter County General Plan contains the following goals and policies related to cultural resources:

Environmental Resources Goals:

- *ER 8: Identify, protect, and enhance Sutter County's important cultural and paleontological resources to increase awareness of the County's heritage.*

Environmental Resources Policies:

- *ER 8.5 - Consultation. Consult with the appropriate organizations and individuals early in the development process (e.g., Information Centers of the California Historical Resources Information System, Native American Heritage Commission, and Native American groups and individuals) to minimize potential impacts to cultural resources.*
- *ER 8.7 - Adaptive Reuse. Encourage the adaptive reuse of historic resources when the original use of the resource is no longer feasible.*

4.5.3 IMPACT ANALYSIS

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to in § 15064.5?

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

a & b) Less than Significant with Mitigation Incorporated. As stated above, five cultural resources recorded within the Project area including the Karnak Drainage Facility (RD1500-JN-03), Reclamation

District 1500 Canal (RD1500-JN-04), East Levee of Reclamation District No. 1500 (RD1500-JN-02), East Canal (RD1500-JN-05), and Reclamation District (RD1500-JN-08).

Of the five cultural resources and historic properties identified, two historic properties would be adversely impacted by the Project: the Karnak Drainage Facility and the Reclamation District 1500 Historic District, of which the Karnak Drainage Facility is a contributing resource. These historic properties are eligible for listing in the NRHP under Criterion A or in the CRHR under Criterion 1 for their association with the development of flood control and agricultural expansion in the State of California. The only impact on the Reclamation District 1500 Historic District is the impact on the Karnak Drainage Facility and the work that will occur within the APE, no other portion of the historic district will be impacted as a result of the Project.

The Project will involve modernization of the facility to upgrade infrastructure at PP1, demolition of PP2 and PP3, and construction of a new pump station utilizing submersible pumps, a new gravity outlet structure, and a new elevated electrical control building that will be designed to coordinate architecturally with the PP1 building. In addition, relocation of a PG&E transformer cluster to a higher elevation within the APE may be required pending final Project design. Renovation of the existing PP1 pump station building and demolition of both the PP2 and PP3 pump station buildings located at the Karnak facility would result in potential impacts to historic properties. These facilities were evaluated as being eligible for listing in the NRHP subject to consultation with the SHPO, and mitigation of adverse effects from the mitigation measures will be required to reduce impacts to a less than significant level. In order to reduce impacts to historic resources and properties a Memorandum of Agreement will be executed between SHPO and NRCS, including mitigation measures CUL-1, CUL-2, CUL-3, and CUL-5, described in detail below, will be implemented. Implementation of these mitigation measures will reduce Project impacts to historic resources and properties to a less than significant level. Therefoe, impacts would be less than significant with mitigation incorporated.

c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Less than Significant with Mitigation Incorporated. While there is no evidence to indicate the Project site has the potential to be an unknown burial site or the site of buried human remains, the Project area is considered to have moderate to high sensitivity for cultural resources. In the event human remains are discovered in the Project area, mitigation shall be implemented. Mitigation measure CUL-4 and CUL-5 outlined below would be implemented and any impacts resulting from the discovery of remains would be reduced to less than significant.

4.5.4 MITIGATION

CUL-1 (Archaeological Remains) Should archeological remains or artifacts be unearthed during any stage of project activities, work in the area of the discovery shall cease until the area is evaluated by a qualified archaeologist. If mitigation is warranted, the Project proponent shall abide by recommendations of the archaeologist.

CUL-2 Proposed modifications to the exterior of PP1 shall conform with the Secretary of the Interior's Standards for Preservation and the Secretary of the Interior's Standards for the Treatment of Historic Properties as economically and technically feasible to realize the objectives of the proposed Project. Additionally, an architectural historian that meets the Secretary of the Interior's Professional Qualifications Standards for architectural history or a historic architect that meets the Secretary of the Interior's Professional Qualifications Standards for historic architecture shall be retained to review project Plans

at concept, preliminary, and final design for compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

CUL-3 New construction of the elevated electrical control building shall conform with the Secretary of the Interior's Standards for the Treatment of Historic Properties as economically and technically feasible to realize the objectives of the proposed Project. The Secretary of the Interior Standards for the Treatment of Historic Properties stipulates that new construction needs to be built in a manner that protects the integrity of the historic building(s) and the property's setting. It further stipulates that the massing, size, scale, and architectural features of new construction on the site of a historic building must be compatible with those of the historic building. When visible and in close proximity to historic buildings, the new construction must be subordinate to these buildings. New construction should also be distinct from the old and must not attempt to replicate historic buildings elsewhere on site to avoid creating a false sense of historic development. Additionally, an architectural historian that meets the Secretary of the Interior's Professional Qualifications Standards for architectural history or a historic architect that meets the Secretary of the Interior's Professional Qualifications Standards for historic architecture shall be retained to review Project plans at concept, preliminary, and final design for compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties. As the design of the new elevated electrical control building progresses, the exterior of the building will be styled to coordinate architecturally with the nearby historic Pumphouse No. 1 building.

CUL-4 (Human Remains) In the event that human remains are discovered on the Project site, the Sutter County Coroner must be notified of that discovery (Health and Safety Code Section 7050.5) and all activities in the immediate area if the find or in any nearby area reasonably suspected of overlie adjacent human remains must cease until appropriate and lawful measures have been implemented. If the Coroner determines that the remains are not recent, but rather of Native American origin, the Coroner shall notify the NAHC in Sacramento within 24 hours to permit the NAHC to determine the most likely descendent of the deceased Native American.

CUL-5 Monitoring of PP2 and PP3 demolition activities by a qualified archaeologist and tribal monitor due to potential for discovery of human remains and/or cultural materials in the levees and any non-disturbed sediments will be coordinated with the potentially affected tribes.

4.6 ENERGY

Table 4-13: Energy Impacts

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

4.6.1 BASELINE CONDITIONS

PG&E provides electricity throughout the District. There are some solar generation facilities within the District, including at the Karnak Drainage Facility site, that feed electricity into the PG&E grid. PG&E reports a United States average of 2.68 pounds of carbon dioxide emitted per megawatt-hour of delivered electricity. In the event of a PG&E power outage, a desirable feature of the Facility would be to incorporate the use of diesel-fueled back-up engine generators for temporary energy to power pump stations used to dewater the Sutter Basin during the power outage. An emergency generator would be required to meet local air management districts rules and regulations for temporary emergency use.

4.6.2 APPLICABLE REGULATIONS

Federal

Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the United States would meet certain fuel economy goals. Through this act, Congress established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to the act, the National Highway Traffic Safety Administration, which is part of the United States Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and for revising existing standards. Since 1990, the fuel economy standard for new passenger cars has been 27.5 mpg. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not currently subject to fuel economy standards. Compliance with federal fuel economy standards is determined based on each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the United States. The corporate average I economy (CAFE) program, administered by USEPA, was created to determine vehicle manufacturers' compliance with fuel economy standards. USEPA calculates a (CAFE) value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the USDOT is authorized to assess penalties for noncompliance.

Energy Policy Act of 1992

The Energy Policy Act of 1992 was passed to reduce the country's dependence on foreign petroleum and improve air quality. The act includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. The act requires certain federal, State, and local government and private fleets to purchase a percentage of light-duty AFVs capable of running on

alternative fuels each year. In addition, financial incentives are included in the act. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005

The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

State

Warren-Alquist Act

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). This act established a State policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The California Public Utilities Commission (CPUC) regulates privately-owned utilities in the energy, rail, telecommunications, and water fields.

Assembly Bill 32: Climate Change Scoping Plan and Update

In October 2008, CARB published its Climate Change Proposed Scoping Plan, which is the State's plan to achieve Greenhouse Gas (GHG) reductions in California required by AB 32. This initial Scoping Plan contained the main strategies to be implemented in order to achieve the target emission levels identified in AB 32. The Scoping Plan included CARB-recommended GHG reductions for each emissions sector of the State's GHG inventory. The largest proposed GHG reduction recommendations were associated with improving emissions standards for light-duty vehicles, implementing the Low Carbon Fuel Standard program, implementation of energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems, and developing a renewable portfolio standard for electricity production.

The Scoping Plan states that land use planning and urban growth decisions will play important roles in the State's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. CARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emissions sectors. With regard to land use planning, the Scoping Plan expects approximately 5.0 MMT CO_2e (million metric tons carbon dioxide equivalent) will be achieved associated with the implementation of Senate Bill (SB) 375, which is discussed further below.

The initial Scoping Plan was first approved by CARB on December 11, 2008, and is updated every five years. The first update of the Scoping Plan was approved by CARB on May 22, 2014, and looked past 2020 to set mid-term goals (2030-2035) on the road to reaching the 2050 goals. The 2017 Climate Change Scoping Plan, which was released in November 2017. The 2017 Climate Change Scoping Plan incorporates strategies for achieving the 2030 GHG-reduction target established in Senate Bill 32 and Executive Order (EO) B-30-15. Most notably, the 2017 Climate Change Scoping Plan encourages zero net increases in GHG emissions. However, the 2017 Climate Change Scoping Plan recognizes that achieving net zero increases in GHG emissions may not be possible or appropriate for all projects and that the inability of a project to mitigate its GHG emissions to zero would not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA.

On November 16, 2022, CARB approved the 2022 Scoping Plan for Achieving Carbon Neutrality. The 2022 Scoping Plan continues the path to achieve the SB 32 2030 target and expands upon earlier plans by targeting an 85 percent reduction in GHG below 1990 levels by 2045.[11]

Assembly Bill 1007: State Alternative Fuels Plan

AB 1007 (Chapter 371, Statues of 2005) required CEC to prepare a state plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels (SAF) Plan in partnership with CARB and in consultation with other State, federal, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes the costs to California and maximizes the economic benefits of in-state production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuel use, reduce GHG emissions, and increase in-state production of biofuels without causing significant degradation of public health and environmental quality.

Assembly Bill 2076: Reducing Dependance on Petroleum

Pursuant to AB 2076 (Chapter 936, Statutes of 2000), CEC and CARB prepared and adopted a joint agency report in 2003, Reducing California's Petroleum Dependence. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita vehicle miles travelled (VMT).[12] Further, in response to the CEC's 2003 and 2005 Integrated Energy Policy Reports, Governor Davis directed CEC to take the lead in developing a long-term plan to increase alternative fuel use. A performance-based goal of AB 2076 was to reduce petroleum demand to 15 percent below 2003 demand by 2020.

Senate Bill 350: Clean Energy and Pollution Prevention Reduction Act of 2015

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources to be increased to 50 percent by December 31, 2030. This act also requires a doubling of the energy efficiency savings in electricity and natural gas for retail customers through energy efficiency and conservation by December 31, 2030.

Senate Bill 375

SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will address land use allocation in that MPOs regional transportation plan (RTP). CARB, in consultation with MPOs, establishes regional reduction targets for GHGs emitted by passenger cars and light trucks for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, funding for transportation projects may be withheld.

Senate Bill 1078

SB 1078 (Public Utilities Code [PUC] Sections 387, 390.1, 399.25 and Article 16) addresses electricity supply and requires that retail sellers of electricity, including investor-owned utilities and community choice aggregators, provide a minimum 20 percent of their supply from renewable sources by 2017. This SB will affect statewide GHG emissions associated with electricity generation. In 2008, Governor Schwarzenegger signed EO S-14-08, which set the Renewables Portfolio Standard target to 33 percent by 2020. It directed State government agencies and retail sellers of electricity to take all appropriate actions to implement this

[11] (California Air Resources Board, 2022)
[12] (California Energy Commission and California Air Resources Board, 2003)

target. EO S-14-08 was later superseded by EO S-21-09 on September 15, 2009. EO directed CARB to adopt regulations requiring 33 percent of electricity sold in the state to come from renewable energy by 2020. Statute SB X1-2 superseded this EO in 2011, which obligated all California electricity providers, including investor-owned utilities and publicly owned utilities, to obtain at least 33 percent of their energy from renewable electrical generation facilities by 2020.

Senate Bill 32 and Assembly Bill 197 of 2016

SB 32 was signed by Governor Brown on September 8, 2016. SB 32 effectively extends California's GHG emission-reduction goals from the year 2020 to year 2030. This new emission-reduction target of 40 percent below 1990 levels by 2030 is intended to promote further GHG reductions in support of the State's ultimate goal of reducing GHG emissions by 80 percent below 1990 levels by 2050. SB 32 also directs CARB to update the Climate Change Scoping Plan to address this interim 2030 emission-reduction target. Achievement of these goals will have the co-benefit of increasing energy efficiency and reducing California's dependency on fossil fuels.

Executive Order S-06-06

EO S-06-06, signed on April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs State agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The EO establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The EO also calls for the State to meet a target for the use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 plan and provides a more detailed action plan to achieve the following goals:

- increase environmentally- and economically-sustainable energy production from organic waste;
- encourage the development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications;
- create jobs and stimulate economic development, especially in rural regions of the state; and
- reduce fire danger, improve air and water quality, and reduce waste.

In 2020, 2.45 percent of the total electrical system power in California was derived from biomass.[13]

Executive Order B-48-18: Zero Emission Vehicles

In January 2018, Governor Brown signed EO B-48-18 which required all State entities to work with the private sector to put at least 5 million zero-emission vehicles on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 zero-emissions chargers by 2025. In addition, State entities are also required to continue to partner with local and regional governments to streamline the installation of zero-emission vehicle infrastructure. State entities are to support and recommend policies and actions to expand infrastructure in homes through the Low-Carbon Fuel Standard.

Energy Action Plan

The first Energy Action Plan (EAP) emerged in 2003 from a crisis atmosphere in California's energy markets. The State's three major energy policy agencies (CEC, CPUC, and the Consumer Power and Conservation Financing Authority [the last established under deregulation and now defunct]) came together to develop one high-level, coherent approach to meeting California's electricity and natural gas needs. It was the first

[13] (California Energy Commission, 2026)

time that energy policy agencies formally collaborated to define a common vision and set of strategies to address California's future energy needs and emphasize the importance of the impacts of energy policy on the California environment.

In October 2005 EAP II, CEC and CPUC updated their energy policy vision by adding some important dimensions to the policy areas included in the original EAP, such as the emerging importance of climate change, transportation-related energy issues, and research and development activities. The CEC adopted an update to the EAP II in February 2008 that supplements the earlier EAPs and examines the State's ongoing actions in the context of global climate change.

California Building Code

The CBC contains standards that regulate the method of use, properties, performance, or types of materials used in the construction, alteration, improvement, repair, or rehabilitation of a building or other improvement to real property. The CBC is adopted every three years by the Building Standards Commission (BSC). In the interim, the BSC also adopts annual updates to make necessary mid-term corrections. The CBC standards apply statewide; however, a local jurisdiction may amend a CBC standard if it makes a finding that the amendment is reasonably necessary due to local climatic, geological, or topographical conditions.

Advanced Clean Cars Program

In January 2012, CARB approved the Advanced Clean Cars program which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of standards for vehicle model years 2017 through 2025. The new rules strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires a battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles planned by vehicle manufacturers by 2015 by requiring increased numbers of hydrogen fueling stations throughout the state. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. By 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 34 percent less global warming gases and 75 percent less smog-forming emissions than the statewide fleet in 2016.

In 2022, the next level of regulations was adopted, Advanced Clean Cars II, for model years 2026-2035. By 2035 all new passenger cars, trucks, and SUVs sold in California will be zero emissions.[14]

Local

Sutter County General Plan

The General Plan contains the following goals and policies related to energy resources:

Infrastructure Goals:

- *I-5: Balance the provision of energy to meet the needs of the County with support for energy conservation, efficiency, and renewable resources.*

Infrastructure Policies:

I-5.1 - Energy Efficient Buildings. Implement, as appropriate, the reduction measures in the Climate Action Plan targeted to create energy efficient buildings. Such measures may include: facilitating energy efficient design and incorporating renewable energy components into new residential, commercial, and industrial developments; incorporating energy reduction measures for residential, commercial, and industrial

[14] (California Air Resources Board, 2022)

buildings undergoing major renovations; initiating an incentive program for retrofit of residential buildings with renewable energy components; identifying and removing regulatory and procedural barriers to implementing energy efficient practices; providing public education and training of staff in energy efficiency; providing energy efficiency and solar energy financing; coordinating with other jurisdictions and groups to maximize energy efficiency and renewable resource development and usage; preparing an alternative energy development plan; and documenting energy compliance.

4.6.3 IMPACT ANALYSIS

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

Less than Significant Impact. Fuel consumed by construction equipment would be the primary energy resource expended over the course of Project construction. For heavy-duty construction equipment, horsepower and load factor were assumed using default data from the CalEEMod model. Fuel use associated with construction vehicle trips generated by the Project was also estimated; trips include construction worker trips, haul trucks trips for material transport, and vendor trips for construction material deliveries. Fuel use from these vehicles traveling to the Project was based on (1) the projected number of trips the Project would generate (CalEEMod default values), (2) default average trip distance by land use in CalEEMod, and (3) fuel efficiencies estimated in the ARB 2017 Emissions Factors model (EMFAC2017) mobile source emission model.

Construction is estimated to consume a total of 36,689.56 gallons of diesel fuel and 1,562.58 gallons of gasoline fuel (See Appendix A). California Code of Regulations Title 13, Motor Vehicles, Section 2449(d)(2), Idling, limits idling times of construction vehicles to no more than 5 minutes, thereby precluding unnecessary and wasteful consumption of fuel because of unproductive idling of construction equipment. In addition, the energy consumption for construction activities would not be ongoing as they would be limited to the duration of Project construction.

The Project would result in the modernization of the Karnak Drainage Facility. The antiquated buildings and pumps would be rehabilitated with new and up to date equipment which would work more efficiently and use less energy doing so. As discussed above, installation of new infrastructure would result in a reduction of energy uses as newer equipment has greater efficiency, reliability, and runs cleaner. Energy consumption reductions can also translate into lowering overall operating costs. The Project would also improve energy efficiency with proposed building upgrades by adhering to current California Building Code requirements which identify sustainable and energy reduction practices.

The modernization of the facility would include the installation of new electrical equipment including a new air-conditioned control room, a SCADA system for automated operation and monitoring of the pumps, installation of a backup generator in the event of PG&E grid failure, installation of new elevated PG&E transformers, installation of new pumps and valves. The installation of new electrical equipment and overall modernization of the facility with more energy efficient equipment would result in the site meeting current energy standards, while providing for easier, automated operation of the facility and providing for back-up systems to prevent failure of the facility during power outages resulting from major storm and flood events. Therefore, impacts would be less than significant.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. The Project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. The Project would modernize and improve the energy efficiency of buildings at the site.

The Project would follow all applicable State and local plans regarding renewable energy and energy efficiency. Therefore, there would be no impact.

4.7 GEOLOGY AND SOILS

Table 4-14: Geology and Soils Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☐	☒
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv. Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994) creating substantial direct or indirect risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	☐	☒	☐	☐

4.7.1 BASELINE CONDITIONS

The Project is located 17.5 miles northwest of downtown Sacramento, in the northern section of California's Great Valley Geomorphic Province, or Central Valley, directly adjacent to the Sacramento Slough. The Sacramento Valley makes up the northern third and the San Joaquin Valley makes up the southern two-thirds of the geomorphic province. Both valleys are watered by large rivers flowing west from the Sierra Nevada Range, with smaller tributaries flowing east from the Coast Ranges. Most of the surface of the Central Valley is covered by Quaternary (present day to 1.6 million years ago) alluvium. The sedimentary formations are steeply upturned along the western margin due to the uplifted Sierra Nevada

Range.[15] From the time the Central Valley first began to form, sediments derived from erosion of igneous and metamorphic rocks and consolidated marine sediments in the surrounding mountains have been transported into the Central Valley by streams.

4.7.1.1 GEOLOGY AND SOILS

According to the NRCS, the APE has one soil type, Capay silty clay. Capay silty clay occurs on zero to two percent slopes and is considered a moderately well drained soil commonly find in valleys. This soil is considered hydric, meaning that it tends to pond water and support the growth of wetland vegetation. The soil in this area has been identified as slightly alkaline, with a pH of 7.5 (see Appendix B).

4.7.1.2 FAULTS AND SEISMICITY

Like most of California, the Project site experiences seismic activity to a varying degree. The Project site is not located on any known fault or fault zone, but it could experience seismic activity as a result of fault activity in other parts of the state. The Willows Fault Zone is located approximately 6 miles to the east of the Project site, the Foothills Fault System is located approximately 35 miles to the east, and the Maacama Fault Zone is located approximately 58 miles southwest of the Project site.[16]

4.7.1.3 LIQUEFACTION

Liquefaction is a seismic phenomenon in which loose, saturated granular and non-plastic, fine-grained soils lose their structure or strength when subjected to high-intensity ground shaking. Soil liquefaction causes ground failure that can damage roads, pipelines, underground cables, and buildings with shallow foundations. Liquefaction more commonly occurs in loose, saturated materials. According to the California Geologic Survey the Project site is not located in or near a zone that has been designated as an area that has experienced soil liquefaction.[17]

4.7.1.4 SOIL SUBSIDENCE

Subsidence occurs below the surface when subsurface pressure is reduced by the withdrawal of fluids (e.g., groundwater, natural gas, oil) resulting in sinking of the ground. According to the United States Geological Survey the Project site is located approximately 5.5 miles northeast of a land that has experienced soil subsidence due to groundwater pumping.[18]

4.7.1.5 DAM AND LEVEE FAILURE

The Project site is an existing water pump facility that includes a levee. The facility protects the surrounding area from flooding and could itself experience failure resulting in the flooding of approximately 65,000 acres, including the Project site. The upgrade of the pump stations on site would allow the facility to maintain an ability to operate to its full potential during a flood event.

4.7.2 APPLICABLE REGULATIONS

Federal

Clean Water Act (Erosion Control)

The CWA (33 USC 1251, et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of

[15] Harden, D.R. 1998, California Geology, Prentice Hall, 479 pages
[16] (California Department of Conservation, 2026)
[17] (California Department of Conservation, 2026)
[18] (United States Geological Survey, 2026)

the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point-source and certain nonpoint-source discharges to jurisdictional waters of the United States. Such discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). The Project site is within the jurisdiction of the Central Valley RWQCB. For purposes of regulating non-point source storm water discharges, projects that disturb one or more acres may be required to obtain NPDES coverage under the Construction General Permit if the project is deemed to discharge to a water of the United States. The Construction General Permit requires the development and implementation of a SWPPP, which includes BMPs to regulate stormwater runoff, including measures to prevent soil erosion. Requirements of the CWA and associated SWPPP are described in further detail in Section 4.10 Hydrology and Water Quality.

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1997 to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the Act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by NEHRP, which refined the description of agency responsibilities, program goals, and objectives. NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results.

The NEHRP designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Programs under NEHRP help inform and guide planning and building code requirements such as emergency evacuation responsibilities and seismic code standards such as those to which the project would be required to adhere.

Paleontological Resources Preservation Act

The Paleontological Resources Preservation Act offers provisions of paleontological resources identified on federal, Native American, or state lands and guidance for their management and protection and promotes public awareness and scientific education regarding vertebrate fossils. The law also requires federal agencies to develop plans for inventory, collection, and monitoring of paleontological resources and establishes stronger criminal and civil penalties for the removal of scientifically significant fossils on federal lands.

State

The Alquist-Priolo Earthquake Zoning Act of 1972

In response to the 1971 San Fernando Earthquake in Southern California, the Alquist-Priolo Special Studies Zones Act of 1972 was enacted. The act was renamed in 1994 to the Alquist-Priolo Earthquake Fault Zoning Act. Under this Act, Earthquake Fault-Rupture Zones have been delineated along the traces of active faults to prevent the construction of structures for human occupancy across these earthquake faults. The boundary of the fault zone is approximately 500 feet from major active faults and 200 to 300 feet from well-defined minor faults. The State Geologist defines an active fault as a fault that has previous surface displacement within the Holocene period (i.e., within the last 11,000 years). A potentially active fault is defined as any fault that has surface displacement during Quaternary time (i.e., within the last 1,600,000 years), but not within the Holocene period.

Seismic Hazards Mapping Act

In accordance with PRC Division 2, Chapter 7.8, the California Geologic Survey (CGS) is directed to delineate seismic hazard zones. The purpose of the act is to reduce the threat to public health and safety and

minimize the loss of life and property by identifying and mitigating seismic hazards, such as those associated with strong ground shaking, liquefaction, landslides, other ground failures, or other hazards caused by earthquakes. Cities, counties, and State agencies are directed to use seismic hazard zone maps developed by the CGS in their land use planning and permitting processes. In accordance with the Seismic Hazards Mapping Act, site-specific geotechnical investigations must be performed prior to permitting most urban development projects within seismic hazard zones.

California Building Code

The CBC, which is codified in Title 24 of the California Code of Regulations, Part 2, was created to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, means of egress facilities, and general stability of buildings. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24, or they are not enforceable. The provisions of the CBC apply to the construction, alteration, movement, replacement, location, and demolition of every building or structure, or any appurtenances connected or attached to such buildings or structures throughout California. The 2025 edition of the CBC is based on the 2024 International Building Code (IBC) published by the International Code Council. The code is updated triennially, and the 2025 edition of the CBC was published by the California Building Standards Commission in July of 2025 and took effect on January 1, 2026. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake. However, it is reasonable to expect that a structure designed in accordance with the seismic requirements of the CBC should not collapse in a major earthquake.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a seismic design category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site; SDC ranges from A (very small seismic vulnerability) to E/F (very high seismic vulnerability and near a major fault). Seismic design specifications are determined according to the SDC in accordance with Chapter 16 of the CBC. Chapter 18 of the CBC covers the requirements of geotechnical investigations (Section 1803), excavation, grading, and fills (Section 1804), load-bearing of soils (1806), as well as foundations (Section 1808), shallow foundations (Section 1809), and deep foundations (Section 1810). For Seismic Design Categories D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses measures to be considered in structural design, which may include ground stabilization, selecting appropriate foundation type and depths, selecting appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions.

Chapter 18 also describes analysis of expansive soils and the determination of the depth to groundwater table. Expansive soils are defined in the CBC as follows:

1803.5.3 Expansive Soil. In areas likely to have expansive soil, the building official shall require soil tests to determine where such soils do exist. Soils meeting all four of the following provisions shall be considered expansive, except that tests to show compliance with Items 1, 2, and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. *Plasticity index of 15 or greater, determined in accordance with ASTM D 4318.*
2. *More than 10 percent of the soil particles pass a No. 200 sieve (75 micrometers), determined in accordance with ASTM D 422.*
3. *More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D 422.*
4. *Expansion index greater than 20, determined in accordance with ASTM D 4829.*

Public Resources Code Section 5097.5

PRC Section 5097.5 prohibits the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, defines the removal of paleontological sites or features as a misdemeanor, and requires reasonable mitigation of adverse impacts to archaeological or paleontological resources.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, waters of the State fall under the jurisdiction of the appropriate RWQCB. Under the act, the RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet waste discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under CWA Section 401.

State Water Resources Control Board, Stormwater Construction General Permit

The five-member State Water Resources Control Board (SWRCB) allocates water rights, adjudicates water right disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine RWQCBs in the major watersheds of the state. The joint authority of water allocation and water quality protection enables the SWRCB to provide comprehensive protection for California's waters.
In 1999, the state adopted the NPDES General Permit for Stormwater Discharges Associated with Construction Activities (Construction General Permit) (SWRCB Order No. 2012-0006-DWQ, NPDES No. CAS000002). The Construction General Permit generally requires that construction sites with 1 acre or greater of soil disturbance, or less than 1 acre but part of a greater common plan of development, apply for coverage for discharges under the Construction General Permit by submitting a Notice of Intent for coverage, developing a SWPPP, and implementing BMPs to address construction site pollutants if the project is deemed to discharge into a water of the United States.

The SWPPP should contain a site map(s) showing the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the project. The SWPPP must list the BMPs the discharger will use to protect stormwater runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program, a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Section A of the Construction General Permit describes the elements that must be contained in a SWPPP. Enrollment under the Construction General Permit is through the Stormwater Multiple Application and Report Tracking System. Additionally, the SWRCB is responsible for implementing the CWA and issuing NPDES permits to cities and counties through the individual regional boards.

Local

Sutter County General Plan

The Sutter General Plan contains the following policies related to geology, soil, and seismic resources:

Public Health and Safety Policies:

- *PHS 2.1 – Review Standards. Review and enforce seismic and geologic safety standards and require the use of best management practices in site design and building construction methods.*
- *PHS 2.4 – Essential Facilities. Promote the upgrade, retrofitting, and/or relocation of existing essential facilities (e.g., hospitals, schools, law enforcement and fire stations, etc.) that do not meet current building code standards and are within areas susceptible to seismic or geologic hazards.*

4.7.3 IMPACT ANALYSIS

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

ii. Strong seismic ground shaking?

Less than Significant Impact. Ground Shaking intensity is a function of distance from an earthquake's epicenter and underlying geology. The most common impact associated with ground shaking is damage to structures. The Project would result in the construction of an upgraded water pumping facility that would meet California Building Code requirements governing potential structural damage due to earthquakes. The Project would not cause potential substantial adverse effects, including the risk of loss, injury, or death as a result in a rupture of a known earthquake fault, nor would it result strong seismic activity from Project inundations. Therefore, impacts would be less than significant.

iii. Seismic-related ground failure, including liquefaction?

No Impact. The Project site would not be located in an area that is known to experience liquefaction. The Project would result in the construction of an upgraded and modernized water pump facility. Project construction would not result in the increased likelihood for liquefaction to occur at the Project site. Therefore, there would be no impact.

iv. Landslides?

No Impact. The Project is located along a levee between the RD 1500 Canal and the Sacramento Slough. While construction would occur along the bank of the RD 1500 Canal and Sacramento Slough, the use of a cofferdam during construction activities near the banks of the levee would ensure that Project activities will not destabilize the bank of the levee in such a way that would contribute to a landslide. Therefore, there would be no impact.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less than Significant with Mitigation Incorporated. The Project would result in the upgrade and modernization of an existing water pumping facility. Developers whose projects disturb one (1) or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the Statewide General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ). Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation, and

construction of linear underground or overhead facilities associated with trail construction, but does not include regular maintenance activities performed to restore the original lines, grade, or capacity of the overhead or underground facilities. The Construction General Permit requires the development of a SWPPP by a certified Qualified SWPPP Developer. Project construction activities may result in soil erosion and the loss of topsoil, including the buildup of soil within the canals and natural waterways that the Project would construct adjacent to and within. Implementation of mitigation measure BIO-10(a), requiring preparation of a SWPPP will ensure that any impacts related to soil degradation and the loss of topsoil remain less than significant. Therefore, impacts would be less than significant with mitigation incorporated.

c) Would the project 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?

No Impact. Due to the relatively flat topography of the Project site of greater surrounding area and distance from active faults, landslides, lateral spreading, subsidence, liquefaction or collapse are not considered a potentially significant geologic hazard. In addition, the construction activities of the Project would not result in the likelihood for soil to become unstable through landslide, lateral spreading, subsidence, liquefaction, or collapse. Therefore, there would be no impact.

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

No Impact. The Project would not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property. There are no habitable structures proposed as part of the Project and all updates to the existing facilities would be done in compliance with the CBC. Therefore, there would be no impact.

e) Would the project 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?

No Impact. All unincorporated areas in Sutter County rely on on-site wastewater systems, however the Project does not propose any habitable structures, nor does the Project propose the introduction of a new septic tank system or alternative wastewater system. Therefore, there would be no impact.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

Less than Significant with Mitigation Incorporated. There are no known unique paleontological resources or geological features on the Project site; however, during construction unique paleontological or geological resources could be unearthed. In this event all construction would stop and mitigation measure GEO-1 would be implemented, described in detail below. GEO-1 would reduce any potential impacts to a less than significant level. Therefore, impacts would be less than significant with mitigation incorporated.

4.7.4 MITIGATION

See BIO-10 outlined above in Section 4.4.

GEO-1 Should a unique paleontological resource, site, or unique geological feature be unearthed during any stage of Project activities, work in the area of discovery will cease until the area is evaluated by a qualified geologist and/or paleontologist. If discoveries

are uncovered, the Project proponent will abide by recommendations of the geologist or paleontologist.

4.8 GREENHOUSE GAS EMISSIONS

Table 4-15: Greenhouse Gas Emissions Impacts

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

4.8.1 BASELINE CONDITIONS

Commonly identified GHG emissions and sources include the following:

Carbon dioxide (CO_2) is an odorless, colorless natural greenhouse gas. CO_2 is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic out gassing. Anthropogenic sources include the burning of coal, oil, natural gas, and wood.

Methane (CH_4) is a flammable greenhouse gas. A natural source of CH_4 is the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and ruminants such as cattle.

Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas. N_2O is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load.

Water vapor is the most abundant, and variable greenhouse gas. It is not considered a pollutant; in the atmosphere, it maintains a climate necessary for life.

Ozone (O_3) is known as a photochemical pollutant and is a greenhouse gas; however, unlike other greenhouse gases, ozone in the troposphere is relatively short-lived and, therefore, is not global in nature. Ozone is not emitted directly into the atmosphere but is formed by a complex series of chemical reactions between volatile organic compounds, nitrogen oxides, and sunlight.

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

Chlorofluorocarbons (CFCs) are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. CFCs destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol in 1987.

Hydrofluorocarbons (HFCs) are synthetic chemicals that are used as a substitute for CFCs. Of all the greenhouse gases, HFCs are one of three groups (the other two are perfluorocarbons and sulfur

hexafluoride) with the highest global warming potential. HFCs are human-made for applications such as air conditioners and refrigerants.

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere; therefore, PFCs have long atmospheric lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest global warming potential of any gas evaluated. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

There are uncertainties as to exactly what the climate changes will be in various local areas of the earth, and what the effects of clouds will be in determining the rate at which the mean temperature will increase. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, air pollution episodes, and the consequence of these effects on the economy.

Emissions of GHGs contributing to global climate change are largely attributable to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. About three-quarters of human emissions of CO_2 to the global atmosphere during the past 20 years are due to fossil fuel burning. Atmospheric concentrations of CO_2, CH_4, and N_2O have increased 31 percent, 151 percent, and 17 percent respectively since the year 1750. GHG emissions are typically expressed in carbon dioxide-equivalents (CO_2e), based on the GHG's Global Warming Potential (GWP). The GWP is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. The FRAQMD has not set a threshold for determining the significance of GHGs, however the Bay Area Air Quality Management District has set an annual threshold of 1,100 Metric Tons of Carbon Dioxide Equivalent (MT CO2e) per year based on AB 32. This threshold will be considered the applicable threshold for the Project to be analyzed against.

4.8.2 APPLICABLE REGULATIONS

Federal

Executive Order 13514

EO 13514 is focused on reducing GHGs internally in federal agency missions, programs, and operations. In addition, the executive order directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

On April 2, 2007, in *Massachusetts v. USEPA*, 549 United States 497 (2007), the Supreme Court found that GHGs are air pollutants covered by the CAA and that the USEPA has the authority to regulate GHG. The Court held that the USEPA Administrator must determine whether or not emissions of GHGs from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA:

- Endangerment Finding: The Administrator found that the current and projected concentrations of the six key well-mixed GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) in the atmosphere threaten the public health and welfare of current and future generations.

- Cause or Contribute Finding: The Administrator found that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industry or other entities, this action was a prerequisite to finalizing the USEPA's Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles, which was published on September 15, 2009. On May 7, 2010, the final Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards was published in the Federal Register.

The USEPA and the NHTSA are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations. These steps were outlined by President Obama in a Presidential Memorandum on May 21, 2010.

The final combined USEPA and NHTSA standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile (the equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements). Together, these standards will cut GHG emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016). On August 28, 2012, USEPA and NHTSA issued their joint rule to extend this national program of coordinated GHG and fuel economy standards to model years 2017 through 2025 passenger vehicles.

State

Executive Order S-3-05

EO S-3-05 proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada mountain's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the EO established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, to the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The EO directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The secretary will also submit biannual reports to the governor and State legislature describing (1) progress made toward reaching the emission targets, (2) impacts of global warming on California's resources, and (3) mitigation and adaptation plans to combat these impacts. To comply with the EO, the secretary of CalEPA created a Climate Action Team made up of members from various State agencies and commissions. The Climate Action Team released its first report in March 2006 and continues to release periodic reports on progress. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government, and community actions, as well as through State incentive and regulatory programs.

Executive Order B-30-15

EO B-30-15 is an interim statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 is established in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050. The EO directed State agencies to implement measures to achieve a reduction in GHG emissions.

Assembly Bill 32: Climate Change Scoping Plan and Update

See Section 4.6.2.

Senate Bill 1078 and Governor's Order S-14-08

See Section 4.6.2.

Mandatory Reporting of GHG Emissions

AB 32 requires the reporting of GHGs by major sources to CARB. Major sources required to report GHG emissions include industrial facilities, suppliers of transportation fuels, natural gas, natural gas liquids, liquefied petroleum gas, and carbon dioxide, operators of petroleum and natural gas systems, and electricity retail providers and marketers.

Cap-and-Trade Regulation

The cap-and-trade regulation is a key element in California's climate plan. It sets a statewide limit on sources responsible for 85 percent of California's GHG emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The cap-and-trade rules came into effect on January 1, 2013, and apply to large electric power plants and large industrial plants. In 2015, fuel distributors, including distributors of heating and transportation fuels, also became subject to the cap-and-trade rules. At that stage, the program will encompass around 360 businesses throughout California and nearly 85 percent of the state's total GHG emissions.

Under the cap-and-trade regulation, companies must hold enough emission allowances to cover their emissions and are free to buy and sell allowances on the open market. California held its first auction of GHG allowances on November 14, 2012. California's GHG cap-and-trade system is projected to reduce GHG emissions to 1990 levels by the year 2020 and would achieve an approximate 80 percent reduction from 1990 levels by 2050.

Senate Bill 32

See Section 4.6.2.

Senate Bill 97

SB 97 was enacted in 2007. SB 97 required the Governor's Office of Planning and Research to develop, and the Natural Resources Agency to adopt, amendments to the CEQA Guidelines addressing the analysis and mitigation of GHG emissions. Those CEQA Guidelines amendments clarified several points, including the following:

- Lead agencies must analyze the GHG emissions of proposed projects and must reach a conclusion regarding the significance of those emissions.
- When a project's GHG emissions may be significant, lead agencies must consider a range of potential mitigation measures to reduce those emissions.
- Lead agencies must analyze potentially significant impacts associated with placing projects in hazardous locations, including locations potentially affected by climate change.

- Lead agencies may significantly streamline the analysis of GHGs on a project level by using a programmatic GHG emissions reduction plan meeting certain criteria.

- CEQA mandates analysis of a proposed project's potential energy use (including transportation-related energy), sources of energy supply and ways to reduce energy demand, including through the use of efficient transportation alternatives.

As part of the administrative rulemaking process, the California Natural Resources Agency developed a Final Statement of Reasons explaining the legal and factual bases, intent, and purpose of the CEQA Guidelines amendments. The amendments to the CEQA Guidelines implementing SB 97 became effective on March 18, 2010.

Senate Bill 100

SB 100 was signed by Governor Jerry Brown on September 10, 2018. SB 100 sets a goal of phasing out all fossil fuels from the State's electricity sector by 2045. SB 100 increases to 60 percent, from 50 percent, how much of California's electricity portfolio must come from renewables by 2030. It establishes a further goal to have an electric grid that is entirely powered by clean energy by 2045, which could include other carbon-free sources, like nuclear power, that are not renewable.

Senate Bill 375

SB 375 requires MPOs to adopt a SCS or APS that will address land-use allocation in that MPOs regional transportation plan. CARB, in consultation with MPOs, establishes regional reduction targets for GHGs emitted by passenger cars and light trucks for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, funding for transportation projects may be withheld. In 2018, CARB adopted updated SB 375 targets.

California Building Code

See Section 4.6.2.

Green Building Standards

See Section 4.6.2.

Short-Lived Climate Pollutant Reduction Strategy

In March 2017, CARB adopted the *Short-Lived Climate Pollutant Reduction Strategy* (*SLCP Strategy*) establishing a path to decrease GHG emissions and displace fossil-based natural gas use. Strategies include avoiding landfill methane emissions by reducing the disposal of organics through edible food recovery, composting, in-vessel digestion, and other processes; and recovering methane from wastewater treatment facilities, and manure methane at dairies, and using the methane as a renewable source of natural gas to fuel vehicles or generate electricity. The *SLCP Strategy* also identifies steps to reduce natural gas leaks from oil and gas wells, pipelines, valves, and pumps to improve safety, avoid energy losses, and reduce methane emissions associated with natural gas use. Lastly, the *SLCP Strategy* also identifies measures that can reduce hydrofluorocarbon emissions at national and international levels, in addition to State-level action that includes an incentive program to encourage the use of low-GWP refrigerants, and limitations on the use of high-GWP refrigerants in new refrigeration and air-conditioning equipment.[19]

[19] (California Air Resources Board, 2017)

Local

Sutter County General Plan

The Sutter County General Plan establishes the following policies aimed at guiding development in a manner that limits the impact of air quality emissions within the County:

Environmental Resources Policies:

- *ER 9.1 - Ambient Air Quality Standards. Work with the California Air Resources Board and the Feather River Air Quality Management District (FRAQMD) to meet state and federal ambient air quality standards.*
- *ER 9.3 - Ambient Air Quality Standards. Implement, as appropriate, the reduction measures in the Climate Action Plan targeted to reduce air quality emissions. Such measures may include: adopting a trip reduction ordinance; adopting a comprehensive parking program that facilitates the use of alternative modes and carpooling; providing incentives for carpooling at the workplace; providing a comprehensive system of facilities for non-motorized transportation; developing transit infrastructure; and expanding the use of renewable fuels and low emission vehicles.*

4.8.3 IMPACT ANALYSIS

Project Related Emissions

Construction of the Project is assumed to be completed over approximately 14 months, split over two years. Within the first year it is anticipated that construction would occur between May and October, with construction occurring between April and November in year 2. For the purposes of calculating anticipated emissions of the Project, emissions were assumed to occur over a 14-month consecutive basis, between May of 2030 and June of 2031. Emissions associated with the Project were calculated using the CalEEMod Air Quality Model, Version 2022.1.1.41 (California Emissions Estimator Modeling). The emissions modeling includes emissions generated by offroad equipment, haul trucks, and worker commute trips. Emissions were quantified based on anticipated construction schedules and the default parameters contained in the model. Localized air quality impacts associated with the Project would be minor and were qualitatively assessed. Modeling assumptions and output files are included in Appendix A. Estimated construction-generated and operational related emissions are summarized in Table 4-16 and Table 4-17. GHGs impact the environment over time as they increase and contribute to climate change.

Table 4-16: Short Term Construction Related GHG Emissions

	Emissions (MT CO2e) in Tons per Year
Maximum Annual Construction CO2e Emissions	225.258
AB 32 Consistency Threshold for Land-Use Development Projects*	1,100
AB 32 Consistency Threshold for Stationary Source Projects*	10,000
Threshold Exceeded?	No

* As published in the Bay Area Air Quality Management District's CEQA Air Quality Guidelines. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en Accessed 4/13/2026.

Table 4-17: Long Term Operational Related GHG Emissions

	Emissions (MT CO2e) in Tons per Year
Annual Operational CO2e Emissions	241.434
AB 32 Consistency Threshold for Land-Use Development Projects*	1,100
AB 32 Consistency Threshold for Stationary Source Projects*	10,000
Threshold Exceeded?	No

* As published in the Bay Area Air Quality Management District's CEQA Air Quality Guidelines. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en Accessed 4/13/2026.

Construction related generation of GHGs would be a maximum of 225.258 MT CO2e per year, while operational emissions are expected to be 241.434 MT CO2e per year. The Project would not exceed the AB 32 consistency threshold for land use projects for both short term construction emissions and long-term operational emissions as a result.

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

Less than Significant Impact. The Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. As shown in Table 4-16 and Table 4-17, the Project is not expected to result in the generation of GHG emissions that would exceed the AB 32 consistency threshold of 1,100 MT CO2e annually during both construction and operational activities. Therefore, impacts would be less than significant.

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

No Impact. The Project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. The Project would be in compliance with all FRAQMD policies and regulations and would not exceed an applicable threshold for GHG emissions. Therefore, there would be no impact.

4.9 HAZARDS AND HAZARDOUS MATERIALS

Table 4-18: Hazards and Hazardous Materials Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	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 or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

4.9.1 BASELINE CONDITIONS

4.9.1.1 HAZARDOUS MATERIALS

The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. Government Code (GC) Section 65962.5 requires the California Environmental Protection Agency (CalEPA) to develop at least annually an updated Cortese List. The Department of Toxic Substances Control (DTSC) is responsible for a portion of the information contained in the Cortese List. Other State and local government agencies are required to provide additional hazardous material release information for the Cortese List. DTSC's EnviroStor database provides DTSC's component of Cortese List data. In addition to the EnviroStor database, the SWRCB's Geotracker database provides

information on regulated hazardous waste facilities in California, including underground storage tank (UST) cases and non-UST cleanup programs, including Spills-Leaks-Investigations-Cleanups (SLIC) sites, Department of Defense sites, and Land Disposal program. A search of the DTSC EnviroStor database and the SWRCB Geotracker performed on January 26, 2026, determined that there are no known active hazardous waste generator or hazardous material spill site within the APE or its vicinity.

4.9.1.2 AIRPORTS

The Project site is located approximately six and a half miles from the Sacramento International Airport and is included within the airport's Airport Land Use Compatibility Plan (ALUCP).[20] The ALUCP splits the surrounding land into 2 buffer zones called Referral Area 1 and Referral Area 2. "Referral Area 1" encompasses locations where noise and/or safety represent compatibility concerns. Areas within the FAA-defined 10,000-foot separation distance for wildlife attractants are also encompassed within Referral Area 1. The Project site can be found in "Referral Area 2". Referral Area 2 includes locations where airspace protection and/or overflight are compatibility concerns, but not noise or safety. New projects inside the ALUCP would need to consult with the airport to confirm that the Project would not interfere with airport operations, however the Project proposes to upgrade and modernize an existing facility.

4.9.1.3 EMERGENCY RESPONSE PLAN

Sutter County has adopted an Emergency Operations Plan (EOP) that was last updated in September of 2022.[21] The plan provides two major evacuation routes near the Project area are SR's 99 and 113.

4.9.1.4 SENSITIVE RECEPTORS

Sensitive Receptors are groups that would be more affected by air, noise, and light pollution, pesticides, and other toxic chemicals than others. This includes infants, children under 16, elderly over 65, athletes, and people with cardiovascular and respiratory diseases. High concentrations of these groups would include, daycares, residential areas, hospitals, elder care facilities, schools and parks. The Project would not be located near sensitive receptors, as the existing area surrounding the Project site is rural comprised of agricultural lands and open space. The employee home next to the Project site is the only residence within a one mile radius of the facility and serves the facility's operators.

4.9.2 APPLICABLE REGULATIONS

Federal

Resource Conservation and Recovery Act

The 1976 Federal Resource Conservation and Recovery Act (RCRA) and the 1984 RCRA Amendments regulate the treatment, storage, and disposal of hazardous and non-hazardous wastes. The legislation mandated that hazardous wastes be tracked from the point of generation to their fate in the environment. This includes detailed tracking of hazardous materials during transport and permitting of hazardous material handling facilities.

The 1984 RCRA amendments provided the framework for a regulatory program designed to prevent releases from USTs. The program establishes tank and leak detection standards, including spill and overflow protection devices for new tanks. Tanks must also meet performance standards to ensure that stored material will not corrode their tanks.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) introduced active federal involvement in emergency response, site remediation, and spill prevention, most notably the

[20] (Sacramento Area Council of Governments, 2013)
[21] (Sutter County, 2022)

Superfund program. The act was intended to be comprehensive in encompassing both the prevention of, and response to, uncontrolled hazardous substances releases. CERCLA deals with environmental response, providing mechanisms for reacting to emergencies and to chronic hazardous material releases. In addition to establishing procedures to prevent and remedy problems, it establishes a system for compensating appropriate individuals and assigning appropriate liability.

Occupational Safety and Health Act

The Occupational Safety and Health Act is intended to ensure worker and workplace safety by requiring that employers provide their workers a place of employment free from recognized health hazards, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, heat or cold stress, and unsanitary conditions. The Occupational Safety and Health Administration (OSHA) is a division of the United States Department of Labor that oversees the administration of the act and enforces standards in all 50 states.

Toxic Substances Control Act

The TSCA provides the USEPA with authority to require reporting, record-keeping, testing requirements, and restrictions relating to chemical substances and mixtures. The TSCA addresses the production, importation, use, and disposal of specific chemicals, including PCBs, asbestos, radon, and lead-based paint.

Emergency Planning Community Right-to-Know Act

The Emergency Planning Community Right-to-Know Act (EPCRA), also known as Superfund Amendments and Reauthorization Act (SARA) Title III, was enacted in October 1986. This law requires any infrastructure at the State and local levels to plan for chemical emergencies.

Reported information is then made publicly available so that interested parties may become informed about potentially dangerous chemicals in their community. EPCRA Sections 301 through 312 are administered by the USEPA Office of Emergency Management. The USEPA Office of Information Analysis and Access implements the EPCRA Section 313 program. In California, SARA Title III is implemented through the California Accidental Release Program.

Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act, as amended, is the basic statute regulating hazardous materials transportation in the United States. The purpose of the law is to provide adequate protection against the risks to life and property inherent in transporting hazardous materials in interstate commerce. This law gives the USDOT and other agencies, such as the CPUC and the California Highway Patrol, the authority to issue and enforce rules and regulations governing the safe transportation of hazardous materials.

United States Environmental Protection Agency

The USEPA implements laws and regulations to ensure the safe production, handling, disposal, and transportation of hazardous materials. Many of these regulations are enforced by CalEPA.

Occupational Safety and Health Administration

OSHA oversees the administration of the Occupational Safety and Health Act, which requires specific training for hazardous materials handlers, provision of information to employees who may be exposed to hazardous materials, and acquisition of Safety Data Sheets (SDS) (formerly Material Safety Data Sheets) from materials manufacturers. The SDSs describe risks, as well as proper handling and procedures, related to particular hazardous materials. Employee training must include response and remediation procedures for hazardous materials releases and exposures.

United States Department of Transportation

The USDOT has the regulatory responsibility for the safe transportation of hazardous materials between states and foreign countries. The USDOT regulations govern all means of transportation, except for those

packages shipped by mail, which are covered by United States Postal Service regulations. The federal RCRA of 1976 imposes additional standards for the transport of hazardous wastes.

State

California Code of Regulations

Title 3 of the CCR pertains to the application of pesticides and related chemicals. Parties applying regulated substances must continuously evaluate application equipment, weather, the treated lands, and all surrounding properties. Title 3 prohibits any application that would:

- Contaminate persons not involved in the application
- Damage non-target crops or animals or any other public or private property
- Contaminate public or private property or create health hazards on said property

Title 8 of the CCR establishes Cal/OSHA requirements related to public and worker protection. Topics addressed in Title 8 include materials exposure limits, equipment requirements, protective clothing, hazardous materials, and accident prevention.

Construction safety and exposure standards for lead and asbestos are set forth in Title 8.

Title 14 of the CCR establishes minimum standards for solid waste handling and disposal.

Title 17 of the CCR establishes regulations relating to the use and disturbance of materials containing naturally occurring asbestos.

Title 22 of the CCR sets forth definitions of hazardous waste and special waste. The section also identifies hazardous waste criteria and establishes regulations pertaining to the storage, transport, and disposal of hazardous waste. Title 22 was created to regulate the hazardous wastes generated by factories or similar sources, but soil excavated during construction may also be regulated.

Title 26 of the CCR pertains to hazardous materials and waste that are presented in other regulatory sections. Title 26 mandates specific management criteria related to hazardous materials identification, packaging, and disposal. In addition, Title 26 establishes requirements for hazardous materials transport, containment, treatment, and disposal. Staff training standards are also set forth in Title 26.

Title 27 of the CCR sets forth a variety of regulations relating to the construction, operation, and maintenance of the State's landfills. The title establishes a landfill classification system and categories of waste. Each class of landfill is constructed to contain specific types of waste (household, inert, special, and hazardous).

California Health and Safety Code and Code of Regulations

HSC Chapter 6.95 and CCR, Title 19, Section 2729 set out the minimum requirements for business emergency plans and chemical inventory reporting. These regulations require businesses to provide emergency response plans and procedures, training program information, and a hazardous material chemical inventory disclosing hazardous materials stored, used, or handled on-site. A business that uses hazardous materials or a mixture containing hazardous materials must establish and implement a business plan if the hazardous material is handled in certain quantities.

California Environmental Protection Agency

One of the primary agencies that regulate hazardous materials is the CalEPA. The State, through CalEPA, is authorized by the USEPA to enforce and implement certain federal hazardous materials laws and regulations. The DTSC, a department of CalEPA, protects California and Californians from exposure to

hazardous waste, primarily under the authority of the RCRA and the California Health and Safety Code. The DTSC requirements include the need for written programs and response plans, such as Hazardous Materials Business Plans. The DTSC programs include dealing with aftermath clean-ups of improper hazardous waste management, evaluation of samples taken from sites, enforcement of regulations regarding use, storage, and disposal of hazardous materials, and encouragement of pollution prevention.

California Division of Occupational Safety and Health

Like OSHA at the federal level, Cal/OSHA is the responsible State-level agency for ensuring workplace safety. Cal/OSHA assumes primary responsibility for the adoption and enforcement of standards regarding workplace safety and safety practices. If a site is contaminated, a Site Safety Plan is prepared and implemented to protect the safety of workers. Site Safety Plans establish policies, practices, and procedures to prevent the exposure of workers and members of the public to hazardous materials originating from the contaminated site or building.

California Department of Transportation

Caltrans has primary responsibility for enforcing federal and State regulations and responding to hazardous materials transportation emergencies. Caltrans manages more than 50,000 miles of California's highway and freeway lanes, provides intercity rail services, permits more than 400 public-use airports and special-use hospital heliports, and works with local agencies. Caltrans is also the first responder for hazardous material spills and releases that occur on those highway and freeway lanes and intercity rail services.

California Highway Patrol (CHP)

The CHP is responsible for assuring the safe, convenient, and efficient transportation of people and goods on the State highway system. The CHP implements the Commercial Vehicle Safety Program, which includes enforcement, education, and partnerships to minimize the disastrous results from collisions involving commercial vehicles. CHP's Commercial Vehicle Section aids in safe operation and enforcement of commercial vehicles. Common carriers are licensed by the CHP, pursuant to the California Vehicle Code, Section 32000. This section requires licensing every motor (common) carrier who transports, for a fee, more than 500 pounds of hazardous materials at one time and every carrier who carries more than 1,000 pounds of hazardous material of the type requiring placards. Common carriers conduct a large portion of the business in the delivery of hazardous materials.

Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP. The CHP conducts regular inspections of licensed transporters to assure regulatory compliance and responds to hazardous materials emergencies on roadways.

Central Valley Regional Water Quality Control Board

The Porter-Cologne Water Quality Act established the SWRCB and divided the State into nine regional basins, each under the jurisdiction of a RWQCB. The Central Valley RWQCB regulates water quality in the Project area. The RWQCB has the authority to require groundwater investigations when the quality of groundwater or surface waters of the State is threatened, and to require remediation actions, if necessary.

Local

Sutter County Hazardous Materials Area Plan

The Sutter County Hazardous Materials Area Plan describes the County's planning and preparedness for hazardous materials releases. The plan includes emergency management related to preparedness, response, mitigation, and recovery of hazardous materials during an emergency.

Sutter County General Plan

The General Plan contains the following goals and policies related to hazardous waste and materials:

Public Health and Safety Goals:

- PHS 3 - Protect health, safety, property, and the environment from the use, transport, disposal, and release/discharge of hazardous materials and waste.

Public Health and Safety Policies:

- PHS 3.1 - Use and Disposal. Ensure that the use and disposal of hazardous materials and waste complies with appropriate federal, state, and local requirements.
- PHS 3.3 - Project Review. Coordinate with appropriate state and federal agencies to review all proposed development projects that manufacture, use, or transport hazardous materials and waste.

4.9.3 IMPACT ANALYSIS

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

Less than Significant with Mitigation Incorporated. The Project involves the modernization of an existing drainage water pump facility and would not involve the routine transport of hazardous waste during operations. During construction, the Project does have the potential to spill fuels and lubricants associated with construction equipment. These potential impacts would be short-term in nature and would be reduced to less than significant levels through compliance with applicable local, State, and federal regulations, as well as the use for standard equipment operating practices. Out of an abundance of caution, mitigation measure BIO-10(b) will be implemented to ensure that hazardous materials are not stored in a manner that could result in an accidental spill into one of the waterways adjacent to the areas that would undergo construction. Therefore, impacts would be less than significant with mitigation incorporated.

b) Would the project 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?

Less than Significant with Mitigation Incorporated. As stated above, there are no active hazardous waste sites located in the Project area. During construction, hazardous materials such as diesel fuel, propane, oil, and other lubricants could be spilled; however, implementation of mitigation measure BIO-10 will ensure that hazardous materials are stored in a manner that ensure hazardous materials are not spilled into adjacent waterways. In addition, construction-related BMPs would be implemented to minimize impacts in the event of an accidental spill or release of hazardous materials. Construction related hazards will be addressed through the NPDES program under the 2009-0009-DWQ Construction general permit and executed through a SWPPP, as required by BIO-10. Therefore, impacts would be less than significant with mitigation incorporated.

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

No Impact. The Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing school. The nearest school, Grafton School, is located approximately three and a half miles northwest of the Project site in Knight's Landing, California. Therefore, there would be no impact.

d) Would the project 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?

No Impact. There are no active hazardous waste sites located in the Project area. In addition, the purpose of the Project is to provide reliable and long-term flood control and damage reduction for the Sutter Basin and to protect public safety and emergency access. Implementation of the Project would reduce the risk of catastrophic flooding and in turn reduce the risk of potential release of hazardous materials associated with flooding. Therefore, there would be no impact.

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

No Impact. The Project site is located approximately six and a half miles from Sacramento International Airport and is included within the airport's ALUCP. The Project site can be found in "Referral Area 2". This designated area includes locations where airspace protection and/or overflight are compatibility concerns, but not noise or safety. The Project site is located far enough away from the airport to not be impacted by noise or safety concerns from air traffic. In addition, construction activities would not exceed height levels that would impact air traffic. Therefore, there would be no impact.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact. The Project would not involve any permanent changes to public streets, or roads, and it would not include the construction of any feature that might impair the implementation of any relevant emergency operations plan. Without the Project, flooding in the event of facility failure would interfere with the evacuation routes in the area that are a part of the County's evacuation plan. The Project would not change existing emergency response and rescue access routes within Sutter County. The Project would update existing infrastructure to the water pump facility that prevents flooding for the surrounding area. This would result in the Project improving and maintaining the emergency response plan and emergency evacuation plan for the County. Therefore, impacts would be less than significant.

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

No Impact. The Project site is not located within or near a Very High Fire Hazard Severity Zone or a State Responsibility Area (SRA).[22] [23] The site is generally flat and is not known to be at risk of wildland fire. Therefore, there would be no impact.

4.9.4 MITIGATION

See BIO-10 outlined above in Section 4.4.

[22] (California Department of Forestry and Fire Protection, 2026)
[23] (California Department of Forestry and Fire Protection, 2026)

4.10 HYDROLOGY AND WATER QUALITY

Table 4-19: Hydrology and Water Quality Impacts

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

4.10.1 BASELINE CONDITIONS

4.10.1.1 SACRAMENTO RIVER SYSTEM

The Project is located in the Sacramento Valley in northern California. The Mediterranean climate of the region is characterized by warm, dry summers with temperatures frequently above 90 degrees Fahrenheit (°F) and by cool, moist winters with daytime high temperatures often below 60°F. Sutter County receives an average of 22 inches of rain per year, the majority of which occurs between November and March. The Project would result in the upgrade and modernization of an existing drainage water pumping facility that protects the community of Robbins to the northwest, the surrounding rural residential property, and approximately 65,000 acres of agricultural lands.

The Sacramento River is the principal river of Northern California and is the largest river in California. Rising in the Klamath Mountains near Mount Shasta, the river flows south for nearly 400 miles before reaching the Sacramento–San Joaquin River Delta and ultimately flows into the San Francisco Bay. The river runs through 19 California counties and provides 35% of the State's developed water supply. The river helps support the valley's millions of acres of irrigated agriculture and is home to wildlife and a range of aquatic species. The Sacramento River drains the inland slopes of the Klamath Mountains, the Cascade Range, the Coast Range, and the western slopes of the northern Sierra Nevada Mountains.

The Tisdale Weir, located along the northern boundary of RD 1500, is a critical component of the Sacramento River Flood Control Project (SRFCP). The primary purpose of the weir is to release overflow waters of the Sacramento River into the Sutter Bypass via the Tisdale Bypass. It is one of five major overflow weirs in the SRFCP, and during Sacramento River flood events, it is typically the first to overflow and continues to spill for the longest duration. The conveyance capacity of the Sacramento River upstream of the Tisdale Weir is significantly larger than the capacity downstream of the weir. When river flow exceeds the conveyance capacity downstream of the Tisdale Weir, more than half of the floodwaters are diverted from the river over the weir and into the bypass system.

The Sutter Bypass is a leveed channel of the Lower Sacramento Valley Flood-Control System along the eastern portion of the Sutter Basin. A portion of the Sutter Bypass is within the underlying watershed but routes water around RD 1500 on the eastern side of the District. Water conveyed by the Sutter Bypass does not enter into the District and does not contribute to flooding in the District, other than some seepage from the Bypass which collects in the District drainage system and is subsequently discharged by the Karnak Drainage Facility. The Bypass allows channeling of escapement flow from the Tisdale Weir as well as receiving similar Sacramento River escapement flow from the Colusa Weir, and the Snake River, Gilsizer Slough, Wadsworth Canal, and other watercourses of the Lower Feather Subwatershed that also drain to the Feather River via the Sutter Bypass. The Bypass includes 3.24 square miles of the Sutter National Wildlife Refuge, which is part of California's approximate 5 square miles Sutter Bypass Wildlife Area. The watershed area is comprised of low-lying lands surrounded by levees with the Sacramento River on the west and south, the Tisdale Bypass on the north and the Sutter Bypass on the east. The water level in the adjacent rivers is higher than much of the land in RD 1500. The entire RD 1500 service area is leveed to prevent flooding from rain and nearby river systems and has no natural outlet, relying on the need to remove impounded surface and drainage water from the closed basin.

RD 1500 provides agricultural drainage, levee maintenance (54.35 mile of levees), and flood control services in southwest Sutter County. Storm water flow and groundwater infiltration from river seepage within RD 1500 is collected and drains from the north to the southeast of RD 1500 through the Main Drain that runs from near the Tisdale Bypass to the Facility in the southeast corner of the Sutter Basin and is pumped into the Sacramento Slough. Water discharged into the slough then flows approximately 1.25 miles southeast into the Sacramento River.

Historically this area was a seasonal wetland and floodplain with winter floods frequently transforming the Sacramento Valley into an inland sea. Flood control plans were developed in the late 1800s and the SRFCP, authorized by the federal government in 1917, included the Sutter Bypass as a principal feature. The Sutter Bypass is a major constructed flood control area that acts as an overflow collector of flood flows in the Sacramento River. The Sutter Bypass bounds the east side of the McGriff Lakes-Sutter Basin watershed and generally runs parallel to the eastern boundary of RD 1500, made by the East Canal.

Water resources in Sutter County, where RD 1500 is located, are both abundant and highly managed for multiple beneficial uses including agriculture, drinking water, recreation, and nature. The Sacramento River, the Feather River, connecting tributaries and other waterways cover approximately 5,000 acres within

Sutter County's portion of the Sacramento Valley. According to USGS HUC, RD 1500 is located within the McGriff Lakes-Sutter Basin subwatershed (HUC 180201041102) and is located in the Sacramento Valley – Sutter Groundwater Basin (DWR Bulletin 118 basin 5-021.62).

4.10.1.2 WATER QUALITY

The USEPA monitors surface water quality within the watershed.[24] The three surface water bodies that the USEPA monitors include the Sacramento River, the Sacramento Slough, and the Sutter Bypass. Monitoring by the USEPA is completed using 54 water monitoring locations, located throughout the watershed. These three water bodies are designated as having "impaired" water quality. The Sacramento River holds this designation due to low oxygen, mercury, temperature, and total toxic chemicals. The Sacramento Slough holds the designation due to low oxygen, mercury, and total toxic chemicals. The Sutter bypass is impaired due to low oxygen and metals.

Farmers in the watershed use a variety of herbicides and pesticides during the growing season to control plant diseases and pests. In addition, farmers use fertilizers to ensure successful crop production. Use of these compounds can result in residual concentrations of herbicides, pesticides, and fertilizers that could enter stormwater runoff or irrigation return water ditches. If stormwater runoff and return water from agricultural irrigation is discharged into local streams and rivers, the water quality can be affected. The SWRCB has identified agricultural runoff as a major factor affecting water quality in local drainages and the Sacramento River. Water quality data for the Sacramento River lists the pesticide diazinon, insecticide chlorpyrifos, and Group A pesticides as constituents that require Total Maximum Daily Load monitoring and reduction to ensure beneficial uses within this water body. These pesticides and insecticides are commonly used as part of agricultural practices. A number of water quality monitoring programs are currently in place in the watershed that include 51 water quality monitoring locations that monitor nutrients, metals, pesticides, and other constituents, along with physical characteristics. The California Department of Water Resources (DWR) and the SWRCB monitor discharges into the Sacramento Slough from the existing Karnak Facility. RD 1500 recently installed a debris screen at the Karnak facility in order to limit the amount of debris and other hazardous materials from entering the pump station and potentially entering the Sacramento Slough from the RD 1500 canal. Water quality in the Sacramento Slough, which also receives drainage water from Butte Creek and the Sutter Bypass, is monitored by DWR, SWRCB and the USGS California Water Science Center. In addition, landowners within RD 1500 enrolled in the Irrigated Lands Regulatory Program are members of either the Sacramento Valley Water Quality Coalition or the California Rice Commission Water Quality Coalition, depending on the crop that is grown. These coalitions assist landowners with management practices and conduct an extensive water quality monitoring program. If any exceedances are detected, the coalitions work with the landowners in the area where the exceedance was detected to identify the cause of the exceedance and take appropriate action to avoid future contamination.

Constituents found in runoff vary as a result of differences in rainfall intensity and occurrence, geographic features, the land use of a site, as well as vehicle traffic and percent of impervious surface. In the Sutter County region, there is a natural weather pattern of a long dry period from May to October. During this seasonal dry period, pollutants contributed by vehicle exhaust, vehicle tire wear, crankcase drippings, spills, and atmospheric fallout accumulate within the roadways and end up in the watershed. Precipitation during the early portion of the wet season (November to January) typically washes these pollutants into the stormwater runoff, which can result in elevated pollutant concentrations in the initial wet weather runoff. This initial runoff with peak pollutant levels is referred to as the "first flush" of a storm event or events. Stormwater runoff is addressed through the NPDES. Within the watershed, there is a minimal amount of vehicle traffic and impervious surface area because of the rural agricultural nature of the area, with the

[24] (United States Environmental Protection Agency, 2025)

water quality coalitions having primary responsibility for preventing contamination from agricultural operations. As mentioned above, the water quality of the water discharged by the Karnak Drainage Facility and the water quality of the Sacramento Slough is monitored by DWR, SWRCB and USGS.

4.10.2 APPLICABLE REGULATIONS

Federal

Clean Water Act

The CWA (33 USC Section 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA required states to set standards to protect, maintain, and restore water quality through the regulation of point-source and certain nonpoint – source discharges to surface water. Those discharges are regulated by the NPDES permit process (CWA Section 402). In California, NPDES permitting authority is delegated to, and administered by, the nine RWQCBs. The Project is within the Central Valley RWQCB. Projects that disturb one or more acres, including the proposed Project, are required to obtain NPDES coverage under the Construction General Permits.

In Sackett v. USEPA, the United States Supreme Court narrowed the scope of "waters of the United States" and therefore the CWA. Under Sackett, "the CWA's use of 'waters' encompasses only those relatively permanent, standing or continuously flowing bodies of water forming geographical features that are described in ordinary parlance as streams, oceans, rivers, and lakes." To qualify as waters of the United States, a water must not only be relatively permanent but also connected to traditional navigable waters. Finally, "the CWA extends only to those wetlands that are as a practical matter indistinguishable from waters of the United States," meaning that "the wetland has a continuous surface connection with that water, making it difficult to determine where the water ends, and the wetland begins."

Section 401, Water Quality Certification

Section 401 of the CWA requires that, prior to issuance of any federal permit or license, any activity, including river or stream crossing during road, pipeline, or transmission line construction, which may result in discharges into waters of the U.S., must be certified by the state, as administered by the RWQCB. This certification ensures that the proposed activity does not violate state and/or federal water quality standards.

Section 402, National Pollutant Discharge Elimination System

Section 402 of the CWA authorizes the SWRCB to issue a NPDES General Construction Storm Water Permit (Water Quality Order 2009-0009-DWQ), referred to as the "General Permit." Construction activities can comply with and be covered under the Construction General Permit provided that they:

- *Develop and implement a SWPPP which specific BMPs that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving off site into receiving waters.*
- *Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the nation.*
- *Perform inspections of all BMPs.*

NPDES regulations are administered by the Central Valley RWQCB at the Project site.

Section 404, Discharge of Dredged or Fill Materials

Section 404 of the CWA establishes programs to regulate the discharge of dredged and fill material in waters of the U.S., including wetlands. For purposes of section 404 of the CWA, the limits of non-tidal waters extend to the ordinary high-water line of waters of the U.S., defined as the line on the shore established by the fluctuation of water and indicated by physical characteristics, such as natural line impressed on the bank, changes in the character of the soil, and presence of debris. When an application for a Section 404 permit is made the applicant must show it has:

- *Taken steps to avoid impacts to wetlands or waters of the U.S. where practicable;*
- *Minimized unavoidable impacts on waters of the U.S. and wetlands; and*
- *Provided mitigation for unavoidable impacts.*

Section 404 of the CWA requires a permit for construction activities involving placement of any kind of fill material into waters of the U.S. A water quality certification pursuant to Section 401 of the CWA is required for Section 404 permit actions. If applicable, construction would also require a request for water quality certification (or waiver thereof) from the Central Valley RWQCB. Project activities would adhere to State and federal water quality standards and would be in compliance with Sections 401 and 404 of the CWA.

Safe Drinking Water Act

The federal SDWA was enacted in 1974 and authorized the USEPA to establish safe standards of purity for naturally-occurring and man-made contaminants. It requires all owners or operators of public water systems to comply with primary (health-related) standards and encourages attainment of secondary standards (nuisance-related). Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water. These types of contaminants are currently regulated by the USEPA through primary and secondary MCLs. As directed by the SDWA amendments of 1986, the USEPA has been expanding its list of primary MCLs. MCLs have been proposed or established for approximately 100 contaminants. In California, the USEPA has delegated SDWA powers to the state government.

National Flood Insurance Act

FEMA is responsible for managing the National Flood Insurance Program (NFIP), which makes federally-backed flood insurance available for communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. The NFIP, established in 1968 under the National Flood Insurance Act, requires that participating communities adopt certain minimum floodplain management standards, including restrictions on new development in designated floodways, a requirement that new structures in the 100-year flood zone be elevated to or above the 100-year flood level (known as base flood elevation), and a requirement that subdivisions be designed to minimize exposure to flood hazards.

To facilitate identifying areas with flood potential, FEMA has developed FIRMs that can be used for planning purposes, including floodplain management, flood insurance, and enforcement of mandatory flood insurance purchase requirements.

State

Department of Water Resources

The major responsibilities of DWR include preparing and updating the California Water Plan to guide development and management of the state's water resources; planning, designing, constructing, operating, and maintaining the State Water Resources Development System; regulating dams; providing flood protection; assisting in emergency management to safeguard life and property; educating the public; and serving local water needs by providing technical assistance. In addition, DWR cooperates with local agencies on water resources investigations, supports watershed and river restoration programs, encourages water

conservation, explores conjunctive use of ground and surface water, facilitates voluntary water transfers, and, when needed, operates a state drought water bank.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code Sections 13000 et seq.), passed in 1969, requires protection of water quality by appropriate designing, sizing, and construction of erosion and sediment controls. The Porter-Cologne Act established the SWRCB and divided California into nine regions, each overseen by a RWQCB. The SWRCB is the primary State agency responsible for protecting the quality of the State's surface and groundwater supplies and has delegated primary implementation authority to the nine RWQCBs. The Porter-Cologne Act assigns responsibility for implementing the CWA Sections 401 through 402 and 303(d) to the SWRCB and the nine RWQCBs.

The Porter-Cologne Act requires the development and periodic review of water quality control plans (basin plans) that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters, provide the technical basis for determining waste discharge requirements, identify enforcement actions, and evaluate clean water grant proposals. The basin plans are updated every 3 years. Compliance with basin plans is primarily achieved through implementation of the NPDES, which regulates waste discharges as discussed above.

The Porter-Cologne Water Quality Control Act requires that any person discharging waste or proposing to discharge waste within any region, other than to a community sewer system, which could affect the quality of the "waters of the State," file a report of waste discharge. Absent a potential effect on the quality of "waters of the State," no notification is required. However, the RWQCB encourages implementation of BMPs similar to those required for NPDES storm water permits to protect the water quality objectives and beneficial uses of local surface waters.

Regional Water Quality Control Plans

California Water Code (Section 13240) requires the preparation and adoption of water quality control plans (Basin Plans), and the Federal CWA (Section 303) supports this requirement. According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment of beneficial uses to be protected, water quality objectives to protect those uses, and an implementation program for achieving the objectives. Because beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the State and federal requirements for water quality control (40 Code of Federal Regulations 131.20).

Basin Plans present water quality objectives in numerical or narrative format for specified water bodies or for protection of specified beneficial uses throughout a specific basin or region. State law defines beneficial uses to include (but not be limited to) "...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050(f)).

SWRCB Decision 1641

SWRCB Decision-1641 and Water Right Order 2001-05 describe the current water right requirements to implement the flow-dependent objectives outlined in the Bay-Delta Plan. In SWRCB Decision-1641, the SWRCB assigned responsibilities to Reclamation and DWR for meeting these requirements. These responsibilities require that the Central Valley Project and State Water Project be operated to protect water quality, and that DWR and/or Reclamation ensure that the flow dependent water quality objectives are met in the Delta.

Sustainable Groundwater Management Act (SGMA)

SGMA is a package of three bills (AB 1739, SB 1168, and SB 1319) that provides local agencies with a framework for managing groundwater basins in a sustainable manner. SGMA establishes minimum standards for sustainable groundwater management; roles and responsibilities for local agencies that manage groundwater resources; and timelines to achieve sustainable groundwater management within 20 years of adoption of a Groundwater Sustainability Plan (GSP). GSPs must consider all beneficial uses and users of groundwater in the basin, as well as include measurable objectives and interim milestones that ensure basin sustainability. Sustainable management is defined under SGMA as the absence of undesirable results, which consist of:

- *Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply*
- *Significant and unreasonable reduction of groundwater storage*
- *Significant and unreasonable seawater intrusion*
- *Significant and unreasonable degradation of water quality*
- *Significant and unreasonable land subsidence*
- *Groundwater-related surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of surface water*

The GSPs developed for each groundwater basin subject to SGMA must individually or in combination (depending on whether a single or multiple Groundwater Sustainability Agencies (GSAs) exist within the same basin) outline how the basin is to achieve sustainability through establishment of sustainable management criteria (i.e., minimum thresholds and measurable objectives) and implementation of projects and management actions.

Local

Sutter County 2030 General Plan

The Sutter County 2030 General Plan contains the following goals and policies related to water resources:

Environmental Resources Goals:

- *ER 6 - Preserve and protect the County's surface water and groundwater resources.*

Environmental Resources Policies:

- *ER 6.1 - Integrated Water Management Programs. Integrate water management programs that emphasize multiple benefits and balance the needs of agricultural, rural, and urban users.*
- *ER 6.2 - Surface Water Resources. Protect the surface water resources in the County including the Sacramento, Feather and Bear Rivers and their significant tributaries.*
- *ER 6.3 - Groundwater Sustainability. Protect the sustainability of groundwater resources.*
- *ER 6.7 - Water Rights. Support the protection of the existing water rights of water agencies and providers within Sutter County. Do not support out-of-area water transfers where they would adversely impact water supply within Sutter County. Support either out-of-area, or in-basin water transfers that would not negatively impact water supply within Sutter County.*

Best Management Practices

The following general guidelines and BMPs will be followed during construction:

- Construction BMPs will be followed as part of the Construction General Permit issued by the RWQCB that will be required for the Project. General construction BMPs developed by the California Stormwater Quality Association (CASQA) are divided into two main categories – Erosion and Sediment Control BMPs (Section 3 of the CASQA Stormwater BMP Handbook) and Non-Stormwater Management and Material Management BMPs (Section 4 of the BMP Handbook). The

specific BMPs that will be implemented from this list will be utilized in a variety of combinations depending on project specifics and will be identified after Project design is complete.

- Ground disturbances would be limited to those areas necessary to safely implement the Project.
- Construction BMPs such as silt fencing, straw wattles, geotextile filters, straw bales, or other erosion control measures would be used to minimize soil erosion and prevent soil erosion from entering waterbodies during construction in accordance with an approved SWPPP. Erosion control measures would be free of weeds and weed seeds.
- Drainage measures would be incorporated into the engineering design to minimize local flooding during construction.
- Adjacent landowners would be provided a construction schedule prior to beginning construction. Access to residences and farms would be maintained during construction.
- Construction would be confined within the existing right-of-way (ROW) and easements whenever possible to preserve existing vegetation and private property. The ROW and easements will be clearly marked in the field prior to construction.
- Construction would occur during the daytime to minimize disturbance to any landowners, or other individuals in the vicinity of the construction area.
- Construction limits will be clearly flagged onsite to avoid unnecessary plant loss or ground disturbance.
- Temporary travel routes and construction staging areas would be selected to minimize effects on vegetation to the extent practicable.
- The condition of roadways and work zones will be communicated to landowners and travelers via the RD 1500's website, messaging system, or other communication channels.
- Standard construction safety procedures and traffic control measures will be employed to reduce the risk of collisions between construction vehicles and other vehicles, pedestrians, or bicyclists while construction is ongoing.
- Appropriate emission control devices will be required for all construction equipment.
- When needed, water or other dust suppressants will be used on unpaved roads and areas of ground disturbance to minimize dust and any effects on air quality in accordance with an approved Dust Control Plan issued by the FRAQMD.

4.10.3 IMPACT ANALYSIS

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less than Significant with Mitigation Incorporated. The Project would result in the upgrade and modernization of an existing drain water pumping facility. Developers whose projects disturb one (1) or more acres of soil or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the Statewide General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ). Construction activity subject to this permit includes clearing, grading and disturbances to the ground such as stockpiling, or excavation, and construction of linear underground or overhead facilities associated with trail construction, but does not include regular maintenance activities performed to restore the original lines, grade, or capacity of the overhead or underground facilities. The Construction General Permit requires the development of a SWPPP by a certified Qualified SWPPP Developer. Project construction activities may result in soil erosion and the loss of topsoil, including the buildup of soil within the canals and natural waterways that the Project would construct adjacent to and within. Implementation of mitigation measure BIO-10(a), requiring preparation of a SWPPP will ensure that any impacts related to soil degradation and the loss of

topsoil remain less than significant. Therefore, impacts would be less than significant with mitigation incorporated.

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

No Impact. The Project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin. The Project would result in the upgrade and modernization of an existing drain water pumping facility. The facility serves to protect the surrounding community of Robbins, rural residential property, and approximately 65,000 acres of agricultural lands from flooding. The existing facility has become antiquated and puts the surrounding areas at risk of up to five feet of flooding in some storm events. The construction and operation of upgrades at the facility would not affect groundwater supplies and would serve to protect individuals and emergency routes from flooding. Therefore, there would be no impact.

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. result in substantial erosion or siltation on- or off-site;

Less than Significant with Mitigation Incorporated. As discussed above, the Project could result in soil erosion and the loss of topsoil, however implementation of mitigation measures BIO-10(a) will ensure that impacts are reduced to a less than significant level through the requirement to prepare a SWPPP. Therefore, impacts would be less than significant with Mitigation Incorporated.

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

iv. impede or redirect flood flows?

Less than Significant Impact. The Project would result in the construction of upgrades and modernized facilities for an existing drain water pumping station. The station exists to protect the surrounding area and residents from possible flooding during major storm events. Storm flow runs into the RD 1500 canal and is pumped out, into the Sacramento River via the East Canal and Sacramento Slough by this facility. In addition, the Project will significantly improve the reliability of the facility's ability to pump storm flow out and protect the area. Therefore, impacts would be less than significant.

d) Would the project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundations?

No Impact. The Project would result in the upgrade and modernization of an existing water pumping facility. The facility is designed to provide flood protection for the surrounding community of Robbins, rural residential homes in the area, and approximately 65,000 acres of agricultural land. The Project is not located in a tsunami or seiche zone, however the east side of the APE would be located within a flood zone (see Figure 4-2). Not completing the Project would result in a higher risk of flood hazards for the

surrounding area than would without the completion of the Project. Project inundations are not expected to result in the release of any pollutants to the area. Therefore, there would be no impact.

e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

No Impact. The Project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. The Project site is located within the Reclamation District 1500 GSA boundaries. The GSA is found within the Sutter Subbasin and is part of the Sutter Subbasin GSP, which was approved by DWR in 2023. The Project site is also located within the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin Rivers Basin. The Project will comply with both the Sutter Subbasin GSP and Water Quality Control Plan for the Sacramento River Basin and the San Joaquin Rivers Basin. Therefore, there would be no impact.

4.10.4 MITIGATION

See BIO-10 outlined above in Section 4.4.

Figure 4-2: FEMA Flood Map



4.11 LAND USE AND PLANNING

Table 4-20: Land Use and Planning Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

4.11.1 BASELINE CONDITIONS

The Project site is located in Karnak, California which is approximately three and a half miles southeast of Knight's Landing and 17.5 miles northwest of downtown Sacramento. Karnak is located within Sutter County, California. The Project site can be found in a rural area along a point where the RD 1500 Canal dead ends into the East Canal, where the Karnak drainage facility pumps water from the RD 1500 Canal to the East Canal and Sacramento Slough. Knight's Landing is the nearest census designated place to the Project site.

The Sutter County General Plan designates the Project site is AG-80 west of the levee and OS east of the levee (see Figure 2-4). Additionally, Sutter County has designated the Project site as zoned AG (see Figure 2-5).

4.11.2 APPLICABLE REGULATIONS

Local

Sutter County General Plan Polices

The Sutter County General Plan contains the following goals and policies related to land use and planning:

Land Use Goals:

- *LU-1 - Promote the efficient and sensitive use of lands to protect and enhance Sutter County's quality of life and meet the needs of existing and future residents and business.*

Land Use Policies:

- *LU 1.2 - Balanced Land Use Pattern. Maintain a balance of land uses that allows residents the opportunity to live, work, and shop in the County.*
- *LU 1.11 - Efficient Land Use Patterns. Encourage land use patterns that support the efficient use of resources, enhance the timely provision of services and infrastructure, promote a variety of transportation modes, facilitate pedestrian mobility, and support health and wellness.*
- LU 1.13 - Green Building Standards. *Promote project design that incorporates "smart growth" planning principles and cost effective "green" building standards applicable to the type and scale of development.*
- *LU 7.3 - Reuse of Existing Structures. Encourage the reuse/revitalization of existing and vacant structures as appropriate within the Industrial/Commercial and Employment Corridor. Require such*

structures and site improvements (i.e. parking areas, landscaping, etc.) to be improved to current design standards to the extent feasible.

4.11.3 IMPACT ANALYSIS

a) Would the project physically divide an established community?

No Impact. The Project would not physically divide an established community. The Project is located in a rural, agricultural area, and is already in use as an existing drain water pumping facility. The Project itself would only upgrade this existing infrastructure, without changing its use or expanding its footprint in a manner that would impact adjacent parcels. The nearest census designated place is Knights Landing, three and a half miles northwest. Therefore, there would be no impact.

b) Would the project cause a significant environmental conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The Project site and surrounding area is planned and zoned for agricultural and open space uses. The Project would not change any existing planned land use or zoning designations and would result in the modernization of an existing water drainage facility. As a result, the Project would not cause a significant environmental conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, there would be no impact.

4.12 MINERAL RESOURCES

Table 4-21: Mineral Resources Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	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?	☐	☐	☐	☒

4.12.1 BASELINE CONDITIONS

The California Geological Survey (CGS) is responsible for the classification and designation of areas within California containing or potentially containing significant mineral resources. The CGS classifies lands into Aggregate and Mineral Resource Zones (MRZs) based on guidelines adopted by the California State Mining and Geologic Board, as mandated by the Surface Mining and Reclamation Act (SMARA) of 1975. These MRZs identify whether known or inferred significant mineral resources are presented in areas. Lead agencies are required to incorporate identified MRZs resource areas delineated by the state into their general plans.[25] The CGS identifies concrete aggregate as being found within the area of the Project site.[26]

4.12.2 APPLICABLE REGULATIONS

Federal

United States Department of the Interior's Minerals Availability System

Identifies between 15 and 17 rare Earth minerals as critical resources for United States Department of Defense applications or resources which are critical to national security. It recommends the development of a comprehensive approach to help ensure a secure supply of each resource and identifies risks as well as timeframes for actions.

State

California Surface Mining and Reclamation Act of 1975

The California Surface Mining and Reclamation Act of 1975 was enacted by the California Legislature to address the need for a continuing supply of mineral resources, and to prevent or minimize the negative impacts of surface mining to public health, property, and the environment.

- *MRZ-1: An area where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.*
- *MRZ-2: An area where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.*

[25] Public Resources Code, Section 2762(a)(1).
[26] (California Department of Conservation, 2026)

- *MRZ-3: An area containing mineral deposits, the significance of which cannot be evaluated.*
- *MRZ-4: An area where available information is inadequate for assignment to any other MRZ zone.*

Of the four categories, lands classified as MRZ-2 are of the greatest importance. Such areas are underlain by demonstrated mineral resources or are located where geologic data indicate that significant measured or indicated resources are present. MRZ-2 areas are designated by the CGS as being "regionally significant." Such designations require that a Lead Agency's land use decisions involving designated areas are to be made in accordance with its mineral resource management policies and that it considers the importance of the mineral resource to the region or the State as a whole, not just to the Lead Agency's jurisdiction.

The planning area does not contain any significant or sustainable deposits located in Sutter County.[27]

Local

Sutter County General Plan

The Sutter County General Plan contains the following policies related to Mineral Resources:

Environmental Resources Policies:

- *ER 5.1* - Significant Resources. *Conserve and protect mineral resources that may be identified by the State as a significant resource to allow for their continued use in the economy.*
- *ER 5.2 - Compatible Operations. Require that gas and mineral resource extraction activities be designed and operated to minimize incompatibilities with nearby land uses and incorporate features that buffer existing and planned adjacent uses. Extraction activities shall incorporate adequate measures to minimize impacts to local residents, county roadways, services, facilities, and the environment.*

4.12.3 IMPACT ANALYSIS

a) Would the project 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?

No Impact. The Project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state. The CGS designates the Project area as containing concrete aggregate materials, however the Project would result in the modernization of an existing water pump facility and would not affect the availability of known mineral resources to be of value to the region and residents of the State. Therefore, there would be no impact.

b) Would the project 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?

No Impact. The Project would not 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. The CGS designates the Project area as containing concrete aggregate materials, however the Project would result in the modernization of an existing drain water pump facility and would not affect the availability of known mineral resources. Additionally, the area is not designated by the Sutter County General Plan as

[27] (Sutter County, 2011)

containing mineral resources that are locally important. The area surrounding the Project site is planned and zoned for agricultural use and open space use. Therefore, there is no impact.

4.13 NOISE

Table 4-22: Noise Impacts

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

4.13.1 BASELINE CONDITIONS

The Project site is located in a rural area surrounded by farmland and open space. During operation, the Karnak pump station emits noise while it is running and during maintenance operations required by the facility, the nearest sensitive receptor to the Project site is located over a mile from the site. Land uses surrounding the site experience varying levels of noise emitted during agricultural operations.

4.13.2 APPLICABLE REGULATIONS

Federal

Noise Control Act of 1972

The Noise Control Act of 1972 (42 USC 4910) establishes a national policy to promote an environment for all Americans to be free from noise that jeopardizes their health and welfare. The act establishes a means for the coordination of federal research and activities in noise control, authorizes the establishment of federal noise emissions standards for products distributed in commerce, and provides the noise-emission and noise-reduction characteristics of such products to the public.

United States Environmental Protection Agency, Environmental Noise Levels

The USEPA provided guidance on environmental noise levels in Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety (USEPA, 1974), commonly referenced as the "Levels Document," that establishes an Ldn of 55 dBA, as the requisite level, with an adequate margin of safety, for areas of outdoor uses, including residences and recreation areas. The Levels Document does not constitute USEPA regulations or standards but identifies safe levels of environmental noise exposure without consideration of technical or economic feasibility for achieving these levels or other potentially relevant considerations.

Federal Transit Administration, Construction Noise Guidelines

In its Transit Noise and Vibration Impact Assessment guidance manual, the Federal Transit Administration (FTA) recommends a daytime construction noise level threshold of 80 dBA L_{eq} over an eight-hour period when detailed construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project. Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such limits at the state and local jurisdictional levels.

Federal Highway Administration Noise Abatement Procedures (23 CFR Part 772)

The purpose of 23 CFR Part 772 is to provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, supply noise abatement criteria, and establish requirements for information to be given to local officials for use in the planning and design of highways. It establishes five categories of noise-sensitive receptors and prescribes the use of the hourly L_{eq} as the criterion metric for evaluating traffic noise impacts.

Occupational Safety and Health Administration, Occupational Noise Exposure

OSHA, Occupational Noise Exposure; Hearing Conservation Amendment (Federal Register 48 [46], 9738–9785, 1983) stipulates that protection against the effects of noise exposure shall be provided for employees when sound levels exceed 90 dBA over an 8-hour exposure period. Protection shall consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to acceptable levels, personal protective equipment shall be provided and used to reduce exposure of the employee. Additionally, a Hearing Conservation Program must be instituted by the employers whenever employee noise exposure equals or exceeds the action level of an 8-hour time-weighted average sound level of 85 dBA L_{eq}(8). The Hearing Conservation Program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

Local

Sutter County General Plan

The Sutter County General Plan contains goals and policies related to noise and vibration:

Noise Goals:

- N 1 - Protect the health and safety of County residents from the harmful effects or exposure to excessive noise and vibration.

Noise Policies:

- N 1.6 - Construction Noise. Require discretionary projects to limit noise-generating construction activities within 1,000 feet of noise-sensitive uses (i.e., residential uses, daycares, schools, convalescent homes, and medical care facilities) to daytime hours between 7:00 a.m. and 6:00 p.m. on weekdays, 8:00 a.m. and 5:00 p.m. on Saturdays, and prohibit construction on Sundays and holidays unless permission for the latter has been applied for and granted by the County.

4.13.3 IMPACT ANALYSIS

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

Less than Significant Impact. The proposed Project would require the use of construction equipment that would have a temporary increase in ambient noise levels that would exceed the Sutter County noise ordinance allowed level of 70dBA.[28] However, Sutter County noise ordinance has a provision excepting construction activities from this level when activities occur between 7 a.m. and 6 p.m. during the week and 8 a.m. to 5 p.m. on Saturdays. In addition, noise levels diminish further from their origin point, decreasing the effect that the Project would have on its surrounding area. Construction-related noise levels would be temporary, and during operation, noise levels in the area would be similar to existing conditions. There are no sensitive receptors or non-District owned habitable structures within one mile of the Project site and as a result, continued operation of the facility following construction would not have an impact on surrounding uses. Therefore, impacts would be less than significant.

b) Would the project result in generation of excessive ground borne vibration or ground borne noise levels?

Less than Significant Impact. Construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. Construction activities can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures, and soil type. The generation of vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight damage at the highest levels. Given the type of improvements, it is not anticipated the Project would generate excessive ground-borne vibration or ground-borne noise levels. In addition, vibration levels subside with increased distance from the source, diminishing the effect the Project would have on the surrounding area. The nearest sensitive receptor to the Project is located over a mile from the Project site and would not be impacted due to ground borne vibration. Construction-related ground borne vibration would be temporary, and during operation, noise levels in the area would be similar to existing conditions. Therefore, impacts would be less than significant.

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

No Impact. The Project site is located approximately six and a half miles from the Sacramento International Airport and is included within the airport's ALUCP.[29] The Project site can be found in "Referral Area 2". This designated area includes locations where airspace protection and/or overflight are compatibility concerns, but not noise or safety. Therefore, there would be no impact.

[28] (Sutter County, 2026)
[29] (Sacramento Area Council of Governments, 2013)

4.14 POPULATION AND HOUSING

Table 4-23: Population and Housing Impacts

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

4.14.1 BASELINE CONDITIONS

The Project site is located in unincorporated Sutter County in Karnak, California, surrounded by land designated for agricultural and open space use. Sutter County had an estimated population of 98,787 in 2025 according to the United States Census Bureau.[30] The town of Robbins, located approximately 6.5 miles northwest of the project site with a population of 421, is the only urban-build environment located within the RD 1500 service area.

4.14.2 APPLICABLE REGULATIONS

There are no applicable regulations related to Population and Housing for the Project.

4.14.3 IMPACT ANALYSIS

a) Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. The Project would not induce substantial unplanned population growth in an area, either directly or indirectly. The Project would modernize an existing pumping facility in order to limit flooding in the area. The Project would result in flood protection for lands within the surrounding area, including the Community of Robbins, which could face high levels of destruction in the event of a failure of the Karnak drainage facility during large storm events. Therefore, there would be no impact.

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

No Impact. The Project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere. The proposed Project would upgrade and modernize an existing water pump facility and flood protecting the surrounding area. The Project

[30] (United States Census Bureau, 2026)

area is a pump facility and would remain a pump facility after the construction occurs. The surrounding area is made up of either rural or open space and is three and a half miles from the nearest census designated place of Knight's Landing. Therefore, there would be no impact.

4.15 PUBLIC SERVICES

Table 4-24: Public Services

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i. Fire protection?	☐	☐	☐	☒
ii. Police protection?	☐	☐	☐	☒
iii. Schools?	☐	☐	☐	☒
iv. Parks?	☐	☐	☐	☒
v. Other public facilities?	☐	☐	☒	☐

4.15.1 BASELINE CONDITIONS

Fire Protection: Fire protection and emergency services for the County are provided by four county service areas are two independent fire protection districts. The Project site is located within the Sutter Basin Fire Protection District that oversees the communities of Robbins and Knights Landing. According to the Sutter County General Plan the nearest fire station serving the Project area is located in Robbins, located six and a half miles to the northwest.

Police Protection: The Sutter County Sheriff's Department provides police protection services within unincorporated Sutter County. The nearest Police Station serving the Project area is located in Woodland, 10 miles to the southwest.

Schools: The nearest School to the Project is Grafton School located in Knight's Landing, three and a half miles to the northwest.

Parks: The nearest City Park to the Project is Knight's Landing Community Park, three and a half miles to the northwest.

Public Facilities: Other public facilities found in the County include libraries, hospitals, and landfills. The nearest library, the Knight's Landing Branch Library, is located approximately three and a half miles northwest of the Project. The nearest hospital serving the Project area is Woodland Memorial Hospital, 11 miles to the southwest. The nearest landfill serving the Project area is the Recology Ostrom Road Landfill 25 miles to the northeast.

4.15.2 APPLICABLE REGULATIONS

Federal

Federal Fire Prevention and Control Act of 1974

The National Fire Incident Reporting System is a system established by the National Fire Data Center of the United States Fire Administration (USFA) to carry out the intentions of the Federal Fire Prevention and Control Act of 1974. The act authorizes the USFA to gather and analyze information on the magnitude of the Nation's fire problem, as well as its detailed characteristics and trends. The act further authorizes the USFA to develop uniform data reporting methods, and to encourage and assist State agencies in developing and reporting data.

National Fire Protection Association Standard 901

The National Fire Protection Association Standard 901 provides the latest guidelines to help fire departments and other fire protection organizations effectively share data with other agencies. This standard provides common language and definitions that define and describe elements and classifications used by many fire departments in the United States and other countries to describe fire damage potential and experience during incidents.

State

California Fire Plan

The Strategic California Fire Plan is the State's road map for reducing the risk of wildfire. In compliance with the California Fire Plan, individual CAL FIRE units are required to develop Fire Management Plans for their areas of responsibility. These documents assess the fire situation within each of CAL FIRE's 21 units and six contract counties. The plans include stakeholder contributions and priorities and identify strategic areas for pre-fire planning and fuel treatment as defined by the people who live and work with the local fire problem. The plans are required to be updated annually.

State Hazard Mitigation Plan

The purpose of the State Hazard Mitigation Plan (SHMP) is to significantly reduce deaths, injuries, and other losses attributed to natural and human-caused hazards in California. The SHMP provides guidance for hazard mitigation activities emphasizing partnerships among local, state, and federal agencies as well as the private sector. The California Office of Emergency Services (OES) prepares the SHMP. The SHMP identifies hazard risks and includes a vulnerability analysis and a hazard mitigation strategy. The SHMP is Federally required under the Disaster Mitigation Act of 2000 in order for the State to receive federal funding. The Disaster Mitigation Act of 2000 requires a State mitigation plan as a condition of disaster assistance. The SHMP was most recently updated in 2018.

Wildland-Urban Interface Building Standards

CCR Title 24, Part 9 (2022 California Fire Code) establishes standards and requirements for construction in relation to the prevention of wildfire. These codes include provisions for ignition-resistant construction standards in the wildland urban interface.

California Office of Emergency Service

Through the California Emergency Services Act of 1970, the California OES provides the basis for local emergency preparedness. The Office of Emergency Services is responsible for preparing the California State Emergency Plan and for coordinating and supporting emergency services conducted by local governments. The responsibility for immediate response to an emergency, such as fires, landslides, earthquakes or riots, rests with local government agencies and segments of the private sector, with support services provided by other jurisdictions and/or State and federal agencies. In accordance with their normal operating

procedures, the initial response to an emergency will be made by local Fire, Law Enforcement, Medical or Maintenance (Public Works) districts or departments.

California Fire and Building Code

The 2025 Fire and Building Code establishes the minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety, and general welfare for the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures, and premises, and to provide safety and assistance to firefighters and emergency responders during emergency operations. The provisions of this code apply to the construction, alteration, movement enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout the State of California.

California Health and Safety Code

State fire regulations are set forth in HSC Section 13000, et seq. This includes regulations for building standards (as also set forth in the CBC), fire protection and notification systems, fire protection devices such as extinguishers and smoke alarms, high-rise building and childcare facility standards, and fire suppression training.

California Code of Regulations

CCR Title 5, Education, contains the implementing regulations that govern all aspects of education within the State.

State Public Park Preservation Act

The State Public Park Preservation Act (PRC Sections 5400-5409) is the primary instrument for protecting and preserving parkland in California. Under the act, cities and counties may not acquire any real property that is in use as a public park for any non-park use unless compensation or land, or both, are provided to replace the parkland acquired. This ensures a no net loss of parkland and facilities.

Local

Sutter County General Plan

The Sutter County General Plan contains goals and policies related to public services:

Public Services Goals:

- *PS 3 - Minimize risk to life and property resulting from wildland fire hazards.*

Public Services Policies:

- PS 2.9 - Development Review. Include the appropriate fire agency in the review of new private and public development plans to ensure compliance with state and other adopted fire safety standards and that fire protection and prevention concerns are addressed.

4.15.3 IMPACT ANALYSIS

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i. Fire Protection:

No Impact. The Project would not 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 performance objectives for fire protection. The Project proposes to modernize an existing water pump station within a rural area of Sutter County. The Project would not result in an increase or changing of the population that would increase the demand on local governmental facilities. The Project site is served by the Sutter Basin Fire Protection District and would remain protected by this district after completion of the Project. Therefore, there would be no impact.

ii. Police Protection:

No Impact. The Project would not 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 performance objectives for police protection. The Project proposes to modernize an existing water pump station within a rural area of Sutter County. The Project would not result in an increase or changing of the population that would increase the demand on local governmental facilities. The Project site is currently served by the Woodland Police Department 10 miles away, as well as the California Highway Patrol, and would remain protected by these entities after the proposed Project is completed. Therefore, there would be no impact.

iii. Schools:

No Impact. The Project would not 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 performance objectives for schools. The Project proposes to update and improve an existing water pump station within a rural area of Sutter County. The Project would not result in an increase or changing of the population that would increase the stress on local governmental facilities. The nearest school to the Project site is Grafton School three and a half miles northwest in Knight's Landing, is a behavioral health organization serving infants, children, adolescents, and adults with autism, intellectual and developmental disabilities, and complex mental health changes. The nearest public school is Robbins Elementary School, six and a half miles northwest in Robbins, California. The Project would not increase the number of schools, teachers needed, or students attending schools within the area. Therefore, there would be no impact.

iv. Parks:

No Impact. The Project would not 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 performance objectives for parks. The Project proposes to modernize an existing water pump station within a rural area of Sutter County. The Project would not result in an increase of the population that would increase the demand on local governmental facilities. The nearest park to the Project site is Knight's Landing Community Park, three and a half miles

to the northwest. The Project would not result in an increased demand for park usage or require new park staff to be hired as a result of the Project. Therefore, there would be no impact.

v. Other public facilities:

Less than Significant Impact. There are no hospitals, libraries, or other public facilities located within a two mile radius of the Project. Implementation of the Project would not result in population growth or result in substantial physical impacts associated with the provision of new or physically altered public facilities or the need for new facilities. The Project would result in waste produced from construction activities, which would likely be transported and deposited at the Recology Ostrom Road Landfill northeast of Wheatland, California, 25 miles to the northeast from the Project site. While waste created by construction would result in a decrease in storage capacity for the Ostrom Landfill, a Status Impact Report prepared for the facility in 2022 found that the expected date at which the Ostrom Landfill meets capacity would be 2102.[31] Therefore, impacts would be less than significant.

[31] (Recology Services, Inc., 2022)

4.16 RECREATION

Table 4-25: Recreation Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
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?	☐	☐	☐	☒

4.16.1 BASELINE CONDITIONS

The Project site is located in a rural area of Sutter County, surrounded by land planned and zoned for agricultural use and open space use. The nearest census designated place to the site is Knight's Landing, three and a half miles to the northwest. The nearest park space to the Project site is Knight's Landing Community Park, located in Knight's Landing. The nearest recreational facility to the Project site is the Verona Marina and Campground located two miles east. In addition, the Sacramento and Feather River serve as an area for recreation themselves. People use the riverways as an area for boating activities and fishing. The Fremont Weir State Wildlife Area is also located one and a half miles south of the Project site.

4.16.2 APPLICABLE REGULATIONS

Local

Sutter County General Plan

The Sutter County General Plan contains the following goals and policies related to recreation:

Environmental Resources Goals:

- ER 1 - Support a comprehensive approach for the conservation, enhancement, and regulation of Sutter County's significant habitat and natural open space resources.
- ER 4 - Conserve, protect, and enhance Sutter County's unique natural open space lands, drainages, floodplains, and resources.

Environmental Resources Policies:

- ER 1.3 - Interconnected Habitat. Emphasize the preservation, enhancement, and creation of sustainable, interconnected habitat and open space areas that highlight unique resources and integrate educational and recreational opportunities as appropriate.
- ER 4.3 - River Corridors. Preserve the Sacramento, Feather, and Bear River corridors as important habitat, recreation and open space resources. Support efforts to increase public access and recreational uses along the County's river corridors.

4.16.3 IMPACT ANALYSIS

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

No Impact. The Project would not 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. The Project would modernize an existing drain water pump facility. The improvements made to the Project site would not result in an addition of population in the area that would increase use of local or regional recreational facilities. The Project site is in a rural, agricultural area surrounded by crop fields, a storage area to the southwest, and open space. The nearest residential neighborhood with park facilities is located approximately three and a half miles away in Knight's Landing. The Sacramento River is used for recreational activity, but would not be affect it in a recreational capacity by the completion of this Project. Therefore, there would be no impact.

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?

No Impact. The Project does not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. The Project proposes to modernize an existing water pump facility. After construction, the site would maintain the same use as it did pre-construction. The Project site is not in the immediate vicinity of any recreational facility and would not cause an increase in population that would require either a new facility to be built, or require an increase in maintenance of existing recreational facilities in the area. Therefore, there would be no impact.

4.17 TRANSPORTATION

Table 4-26: Transportation Impacts

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

4.17.1 BASELINE CONDITIONS

The Project site is located in a rural area at the end of the RD 1500 Canal, that is accessible by either Reclamation Road to the south or Bates Road to the north. The Project area is surrounded by farmland and open space. The roads connecting to and extending from the Project area are not ones that are used by the general public. Roads in the area serve farmers of the surrounding fields, a farm equipment storage facility to the southwest, and maintenance workers of the Karnak drainage facility.

4.17.2 APPLICABLE REGULATIONS

Federal

Federal Highway Administration

The FHWA is responsible for the federally funded roadway system, including the interstate highway network and portions of the primary State highway network. FHWA funding is provided through the Fixing America's Surface Transportation Act. Federal funds can be used to fund eligible local transportation improvements, such as projects to improve the efficiency of existing roadways, traffic signal coordination, bikeways, pedestrian facilities, and transit system upgrades.

State

California Department of Transportation

Caltrans has jurisdiction over State highways and sets maximum load limits for trucks and safety requirements for oversized vehicles that operate on highways. Sutter County (i.e., including the Project site and surrounding area) is under the jurisdiction of Caltrans District 3.

Senate Bill 743

SB 743, which was signed into law by Governor Brown in 2013, tasked Office of Planning and Research with establishing new criteria for determining the significance of transportation impacts under CEQA. SB 743 requires the new criteria to "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." It also states that alternative measures

of transportation impacts may include "vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated." SB 743 changes the way that public agencies evaluate the transportation impacts of projects under CEQA, recognizing that roadway congestion, while an inconvenience to drivers, is not itself an environmental impact (see PRC Section 21099(b)(2)). In addition to new exemptions for projects that are consistent with specific plans, the draft SB 743 guidelines replace congestion-based metrics, such as auto delay and level of service, with VMT as the basis for determining significant impacts, unless the guidelines provide specific exceptions.

4.17.3 IMPACT ANALYSIS

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

No Impact. The Project would not conflict with a plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. The surrounding roads that would serve the Project are unpaved and do not serve public use. As a result, the Project wouldn't alter any plan, ordinance, or policy in regard to transit, roadway, bicycle and pedestrian facilities. Therefore, there would be no impact.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b)?

No Impact. The Project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b). The Project would result in the modernization of an existing water pump facility. Trips generated from operations would not be substantially increased during operations of the modernized facility. There would be little to no increase in VMT as a result of the Project. Therefore, there would be no impact.

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

No Impact. The Project would not substantially increase hazards due to a geometric design feature or incompatible use. The Project would not alter any roadway or intersection. The Project proposes to modernize and improve an existing water pump station. The existing use of the Project site would remain the same after construction is finished. In addition, the area surrounding the Project site is not used by the general public and experiences little traffic. Therefore, there would be no impact.

d) Would the project result in inadequate emergency access?

No Impact. The Project would not result in inadequate emergency access. The surrounding roads that would serve the Project are unpaved and do not serve public use. Completion of the Project would reduce the amount of upland flooding that would occur during rainy periods and would prevent the eventual failure of the Karnak Drainage facility, which in a major storm event would have a major effect on access to emergency routes. This would result in the emergency plan for the county being maintained, and thus maintaining a high quality of emergency access for the area. Therefore, there would be no impact.

4.18 TRIBAL CULTURAL RESOURCES

Table 4-27: Tribal Cultural Resources Impacts

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

4.18.1 BASELINE CONDITIONS

The Project is located in Sutter County and is in an area that is within the traditional territory of the Nisenan Tribe. Indigenous populations used the local region for season and/or permanent settlement as well as for catering food, materials, and hunting seasonal game. As discussed in Section 4.5 above, five cultural resources were identified, none of which were that of a Native American Tribe.

4.18.1.1 NATIVE AMERICAN OUTREACH

On February 2, 2026, Provost & Pritchard requested a search of the NAHC SLF search. NAHC was provided with a brief description of the Project and a map showing its located with a request that NAHC preform a search of the SLF to determine if any Native American resources have been recorded in the immediate APE. The results of the SLF search were negative; however, tribes do not always record their sacred sites in the SLF, nor are they required to do so.

As discussed above in Section 4.5, Kleinfelder conducted a study of the APE in 2021, which included background and archival research, a records search, interested parties' consultation, a NAHC SLF search, and a cultural resources pedestrian survey. The study identified five built-environment resources with the

APE: the Karnak Drainage Facility, the East Levee, the East Canal, the Reclamation District 1500 Canal, and the Reclamation District 1500 Historic District. In 2023 a Cultural Resources Evaluation and Finding of Effects Report was prepared to supplement the original study and to analyze the potential for significant effects under NEPA. Additionally, a Cultural Resources Identification Report was prepared by Kleinfelder in 2023. These reports are provided in Appendix C.

The Cultural Resources Evaluation and Finding of Effects Report and Cultural Resources Identification Report were completed to evaluate the five cultural resources located with the APE identified in the original cultural resources inventory report. The studies consisted of a summary of the previous cultural resources study, evaluation of cultural resources within the APE, finding of effect, and mitigation recommendations for the APE.

Two historic properties/historical resources were identified within the APE: the Karnak Drainage Facility and the Reclamation District 1500 Historic District. Kleinfelder recommended a finding of Adverse Effects for both resources, which also constitute a potential significant impact under CEQA if not adequately mitigated.

Assembly Bill 52 requires that a lead agency, within 14 days of determining that it will undertake a project, must notify in writing any California Native American Tribe traditionally and culturally affiliated with the geographic area of the project if that Tribe has previously requested notification about projects in that geographic area. The notice must briefly describe the project and inquire whether the Tribe wishes to initiate request formal consultation. Tribes have 30 days from receipt of notification to request formal consultation. The lead agency then has 30 days to initiate the consultation, which then continues until the parties come to an agreement regarding necessary mitigation or agree that no mitigation is needed, or one or both parties determine that negotiation occurred in good faith, but no agreement will be made.

While RD 1500 has not formally received any written correspondence from a Tribe pursuant to Public Resources Code Section 21080.3.1 requesting notification of proposed Project, the United Auburn Indian Community of the Auburn Rancheria and Estom Yumeka Maidu Tribe of the Enterprise Rancheria have expressed interest in the Project and its potential to affect tribal cultural resources within the sacred land. As a result, letters were sent to the following contacts via mail on March 2, 2026 (see Appendix C):

- United Auburn Indian Community of the Auburn Rancheria, Anna Starkey, Cultural Regulatory Manager
- United Auburn Indian Community of the Auburn Rancheria, Gene Whitehouse, Chairperson
- Estom Yumeka Maidu Tribe of the Enterprise Rancheria, Glenda Nelson, Chairperson

On March 16, 2026, Anna Starkey of the United Auburn Indian Community of the Auburn Rancheria responded to the letter, requesting a tribal monitor be present to inspect borings for cultural soils potentially located in the Project area. No other responses were received.

4.18.2 APPLICABLE REGULATIONS

Federal

National Historic Preservation Act

See Section 4.5.2

State

California Register of Historical Resources

See Section 4.5.2

Significant Historical Resources under CEQA Guidelines

See Section 4.5.2

Health and Safety Code

See Section 4.5.2

Government Code 65352.3-5: Local Government-Tribal Consultation.

GC Sections 65092, 65351, 65352, 65352.3, and 65352.4, formally known as SB 18, regulate the consultation with California Native American tribes having traditional lands located within the jurisdiction of applicable cities and counties. The intent of the underlying legislation was to provide all California Native American tribes that are on the contact list maintained by the NAHC, an opportunity to consult with specific local governments for the purpose of preserving and protecting their sacred places. Such consultations apply to the preparation, adoption and amendment of general plans.

Assembly Bill 52: Native American Historic Resource Protection Act

AB 52, codified at PRC Section 21080.3.1, et seq., sets forth a proactive approach intended to reduce the potential for delay and conflicts between Native American and development interests. Projects subject to AB 52 are those that file a notice of preparation for a DEIR or notice of intent to adopt a negative or MND on or after July 1, 2015. AB 52 adds TCRs to the specific cultural resources protected under CEQA. Under AB 52, a TCR is defined as a site, feature, place, cultural landscape (must be geographically defined in terms of size and scope), sacred place, or object with cultural value to a California Native American tribe that is either included or eligible for inclusion in the CRHR, or included in a local register of historical resources. A Native American Tribe or the lead agency, supported by substantial evidence, may choose at its discretion to treat a resource as a TCR. AB 52 also mandates lead agencies to consult with tribes, if requested by the tribe, and sets the principles for conducting and concluding consultation.

Native American Heritage Act

Also relevant to the evaluation and mitigation of impacts to cultural resources is the Native American Heritage Act of 1976 which established the NAHC and protects Native American religious values on state property (see PRC Section 5097.9).

Disposition of Human Remains

When an IS identifies the existence, or the probable likelihood, of Native American human remains within the project, a lead agency shall work with the appropriate Native American groups or individuals as identified by the NAHC as provided in PRC Section 5097.98. The applicant may develop an agreement for treating or disposing of, with appropriate dignity, the human remains, and any items associated with Native American burials. Furthermore, HSC Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the county coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the NAHC.

California Native American Graves Protection and Repatriation Act of 2001

HSC Sections 8010-8011 establish a State repatriation policy intent that is consistent with and facilitates implementation of the California Native American Graves Protection and Repatriation Act (NAGPRA). NAGPRA strives to ensure that all California Indian human remains, and cultural items are treated with

dignity and respect. It encourages voluntary disclosure and return of remains and cultural items by publicly funded agencies and museums in California. It also states the intent for the state to provide mechanisms for aiding California Indian tribes, including non-federally recognized tribes, in filing repatriation claims and getting responses to those claims

Local

Sutter County General Plan

The General Plan contains the following goals and policies related to tribal cultural resources:

Environmental Resources Goals:

- *ER 8: Identify, protect, and enhance Sutter County's important cultural and paleontological resources to increase awareness of the County's heritage.*

Environmental Resources Policies:

- *ER 8.5 - Consultation. Consult with the appropriate organizations and individuals early in the development process (e.g., Information Centers of the California Historical Resources Information System, Native American Heritage Commission, and Native American groups and individuals) to minimize potential impacts to cultural resources.*

4.18.3 IMPACT ASESSMENT

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

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

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

a i.-ii.) Less than Significant Impact with Mitigation Incorporated. A records search of the NAHC SLF was completed for the Project area and the results were negative for the presence of Native American tribal cultural resources. However, tribes do not always record their sacred sites in the SLF, nor are they required to do so. Two Native American tribes expressed interest in the Project including the Estom Yumeka Maidu Tribe of the Enterprise Rancheria and the United Auburn Indian Community of the Auburn Rancheria. Three letters were sent to the tribes pursuant to AB 52 on March 2, 2026. On March 16, 2026, Anna Starkey of the United Auburn Indian Community of the Auburn Rancheria responded, requesting a tribal monitor be present to inspect borings for cultural soils potentially located in the Project area. No other responses were received. Within implementation of mitigation measure CUL-1 and CUL-4 described above in Section 4.5, and mitigation measure TCR-1, described in detail below, impacts resulting from the discovery of tribal cultural resources would be less than significant. Therefore, impacts would be less than significant with mitigation incorporated.

4.18.4 MITIGATION

See CUL-1 and CUL-4 outlined above in Section 4.5.

TCR-1 At least 30 days prior to the start of any ground-disturbing activities, the District shall notify the United Auburn Indian Community of the Auburn Rancheria to determine if the tribe would like to be present during ground-disturbing activities. If the tribe determines a monitor is required, the District shall retain a paid tribal monitor approved by the United Auburn Indian Community of the Auburn Rancheria. The monitor would only be present during ground-disturbing activities. The term "ground-disturbing activities" includes activities such as grading, excavation, trenching, clearing, and drilling within the Project site. If the tribal monitor determines the presence of cultural soils is negative, no additional monitoring would be required. All monitoring would cease following the completion of ground-disturbing activities.

4.19 UTILITIES AND SERVICE SYSTEMS

Table 4-28: Utilities and Service Systems Impacts

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

4.19.1 BASELINE CONDITIONS

The Project site is located in Kanak, CA. The existing pumping facility is surrounded by area that is zoned for agricultural use and open space use. Karnak is an unincorporated area of Sutter County. The nearest urban areas are Knight's Landing, Yolo County, CA which is three and a half miles northwest and Robbins, Sutter County, CA which is six and half miles northwest.

4.19.1.1 WATER SUPPLY

Unincorporated areas within Sutter County, including the Project site, rely upon on site wells that are privately owned.

4.19.1.2 WASTEWATER COLLECTION AND TREATMENT

Unincorporated areas within Sutter County, including the Project site, treat and dispose of wastewater on site through the use of septic tanks or other on-site disposal methods. Sutter County ensures that septic tanks are designed and installed correctly by requiring the system be permitted by the Sutter County Community Services Department.

4.19.1.3 LANDFILLS

The Recology Ostrom Road Landfill serves the Project area. The landfill is located northeast of Wheatland, California, 25 miles to the northeast. According to the landfill's 2022 Status Impact Report, the facility has capacity to continue to be operational until 2102.[32]

4.19.2 APPLICABLE REGULATIONS

Federal

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (40 CFR, Part 258 Subtitle D) establishes minimum location standards for siting municipal solid waste landfills. In addition, because California laws and regulations governing the approval of solid waste landfills meet the requirements of Subtitle D, the USEPA has delegated the enforcement responsibility to the State of California.

State

California Water Code

The California Water Code is the governing law for all aspects of water management in California.

California Integrated Solid Waste Management Act of 1989 (Assembly Bill 939)

Pursuant to the California Integrated Solid Waste Management Act of 1989 (PRC Section 40050, et seq.) or AB 939, all cities in California are required to reduce the amount of solid waste disposed in landfills. AB 939 required a reduction of 25 percent by 1995 and 50 percent by 2000. Contracts that include work that will generate solid waste, including construction and demolition (C&D) debris, have been targeted for participation in source-reduction, reuse, and recycling programs. The contractor is urged to manage solid waste generated by the work to divert waste from disposal in landfills (particularly Class III landfills) and maximize source reduction, reuse, and recycling of C&D debris.

Protection of Underground Infrastructure

GC Sections 4216-4216.9 "Protection of Underground Infrastructure" requires an excavator to contact a regional notification center such as Underground Services Alert or Dig Alert at least two days prior to excavation of any subsurface installations. Any utility provider seeking to begin a project that could damage underground infrastructure can call Underground Service Alert, the regional notification center for southern California. Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the project. Representatives of the utilities are then notified and are required to mark the specific location of their facilities within the work area prior to the start of project activities in the area.

4.19.3 IMPACT ANALYSIS

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

Less than Significant Impact. The Project would not require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, natural gas or telecommunications facilities, the construction or relocation of which would cause significant environmental effects. The Project would improve and modernize an existing drain water pump station. As a part of the Project, the facility would receive upgrades to its electrical system, expanding the electric

[32] (Recology Services, Inc., 2022)

power facilities for the facility. Construction of the expanded facilities would be done in coordination with PG&E and would not create substantial adverse effects on the environment. Therefore, impacts would be less than significant.

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

No Impact. The Project would have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years. The Project proposes to modernize an existing drain water pump station. The water availability for the Project site and its underlying aquifer would not change as a result of the Project. Therefore, there would be no impact.

c) Would the project 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?

No Impact. The Project would not 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. The Project proposes to modernize and improve an existing drain water pump facility that is already in operation. The site is served by a septic system and the Project would not result in changes to a wastewater providers ability to serve the Project area. Therefore, there would be no impact.

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

Less than Significant Impact. The Project would not generate solid waste in excess of State and local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. The Project site is served by the Recology Ostrom Road Landfill, 25 miles northeast of Wheatland, California. As discussed above, the facility is expected to have capacity until 2102. Therefore, impacts would be less than significant.

e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less than Significant Impact. The Project would be required to comply with federal, State, and local management and reduction statutes and regulations related to solid waste. Compliance with the applicable laws and regulations would limit any excessive waste production from construction activities performed for the Project. The Project would comply with best recycling practices in coordination with the recycling goals of the County. Therefore, impacts would be less than significant.

4.20 WILDFIRE

Table 4-29: Wildfire Impacts

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

4.20.1 BASELINE CONDITIONS

According to the California Department of Forestry and Fire Control (CAL FIRE), the Project site is not located within a Very High Fire Hazard Severity zone or a SRA and is served by local firefighters.[33] [34] The nearest serving fire station is located in Knight's Landing, three and a half miles to the northwest. The Project site is on relatively flat ground without a major slope and is next to the RD 1500 Canal and the East Canal. The Project site is not accessed by a roadway that is generally used by the public.

4.20.2 APPLICABLE REGULATIONS

Federal

Federal Emergency Management Agency

FEMA is an agency within the United States Department of Homeland Security, created via EO 12127 on April 1, 1979, by President Carter. A second EO 12148 signed on July 20, 1979, accorded the agency with the missions of emergency management and civil defense. In order to receive assistance through FEMA in the event of a disaster, a state's governor must declare a state of emergency and formally request a federal government response.

[33] (California Department of Forestry and Fire Protection, 2026)
[34] (California Department of Forestry and Fire Protection, 2026)

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 requires a state mitigation plan as a condition of disaster assistance. There are two different levels of state disaster plans: "Standard;" and "Enhanced." States that develop an approved Enhanced State Plan, which includes California, can increase the amount of funding available through the Hazard Mitigation Grant Program. The act has also established new requirements for local hazard mitigation plans.

National Fire Plan

The National Fire Plan was developed under Executive Order 11246 in August 2000, following a landmark wildland fire season. Its intent is to actively respond to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. The plan addresses firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability

State

California Fire Plan

The Strategic California Fire Plan is the State's road map for reducing the risk of wildfire. In compliance with the California Fire Plan, individual CAL FIRE units are required to develop Fire Management Plans for their areas of responsibility. These documents assess the fire situation within each of CAL FIRE's 21 units and six contract counties. The plans include stakeholder contributions and priorities and identify strategic areas for pre-fire planning and fuel treatment as defined by the people who live and work with the local fire problem. The plans are required to be updated annually.

Wildland-Urban Interface Building Standards

CCR Title 24, Part 9 (2025 California Fire Code) establishes standards and requirements for construction in relation to the prevention of wildfire. These codes include provisions for ignition-resistant construction standards in the wildland urban interface.

California Office of Emergency Service

Through the California Emergency Services Act of 1970, the California Office of Emergency Service provides the basis for local emergency preparedness. The Office of Emergency Services is responsible for preparing the California State Emergency Plan and for coordinating and supporting emergency services conducted by local governments. The responsibility for immediate response to an emergency, such as fires, landslides, earthquakes or riots, rests with local government agencies and segments of the private sector, with support services provided by other jurisdictions and/or State and federal agencies. In accordance with their normal operating procedures, the initial response to an emergency will be made by local Fire, Law Enforcement, Medical or Maintenance (Public Works) districts or departments.

California Fire and Building Code

The 2025 Fire and Building Code establish the minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety, and general welfare for the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises, and to provide safety and assistance to firefighters and emergency responders during emergency operations. The provisions of this code apply to the construction, alteration, movement enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout the State of California.

Government Code Section 51175

Wildfires are extremely costly, not only to property owners and residents, but also to local agencies. Wildfires pose a serious threat to the preservation of public peace, health, or safety. The wildfire front is

not the only source of risk since embers, or firebrands, travel far beyond the area impacted by the front and pose a risk of ignition to a structure or fuel on a site for a longer time. Since fires ignore civil boundaries, it is necessary that cities, counties, special districts, State agencies, and federal agencies work together to bring raging fires under control. Preventive measures are therefore needed to ensure the preservation of public peace, health, or safety.

Local

Sutter County General Plan

The Sutter County General Plan contains the following goals and policies related to wildfire:

Public Safety Goals:

- *PS 3 - Minimize risk to life and property resulting from wildland fire hazards.*

Public Safety Policies:

- *PS 3.1 - Development Limitation. Limit development in areas of extreme, very high, and high wildfire risk.*

4.20.3 IMPACT ANALYSIS

a) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

No Impact. As discussed above, the Project is not located within a Very High Fire Hazard Severity Zone or SRA and is served by locally for fire protection. The Sutter County EOP includes two major evacuation routes near the Project area, SR 99 and SR 113. Implementation of the project would reduce potential hazards as the project would reduce risk of flooding which could impact these routes during an emergency. Therefore, there would be no impact.

b) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project due to slope, prevailing winds, and other factors, exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No Impact. As discussed above, the Project is not located within a Very High Fire Hazard Severity Zone or SRA and is served by locally for fire protection. The Project would not exacerbate wildfire risks and thereby expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire, due to slope, prevailing winds, and other factors. The Project site is located on relatively flat land without a major slope. In addition, the Project site is near multiple waterways such that would suppress potential spreading of any potential wildfires. Therefore, there would be no impact.

c) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No Impact. As discussed above, the Project is not located within a Very High Fire Hazard Severity Zone or SRA and is served by locally for fire protection. The Project would provide upgraded electrical utilities for

the modernized Karnak drainage facility as a part of the Project. Installation of new electrical facilities would be done in coordination with PG&E and would not result in impacts within a fire prone area, as the Project site is not located within a Very High Fire Hazard Severity Zone or SRA. Therefore, there would be no impact.

d) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No Impact. As discussed above, the Project is not located within a Very High Fire Hazard Severity Zone or SRA and is served by locally for fire protection. The Project would not expose people or structures, including downslope or downstream flooding or landslides as a result of runoff, post-fire slope instability, or drainage changes. The Project site is located on relatively flat ground and does not have major slope nearby. The Project itself is designed and would operate to further reduce the possibility of flooding within the area. Therefore, there would be no impact.

4.21 CEQA MANDATORY FINDINGS OF SIGNIFICANCE

Table 4-30: CEQA Mandatory Findings of Significance

Does the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) 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) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

4.21.1 STATEMENT OF FINDINGS

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

Less than Significant with Mitigation Incorporated. The analysis conducted in this IS/MND results in a determination that the Project, with incorporation of mitigation measures, would have a less than significant effect on the environment. The potential for impacts to biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, and tribal cultural resources from the implementation of the Project would be less than significant with the incorporation of the mitigation measures identified in this analysis. Accordingly, the 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 elimination of examples of a major period 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)?

Less than Significant Impact. CEQA Guidelines Section 15064(i) states that a Lead Agency shall consider whether the cumulative impact of a project is significant and whether the effects of the project are cumulatively considerable. The assessment of the significance of the cumulative effects of a project must, therefore, be conducted in connection with the effects of past projects, other current projects, and probable future projects. The Project involves the modernization of an existing pump drainage facility, the effects of which would not result in significant cumulatively considerable impacts. Implementation of the Project would not result in significant cumulative impacts, and all potential impacts would be less than significant through the implementation of basic regulatory requirements and Project design.

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

Less than Significant Impact. The analysis conducted in this IS/MND results in a determination that the Project would have a less than significant effect on the environment. All potential impacts to human beings have been found to be unsubstantial and would be considered less than significant.

CHAPTER 5 MITIGATION, MONITORING, AND REPORTING PROGRAM

This Mitigation Monitoring and Reporting Program (MMRP) has been formulated based upon the findings of the IS/MND for the Project. The MMRP lists mitigation measures recommended in the IS/MND for the Project and identifies monitoring and reporting requirements.

Table 5-1: Mitigation, Monitoring, and Reporting Program presents the mitigation measures identified for the Project. Each mitigation measure is numbered with a symbol indicating the topical section to which it pertains, a hyphen, and the impact number. For example, BIO-2 would be the second mitigation measure identified in the Air Quality analysis of the IS/MND.

The first column of Table 5-1: Mitigation, Monitoring, and Reporting Program identifies the mitigation measure. The second column, entitled "When Monitoring is to Occur," identifies the time the mitigation measure should be initiated. The third column, "Frequency of Monitoring," identifies the frequency of the monitoring of the mitigation measure. The fourth column, "Agency Responsible for Monitoring," names the party ultimately responsible for ensuring that the mitigation measure is implemented. The last columns will be used by the Lead and Responsible Agencies to ensure that individual mitigation measures have been complied with and monitored

In addition to the mitigation measures listed in Table 5-1: Mitigation, Monitoring, and Reporting Program, the Project shall comply with the BMPs listed in Section 4.4.2 and Section 4.10.2.

Table 5-1: Mitigation, Monitoring, and Reporting Program

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
Biological Resources						
BIO-1	The Project has the potential to impact special status plant species, including Wooly-Rose Marrow, Sanford's Arrow Head, and Suisun Marsh Aster. To avoid significant impacts to these species, the following mitigation measures will be implemented: (**Rare Plant Surveys**) Prior to construction commencing for any portion of the Project, rare plant surveys shall be conducted during the appropriate blooming periods by a qualified biologist. Should Wooly-Rose Marrow, Sanford's Arrowhead, or Suison Marsh Aster be identified within the APE, the Project shall comply with the recommendations of the qualified biologist. (**Avoidance**) If any special status plants are detected during the rare plant surveys, the Project should be designed to avoid direct (i.e. species removal) and indirect impacts to these populations. Avoidance of indirect impacts would entail establishing a suitable disturbance-free buffer of at least 25 to 50 feet from any special status plants. (**Relocation**) If it is not possible to avoid populations of rare plants identified within construction zones, a qualified biologist will remove all individual plants to be impacted and relocate them to suitable habitat in the vicinity of the planning area.	Prior to construction during blooming season	Once, prior to construction during blooming season	RD 1500 and/or construction contractor	Rare Plant survey memo	
BIO-2	The following mitigation measures will be implemented to mitigate potential impacts to green sturgeon, Chinook salmon, and white sturgeon: (**Avoidance**) Peak outmigration of sturgeon juveniles occurs during the spring and early summer. Peak outmigration of salmon and steelhead smolts occurs during the spring. Few,	During Construction Activities	Daily	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified biologist	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	if any juvenile sturgeon, salmon, or steelhead would be present in the Sacramento River or waters outside of Sutter Basin between August 15th and October 31st. Therefore, to the extent possible, all Project activities in the Sacramento River and waters outside of Sutter Basin will occur during that time frame, to avoid possible Project impacts to these species. (**Fish Rescue and Relocation**) Should Project activities be required to be conducted between November 1 and August 14 in the Sacramento River or waters outside of the Sutter basin, a fish rescue and relocation plan shall be prepared and implemented in consultation with the National Marine Fisheries Service (NMFS) to minimize impacts to these species.					
BIO-3	The following mitigation measures will be implemented to mitigate potential impacts to giant garter snakes: (**Pre-construction Surveys**) If work will occur during the active season for giant garter snake (between May 1 and September 30), a qualified biologist will conduct two giant garter snake pre-construction surveys of the APE (including any accessible suitable habitat adjacent to the APE) with the first occurring within 15 days and the second occurring within 24-hours of the onset of construction. The information collected from this first pre-construction survey will serve primarily to alert the biologist and construction crews of the general level of giant garter snake activity at the site, and the second survey will serve to minimize potential for take of giant garter snakes (**Education Program**) Prior to any work occurring within the APE, an education program shall be prepared and delivered by a qualified biologist to	Prior to and During Construction Activities	Daily during Construction Activities	RD 1500 and/or construction contractor	Daily inspection reports	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	all personnel working on the site. It shall include a description on the regulations protecting this species, implications for impacting this species, the biology of this species, and who to contact should personnel potentially observe this species. (**Exclusion**) If work will occur during the inactive season for giant garter snake (between October 1 and April 30), an exclusion fence will be installed around the work areas prior to the start of the inactive season. The design of the fence will be approved by the CDFW and USFWS prior to installation. Fence installation will be supervised by a qualified biologist. (**Monitoring**) A qualified biological monitor will inspect the exclusion fence each day to ensure it is functional for the intended purpose and monitor all in-water construction activities. The biologist will conduct a daily survey of the Project site (morning). The purpose of daily monitoring is to ensure that the exclusion fence remains in good repair as long as construction is occurring at the Project site. Any wildlife, including giant garter snakes, observed in the Project area will be allowed to passively leave the site. (**Vegetation Removal**) Clearing of herbaceous vegetation (i.e., grasses and forbs) will be confined to the minimal area necessary to facilitate construction activities and preserve native vegetation.					
BIO-4	The following mitigation measures will be implemented to mitigate potential impacts to western pond turtles: (**Pre-construction Survey**) Within 24 hours of the start of construction activities, a qualified biologist will complete a preconstruction survey for western pond turtle.	Prior to and During Construction Activities	Daily during Construction Activities	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified biologist	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	(**Avoidance**) Should any western pond turtles be observed on the site, they shall be allowed to leave the Project on their own.					
BIO-5	The following mitigation measures will be implemented to mitigate potential impacts to Swainson's hawks: (**Avoidance**) In order to avoid Project-related "take" of Swainson's hawk, Project-related activities will occur, where possible, outside of the Swainson's hawk nesting season, or between September 16th and the end of February. (**Establish Buffers**) Should any active Swainson's hawk nests be discovered within ½ mile of impact areas of the APE, the biologist will consult with CDFW to determine an appropriate construction setback distance. Construction-free buffers will be identified on the ground with flagging, fencing, or by other easily visible. (**Foraging Habitat Compensation**) Should any active Swainson's hawk nests be discovered within ½ mile of impact areas of the APE, and the Project may remove any potential foraging habitat for Swainson's hawk (i.e. agricultural fields suitable for foraging or unknown upland habitats), an amount of habitat management land, to be determined in consultation with CDFW, shall be required to mitigate for loss of Swainson's hawk foraging habitat. The amount of habitat management land set aside for impacts to Swainson's hawk foraging habitat may range from 0.5 – 1.0 acres of habitat management for every acre of Swainson's hawk foraging habitat removed by the Project.	During Construction Activities	Daily	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified biologist	
BIO-6	The following mitigation measures will be implemented to mitigate potential impacts to burrowing owls:	During Construction Activities	Daily	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified biologist	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	(**Take Avoidance Surveys**). Take avoidance surveys for burrowing owls shall be conducted by a qualified biologist within 30 days prior to the start of construction and activities involving ground disturbance. The surveys will be conducted according to methods described in the Staff Report on Burrowing Owl Mitigation (CDFG 2012). Each survey is to cover the work area(s) in question and adjacent lands within 200 meters, where potential nesting or roosting habitat is present ("survey area"). (**Avoidance of Nest Burrows**). If construction or ground-disturbing activities are to occur during the breeding season (February 1-August 31) and active nest burrows are identified within the survey area, a disturbance-free buffer will be established by a qualified biologist around each burrow, following the Staff Report on Burrowing Owl Mitigation (CDFG 2012). The buffers will be enclosed with temporary fencing to prevent encroachment by construction equipment and workers. Buffers will remain in place for the duration of the breeding season, unless otherwise arranged with CDFW. After the breeding season, passive relocation of any remaining owls may take place as described below. (**Avoidance or Passive Relocation of Resident Owls**). During the non-breeding season (September 1-January 31), resident owls occupying burrows in work areas associated with construction or ground-disturbing activities may either be avoided, or passively relocated to alternative habitat. If the applicant chooses to avoid active owl burrows within the work area during the non-breeding season, a 50-meter disturbance-free buffer will be established					

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	around these burrows. 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.					
BIO-7	The following mitigation measures will be implemented to mitigate potential impacts to Nesting Bank Swallow, Western Yellow-billed Cuckoo, Tricolored Blackbird, Northern Harrier, White-tailed Kite, Modesto Song Sparrow, Long-eared Owl, Short-eared Owl, Loggerhead Shrike and other Nesting Raptors and Migratory Birds: (**Avoidance**) When possible, Project construction activities will occur outside of the February 1-August 31 avian nesting season such that Project activities will have no potential to disrupt active nests. (**Preconstruction Surveys**) If Project construction activities must occur during the nesting season, a qualified biologist will conduct preconstruction surveys for active nests within 14 days of the onset of these activities. The survey will include the proposed work area(s) and surrounding lands within 500 feet. If no active nests are found within the survey area, no further mitigation would be required. (**Special Status Bird Nest Consultation, Nest Buffers, and other Minimization or Mitigation Measures**) Should any active nests of federal or State threatened or endangered birds be discovered on or near proposed work areas, a qualified biologist will consult with the CDFW and/or USFWS (depending on their listing status)	During Construction Activities	Daily	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified biologist	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	to determine an appropriate disturbance-free nest buffer and any other minimization or mitigation measures. Should any nests of nests of bird species of special concern be discovered near proposed work areas, a qualified biologist will determine an appropriate disturbance-free nest buffer and any other minimization or mitigation measures. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist has determined that the young have fledged. (**Other Nesting Raptor and Migratory Bird Nest Buffers**) Should the active nests of any non-special-status birds or raptors be discovered near proposed work areas, a qualified biologist will determine appropriate no-disturbance nest buffers based on applicable CDFW guidelines and/or the biology of the affected species. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist has determined that the young have fledged.					
BIO-8	The following mitigation measures will be implemented to mitigate potential impacts to Townsend's big-eared bat, pallid bat, western red bat, and other roosting bats: (**Preconstruction Survey**) Prior to Project activities that will impact potentially suitable roosting habitat for special-status bats (e.g. removal or modification of buildings or bridges, removal of shrubs or trees) a qualified biologist will conduct preconstruction surveys within 14 days of the onset of these activities. The surveys will include inspecting any suitable roost sites for bat sign (guano, etc.) and completing an acoustic	During Construction Activities	Daily	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified biologist	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	monitoring survey and evening emergence survey at all locations suitable for bats, as determined by the qualified biologist. The bat acoustic monitoring survey will include setting up bat detectors adjacent to the suitable structures the afternoon before the emergence survey, which will be left in place for at least two nights, and will be used to determine which species are utilizing the area. The evening emergence surveys will include watching for bats emerging from suitable structures over two consecutive nights. If no emerging bats are found within the survey area, no further mitigation would be required. (**Avoidance, Consultation, and/or Establish Buffers**) Should active roosts for special-status bats be observed, or active roosts for other bat species are observed during the bat winter roosting season (November 1 through April 15) or maternity roosting season (May 15 through August 15), these bat roosts will be avoided and buffers will be established. If any active special-status bat roosts are discovered near proposed work areas, the biologist will consult with CDFW to determine appropriate disturbance-free setback distances and other minimization measures. Should any other bat winter or maternal roosts be discovered near proposed work areas, the biologist will determine appropriate disturbance-free setback distances. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist and/or CDFW has determined the roost is no longer active. (**Exclusion**) Should active roosts for bats be identified, bats may be excluded from occupied					

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	features outside of the bat winter roosting season (August 15-November 1) and maternity roosting season (April 15-May 15 and). An exclusion plan would be developed in consultation with CDFW for any special-status bat roosts, and may include compensation, exclusion methods, and roost removal methods to safely exclude roosting bats from the roosting structure to be removed, monitoring the roost during eviction, and a discussion of type, amount, and distance of suitable habitat near the habitat to be removed. Should any other bat winter or maternal roosts be discovered near proposed work areas, the biologist will develop the exclusion plan. Exclusion methods may include the use of one-way doors at roost entrances, or sealing roost entrances when a site can be confirmed to contain no bats.					
BIO-9	The following mitigation measures will be implemented to mitigate potential impacts to waters of the United States and other jurisdictional waters and wetlands: (**Delineation**) An aquatic resources delineation will be prepared for the Project area, to determine the boundaries of all potentially jurisdictional waters present. (**Minimization**) Based on the results of the aquatic resources delineation, the Project will be designed to minimize impacts to potentially jurisdictional waters to the maximum extent practicable while still achieving its goal of flood control. (**Permits**) If the final Project design requires impacts to areas of jurisdictional waters, permits under Section 404 and 401 of the Clean Water Act and a Streambed Alteration Agreement will be obtained for the Project, and the Project will	Before Construction Activities	Daily	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified biologist	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	adhere to all conditions of the permits, such as compensatory mitigation requirements, survey requirements, monitoring requirements, timing requirements and reporting requirements.					
BIO-10	The following mitigation measures will be implemented to mitigate potential impacts related to the degradation of water quality in seasonal drainages and downstream waters: (**Preparation of a Storm Water Pollution Prevention Plan**) The District will have a certified contractor prepare a Storm Water Pollution Prevention Plan (SWPPP) that includes erosion and sedimentation control Best Management Practices (BMP's) to protect water quality and measures to prevent contaminants from entering storm water. The plan would include, at a minimum, provisions that the limits of construction be defined and wattles or other appropriate erosion controls be placed downstream and/or downslope of areas where ground disturbance will occur, to prevent flows and/or surface runoff from causing erosion. The plan will also require all exposed graded slopes to be stabilized. (**Spill Containment and Material Storage**) The contractor shall store fuel used for contractor equipment and hazardous materials away from the APE. When possible, the contractor shall not refuel construction equipment when working adjacent to potential waters of the United States or State. If refueling is necessary near potential waters of the United States or State, the contractor shall use portable spill containment equipment or maintain a spill containment kit during construction.	Before and During Construction Activities	Weekly inspections and inspections prior to and following storm events	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified SWPPP developer and/or qualified SWPPP practitioner	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
BIO-11	The following mitigation measures will be implemented to mitigate potential impacts to mixed riparian forest habitat: (**Vegetation Survey**) Prior to Project construction, a qualified biologist will survey all mixed riparian forest habitat with the potential to be impacted by construction and will record the species, location, and diameter at breast height (DBH) of each tree and the general flora present within this habitat. Upon Project completion, a qualified biologist will survey the mixed riparian forest habitat again to determine if any of this habitat was impacted. (**Revegetation**) The District will prepare a revegetation plan to provide compensation for removal of any riparian trees and associated riparian vegetation. It will include replacement tree plantings at a ratio of 3:1 for trees with a DBH between 4 and 24 inches, and at a ratio of 10:1 for trees with a DBH greater than 24 inches. Associated species of Great Valley mixed riparian forest will also be included in the revegetation plan. The revegetation plan will also detail the methods for planting, irrigating, and maintaining any replacement revegetation planted. All plantings will be monitored annually for a minimum of five years.	Before, During, and After Construction Activities	Annually for five years after construction	RD 1500 and/or construction contractor	Annual Revegetation Monitoring Report	
Cultural Resources						
CUL-1	(**Archaeological Remains**) Should archeological remains or artifacts be unearthed during any stage of project activities, work in the area of the discovery shall cease until the area is evaluated by a qualified archaeologist. If mitigation is warranted, the Project proponent shall abide by recommendations of the archaeologist.	During Construction Activities	Daily during excavation and ground disturbance activities	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified archaeologist	
CUL-2	Proposed modifications to the exterior of PP1 shall conform with the Secretary of the Interior's	Before Construction Activities	Completion of Design Plans	RD 1500	RD 1500 with assistance of	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	Standards for Preservation and the Secretary of the Interior's Standards for the Treatment of Historic Properties as economically and technically feasible to realize the objectives of the proposed Project. Additionally, an architectural historian that meets the Secretary of the Interior's Professional Qualifications Standards for architectural history or a historic architect that meets the Secretary of the Interior's Professional Qualifications Standards for historic architecture shall be retained to review project Plans at concept, preliminary, and final design for compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.				a qualified historic architect	
CUL-3	New construction of the elevated electrical control building shall conform with the Secretary of the Interior's Standards for the Treatment of Historic Properties as economically and technically feasible to realize the objectives of the proposed Project. The Secretary of the Interior Standards for the Treatment of Historic Properties stipulates that new construction needs to be built in a manner that protects the integrity of the historic building(s) and the property's setting. It further stipulates that the massing, size, scale, and architectural features of new construction on the site of a historic building must be compatible with those of the historic building. When visible and in close proximity to historic buildings, the new construction must be subordinate to these buildings. New construction should also be distinct from the old and must not attempt to replicate historic buildings elsewhere on site to avoid creating a false sense of historic development. Additionally, an architectural historian that meets the Secretary of the Interior's Professional Qualifications Standards for architectural history or a historic architect that	Before Construction Activities	Completion of Design Plans	RD 1500	RD 1500 with assistance of a qualified historic architect	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	meets the Secretary of the Interior's Professional Qualifications Standards for historic architecture shall be retained to review Project plans at concept, preliminary, and final design for compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties. As the design of the new elevated electrical control building progresses, the exterior of the building will be styled to coordinate architecturally with the nearby historic Pumphouse No. 1 building.					
CUL-4	(Human Remains) In the event that human remains are discovered on the Project site, the Sutter County Coroner must be notified of that discovery (Health and Safety Code Section 7050.5) and all activities in the immediate area if the find or in any nearby area reasonably suspected of overlie adjacent human remains must cease until appropriate and lawful measures have been implemented. If the Coroner determines that the remains are not recent, but rather of Native American origin, the Coroner shall notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours to permit the NAHC to determine the most likely descendent of the deceased Native American.	During Construction Activities	Daily during excavation and ground disturbance activities	RD 1500 and/or construction contractor	RD 1500 with assistance of County Coroner	
CUL-5	Monitoring of PP2 and PP3 demolition activities by a qualified archaeologist and tribal monitor due to potential for discovery of human remains and/or cultural materials in the levees and any non-disturbed sediments will be coordinated with the potentially affected tribes.	During Demolition of PP2 and PP3	During demolition activities	RD 1500 and/or construction contractor	RD 1500 with assistance of qualified archaeologist and tribal monitor	
Geology and Soils						
GEO-1	Should a unique paleontological resource, site, or unique geological feature be unearthed during any stage of Project activities, work in the area of discovery will cease until the area is evaluated by a qualified geologist and/or paleontologist. If discoveries are uncovered, the Project proponent	During Construction Activities	Daily during excavation and ground disturbance activities	RD 1500 and/or construction contractor	RD 1500 with assistance of a qualified geologist and/or paleontologist	

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	will abide by recommendations of the geologist or paleontologist.					
Hazards and Hazardous Materials						
See **BIO-10**.						
Hydrology and Water Quality						
See **BIO-10**.						
Tribal Cultural Resources						
TCR-1	At least 30 days prior to the start of any ground-disturbing activities, the District shall notify the United Auburn Indian Community of the Auburn Rancheria to determine if the tribe would like to be present during ground-disturbing activities. If the tribe determines a monitor is required, the District shall retain a paid tribal monitor approved by the United Auburn Indian Community of the Auburn Rancheria. The monitor would only be present during ground-disturbing activities. The term "ground-disturbing activities" includes activities such as grading, excavation, trenching, clearing, and drilling within the Project site. If the tribal monitor determines the presence of cultural soils is negative, no additional monitoring would be required. All monitoring would cease following the completion of ground-disturbing activities	During Construction Activities	Daily during excavation and ground disturbance activities	RD 1500 and/or construction contractor	RD 1500 with assistance of County Coroner	
See **CUL-1** and **CUL-4**.						

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APPENDICES

Appendix A- Air Quality and Greenhouse Gas Model

RD 1500 Karnak Flood Control & Safety Rehab Project Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	RD 1500 Karnak Flood Control & Safety Rehab Project
Construction Start Date	5/6/2030
Operational Year	2031
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.60000
Precipitation (days)	37.6000
Location	38.78440353065676, -121.65530513870985
County	Sutter
City	Unincorporated
Air District	Feather River AQMD
Air Basin	Sacramento Valley
TAZ	308
EDFZ	4
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.41

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Light Industry	23.0250	1000sqft	0.53000	23,025.0	0.00000	0.00000	—	—

Other Non-Asphalt Surfaces	7.07000	Acre	7.07000	0.00000	0.00000	0.00000	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	18.4300	18.4092	24.3229	27.2666	0.04621	1.04431	5.26237	6.30668	0.96076	2.66216	3.62292	—	5,160.55	5,160.55	0.20503	0.04831	0.48328	5,179.84
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.16039	0.97187	8.53183	13.2726	0.02413	0.26158	0.12556	0.38714	0.24077	0.03060	0.27137	—	2,575.33	2,575.33	0.09956	0.03719	0.01062	2,588.92
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.32230	1.27035	5.14757	7.12043	0.01247	0.18165	0.31021	0.49186	0.16716	0.13680	0.30396	—	1,353.92	1,353.92	0.05253	0.01763	0.08173	1,360.57
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.24132	0.23184	0.93943	1.29948	0.00228	0.03315	0.05661	0.08976	0.03051	0.02497	0.05547	—	224.158	224.158	0.00870	0.00292	0.01353	225.258

2.2. Construction Emissions by Year

2.2.1. Total Construction Emissions by Year, Unmitigated

Includes both onsite and offsite emissions.

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	3.42105	2.87787	24.3229	27.2666	0.04621	1.04431	5.26237	6.30668	0.96076	2.66216	3.62292	—	5,160.55	5,160.55	0.20503	0.04831	0.48328	5,179.84
2031	18.4300	18.4092	8.23897	13.3329	0.02413	0.24470	0.12556	0.37026	0.22524	0.03060	0.25584	—	2,582.13	2,582.13	0.09892	0.03320	0.35672	2,594.85
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	1.16039	0.97187	8.53183	13.2726	0.02413	0.26158	0.12556	0.38714	0.24077	0.03060	0.27137	—	2,575.33	2,575.33	0.09956	0.03719	0.01062	2,588.92
2031	1.13217	0.94814	8.25152	13.2071	0.02413	0.24470	0.12556	0.37026	0.22524	0.03060	0.25584	—	2,570.93	2,570.93	0.09935	0.03625	0.00926	2,584.22
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	0.71109	0.59658	5.14757	7.12043	0.01247	0.18165	0.31021	0.49186	0.16716	0.13680	0.30396	—	1,353.92	1,353.92	0.05253	0.01763	0.08173	1,360.57
2031	1.32230	1.27035	2.31868	3.71134	0.00675	0.06804	0.03488	0.10292	0.06262	0.00849	0.07111	—	718.365	718.365	0.02767	0.01010	0.04346	722.111
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	0.12977	0.10888	0.93943	1.29948	0.00228	0.03315	0.05661	0.08976	0.03051	0.02497	0.05547	—	224.158	224.158	0.00870	0.00292	0.01353	225.258
2031	0.24132	0.23184	0.42316	0.67732	0.00123	0.01242	0.00637	0.01878	0.01143	0.00155	0.01298	—	118.934	118.934	0.00458	0.00167	0.00719	119.554

2.2.2. Onsite Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	3.36497	2.82751	24.2907	26.5137	0.04621	1.04431	5.11082	6.15513	0.96076	2.62664	3.58740	—	5,005.55	5,005.55	0.20305	0.04061	0.00000	5,022.72
2031	18.4231	18.4031	8.11856	12.8454	0.02340	0.24323	0.00000	0.24323	0.22377	0.00000	0.22377	—	2,396.83	2,396.83	0.09723	0.01945	0.00000	2,405.06
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	1.12372	0.94034	8.39196	12.8848	0.02340	0.26012	0.00000	0.26012	0.23931	0.00000	0.23931	—	2,396.83	2,396.83	0.09723	0.01945	0.00000	2,405.06

2031	1.09751	0.91839	8.11856	12.8454	0.02340	0.24323	0.00000	0.24323	0.22377	0.00000	0.22377	—	2,396.83	2,396.83	0.09723	0.01945	0.00000	2,405.06
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	0.69187	0.57996	5.09256	6.91088	0.01219	0.18106	0.24833	0.42939	0.16657	0.12187	0.28845	—	1,270.33	1,270.33	0.05153	0.01031	0.00000	1,274.69
2031	1.31232	1.26180	2.28272	3.60488	0.00655	0.06763	0.00000	0.06763	0.06222	0.00000	0.06222	—	668.673	668.673	0.02712	0.00542	0.00000	670.967
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	0.12627	0.10584	0.92939	1.26124	0.00222	0.03304	0.04532	0.07836	0.03040	0.02224	0.05264	—	210.317	210.317	0.00853	0.00171	0.00000	211.039
2031	0.23950	0.23028	0.41660	0.65789	0.00120	0.01234	0.00000	0.01234	0.01136	0.00000	0.01136	—	110.706	110.706	0.00449	0.00090	0.00000	111.086

2.2.3. Offsite Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	0.05930	0.05245	0.14262	0.77780	0.00073	0.00205	0.18029	0.18234	0.00205	0.04339	0.04544	—	248.449	248.449	0.00298	0.02052	0.48328	255.121
2031	0.03799	0.03320	0.12041	0.48750	0.00073	0.00146	0.12556	0.12703	0.00146	0.03060	0.03206	—	185.296	185.296	0.00170	0.01375	0.35672	189.793
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	0.03667	0.03154	0.13987	0.38786	0.00073	0.00146	0.12556	0.12703	0.00146	0.03060	0.03206	—	178.500	178.500	0.00233	0.01775	0.01062	183.857
2031	0.03467	0.02975	0.13296	0.36176	0.00073	0.00146	0.12556	0.12703	0.00146	0.03060	0.03206	—	174.098	174.098	0.00212	0.01680	0.00926	179.167
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	0.01921	0.01662	0.05501	0.20955	0.00028	0.00059	0.06188	0.06247	0.00059	0.01493	0.01552	—	83.5978	83.5978	0.00100	0.00732	0.08173	85.8870
2031	0.00998	0.00855	0.03596	0.10646	0.00020	0.00040	0.03488	0.03529	0.00040	0.00849	0.00889	—	49.6928	49.6928	0.00054	0.00468	0.04346	51.1433
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2030	0.00351	0.00303	0.01004	0.03824	0.00005	0.00011	0.01129	0.01140	0.00011	0.00272	0.00283	—	13.8406	13.8406	0.00016	0.00121	0.01353	14.2196
2031	0.00182	0.00156	0.00656	0.01943	0.00004	0.00007	0.00637	0.00644	0.00007	0.00155	0.00162	—	8.22721	8.22721	0.00009	0.00077	0.00719	8.46735

2.3. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.31157	1.25145	0.70518	5.12310	0.01183	0.02953	0.90988	0.93942	0.02863	0.23148	0.26011	25.5903	1,496.23	1,521.82	2.66367	0.07681	8.18113	1,619.48
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.09505	1.04752	0.76839	3.42741	0.01092	0.02776	0.90988	0.93764	0.02729	0.23148	0.25877	25.5903	1,405.69	1,431.28	2.66741	0.08042	6.05024	1,527.98
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.14744	1.09703	0.69749	3.62755	0.01026	0.02787	0.80666	0.83454	0.02724	0.20531	0.23255	25.5903	1,337.22	1,362.81	2.66236	0.07399	6.85148	1,458.27
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.20941	0.20021	0.12729	0.66203	0.00187	0.00509	0.14722	0.15230	0.00497	0.03747	0.04244	4.23677	221.393	225.629	0.44078	0.01225	1.13434	241.434

2.4. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.44167	0.40940	0.44035	3.90631	0.01023	0.00827	0.90988	0.91815	0.00780	0.23148	0.23928	—	1,043.94	1,043.94	0.02931	0.04855	2.18762	1,061.33
Area	0.84169	0.82795	0.00843	1.00142	0.00006	0.00178	—	0.00178	0.00134	—	0.00134	—	4.11794	4.11794	0.00017	0.00004	—	4.13279
Energy	0.02820	0.01410	0.25640	0.21538	0.00154	0.01949	—	0.01949	0.01949	—	0.01949	—	438.853	438.853	0.04858	0.00318	—	441.016
Water	—	—	—	—	—	—	—	—	—	—	—	10.2031	9.31923	19.5223	1.04771	0.02504	—	53.1771
Waste	—	—	—	—	—	—	—	—	—	—	—	15.3872	0.00000	15.3872	1.53790	0.00000	—	53.8347
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.99351	5.99351

Total	1.31157	1.25145	0.70518	5.12310	0.01183	0.02953	0.90988	0.93942	0.02863	0.23148	0.26011	25.5903	1,496.23	1,521.82	2.66367	0.07681	8.18113	1,619.48
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.40347	0.37004	0.51199	3.21203	0.00938	0.00827	0.90988	0.91815	0.00781	0.23148	0.23929	—	957.521	957.521	0.03321	0.05220	0.05673	973.963
Area	0.66338	0.66338	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.02820	0.01410	0.25640	0.21538	0.00154	0.01949	—	0.01949	0.01949	—	0.01949	—	438.853	438.853	0.04858	0.00318	—	441.016
Water	—	—	—	—	—	—	—	—	—	—	—	10.2031	9.31923	19.5223	1.04771	0.02504	—	53.1771
Waste	—	—	—	—	—	—	—	—	—	—	—	15.3872	0.00000	15.3872	1.53790	0.00000	—	53.8347
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.99351	5.99351
Total	1.09505	1.04752	0.76839	3.42741	0.01092	0.02776	0.90988	0.93764	0.02729	0.23148	0.25877	25.5903	1,405.69	1,431.28	2.66741	0.08042	6.05024	1,527.98
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.36792	0.33839	0.43694	2.91832	0.00869	0.00751	0.80666	0.81417	0.00709	0.20531	0.21240	—	887.021	887.021	0.02808	0.04575	0.85797	902.213
Area	0.75131	0.74453	0.00416	0.49385	0.00003	0.00088	—	0.00088	0.00066	—	0.00066	—	2.03077	2.03077	0.00009	0.00002	—	2.03809
Energy	0.02820	0.01410	0.25640	0.21538	0.00154	0.01949	—	0.01949	0.01949	—	0.01949	—	438.853	438.853	0.04858	0.00318	—	441.016
Water	—	—	—	—	—	—	—	—	—	—	—	10.2031	9.31923	19.5223	1.04771	0.02504	—	53.1771
Waste	—	—	—	—	—	—	—	—	—	—	—	15.3872	0.00000	15.3872	1.53790	0.00000	—	53.8347
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.99351	5.99351
Total	1.14744	1.09703	0.69749	3.62755	0.01026	0.02787	0.80666	0.83454	0.02724	0.20531	0.23255	25.5903	1,337.22	1,362.81	2.66236	0.07399	6.85148	1,458.27
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.06715	0.06176	0.07974	0.53259	0.00159	0.00137	0.14722	0.14859	0.00129	0.03747	0.03876	—	146.856	146.856	0.00465	0.00757	0.14205	149.372
Area	0.13711	0.13588	0.00076	0.09013	0.00001	0.00016	—	0.00016	0.00012	—	0.00012	—	0.33622	0.33622	0.00001	< 0.000005	—	0.33743
Energy	0.00515	0.00257	0.04679	0.03931	0.00028	0.00356	—	0.00356	0.00356	—	0.00356	—	72.6571	72.6571	0.00804	0.00053	—	73.0152
Water	—	—	—	—	—	—	—	—	—	—	—	1.68923	1.54290	3.23214	0.17346	0.00415	—	8.80408
Waste	—	—	—	—	—	—	—	—	—	—	—	2.54753	0.00000	2.54753	0.25462	0.00000	—	8.91295
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.99229	0.99229
Total	0.20941	0.20021	0.12729	0.66203	0.00187	0.00509	0.14722	0.15230	0.00497	0.03747	0.04244	4.23677	221.393	225.629	0.44078	0.01225	1.13434	241.434

3. Construction Emissions Details

3.1. Demolition (2030)

3.1.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.48435	2.08511	18.1258	18.6740	0.03253	0.71801	—	0.71801	0.66057	—	0.66057	—	3,426.32	3,426.32	0.13899	0.02780	—	3,438.08
Demolition	—	—	—	—	—	—	0.13513	0.13513	—	0.02046	0.02046	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13613	0.11425	0.99319	1.02323	0.00178	0.03934	—	0.03934	0.03620	—	0.03620	—	187.744	187.744	0.00762	0.00152	—	188.388
Demolition	—	—	—	—	—	—	0.00740	0.00740	—	0.00112	0.00112	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	0.02484	0.02085	0.18126	0.18674	0.00033	0.00718	—	0.00718	0.00661	—	0.00661	—	31.0831	31.0831	0.00126	0.00025	—	31.1898
Demolition	—	—	—	—	—	—	0.00135	0.00135	—	0.00020	0.00020	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.1.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05609	0.05036	0.03224	0.75289	0.00000	0.00000	0.15155	0.15155	0.00000	0.03552	0.03552	—	155.007	155.007	0.00198	0.00572	0.35232	157.114
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00321	0.00208	0.11037	0.02491	0.00072	0.00205	0.02874	0.03079	0.00205	0.00787	0.00992	—	93.4420	93.4420	0.00099	0.01480	0.13096	98.0070
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00280	0.00247	0.00206	0.03099	0.00000	0.00000	0.00810	0.00810	0.00000	0.00190	0.00190	—	7.73082	7.73082	0.00013	0.00031	0.00834	7.83575
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00017	0.00011	0.00639	0.00138	0.00004	0.00011	0.00155	0.00166	0.00011	0.00042	0.00054	—	5.12194	5.12194	0.00005	0.00081	0.00310	5.36801
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00051	0.00045	0.00038	0.00566	0.00000	0.00000	0.00148	0.00148	0.00000	0.00035	0.00035	—	1.27993	1.27993	0.00002	0.00005	0.00138	1.29730
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00003	0.00002	0.00117	0.00025	0.00001	0.00002	0.00028	0.00030	0.00002	0.00008	0.00010	—	0.84800	0.84800	0.00001	0.00013	0.00051	0.88873

3.2. Site Preparation (2030)

3.2.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.36497	2.82751	24.2907	26.5137	0.04621	1.04431	—	1.04431	0.96076	—	0.96076	—	5,005.55	5,005.55	0.20305	0.04061	—	5,022.72
Dust From Material Movement	—	—	—	—	—	—	5.11082	5.11082	—	2.62664	2.62664	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09219	0.07747	0.66550	0.72640	0.00127	0.02861	—	0.02861	0.02632	—	0.02632	—	137.138	137.138	0.00556	0.00111	—	137.609
Dust From Material Movement	—	—	—	—	—	—	0.14002	0.14002	—	0.07196	0.07196	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01682	0.01414	0.12145	0.13257	0.00023	0.00522	—	0.00522	0.00480	—	0.00480	—	22.7048	22.7048	0.00092	0.00018	—	22.7827

Dust From Material Movement	—	—	—	—	—	—	0.02555	0.02555	—	0.01313	0.01313	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.2.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05609	0.05036	0.03224	0.75289	0.00000	0.00000	0.15155	0.15155	0.00000	0.03552	0.03552	—	155.007	155.007	0.00198	0.00572	0.35232	157.114
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00140	0.00123	0.00103	0.01550	0.00000	0.00000	0.00405	0.00405	0.00000	0.00095	0.00095	—	3.86541	3.86541	0.00006	0.00016	0.00417	3.91787
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00026	0.00023	0.00019	0.00283	0.00000	0.00000	0.00074	0.00074	0.00000	0.00017	0.00017	—	0.63996	0.63996	0.00001	0.00003	0.00069	0.64865
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.3. Grading (2030)

3.3.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.75769	1.47695	12.6160	17.3443	0.02732	0.51272	—	0.51272	0.47171	—	0.47171	—	2,958.97	2,958.97	0.12003	0.02401	—	2,969.13
Dust From Material Movement	—	—	—	—	—	—	1.84147	1.84147	—	0.89043	0.89043	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09631	0.08093	0.69129	0.95037	0.00150	0.02809	—	0.02809	0.02585	—	0.02585	—	162.136	162.136	0.00658	0.00132	—	162.692
Dust From Material Movement	—	—	—	—	—	—	0.10090	0.10090	—	0.04879	0.04879	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01758	0.01477	0.12616	0.17344	0.00027	0.00513	—	0.00513	0.00472	—	0.00472	—	26.8434	26.8434	0.00109	0.00022	—	26.9355

Dust From Material Movement	—	—	—	—	—	—	0.01841	0.01841	—	0.00890	0.00890	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.3.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05609	0.05036	0.03224	0.75289	0.00000	0.00000	0.15155	0.15155	0.00000	0.03552	0.03552	—	155.007	155.007	0.00198	0.00572	0.35232	157.114
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00280	0.00247	0.00206	0.03099	0.00000	0.00000	0.00810	0.00810	0.00000	0.00190	0.00190	—	7.73082	7.73082	0.00013	0.00031	0.00834	7.83575
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00051	0.00045	0.00038	0.00566	0.00000	0.00000	0.00148	0.00148	0.00000	0.00035	0.00035	—	1.27993	1.27993	0.00002	0.00005	0.00138	1.29730
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.4. Building Construction (2030)

3.4.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.12372	0.94034	8.39196	12.8848	0.02340	0.26012	—	0.26012	0.23931	—	0.23931	—	2,396.83	2,396.83	0.09723	0.01945	—	2,405.06
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.12372	0.94034	8.39196	12.8848	0.02340	0.26012	—	0.26012	0.23931	—	0.23931	—	2,396.83	2,396.83	0.09723	0.01945	—	2,405.06
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36724	0.30731	2.74258	4.21087	0.00765	0.08501	—	0.08501	0.07821	—	0.07821	—	783.309	783.309	0.03177	0.00635	—	785.998
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06702	0.05608	0.50052	0.76848	0.00140	0.01551	—	0.01551	0.01427	—	0.01427	—	129.686	129.686	0.00526	0.00105	—	130.131
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.4.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03616	0.03247	0.02079	0.48539	0.00000	0.00000	0.09771	0.09771	0.00000	0.02290	0.02290	—	99.9330	99.9330	0.00128	0.00369	0.22714	101.291
Vendor	0.00396	0.00265	0.10327	0.03463	0.00073	0.00146	0.02786	0.02932	0.00146	0.00770	0.00916	—	89.9801	89.9801	0.00042	0.01384	0.18217	94.2982
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03296	0.02906	0.02816	0.35182	0.00000	0.00000	0.09771	0.09771	0.00000	0.02290	0.02290	—	88.4030	88.4030	0.00192	0.00390	0.00589	89.6195
Vendor	0.00371	0.00248	0.11170	0.03604	0.00073	0.00146	0.02786	0.02932	0.00146	0.00770	0.00916	—	90.0967	90.0967	0.00042	0.01384	0.00473	94.2374
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01077	0.00950	0.00793	0.11918	0.00000	0.00000	0.03116	0.03116	0.00000	0.00729	0.00729	—	29.7264	29.7264	0.00049	0.00121	0.03206	30.1298
Vendor	0.00127	0.00084	0.03554	0.01151	0.00024	0.00048	0.00892	0.00940	0.00048	0.00247	0.00295	—	29.4224	29.4224	0.00014	0.00452	0.02573	30.7998
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00197	0.00173	0.00145	0.02175	0.00000	0.00000	0.00569	0.00569	0.00000	0.00133	0.00133	—	4.92154	4.92154	0.00008	0.00020	0.00531	4.98833
Vendor	0.00023	0.00015	0.00649	0.00210	0.00004	0.00009	0.00163	0.00171	0.00009	0.00045	0.00054	—	4.87121	4.87121	0.00002	0.00075	0.00426	5.09926
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.5. Building Construction (2031)

3.5.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.09751	0.91839	8.11856	12.8454	0.02340	0.24323	—	0.24323	0.22377	—	0.22377	—	2,396.83	2,396.83	0.09723	0.01945	—	2,405.06
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.09751	0.91839	8.11856	12.8454	0.02340	0.24323	—	0.24323	0.22377	—	0.22377	—	2,396.83	2,396.83	0.09723	0.01945	—	2,405.06
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.30283	0.25341	2.24015	3.54442	0.00646	0.06711	—	0.06711	0.06175	—	0.06175	—	661.357	661.357	0.02683	0.00537	—	663.626
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05527	0.04625	0.40883	0.64686	0.00118	0.01225	—	0.01225	0.01127	—	0.01127	—	109.495	109.495	0.00444	0.00089	—	109.871
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.5.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03403	0.03055	0.02057	0.45369	0.00000	0.00000	0.09771	0.09771	0.00000	0.02290	0.02290	—	98.2461	98.2461	0.00128	0.00064	0.19967	98.6684
Vendor	0.00396	0.00265	0.09984	0.03381	0.00073	0.00146	0.02786	0.02932	0.00146	0.00770	0.00916	—	87.0502	87.0502	0.00042	0.01311	0.15704	91.1250
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03104	0.02735	0.02469	0.32670	0.00000	0.00000	0.09771	0.09771	0.00000	0.02290	0.02290	—	86.9308	86.9308	0.00171	0.00369	0.00519	88.0778
Vendor	0.00363	0.00240	0.10827	0.03506	0.00073	0.00146	0.02786	0.02932	0.00146	0.00770	0.00916	—	87.1670	87.1670	0.00042	0.01311	0.00407	91.0888
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00857	0.00755	0.00664	0.09327	0.00000	0.00000	0.02631	0.02631	0.00000	0.00616	0.00616	—	24.6794	24.6794	0.00041	0.00102	0.02382	25.0168
Vendor	0.00107	0.00071	0.02906	0.00949	0.00020	0.00040	0.00753	0.00793	0.00040	0.00208	0.00249	—	24.0332	24.0332	0.00011	0.00362	0.01869	25.1329
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00156	0.00138	0.00121	0.01702	0.00000	0.00000	0.00480	0.00480	0.00000	0.00112	0.00112	—	4.08595	4.08595	0.00007	0.00017	0.00394	4.14181
Vendor	0.00020	0.00013	0.00530	0.00173	0.00004	0.00007	0.00137	0.00145	0.00007	0.00038	0.00045	—	3.97897	3.97897	0.00002	0.00060	0.00309	4.16104
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.6. Architectural Coating (2031)

3.6.1. Onsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.11542	0.09539	0.77690	1.10346	0.00173	0.00943	—	0.00943	0.00867	—	0.00867	—	133.518	133.518	0.00542	0.00108	—	133.976
Architectural Coatings	18.3077	18.3077	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00632	0.00523	0.04257	0.06046	0.00009	0.00052	—	0.00052	0.00048	—	0.00048	—	7.31604	7.31604	0.00030	0.00006	—	7.34114
Architectural Coatings	1.00316	1.00316	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.00115	0.00095	0.00777	0.01103	0.00002	0.00009	—	0.00009	0.00009	—	0.00009	—	1.21125	1.21125	0.00005	0.00001	—	1.21541
Architectural Coatings	0.18308	0.18308	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

3.6.2. Offsite - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00681	0.00611	0.00411	0.09074	0.00000	0.00000	0.01954	0.01954	0.00000	0.00458	0.00458	—	19.6492	19.6492	0.00026	0.00013	0.03993	19.7337
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00034	0.00030	0.00026	0.00370	0.00000	0.00000	0.00104	0.00104	0.00000	0.00024	0.00024	—	0.98017	0.98017	0.00002	0.00004	0.00095	0.99357
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00006	0.00005	0.00005	0.00068	0.00000	0.00000	0.00019	0.00019	0.00000	0.00004	0.00004	—	0.16228	0.16228	< 0.000005	0.00001	0.00016	0.16450
Vendor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Hauling	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.44167	0.40940	0.44035	3.90631	0.01023	0.00827	0.90988	0.91815	0.00780	0.23148	0.23928	—	1,043.94	1,043.94	0.02931	0.04855	2.18762	1,061.33
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.44167	0.40940	0.44035	3.90631	0.01023	0.00827	0.90988	0.91815	0.00780	0.23148	0.23928	—	1,043.94	1,043.94	0.02931	0.04855	2.18762	1,061.33
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.40347	0.37004	0.51199	3.21203	0.00938	0.00827	0.90988	0.91815	0.00781	0.23148	0.23929	—	957.521	957.521	0.03321	0.05220	0.05673	973.963
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.40347	0.37004	0.51199	3.21203	0.00938	0.00827	0.90988	0.91815	0.00781	0.23148	0.23929	—	957.521	957.521	0.03321	0.05220	0.05673	973.963
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.06715	0.06176	0.07974	0.53259	0.00159	0.00137	0.14722	0.14859	0.00129	0.03747	0.03876	—	146.856	146.856	0.00465	0.00757	0.14205	149.372
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.06715	0.06176	0.07974	0.53259	0.00159	0.00137	0.14722	0.14859	0.00129	0.03747	0.03876	—	146.856	146.856	0.00465	0.00757	0.14205	149.372

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	132.923	132.923	0.02150	0.00261	—	134.237
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	132.923	132.923	0.02150	0.00261	—	134.237
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	132.923	132.923	0.02150	0.00261	—	134.237
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	132.923	132.923	0.02150	0.00261	—	134.237
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	22.0069	22.0069	0.00356	0.00043	—	22.2245
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	—	22.0069	22.0069	0.00356	0.00043	—	22.2245

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.02820	0.01410	0.25640	0.21538	0.00154	0.01949	—	0.01949	0.01949	—	0.01949	—	305.930	305.930	0.02707	0.00058	—	306.779
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	0.02820	0.01410	0.25640	0.21538	0.00154	0.01949	—	0.01949	0.01949	—	0.01949	—	305.930	305.930	0.02707	0.00058	—	306.779
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.02820	0.01410	0.25640	0.21538	0.00154	0.01949	—	0.01949	0.01949	—	0.01949	—	305.930	305.930	0.02707	0.00058	—	306.779
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	0.02820	0.01410	0.25640	0.21538	0.00154	0.01949	—	0.01949	0.01949	—	0.01949	—	305.930	305.930	0.02707	0.00058	—	306.779
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.00515	0.00257	0.04679	0.03931	0.00028	0.00356	—	0.00356	0.00356	—	0.00356	—	50.6502	50.6502	0.00448	0.00010	—	50.7907
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000	0.00000	—	0.00000	—	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	0.00515	0.00257	0.04679	0.03931	0.00028	0.00356	—	0.00356	0.00356	—	0.00356	—	50.6502	50.6502	0.00448	0.00010	—	50.7907

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.51696	0.51696	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.14642	0.14642	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.17831	0.16457	0.00843	1.00142	0.00006	0.00178	—	0.00178	0.00134	—	0.00134	—	4.11794	4.11794	0.00017	0.00004	—	4.13279
Total	0.84169	0.82795	0.00843	1.00142	0.00006	0.00178	—	0.00178	0.00134	—	0.00134	—	4.11794	4.11794	0.00017	0.00004	—	4.13279
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.51696	0.51696	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.14642	0.14642	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.66338	0.66338	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.09434	0.09434	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.02672	0.02672	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape	0.01605	0.01481	0.00076	0.09013	0.00001	0.00016	—	0.00016	0.00012	—	0.00012	—	0.33622	0.33622	0.00001	< 0.000005	—	0.33743
Total	0.13711	0.13588	0.00076	0.09013	0.00001	0.00016	—	0.00016	0.00012	—	0.00012	—	0.33622	0.33622	0.00001	< 0.000005	—	0.33743

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	10.2031	9.31923	19.5223	1.04771	0.02504	—	53.1771
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	10.2031	9.31923	19.5223	1.04771	0.02504	—	53.1771
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	10.2031	9.31923	19.5223	1.04771	0.02504	—	53.1771
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	10.2031	9.31923	19.5223	1.04771	0.02504	—	53.1771
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	1.68923	1.54290	3.23214	0.17346	0.00415	—	8.80408

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	1.68923	1.54290	3.23214	0.17346	0.00415	—	8.80408

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	15.3872	0.00000	15.3872	1.53790	0.00000	—	53.8347
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	15.3872	0.00000	15.3872	1.53790	0.00000	—	53.8347
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	15.3872	0.00000	15.3872	1.53790	0.00000	—	53.8347
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	15.3872	0.00000	15.3872	1.53790	0.00000	—	53.8347
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	2.54753	0.00000	2.54753	0.25462	0.00000	—	8.91295

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00000	0.00000	0.00000	0.00000	0.00000	—	0.00000
Total	—	—	—	—	—	—	—	—	—	—	—	2.54753	0.00000	2.54753	0.25462	0.00000	—	8.91295

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.99351	5.99351
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.99351	5.99351
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.99351	5.99351
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.99351	5.99351
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.99229	0.99229
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.99229	0.99229

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	5/6/2030	5/31/2030	5.00000	20.0000	—
Site Preparation	Site Preparation	6/4/2030	6/17/2030	5.00000	10.00000	—
Grading	Grading	6/19/2030	7/17/2030	5.00000	20.0000	—
Building Construction	Building Construction	7/18/2030	5/21/2031	5.00000	220.000	—
Architectural Coating	Architectural Coating	5/22/2031	6/18/2031	5.00000	20.0000	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Average	1.000000	8.00000	33.0000	0.73000
Demolition	Excavators	Diesel	Average	3.00000	8.00000	36.0000	0.38000
Demolition	Rubber Tired Dozers	Diesel	Average	2.00000	8.00000	367.000	0.40000
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00000	8.00000	367.000	0.40000
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	3.00000	8.00000	84.0000	0.37000
Grading	Excavators	Diesel	Average	1.000000	8.00000	36.0000	0.38000
Grading	Graders	Diesel	Average	1.000000	8.00000	148.000	0.41000
Grading	Rubber Tired Dozers	Diesel	Average	1.000000	8.00000	367.000	0.40000
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00000	8.00000	84.0000	0.37000
Building Construction	Cranes	Diesel	Average	1.000000	7.00000	367.000	0.29000
Building Construction	Forklifts	Diesel	Average	3.00000	8.00000	82.0000	0.20000
Building Construction	Generator Sets	Diesel	Average	1.000000	8.00000	14.0000	0.74000
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00000	7.00000	84.0000	0.37000
Building Construction	Welders	Diesel	Average	1.000000	8.00000	46.0000	0.45000
Architectural Coating	Air Compressors	Diesel	Average	1.000000	6.00000	37.0000	0.48000

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	Worker	15.0000	14.3000	LDA,LDT1,LDT2
Demolition	Vendor	—	8.80000	HHDT,MHDT
Demolition	Hauling	1.55000	20.0000	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	Worker	15.0000	14.3000	LDA,LDT1,LDT2
Site Preparation	Vendor	—	8.80000	HHDT,MHDT
Site Preparation	Hauling	0.00000	20.0000	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	Worker	15.0000	14.3000	LDA,LDT1,LDT2
Grading	Vendor	—	8.80000	HHDT,MHDT
Grading	Hauling	0.00000	20.0000	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	Worker	9.67050	14.3000	LDA,LDT1,LDT2
Building Construction	Vendor	3.77380	8.80000	HHDT,MHDT
Building Construction	Hauling	0.00000	20.0000	HHDT
Building Construction	Onsite truck	—	—	HHDT
Architectural Coating	Worker	1.93410	14.3000	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	8.80000	HHDT,MHDT
Architectural Coating	Hauling	0.00000	20.0000	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00000	0.00000	39,487.5	13,162.5	0.00000

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)
Demolition	0.00000	0.00000	0.00000	2,625.00	0.00000
Site Preparation	—	—	15.0000	0.00000	0.00000
Grading	—	—	20.0000	0.00000	0.00000

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	3	74%	74%

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2030	0.00000	203.983	0.03300	0.00400
2031	0.00000	203.983	0.03300	0.00400

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
General Light Industry	114.204	45.8198	115.125	38,166.7	1,265.63	507.784	1,275.84	422,971
Other Non-Asphalt Surfaces	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

5.10. Operational Area Sources

5.10.1. Hearths

Land Use	Hearth Type	Unmitigated (number)	Mitigated (number)
General Light Industry	Wood Fireplaces	0	0
General Light Industry	Gas Fireplaces	0	0
General Light Industry	Propane Fireplaces	0	0
General Light Industry	Electric Fireplaces	0	0
General Light Industry	No Fireplaces	0	0
General Light Industry	Conventional Wood Stoves	0	0
General Light Industry	Catalytic Wood Stoves	0	0
General Light Industry	Non-Catalytic Wood Stoves	0	0
General Light Industry	Pellet Wood Stoves	0	0
Other Non-Asphalt Surfaces	Wood Fireplaces	0	0
Other Non-Asphalt Surfaces	Gas Fireplaces	0	0
Other Non-Asphalt Surfaces	Propane Fireplaces	0	0
Other Non-Asphalt Surfaces	Electric Fireplaces	0	0
Other Non-Asphalt Surfaces	No Fireplaces	0	0
Other Non-Asphalt Surfaces	Conventional Wood Stoves	0	0
Other Non-Asphalt Surfaces	Catalytic Wood Stoves	0	0
Other Non-Asphalt Surfaces	Non-Catalytic Wood Stoves	0	0

Other Non-Asphalt Surfaces	Pellet Wood Stoves	0	0

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0.00000	0.00000	34,537.5	11,512.5	18,478.2

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00000
Summer Days	day/yr	180.000

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Light Industry	237,847	203.983	0.0330	0.0040	954,584
Other Non-Asphalt Surfaces	0.00000	203.983	0.0330	0.0040	0.00000

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Light Industry	5,324,531	0.00000
Other Non-Asphalt Surfaces	0.00000	0.00000

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Light Industry	28.5510	0.00000
Other Non-Asphalt Surfaces	0.00000	0.00000

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Light Industry	Other commercial A/C and heat pumps	R-410A	2,088.00	0.30000	4.00000	4.00000	18.0000

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	26.3700	annual days of extreme heat
Extreme Precipitation	4.15000	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00000	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters

Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	0	0	N/A
Extreme Precipitation	1	0	0	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	1	1	3
Extreme Precipitation	1	1	1	2
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	1	1	2
Flooding	1	1	1	2
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	57.1002
AQ-PM	20.1742
AQ-DPM	24.7915
Drinking Water	65.1055
Lead Risk Housing	73.2703
Pesticides	91.4828
Toxic Releases	20.3176
Traffic	0.77500
Effect Indicators	—
CleanUp Sites	68.9436
Groundwater	78.8644
Haz Waste Facilities/Generators	35.6188
Impaired Water Bodies	96.7871
Solid Waste	77.6174
Sensitive Population	—
Asthma	81.1316

Cardio-vascular	52.1934
Low Birth Weights	4.28535
Socioeconomic Factor Indicators	—
Education	72.9436
Housing	29.1635
Linguistic	35.3363
Poverty	67.6131
Unemployment	33.5763

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	32.49069678
Employed	26.07468241
Median HI	23.76491723
Education	—
Bachelor's or higher	17.77235981
High school enrollment	100
Preschool enrollment	20.05646093
Transportation	—
Auto Access	52.22635699
Active commuting	72.56512255
Social	—
2-parent households	97.48492237
Voting	86.92416271
Neighborhood	—
Alcohol availability	67.83010394

Park access	2.194276915
Retail density	0.641601437
Supermarket access	2.399589375
Tree canopy	55.90914924
Housing	—
Homeownership	39.81778519
Housing habitability	63.0822533
Low-inc homeowner severe housing cost burden	44.68112409
Low-inc renter severe housing cost burden	76.01693828
Uncrowded housing	45.28422944
Health Outcomes	—
Insured adults	39.56114462
Arthritis	0.0
Asthma ER Admissions	14.5
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	15.7
Cognitively Disabled	46.5
Physically Disabled	17.3
Heart Attack ER Admissions	26.4
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6

Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	9.5
Elderly	31.8
English Speaking	27.5
Foreign-born	38.2
Outdoor Workers	2.0
Climate Change Adaptive Capacity	—
Impervious Surface Cover	93.7
Traffic Density	0.3
Traffic Access	0.0
Other Indices	—
Hardship	67.1
Other Decision Support	—
2016 Voting	72.1

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	62.0000
Healthy Places Index Score for Project Location (b)	42.0000
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No

Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

8.1. Justifications

Screen	Justification
Land Use	Conservative Building Estimates provided below, other work reflected in other non-asphalt setting. PP1 Assumed to be 12,100' (retrofit of existing building, but analyzing as if it were a new building) Electrical Control Building assumed to be 1,800' PP2 gravity outlet assumed to be 1,125' PP4 assumed to be 8,000'
Construction: Construction Phases	Construction schedule
Construction: Off-Road Equipment	Reduced the number of tractors/loaders/backhoes during site prep from 4 to 3. Due to the limited amount of space where construction would occur this number of equipment used in unrealistic. 3 tractors/loaders/backhoes, may also be unrealistic, but is being used as a worst case scenario.
Construction: Architectural Coatings	No Parking Area

8.3. Land Use

Model Parameter	Units	Default Value	New Value
Lot Area	acre	0.52858	0.53000
Landscape Area	sq. ft	—	0.00000
Special Landscape Area	sq. ft	—	0.00000

8.4. Construction

8.4.1. Construction Phases

Phase Type	Phase Name	Model Parameter	Default Value	New Value
Demolition	Demolition	End Date	6/3/2030	5/31/2030
Site Preparation	Site Preparation	End Date	6/18/2030	6/17/2030
Building Construction	Building Construction	End Date	6/5/2031	5/21/2031
Building Construction	Building Construction	Work Days per Phase	230.000	220.000
Architectural Coating	Architectural Coating	Start Date	7/5/2031	5/22/2031
Architectural Coating	Architectural Coating	End Date	8/2/2031	6/18/2031

8.4.2. Off-Road Equipment

Phase Name	Equipment Type	Model Parameter	Default Value	New Value
Site Preparation	Tractors/Loaders/Backhoes	Number per Day	4.00000	3.00000

8.4.8. Architectural Coatings

Phase Name	Model Parameter	Units	Default Value	New Value
Architectural Coating	Non-Residential Interior Area	sq ft	34,537.5	39,487.5
Architectural Coating	Non-Residential Exterior Area	sq ft	11,512.5	13,162.5
Architectural Coating	Parking Area	sq ft	18,478.2	0.00000

Appendix B – Biological Evaluation Information

Biological Evaluation Report

LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

BIOLOGICAL EVALUATION FOR CEQA/NEPA AND ESA COMPLIANCE RD 1500 FLOOD CONTROL AND FLOOD SAFETY REHABILITATION PROJECT SUTTER COUNTY, CALIFORNIA

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EXECUTIVE SUMMARY

Live Oak Associates, Inc. (LOA) conducted a biological resources investigation of the five alternatives for the Reclamation District 1500 Flood Control and Flood Safety Rehabilitation Project, and evaluated likely impacts to such resources resulting from project implementation. The project proposes to update the existing Karnak Drainage Facility or complete other activities to prevent flooding in Robbins and adjacent areas. The alternatives are all located within the approximately 67,850-acre Sutter Basin, which is located approximately 6 - 22 miles north-northwest of Woodland in rural Sutter County, California.

On January 22, 2021, LOA ecologists Arren Allegretti and Geoffrey Cline surveyed the Alternative A Area of Potential Effects (APE) for its biotic habitats, the plants and animals occurring in those habitats, and significant habitat values that may be protected by state and federal law. At the time of the survey, the project site consisted of the existing Karnak Drainage Facility and a farm equipment storage area. Three land uses/biotic habitats were identified within the project site: ruderal/developed, canal, and slough. Land uses/biotic habitats within Alternatives B – E were assumed based on aerial imagery. These included those identified in Alternative A and agricultural field, unknown upland, mixed riparian forest, and wetland.

The alternatives have the potential to impact a variety of species, which depends on the alternative chosen and the habitats they may impact. These impacts, if they occur, would be considered significant under the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). Implementation of the various mitigation measures will reduce the magnitude of these potential impacts to a less than significant level under CEQA and NEPA.

Impacts associated with project development and operation would be less than significant for vernal pool fairy shrimp, vernal pool tadpole shrimp, other special status animals that would use Alternatives A – E only for foraging, other special animals absent or unlikely occur within Sutter Basin, and local policies or habitat conservation plans.

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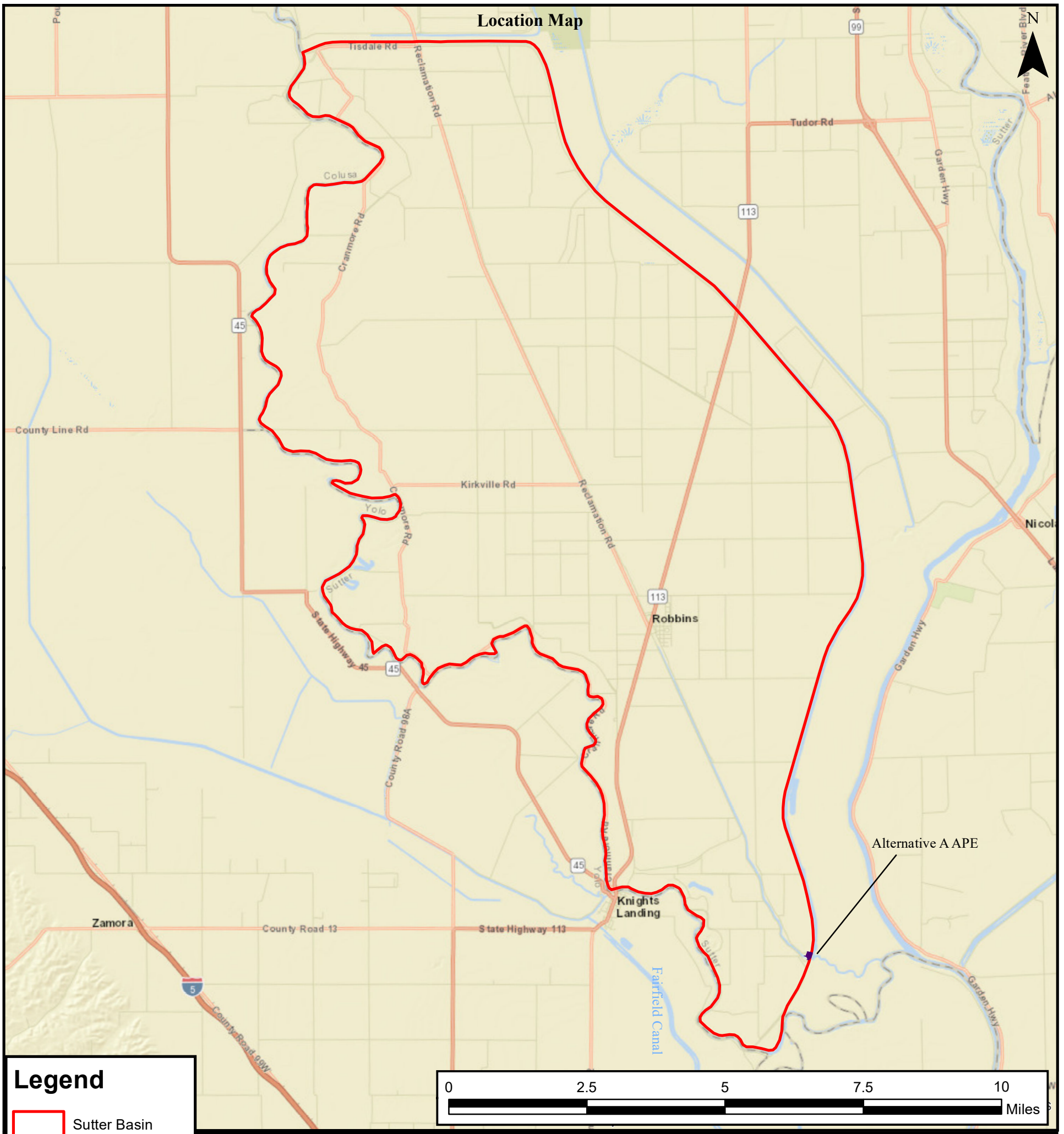
1.0 INTRODUCTION

This technical report, prepared by Live Oak Associates, Inc. (LOA) in compliance with the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and Section 7 of the federal Endangered Species Act, evaluates the potential impacts to biological resources associated with the U.S. Bureau of Reclamation's Reclamation District (RD) 1500 Flood Control and Flood Safety Rehabilitation Project ("project"). The project is located in the Bureau of Reclamation ("Reclamation")'s RD 1500 service area, also known as Sutter Basin, in southwestern Sutter County, California. Reclamation's preferred project alternative would be sited at the existing Karnak Drainage Facility, which is located in the southeast corner of Sutter Basin, approximately 10 miles northeast of the City of Woodland (Figure 1), and can be found on the *Knights Landing* U.S. Geological Survey (USGS) 7.5-minute quadrangle in Section 20 of Township 11 North, Range 3 East, Mount Diablo Base and Meridian (Figure 2).

Sutter Basin is approximately 67,850 acres in size and utilizes the existing Karnak Drainage Facility to protect the community of Robbins and surrounding areas. The existing facility consists of three separate pumping plants. Pumping Plant 1 (PP1) was constructed in 1914 during development of the Sutter Basin Reclamation Project to drain the area of low-lying land protected by levees between the Sacramento and Feather Rivers (i.e. Sutter Basin). Pumping Plant 1 consists of six large centrifugal pumps capable of pumping approximately 1,200 cubic feet per second (cfs) of water out of the Sutter Basin. Pumping Plant 2 (PP2) was constructed in 1929, but was poorly designed and has never been operated. Pumping Plant 3 (PP3) was constructed in 1952 to expand the capacity of the drainage facility and provide the possibility of gravity drainage. Pumping Plant 3 also consists of four vertical pumps capable of pumping approximately 700 cfs of water out of the Sutter Basin. All three pumping plants have existing discharge pipes that are installed through the Sutter Bypass levee for discharge to the Sacramento Slough.

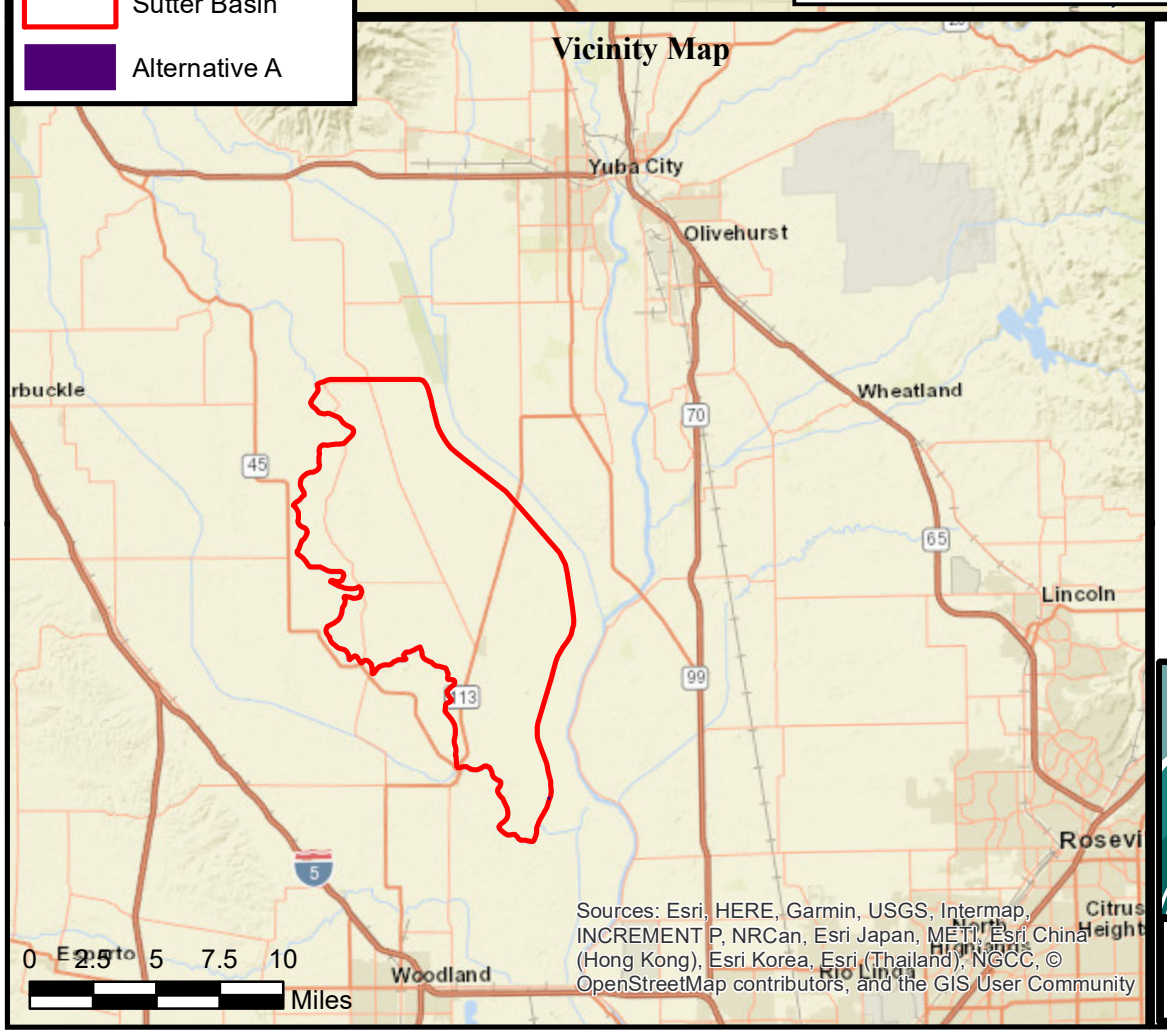
The existing Karnak Drainage Facility has been well maintained over the years but is antiquated and subject to frequent and potentially extended breakdowns due to lack of available parts. This results in increasingly frequent equipment outages and repairs, which greatly impair the facility

Location Map



Legend

- Sutter Basin
- Alternative A





Live Oak Associates, Inc.

Vicinity Map
RD 1500 Flood Control and Flood Safety Rehabilitation Project

Date	Project #	Figure #
April 6, 2021	2525-01	1

N

Alternative A APE

Legend

- Alternative A APE
- Sutter Basin Approx. Boundary

0 0.25 0.5 0.75 1 Miles

0 1.5 3 4.5 6 Miles

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Topographic Map
RD 1500 Flood Safety
Rehabilitation Project

Date	Project #	Figure #
Apr. 6, 2021	2525-01	2

from providing its intended purpose of flood control in the Sutter Basin. In addition, the electrical system likely needs to be replaced.

As such, Reclamation is evaluating alternatives to continue providing flood management in the RD 1500 service area. Five improvement alternatives and a no-action alternative are currently under consideration. The technical report that follows describes the biotic resources of each alternative's Area of Potential Effects (APE) and evaluates possible impacts to sensitive biological resources that could result from implementation of each alternative.

1.1 ALTERNATIVE DESCRIPTIONS

As follows are descriptions of each alternative.

1.1.1 No-Action Alternative

The No-action Alternative would continue to use the antiquated pumping facilities and repair them as needed until failure occurs. As replacements parts become harder and harder to acquire, eventually parts will not be available to repair the facility and pumping capacity will be reduced until the pumping facility is no longer able to pump the required volume of water to protect Sutter Basin and Robbins from flood damage.

1.1.2 Alternative A: Modernize the Existing Karnak Drainage Facility (Preferred Alternative)

The preferred alternative is to modernize the existing Karnak Drainage Facility. Various modernization options will be considered to determine the most cost-effective option, including some combination of the following:

- Replace the existing pumps and motors with new energy efficient pumping equipment in the existing buildings.
- Increase pumping capacity from the current 1,900 cfs to 2,200 cfs
- Upgrade or replace the existing pump station buildings and structures.
- Flood-protect pumping facilities to an elevation two feet above flood stage.
- Rehabilitate the existing discharge facilities in the levee or construct new discharge facilities.
- Upgrade electrical service.
- Install modernized SCADA and controls.

- Install variable frequency drives to provide a wider range of pumping capacity.
- Provide backup electrical power and connect to an on-site solar array to reduce operating costs and provide for resilient operation in the event of power outages.

1.1.3 Alternative B: Capture and Store Drainage Water in a Series of RD-owned Retention Basins

Alternative B would not make any improvements to the existing Karnak Drainage Facility, but would construct a series of RD-owned retention basins, partially excavated and partially above ground, that would capture and store drainage water. Key considerations associated with this alternative include the following:

- Because of low percolation rates in the area and limited evaporation in the winter months, the holding basins would need to store at least 100,000 AF of water; if the water depth in the basin was 10 feet, this would require 10,000 acres of ponds.
- If basin levees exceed 6 feet in height, basins would be subject to Division of Safety of Dams (DSOD) jurisdiction.
- A number of pump stations would be required to lift water into the basins and/or remove water from the basins.
- Water would need to be discharged, or used for irrigation, to empty the basins prior to the next winter season.
- Would take a significant amount of farm land out of production, upwards of 10,000 acres.

1.1.4 Alternative C: Capture and Store Drainage Water on Farms

Alternative C would not make any improvements to the existing Karnak Drainage Facility, but would construct a number of small levees around farm fields to allow storage of drainage water on farms. Key considerations associated with this alternative include the following:

- Numerous pumps would be required to lift the drainage water onto the farm fields.
- Water would be expected to eventually seep into the ground.
- If water was stored on farms to a depth of 3 feet, over 30,000 acres would be required to be flooded, removing nearly half of the RD 1500 acreage from agricultural production.

1.1.5 Alternative D: Construct a RD-Owned Retention Basin with Smaller Karnak Pumping Facility

Under Alternative D, the existing Karnak Drainage Facility would be replaced with a smaller facility and associated RD-owned retention basin. The new facility would be developed at the existing Karnak site, likely by removing the existing PP3 pumping plant and building the new

facility in its place. This would allow the existing PP3 discharge pipes to be utilized, and would maintain the gravity drainage option. The proposed retention basin would be used to reduce peak flow by storing and then releasing water in a more uniform manner for discharge by the new pumping facility. Key considerations associated with this alternative include the following:

- Ideally the basin would be excavated to allow gravity drainage in, but conditions may not allow significant excavation. Whether the basin is excavated or located above ground, a pump station would be required to lift water into the basin and/or remove water.
- If basin levees exceed 6 feet in height, basins would be subject to DSOD jurisdiction.
- The required size of the retention basin would depend on the pumping capacity of the new discharge facility; a discharge facility capacity of 1,000 cfs or approximately 2,000 acre-feet/day is assumed.
- If the water depth in the basin was 10 feet, then approximately 300 acres of land would be needed for the basin.

1.1.6 Alternative E: Construct a New Pumping Facility at a Different Location to Replace the Existing Karnak Facility

Alternative E would replace the existing Karnak Drainage Facility by constructing a new facility, capable of pumping 2,200 cfs, at a different location. A new canal would need to be constructed to draw water from the Robbins Canal upstream of the existing facility, and reroute it to the new facility. The new facility would need to be located in an area adjacent to a river or slough for discharge. One possible location is approximately 1 mile southwest of the existing facility, adjacent to the Sacramento River. Other possible locations are northwest or west of the existing facility (see Appendix A).

Key considerations associated with this alternative include the following:

- Topography may not be favorable at the new site, as existing Karnak facility is located where it is because that was the location of the historic slough.
- Would take some farm land out of production for re-routed drainage channel and for the pumping facility itself.
- If the facility is constructed at the Sacramento River location described above, it would bypass the recently updated debris screen.
- Extensive levee work would be required if gravity drainage is to be provided, which is important for energy cost savings.

1.2 REPORT OBJECTIVES

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

- Summarize all alternative-specific information related to existing biological resources;
- Make reasonable inferences about the biological resources that could occur within each alternative APE based on habitat suitability and the proximity of each improvement alternative APE to a species' known range;
- Summarize all state and federal natural resource protection laws that may be relevant to development of each alternative;
- Identify and discuss project impacts to biological resources likely to occur in each alternative APE within the context of CEQA and NEPA, and state or federal laws; and
- 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 Alternative A APE was conducted on January 22, 2021 by LOA ecologists Arren Allegretti and Geoffrey Cline. The survey consisted of walking through the Alternative A APE while identifying the principal land uses and biotic habitats of the APE, identifying plant and animal species encountered, and assessing the suitability of the APE habitats for special status species. The other alternative APEs (Alternatives B-E) were not investigated in the field because the exact APE location for each of these alternatives was unknown. Instead, LOA made informed assumptions about the habitat/land use types within each APE for Alternatives B-E based on aerial imagery of the Sutter Basin and known plant and animal associations with each habitat/land use type.

LOA conducted an analysis of potential project impacts based on the known and potential biotic resources of each alternative APE and adjacent areas. Sources of information used in the preparation of this analysis included: (1) the *California Natural Diversity Data Base* (CDFW 2021), (2) the U.S. Fish and Wildlife Service (USFWS) *Information for Planning and Consultation* (IPaC) system (USFWS 2021), (3) the *Online Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2021), and (4) manuals, reports, and references related to plants and animals of the Sacramento Valley region.

LOA's field survey of the Alternative A APE included an Aquatic Resources Delineation (ARD), which has been summarized in a separate report (LOA 2021). The ARD was conducted to the minimum standards of the U.S. Army Corps of Engineers (USACE), and identified, evaluated, and delineated the extent of all aquatic resources within the Alternative A APE.

2.0 EXISTING CONDITIONS

2.1 REGIONAL SETTING

The alternative APEs are located in the center of the southern Sacramento Valley. The Sacramento Valley is bordered by the Sierra Nevada to the east, the Sacramento-San Joaquin Delta and San Joaquin Valley to the south, the Northern Coast Ranges to the west, and the southern Siskiyou Mountains to the north. The APEs are located in a portion of the Sacramento Valley that has, for decades, experienced intensive agricultural disturbances. Current agricultural endeavors in the region include orchards and row crops, including rice.

Like most of California, the southern Sacramento Valley has a Mediterranean climate. Warm dry summers are followed by cool moist winters. Summer temperatures commonly exceed 90 degrees Fahrenheit, and the relative humidity is generally very low. Winter temperatures rarely rise much above 70 degrees Fahrenheit, with daytime highs often below 60 degrees Fahrenheit. Annual precipitation within the vicinity of the APEs is about 18 inches, almost all of which falls between the months of September and May. Nearly all precipitation falls in the form of rain. Stormwater readily infiltrates the soils of and surrounding the APEs.

All of the alternative APEs are located within the McGriff Lakes-Sutter Basin subwatershed, which is part of the Sacramento-Stone Corral watershed. The principal drainages in the vicinity are the Feather and Sacramento Rivers, which generally flow south, but meander to the east and west, and even north at times. The Feather River is at least 1.6 miles to the east of the Sutter Basin, and the Sacramento River borders the western boundary of the Sutter Basin. Other drainages in the vicinity include the Sacramento Slough, Sutter Bypass, and various canals that flow into these larger waterways, including the Robbins Canal. The Sacramento Slough directs water from the existing Karnak Drainage Facility and Sutter Bypass to the Sacramento River. The Sutter Bypass is located adjacent to the eastern boundary of the Sutter Basin. Robbins Canal runs southeast through the Sutter Basin to the existing Karnak Drainage Facility and drains the Sutter Basin. Robbins Canal is regularly managed and mostly devoid of riparian habitat, whereas the Feather River, Sacramento River, Sacramento Slough, and Sutter Bypass all have rich riparian habitat.

The Sutter Basin is composed of a matrix of agricultural and residential uses. It is bordered by the Sacramento River, Sutter Bypass, and land uses similar to those of the Sutter Basin itself.

2.2 ALTERNATIVE AREAS OF POTENTIAL EFFECTS

As follows are descriptions of each improvement alternative APE. Because the specific locations of the Alternative B-D APEs are unknown, these APEs have been generally characterized based on known conditions within the Sutter Basin. For the Alternative E APE, we assume it will be located as described in Section 1.1.6 (above) and Appendix A; however, it could be shifted elsewhere.

2.2.1 Alternative A Area of Potential Effects

At the time of the field survey, the Alternative A APE consisted of a small portion of a farm equipment storage yard, several residential structures and associated landscaping, the southern end of Robbins Canal, three large pump buildings and associated intake and discharge culverts, a debris screen, a levee, several roads, and the bank of the Sacramento Slough. The Alternative A APE is fairly level, with the exception of the levee between Robbins Canal and the Sacramento Slough, and has elevations ranging from approximately 17 to 43 feet National Geodetic Vertical Datum (NGVD).

The Alternative A APE contains one soil mapping unit from one soil series: Capay silty clay, 0 to 2 percent slopes. This soil is considered hydric, meaning that it tends to pond water and support the growth of wetland vegetation. The soil in this area has been identified as slightly alkaline, with a pH of 7.5 (Calflora 2021).

2.2.2 Alternatives B, C, and D Areas of Potential Effects

The APEs for Alternatives B, C, and D are likely to consist of a number of agricultural fields bordered by various roads and agricultural ditches. While it is unknown where each APE would be specifically located, the elevation of the Sutter Basin is fairly level, with elevations ranging from approximately 17 to 30 feet NGVD.

2.2.3 Alternative E Area of Potential Effects

Based on aerial imagery dated October 22, 2020, the Alternative E APE likely consists of a small section of the Robbins Canal, various agricultural fields, ditches, and roads, and the banks and channel of the Sacramento River. The Alternative E APE is fairly level, with the exception of the levee between Sutter Basin and the Sacramento Slough, and has elevations ranging from approximately 24 to 41 feet NGVD.

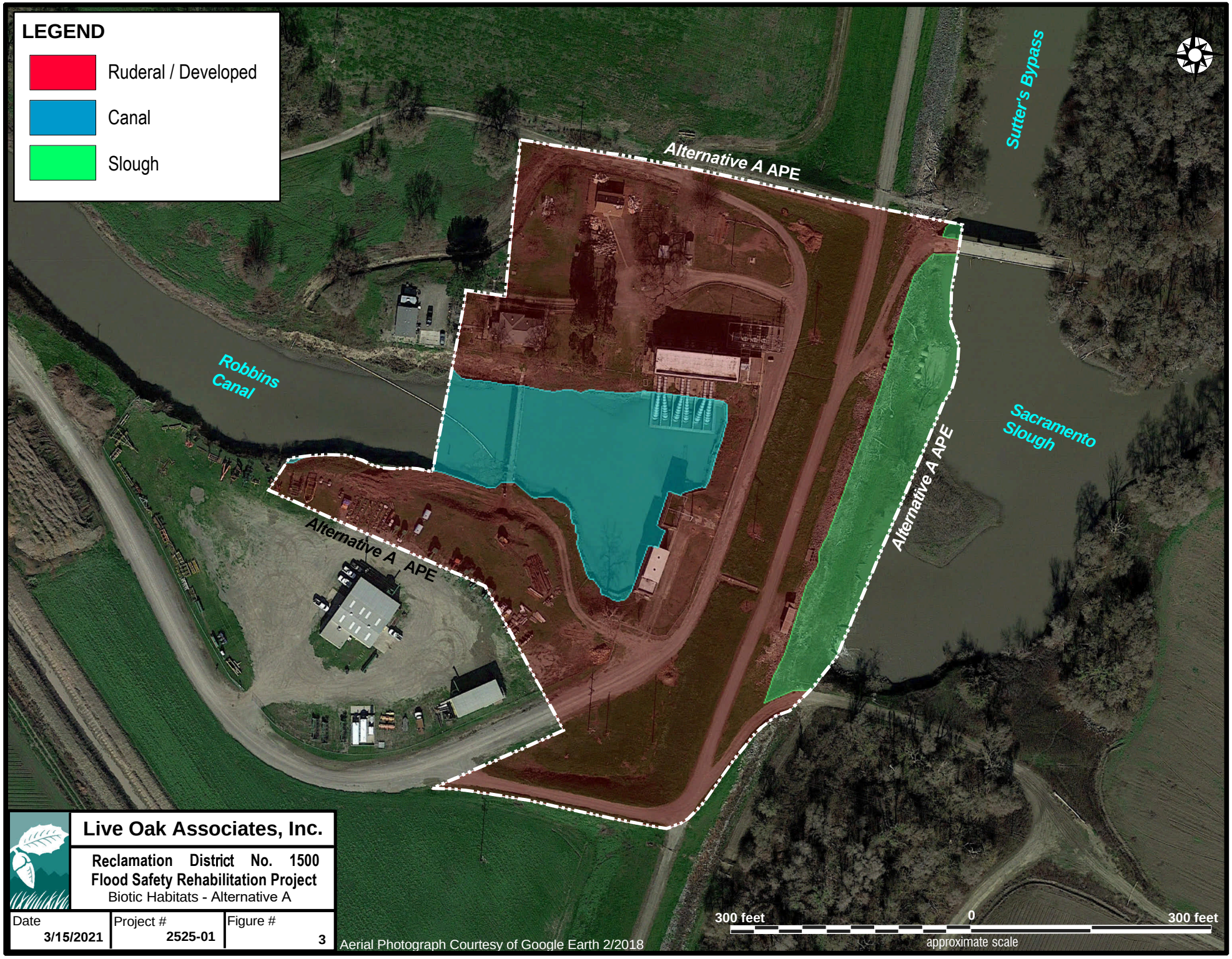
The Alternative E APE contains two soil mapping units: Capay silty clay, 0 to 2 percent slopes and Shanghai silt loam, wet, 0 to 2 percent slopes. Both of these soils are considered hydric. The soils in this area have been identified as slightly alkaline, with a pH of 7.5 (Calflora 2021).

2.3 LAND USES/BIOTIC HABITATS

Three land uses/biotic habitats have been identified in the Alternative A APE: ruderal/developed, canal, and slough (Figure 3). These land uses/biotic habitats are also present within the other improvement alternatives. Additional land uses/biotic habitats present within the Sutter Basin and the other improvement alternatives may include agricultural field, unknown upland, mixed riparian forest, and wetland. These land uses/habitats and their constituent plant and animal species are described in more detail in the following sections. Lists of the vascular plant species observed within the Alternative A APE and the terrestrial vertebrates using, or potentially using, the Alternative A APE are provided in Appendices B and C, respectively. Selected photographs of the Alternative A APE are presented in Appendix D.

2.3.1 Ruderal/Developed

At the time of the field surveys, the majority of the Alternative A APE consisted of ruderal/developed lands, including a farm equipment storage yard, some residences, three large pump buildings, a levee, and some gravel roads. Vegetation was sparce within most of these areas and included many non-native and ornamental species and some native species, including fall panic grass (*Panicum dichotifloroum ssp. dichotiflorum*), wild oat (*Avena fatua*), Johnson grass (*Sorghum halepense*), summer mustard (*Hirshfeldia incana*), yellow star thistle (*Centaurea*


LEGEND
Ruderal / Developed
Canal
Slough
Alternative A APE
Sutter's Bypass
Robbins Canal
Sacramento Slough
Alternative A APE
Alternative A APE
300 feet
0
300 feet
approximate scale
Live Oak Associates, Inc.
Reclamation District No. 1500
Flood Safety Rehabilitation Project
Biotic Habitats - Alternative A
Date 3/15/2021
Project # 2525-01
Figure # 3
Aerial Photograph Courtesy of Google Earth 2/2018

solstitialis), Russian thistle (*Salsola tragus*), Canada horseweed (*Erigeron canadensis*), common sunflower (*Helianthus annus*), valley oak (*Quercus lobata*), grapes (*Vitis sp.*), incense cedar (*Calocedrus decurrens*), among others. We expect that this habitat occurs throughout the Sutter Basin, and would be present within the Alternatives B-E APEs.

Due to extensive disturbance, ruderal/developed lands provide marginal habitat for amphibians and reptiles; however, Pacific tree frogs (*Pseudacris regilla*) and California toads (*Anaxyrus boreas halophilus*) may disperse through these lands during the winter and spring and common reptiles such as the Pacific gophersnake (*Pituophis catenifer catenifer*) may also disperse through these lands in route to aquatic habitats. The presence of various insects may lure lizards such as California alligator lizard (*Elgaria multicarinata multicarinata*), northwestern fence lizard (*Sceloporus occidentalis occidentalis*), and western skink (*Plestiodon skiltonianus*) to forage and possibly reside in this habitat.

With the exception of the ornamental trees around the residences, ruderal/developed lands also provide marginal habitat for a number of avian species. Common resident species likely to forage in these lands include the mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), and mixed flocks of European starlings (*Sturnus vulgaris*). Summer migrants that would be common in here include the western kingbird (*Tyrannus verticalis*), and expected winter migrants include the savannah sparrow (*Passerella sandwichensis*) and American pipit (*Anthus rubescens*).

A few mammal species may also occur within the ruderal/developed lands. Small mammals such as deer mouse (*Peromyscus maniculatus*) and house mouse (*Mus musculus*), would occur within and around buildings and farm equipment. Botta's pocket gopher (*Thomomys bottae*) may burrow within and adjacent to the lawns associated with the residences. Various species of bat would forage over the ruderal/developed lands and may roost within some of the structures and trees.

The presence of amphibians, reptiles, birds and small mammals is likely to attract foraging raptors and mammalian predators. Raptors such as the red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and northern harrier (*Circus hudsonius*) would likely

forage over the ruderal/developed lands from time to time. Mammalian predators occurring in this habitat would be limited to disturbance-tolerant species such as the raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*).

2.3.2 Canal

Canal habitat in the Alternative A APE consisted of the Robbins Canal and associated infrastructure, which appeared to be intensively managed. A majority of the banks of the canal were metal or concrete; however, the bank on the south side, west of the debris screen, was earthen, vertical in places, and had some small mammal burrows. Vegetation was limited to the dirt bank and included species such as soft rush (*Juncus effussus*), narrow-leaved cattail (*Typha latifolia*), Italian ryegrass (*Festuca perennis*), among others. We expect that this habitat would be present within portions the Alternatives B-E APEs.

Fish more accustomed to warm water likely occupy the canal habitat. Species such as white crappie (*Pomoxis nigromaculatus*), black crappie *Pomoxis annularis*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), redear sunfish (*Lepomis micrlophus*), and largemouth bass (*Micropterus salmoides*) may forage within the canal habitat. The foregoing is a representative (but by no means a comprehensive) list of the warm water species that may be present in canal habitat from time to time. Fish accustomed to more temperate waters are not likely to venture up into this habitat, especially when the pumps are running and expelling water from Robbins Canal into Sacramento Slough.

Amphibians likely utilizing the canal habitat would include species such as American bullfrog (*Lithobates catesbeianus*), Pacific tree frog, and western toad, among others. The presence of various fish and amphibian species would attract reptile species such as valley gartersnake (*Thamnophis sirtalis fitchi*) and western pond turtle (*Emys marmorata*).

The water within this habitat would also be used by a variety of water birds. Pied-billed grebes (*Podilymbus podiceps*) and American coots (*Fulica americana*), to name a couple, may forage within the canal habitat. Some aquatic mammal species would also forage within the canal

habitat, including muskrats (*Ondatra zibethicus*), North American river otters (*Lontra canadensis*), and North American beaver (*Castor canadensis*).

2.3.3 Slough

The slough habitat within the Alternative A APE consisted of the bank of the Sacramento Slough. At the time of LOA's field investigation, the water within the Sacramento Slough was low, and the slough bank within the APE was not inundated. During high flows, it is expected that a portion of the slough habitat would be inundated. Moderately dense vegetation was present within the slough habitat and consisted of alligator weed (*Alternanthera philoxeroides*), bristly oxtongue (*Helminthotheca eschoides*), rough cocklebur (*Xanthium strumarium*), Chinese tamarisk (*Tamarix chinesis*), among others. We expect that this habitat occurs adjacent to the southeast border of the Sutter Basin, and would be present within the Alternative D APE, and possibly the Alternative E APE, depending on the location chosen.

Fish species likely to occur within this habitat when sufficiently inundated would include similar species to those found in the canal habitat. Fish accustomed to more temperate waters are less likely to venture into Sacramento Slough. Spring and fall-run Chinook salmon (*Oncorhynchus tshawytscha*) migrate up the Sacramento River past Sacramento Slough to spawning habitat further upstream. As adults, it is unlikely that they would stray out of the main river channel into Sacramento Slough. Much the same could be said for Central Valley steelhead (*Oncorhynchus mykiss*). During outmigration, which peaks in spring (March-April), smolts (juvenile salmon and steelhead) might forage in Sacramento Slough on their way to the Sacramento/San Joaquin River, but only as long as water temperatures are sufficiently cool for these species. While water temperatures between 55º and 65º F are optimal for these species, temperatures above 71º F are lethal. Since water temperatures in Sacramento Slough are most likely to be too warm for these species during late summer and early fall, it is unlikely that smolts would be present in the slough at that time.

Wildlife use of the slough would be expected to be similar to that described for the canal habitat.

2.3.4 Agricultural Field

Agricultural fields within the Sutter Basin appear to be a mix of rice and other row crops, and orchards. This habitat would be expected to occur within the Alternative B-E APEs, as well. Other vegetation likely occurring within the agricultural fields would consist of a variety of native and non-native plants that prefer regular disturbance.

Some amphibians and reptiles likely utilize the agricultural fields for foraging or dispersal. American bullfrogs, Sierra tree frogs, and western toads may forage within inundated rice fields and disperse across other row crops and orchards. The presence of a variety of prey may also attract various gartersnakes and western pond turtle to the inundated rice fields.

Because of the various types of agriculture occurring within this land use, a large variety of birds would be expected. Various species would utilize orchards for foraging and/or nesting, while others would forage within inundated rice fields, and other row crops.

As with birds, a number of mammals would be expected to utilize the agricultural fields and would vary according to the type of agriculture. Mammal species expected to occur in the agricultural fields would include those described for the ruderal/developed land use.

2.3.5 Unknown Upland

The Sutter basin contains isolated areas of upland habitat that cannot be readily classified from aerial imagery. The unknown upland habitat appears to be sparse within the Sutter Basin; however, it is possible upland habitat would be present within the Alternatives B, D, and E APE. Vegetation present within unknown upland habitat would likely consist of non-native grassland and various oak trees.

Wildlife that likely utilize unknown upland habitat would be similar to those that use the other land uses/habitats within Sutter Basin. Additional wildlife may include American badger (*Taxidea taxus*); however, populations of this species would likely be isolated from other populations adjacent to Sutter Basin.

2.3.6 Mixed Riparian Forest

Mixed riparian forest habitat appears to occur along portions of the Sacramento Slough, Sutter Bypass, and Sacramento River, and adjacent to various other water features within and adjacent to the Sutter Basin. The portion of the Sacramento Slough that passes through the Alternative A APE does not support mixed riparian forest habitat. However, it appears this habitat would occur within the Alternative E APE and possibly other alternatives depending on the specific location of the APE. Trees that would be expected to occur in this habitat include valley oak, Oregon ash (*Fraxinus latifolia*), California black walnut (*Juglans hindsii*), box elder (*Acer negundo*), Goodding's black willow (*Salix gooddingii*), and other riparian trees. Understory shrubs may include poison oak (*Toxicodendron diversilobum*) and Himalayan blackberry (*Rubus armeniacus*), among others.

In general, mixed riparian forests of central California can be used by as many as 25 species of reptiles and amphibians, 140 species of birds, and 50 species of mammals (Mayer et al. 1988). These habitats are often especially important as movement corridors along which animals of all kinds may migrate, disperse or conduct their daily home range movements.

Some of the resident passerine species expected to use mixed riparian forest within the Sutter Basin include black phoebes (*Sayornis nigricans*), western scrub jays (*Aphelocoma californica*), oak titmouse (*Baeolophus inornatus*), and acorn woodpeckers (*Melanerpes formicivorus*), to name a few. Resident raptors that may nest and roost in this habitat include great horned owls (*Bubo virginianus*), Cooper's hawks (*Accipiter cooperi*), red-shouldered hawks (*Buteo linneatus*), and red-tailed hawks. Winter migrants may include white-crowned sparrows (*Zonotrichia sandwichensis*), golden-crowned sparrows (*Zonotrichia atricapilla*), and dark-eyed juncos (*Junco hyemalis*). Spring and summer migrants could include ash-throated flycatcher (*Myiarchus cinerascens*), Bullock's orioles (*Icterus bullockii*), and blue grosbeaks (*Passerina caerulea*).

Mixed riparian forests of the Sacramento Valley also provide habitat for several mammal species. A few of these species include Virginia opossum (*Didelphis virginiana*), striped skunk, and raccoon.

2.3.7 Wetland

Sutter Basin contains a variety of small lakes (such as Horseshoe Lake, Mary Lake, McGriff Lakes, etc.) and other aquatic features likely to ecologically function as wetlands of various types. It is possible this habitat may occur with the Alternatives B, D, and/or E APEs. Vegetation within the wetland habitat would likely consist of aquatic plants. Wildlife utilizing aquatic habitat would likely include some or all of the species that are expected to use the canal, slough, and/or riparian habitats. It is also possible that wildlife species using the inundated rice fields of the agricultural field land use would also use this habitat.

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 California Department of Fish and Wildlife (CDFW) and the 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 (CNPS 2021). Collectively, these plants and animals are referred to as "special status species."

The California Natural Diversity Data Base (CDFW 2021) was queried for special status species occurrences in the eleven USGS 7.5-minute quadrangles associated with Sutter Basin (*Knights Landing, Woodland, Eldorado Bend, Kirkville, Sutter Causeway, Nicolaus, Verona, Taylor Monument, Grays Bend*, *Tisdale Wier* and *Gilsizer Slough*). The USFWS IPaC system (USFWS 2021) was queried for federally listed species and designated critical habitat with the potential to be affected by projects in the Sutter Basin. The species returned in these queries, and their potential to occur on each improvement alternative APE, are listed in Table 1 on the following

pages. Table 1 also contains several species not returned in the CNDDB and IPaC queries, but known by LOA to occur, or potentially occur, in the vicinity. Sources of information for this Table 1 included *California's Wildlife, Volumes I, II, and III* (Zeiner et. al 1988), *The Jepson Manual: Vascular Plants of California, second edition* (Baldwin et al. 2012), *The California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2021), Calflora.org, and eBird.org. Special status species occurrences within 3.1 miles of the Alternative A APE are depicted in Figure 4.

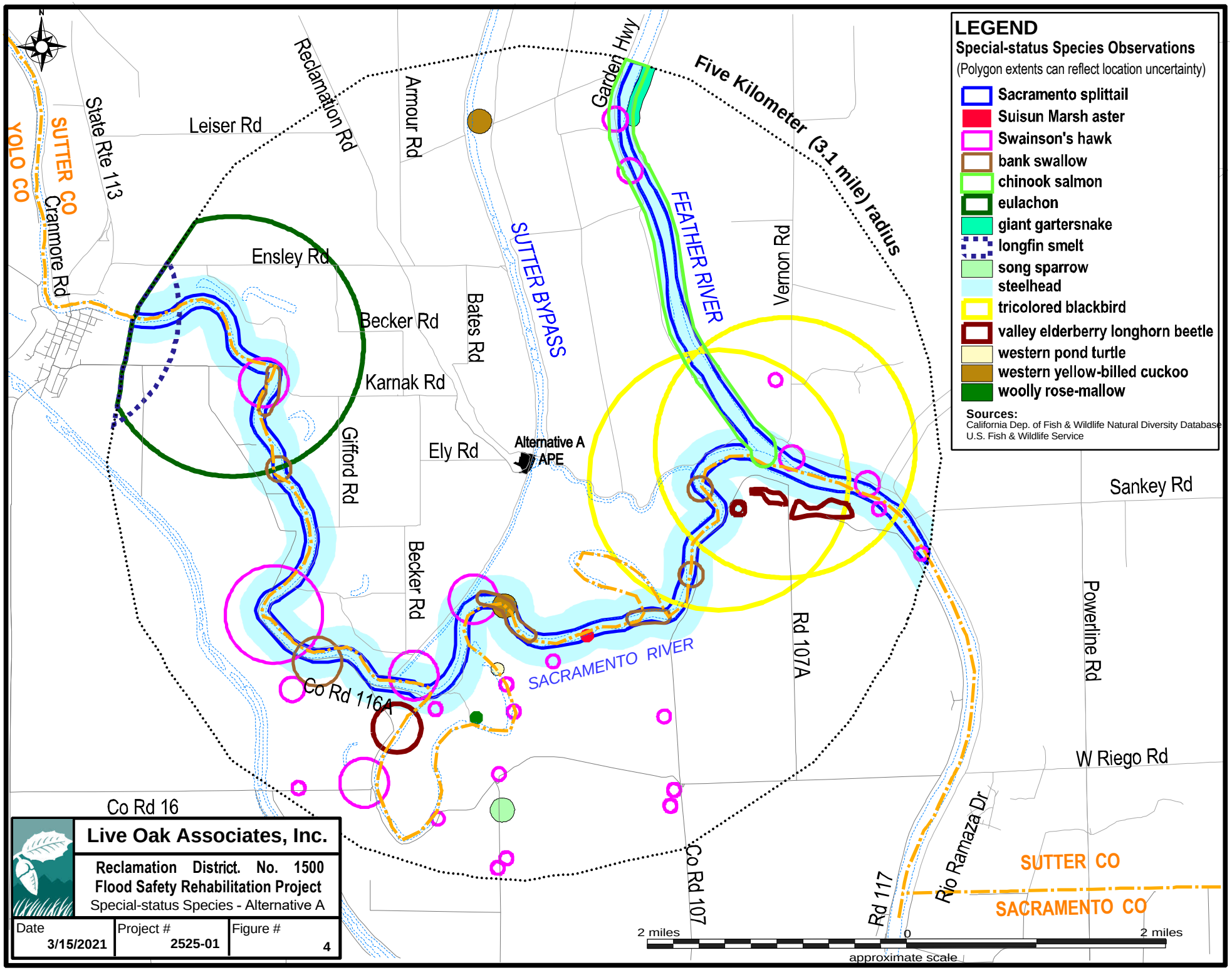

LEGEND
Special-status Species Observations
(Polygon extents can reflect location uncertainty)
Sacramento splittail
Suisun Marsh aster
Swainson's hawk
bank swallow
chinook salmon
eulachon
giant gartersnake
longfin smelt
song sparrow
steelhead
tricolored blackbird
valley elderberry longhorn beetle
western pond turtle
western yellow-billed cuckoo
woolly rose-mallow
Sources:
California Dep. of Fish & Wildlife Natural Diversity Database
U.S. Fish & Wildlife Service
Five Kilometer (3.1 mile) radius
Alternative A APE
SUTTER CO
YOLO CO
SACRAMENTO CO
State Rte 113
Leiser Rd
Reclamation Rd
Armour Rd
Garden Hwy
Cranmore Rd
Ensley Rd
Becker Rd
Bates Rd
SUTTER BYPASS
FEATHER RIVER
Vernon Rd
Karnak Rd
Gifford Rd
Ely Rd
Sankey Rd
Becker Rd
SACRAMENTO RIVER
Rd 107A
Powerline Rd
Co Rd 116A
W Riego Rd
Co Rd 16
Co Rd 107
Rd 117
Rio Ramaza Dr
2 miles
0
2 miles
approximate scale
Live Oak Associates, Inc.
Reclamation District. No. 1500
Flood Safety Rehabilitation Project
Special-status Species - Alternative A
Date 3/15/2021
Project # 2525-01
Figure # 4

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

PLANTS (adapted from CDFW 2021 and CNPS 2021)

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

Species	Status	Habitat	Occurrence in the APEs
Palmate-bracted Salty Bird's-beak (*Chloropyron palmatum*)	CE, FE CNPS 1B.1	California's Central Valley, from Colusa Co. south to Fresno Co., at 15 – 500 ft. in elevation. Occurs in alkaline grassland, alkaline flats, alkali sink scrub.	**Possible (Alternatives B, D, and E).** It is possible alkaline grasslands may be present within unknown upland habitats potentially occurring within these alternatives. **Absent (Alternatives A and C).** Alkaline habitats suitable for this species are absent from these APEs.
Hartweg's Golden Sunburst (*Pseudobahia bahiifolia*)	CE, FE CNPS 1B.1	Occurs in grasslands of the western foothills of the Sierra Nevada in volcanic pumice soils. Often found in soils of the Rocklin series; blooms March to April.	**Absent (Alternatives A-E).** Habitats and soils suitable for this species appear to be absent from Sutter Basin.

CNPS-Listed Plants

Alkali Milk-vetch (*Astragalus tener var. tener*)	CNPS 1B.2	Central California, including the Central Valley and San Francisco Bay Area, at 3 – 200 ft. in elevation. Occurs in alkaline playas, grasslands, and vernal pools.	**Possible (Alternatives B, D, and E).** It is possible alkaline grasslands may be present within unknown upland habitats potentially occurring within these alternatives. **Absent (Alternatives A and C).** Alkaline habitats suitable for this species are absent from these APEs.
Brittlescale (*Atriplex depressa*)	CNPS 1B.2	California's Central Valley from Glenn Co. on the north to Tulare Co. on the south, at 0 to 1,000 ft. in elevation. Occurs in Chenopod Scrub, meadows, playas, valley and foothill grasslands.	**Possible (Alternatives B, D, and E).** It is possible alkaline grasslands may be present within unknown upland habitats potentially occurring within these alternatives. **Absent (Alternatives A and C).** Alkaline habitats suitable for this species are absent from these APEs.
San Joaquin Spearscale (*Etriplex joaquiniana*)	CNPS 1B.2	Eastern Alameda, Contra Costa, and Solano Cos. (possibly others), at 3 to 2,740 ft. in elevation. Occurs in alkali sink scrub, playas, meadows and seeps, alkali grasslands.	**Possible (Alternatives B, D, and E).** It is possible alkaline grasslands may be present within unknown upland habitats potentially occurring within these alternatives. **Absent (Alternatives A and C).** Alkaline habitats suitable for this species are absent from these APEs.
Woolly Rose-mallow (*Hibiscus lasiocarpus var. occidentalis*)	CNPS 1B.2	California's Central Valley from Butte Co. on the north to San Joaquin Co. on the south, at 0 to 400 ft. in elevation. Occurs in freshwater marsh, swamps, on riprap, and on the sides of levees.	**Possible (Alternatives A-E).** All of the APEs are likely to offer at least some suitable habitat for this species, in the form of earthen canal and slough banks. The nearest documented location of this species approx. 1 mile to the south on the Sacramento River (CDFW 2021).

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

CNPS-Listed Plants (continued)

Species	Status	Habitat	Occurrence in the APEs
Heckard's Pepper-grass (*Lepidium latipes var. heckardi*)	CNPS 1B.2	Primarily occurs in the Sacramento Valley from Glenn Co. on the north to Solano Co. on the south, at 6 to 660 ft. in elevation. Occurs on alkaline flats associated with seasonal wetlands.	**Absent (Alternatives A-E).** Alkaline habitats suitable for this species appear to be absent from Sutter Basin.
Veiny monardella (*Monardella venosa)*	CNPS 1B.1	Occurs in heavy clay soil in cismontane woodland and valley and foothill grassland at 200 to 1,300 ft. in elevation.	**Absent (Alternatives A-E).** Sutter Basin is well below the elevation range for this species.
California Alkali Grass (*Puccinellia simplex*)	CNPS 1B.2	Primarily occurs in the Central Valley from Glenn Co. on the north to Kern Co. on the south, at 6 to 3,050 ft. in elevation. Occurs on alkaline flats, alkali sink scrub, and vernal pools.	**Absent (Alternatives A-E).** Alkaline habitats suitable for this species appear to be absent from Sutter Basin.
Sanford's Arrowhead (*Sagittaria sanfordii*)	CNPS 1B.2	Primarily occurs in the Central Valley from Shasta Co. on the north to Fresno Co. on the south, at 0 to 2,130 ft. in elevation. Occurs in freshwater marshes, swamps, ponds, and ditches.	**Possible (Alternatives A-E).** This species could occur within the canal, slough, and wetland habitats within Sutter Basin.
Suisun Marsh Aster (*Symphyotrichium lentum*)	CNPS 1B.2	Primarily occurs in marshes and swamps (brackish and freshwater) up to 1,000 feet in elevation.	**Possible (Alternatives A-E).** This species could occur within the canal, slough, and wetland habitats within Sutter Basin. One observation has been recorded within Sutter Basin that appears to be within an old agricultural canal (Calflora 2021).
Wright's Trichocoronis (*Trichocoronis wrightii* var. *wrightii*)	CNPS 2B.1	Primarily occurs in the Central Valley from Colusa Co. on the north to Merced Co. on the south, at 15 to 1,430 ft. in elevation. Occurs in alkaline meadows, seeps, marshes, riparian forest, and vernal pools.	**Possible (Alternatives B, D, and E).** This species could occur within the wetland habitats that may be present within Alternatives B, D, and E, and within the mixed riparian forest habitat that may be present within Alternative E. **Absent (Alternatives A and C).** Habitats required by this species are absent from these alternatives.
Saline Clover (*Trifolium hydrophilum*)	CNPS 1B.2	Central California in several San Francisco Bay Area counties, as well as the lower Sacramento Valley, at 0 to 1,000 ft. in elevation. Occurs in marshes, swamps, mesic alkaline grasslands, and vernal pools.	**Possible (Alternatives B, D, and E).** This species could occur within the grasslands of the unknown upland and wetland habitats that may be present within these alternatives. **Absent (Alternatives A and C).** Habitats required by this species are absent from these alternatives.

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

ANIMALS (information derived from CDFW 2021, WHR 1988, and California eBird 2021)

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

Species	Status	Habitat/Range	*Occurrence in the APEs
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT	Valleys of the Siskiyou and Cascade Mtns., Central Valley, and San Francisco Bay Area at 35 to 5,600 ft. in elevation. Occurs in vernal pools, clear to tea-colored water in grass or mud-bottomed swales, basalt depression pools, or sandstone rock outcrops.	**Unlikely (Alternatives B, D, and E).** Based on analysis of aerial imagery, it does not appear that there are any vernal pools within Sutter Basin. **Absent (Alternatives A and C).** Habitats required by this species are absent from these alternatives.
Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)	FE	Occurs in vernal pool regions of California's Central Valley, at 20 to 350 ft. in elevation. Primarily found in large deep turbid or alkaline vernal pools.	**Unlikely (Alternatives B, D, and E).** Based on analysis of aerial imagery, it does not appear that there are any vernal pools within Sutter Basin. **Absent (Alternatives A and C).** Habitats required by this species are absent from these alternatives.
Valley Elderberry Longhorn Beetle *(Desmocerus californicus dimorphus*)	FT	The current range is thought to be limited to the Central Valley from Tehama County on the north to Merced County on the south. The blue elderberry (*Sambucus nigra*) is the obligate host of this species.	**Possible (Alternatives B, D, and E).** This species could occur within elderberry shrubs that may be present within unknown upland habitats that potentially occur within Alternatives B, D, and E, and elderberry shrubs that may be present within the mixed riparian forest habitat that may occur within Alternative E. **Unlikely (Alternatives A and C).** Habitats required by this species are marginal in these alternatives.
Green Sturgeon (Southern DPS) (*Acipenser medirotris*)	FT, CSSC	An anadromous fish commonly occurring in marine and estuarine waters as an adult but occurring in the Sacramento River and its tributaries to spawn in spring and early summer.	**Possible (Alternative E).** This species would occasionally occur in the Sacramento River, adjacent to Sutter Basin, on its way to breed or during outmigration. Should Alternative E be required to construct a new pumping facility that discharges into the Sacramento River, this species may be present within the Alternative E APE. **Unlikely (Alternatives A - D).** Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species and are therefore unlikely to be used. During outmigration, juveniles are unlikely to enter Sutter Basin.

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

State and Federal Threatened or Endangered Animals (continued)

Species	Status	Habitat/Range	*Occurrence in the APEs
Chinook Salmon (Central Valley spring-run ESU) (*Oncorhynchus tshawytscha*)	FT, CT	An anadromous fish occurring in the Sacramento River and its tributaries and in the Sacramento River/San Joaquin River delta.	**Possible (Alternative E).** Individual Chinook salmon migrate up the main channel of the Sacramento River, adjacent to Sutter Basin, to remaining spawning habitat in tributary rivers and creeks. Peak outmigration of smolts occurs in March and April. Smolts would not likely be present by late summer/early fall (Moyle 2002). Should Alternative E be required to construct a new pumping facility that discharges into the Sacramento River, this species may be present within the Alternative E APE. **Unlikely (Alternatives A - D).** Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species and are therefore unlikely to be used. During outmigration, juveniles are unlikely to enter Sutter Basin.
Steelhead (Central Valley DPS) (*Oncorhynchus mykiss irideus*)	FT	Occurs in the Sacramento River and its tributaries and in the San Joaquin River and its tributaries south to the Merced River.	**Possible (Alternative E).** Individual Central Valley steelhead migrate up the main channel of the Sacramento River, adjacent to Sutter Basin, to remaining spawning habitat in tributary rivers and creeks. Peak outmigration of smolts occurs in March and April. Smolts would not likely be present by late summer/early fall (Moyle 2002). Should Alternative E be required to construct a new pumping facility that discharges into the Sacramento River, this species may be present within the Alternative E APE. **Unlikely (Alternatives A - D).** Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species and are therefore unlikely to be used. During outmigration, juveniles are unlikely to enter Sutter Basin.

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

State and Federal Threatened or Endangered Animals (continued)

Species	Status	Habitat/Range	*Occurrence in the APEs
Delta Smelt (*Hypomesus transpacificus*)	FT, CE	A euryhaline species occurring in San Francisco, San Pablo, Suisun and Grizzly Bays, the San Joaquin and Sacramento Delta to the east, and the lower San Joaquin and Sacramento Rivers and their tributaries.	**Unlikely (Alternatives A - E).** At least one individual was caught in a rotary screw trap at Knights Landing, adjacent to Sutter Basin, but this individual was a waif. Breeding populations of this species do not appear to occur north of Verona, approximately 12 miles downriver from Knights Landing (Vincik et al. 2012).
Longfin Smelt (*Spirnchus thaleichthys*)	FC, CT	Longfin smelt are an anadromous fish occurring in the San Francisco Bay and Sacramento/San Joaquin River Delta. This species spawns in the Sacramento River generally south of Rio Vista but has been documented in the Sacramento River as far north as Colusa.	**Unlikely (Alternatives A - E).** This species is not known to spawn this far up the Sacramento River.
Eulachon (*Thaleichthys pacificus*)	FT	Eulachon typically occur in rivers of coastal northern California. The southern-most spawning run of this species was in the Mad River of Humboldt County. One mature male eulachon was collected from a trap in the Sacramento River near Knights Landing.	**Unlikely (Alternatives A - E).** One individual was caught in a trap in the Sacramento River a short distance up-stream from the Karnak Drainage Facility in 2006 (CDFW 2021). This species is presumed to be a waif occurring where eulachon does not typically occur. The observation of a single fish in trap near the Karnak Drainage Facility does not indicate a population of eulachon using the Sacramento River, Sacramento Slough, or Robbins Canal.
California Tiger Salamander (*Ambystoma californiense*)	CT, FT	Found primarily in annual grasslands; requires seasonal pools for breeding and rodent burrows for refuge.	**Unlikely (Alternatives A – E).** Habitats required for this species are marginal within the Sutter Basin and there are no known occurrences of this species in the Sutter Basin.
California Red-legged Frog (*Rana draytonii*)	FT	Occurs in permanent aquatic habitats such as creeks and ponds with emergent vegetation.	**Unlikely (Alternatives A – E).** Habitats required for this species are marginal within the Sutter Basin and there are no known occurrences of this species in the Sutter Basin.
Giant Garter Snake (*Thamnophis gigas*)	CT, FT	This species currently occurs in the Central Valley in two disconnected geographic locations, one being an area from Butte/Glenn Cos. on the north to San Joaquin Co. on the south, and the other being in Merced, Madera and Fresno Cos. It occurs primarily in sloughs, drainage canals, and rice fields.	**Likely (Alternatives A-E).** Robbins Canal, Sutter Bypass, and Sacramento Slough provide suitable habitat for this species, as do rice fields located within the Sutter Basin. The nearest observation occurs approximately 0.25 miles to the east of Sutter Basin, along the Feather River (CDFW 2021).

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

State and Federal Threatened or Endangered Animals (continued)

Species	Status	Habitat/Range	*Occurrence in the APEs
California Black Rail (*Laterallus jamaicensis coturniculus*)	CT, CFP	Occurs in saline, brackish, and fresh emergent wetlands in the San Francisco Bay area, Sacramento-San Joaquin Delta, Morro Bay, Salton Sea, and lower Colorado River area. In freshwater it is usually found in bulrushes, cattails, and saltgrass.	**Unlikely (Alternatives B, D, and E).** While habitats suitable for this species may be present within these alternative APE, it is unlikely that these areas are large enough to support a population of this species, and there are no recorded observations of this species within Sutter Basin. **Absent (Alternatives A and C)**. Habitat required by this species is absent from these alternatives.
Bald Eagle (*Haliaeetus leucocephalus*)	CE, CFP	Winters and sometimes nests near Central Valley reservoirs. Most observations made within the vicinity of Knights Landing have been in late fall, winter, and early spring. Individuals foraging in the area mostly feed on fish and winter waterfowl in large bodies of water or rivers.	**Possible (Alternatives A-E).** This species likely flies over Sutter Basin, may forage within some of the aquatic features, and roost within trees of these alternatives.
Swainson's Hawk (*Buteo swainsoni*)	CT	Primarily a migrant species occurring in the Central Valley from mid-to late February through September. Forages in grasslands and fields; usually nests in large trees adjacent to suitable foraging habitat.	**Possible (Alternatives A-E).** Swainson's hawks have been well documented around the border of the Sutter Basin. All of the APEs are likely to provide possible nesting habitat in the form of large trees. Agricultural and unknown upland habitats of Sutter Basin are suitable for foraging.
Western Snowy Plover (*Charadrius alexandrines nivosus*)	FT, CSSC	This shorebird occurs at scattered locations throughout coastal Calif. and the Central Valley. It nests primarily on coastal beaches, however, an interior population nests on sparsely vegetated flats adjacent to alkali wetlands of the San Joaquin Valley.	**Unlikely (Alternatives A - E).** Habitats required by this species are absent from the Sutter Basin, however this species may pass through or over Sutter Basin.
Willow Flycatcher (*Empidonax traillii*)	CE	Occurs throughout California during migration. Forages in dense willow-dominated riparian habitat, usually along rivers, streams, or other wetlands. Breeds at mid-high elevation in the Sierra.	**Unlikely (Alternatives A-E).** This species may pass through or over the Sutter Basin during migration. It would not nest at any of the alternative APEs.
Bank Swallow (*Riparia riparia*)	CT	Localized breeding colonies along rivers and streams primarily in northern California. Nest locations are vertical banks or bluffs of friable soils suitable for burrowing.	**Possible (Alternatives A-E).** Bank swallows have been well documented along the Sacramento River adjacent to the west and south boundaries of Sutter Basin (CDFW 2021). Breeding habitat is also likely present in the form of burrows along the vertical banks of canals, sloughs, and rivers. Terrestrial and aquatic habitat of the alternatives provide possible foraging habitat for this species.

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

State and Federal Threatened or Endangered Animals (continued)

Species	Status	Habitat/Range	*Occurrence in the APEs
Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)	FT, CE	Nesting habitat in California is limited to the northern Sacramento Valley, South Fork of the Kern River Valley, and the Colorado River Valley. Habitat suitable for nesting is riparian woodland encompassing at least 35 acres.	**Possible (Alternative E).** Nesting habitat for this species is likely present within the riparian habitat potentially occurring within this alternative. This species has been observed within the Sutter Bypass adjacent to the east boundary of Sutter Basin and the Sacramento River adjacent to the south boundary of Sutter Basin, but these observations are from 1992 and 2006. respectively (CDFW 2021). **Unlikely (Alternatives A – D).** While this species may fly over these alternatives, foraging and nesting habitat is likely absent.
Tricolored Blackbird (*Agelaius tricolor*)	CT	Occurs widely through coastal and interior California west of the Sierra Nevada. This species typically nests in large colonies in marshes supporting emergent vegetation such as cattails and bulrushes, or in triticale or other grain fields. Forages in grassland and cropland areas; in the Sacramento Valley, a preferred fall foraging habitat is maturing rice fields.	**Likely (Alternatives B - E).** This species has been observed within, and adjacent to, the Sutter Basin, and likely nests within or adjacent to inundated agricultural fields, canals, sloughs, and wetlands with sufficient emergent vegetation or riparian thickets. **Possible (Alternative A).** While this species may forage over this alternative, breeding habitat is absent.

California Animal Species of Special Concern and Fully Protected Species

White Sturgeon (*Acipenser transmontanus*)	CSSC	An anadromous fish commonly occurring in marine and estuarine waters as an adult but occurring in the Sacramento River and its tributaries to spawn in spring and early summer.	**Possible (Alternative E).** This species would occasionally occur in the Sacramento River, adjacent to Sutter Basin, on its way to breed or during outmigration. Should Alternative E be required to construct a new pumping facility that discharges into the Sacramento River, this species may be present within the Alternative E APE. **Unlikely (Alternatives A - D).** Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species and are therefore unlikely to be used. During outmigration, juveniles are unlikely to enter Sutter Basin.

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

California Animal Species of Special Concern and Fully Protected Species (continued)

Species	Status	Habitat/Range	*Occurrence in the APEs
Sacramento Splittail (*Pogonichthys macrolepidotus*)	CSSC	This is an estuarine species occurring mainly in the Sacramento/San Joaquin Delta, with individuals also occurring in the San Joaquin River south to Merced. Co. At one time, the Sacramento splittail occurred as far up the Sacramento River as Redding (Moyle 2002), but the species is now largely absent from the upper Sacramento River.	**Unlikely (Alternatives A - E).** This species is now largely absent from the upper Sacramento River.
Western Pond Turtle (*Emys marmorata*)	CSSC	Occurs in open, slow-moving water or ponds with rocks and logs for basking. Nesting occurs in open areas, on a variety of soil types, and up to ¼ mile away from water.	**Likely (Alternatives A-E).** The Sacramento River and its tributaries provide habitat of moderate quality for western pond turtles, and potentially supports large populations of this species (Jennings and Hayes, 1994; Germano et. al., 2001). Robbins Canal, Sutter Bypass, and Sacramento Slough adjacent to, or within, these alternatives provide suitable habitat. This species may also utilize inundated rice fields within the Sutter Basin.
Golden Eagle (*Aquila chrysaetos*)	CFP	Typically frequents rolling foothills, mountain areas, sage-juniper flats and desert.	**Likely (Alternatives A-E).** The alternatives likely provide roosting habitat for golden eagles in the form of large trees**.** This species has been documented in Knights Landing, adjacent to the Sutter Basin as recently as 2016 (eBird 2021). Golden eagles would be expected to forage over the ruderal/developed, agricultural field, and unknown upland habitats/land uses within these alternatives.
Northern Harrier (*Circus hudsonius*)	CSSC	Frequents meadows, grasslands, open rangelands, fresh-water emergent wetlands; nests on ground, generally in marshes, although grassland and pasture habitat may also be used.	**Likely (Alternatives B - E).** Agricultural fields, and grasslands likely occurring within the unknown upland habitat, within these alternatives provide suitable foraging habitat. Wetland habitats within these alternatives likely provide suitable nesting habitat. **Possible (Alternatives A).** This alternative lacks nesting habitat and preferred foraging habitat is marginal, but this species may nevertheless forage over this alternative from time to time.

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

California Animal Species of Special Concern and Fully Protected Species (continued)

Species	Status	Habitat/Range	*Occurrence in the APEs
White-tailed Kite (*Elanus caueruleus*)	CFP	Common in savannas, open woodlands, marshes, desert grasslands, partially cleared lands, and cultivated fields. They prefer to nest in open-country trees growing in isolation or at the edge of or within a forest.	**Likely (Alternatives B - E).** This species is expected to forage in the agricultural fields and grasslands of these alternatives and could nest within the trees of the unknown upland and mixed riparian forest habitats. **Unlikely (Alternatives A).** Nesting habitat within this alternative is marginal, and this species is unlikely to forage over this alternative.
Peregrine Falcon (*Falco peregrinus anatum*)	CFP	Individuals breed on cliffs in the Sierra or in coastal habitats; occurs in many habitats of the state during migration.	**Possible (Alternatives A - E).** This species may forage in the airspace over the alternatives, and roost in mature trees that may occur within the APEs. Nesting habitat is absent.
Mountain Plover (*Charadrius montanus*)	CSSC	Forages in short grasslands and freshly plowed fields of the Central Valley. This species does not breed in California.	**Likely (Alternatives B - E).** This species likely forages on the agricultural fields within these alternatives, and within the unknown upland habitats that may be present within Alternatives B, D, and E. **Unlikely (Alternative A).** The ruderal/developed land use of this alternative provides marginal foraging habitat for this species; however, this species may fly over the Alternative A APE.
Modesto Song Sparrow (*Melospiza melodia*)	CSSC	Occurs below 200 feet in elevation in the Central Valley from Colusa County south to the northern San Joaquin Valley. Nests in emergent marshes and riparian forests.	**Possible (Alternatives A - E).** This species may nest within or adjacent to wetland habitats potentially occurring within alternatives B, D, and E, and mixed riparian forest within Alternative E. This species may forage or fly over Alternatives A and C, but is not expected to nest in these alternatives. This species was observed foraging in Alternative A during the field survey.
Lesser Sandhill Crane (*Grus canadensis canadensis*)	CSSC	The Pacific Flyway population winters primarily in the Central Valley of California from Butte Co. south to Kern Co. Preferred habitats include grasslands and fields of harvested grain crops. They do not nest within the Central Valley.	**Likely (Alternatives B-E).** This species likely forages on the agricultural fields within these alternatives, and within the unknown upland habitats that may be present within Alternatives B, D, and E. **Unlikely (Alternative A).** Habitats suitable for this species are absent from this alternative; however, it may fly over the Alternative A APE.

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

California Animal Species of Special Concern and Fully Protected Species (continued)

Species	Status	Habitat/Range	*Occurrence in the APEs
Long-eared Owl (*Asio otus*)	CSSC	A scarce and irregular breeder in the Central Valley. Nests in riparian forest providing cover, roosts, and nest platforms. Forages in adjacent open habitats such as grassland or shrubland.	**Possible (Alternatives A - E).** This species may nest within the mixed riparian forest and forage in grassland or other open habitats within Alternative E. Nesting habitat required by this species is likely absent from Alternatives A - D, however this species may forage in or fly over the alternatives.
Short-eared Owl (*Asio flammeus*)	CSSC	Transient or occasional breeder in grasslands, marshes, and in some agricultural lands of the Sacramento Valley.	**Possible (Alternatives A - E).** This species may breed within the grasslands potentially occurring within the unknown upland habitat and marshes potentially occurring within the wetland habitat of Alternatives B, D, and E, and agricultural field habitat within Alternatives B-E. Habitats suitable for this species are absent from Alternative A; however, this species may occasionally forage or fly over this alternative.
Burrowing Owl (*Athene cunicularia*)	CSSC	Found in open, dry grasslands, deserts, ruderal areas, and adjacent to agricultural fields. Requires suitable small mammal burrows for roosting and nesting.	**Possible (Alternatives A - E).** This species may utilize small mammal burrows along the levees of the canal and slough habitats within the Sutter Basin. It would be expected to forage within open areas within ruderal/ developed, agricultural field, and unknown upland habitats/land uses.
Black Swift (*Cypeseloides niger*)	CSSC	Migrants and transients found throughout many habitats of state; often nests behind waterfalls in the Sierra.	**Possible (Alternatives A - E).** Nesting habitats required by this species are absent from the alternatives; however, this species may forage or fly over the Sutter Basin from time to time.
Vaux's Swift (*Chaetura vauxi*)	CSSC	Migrants and transients move through the western Sierra foothills in spring and late summer; nests in conifer forest.	**Possible (Alternatives A - E).** Nesting habitats required by this species are absent from the alternatives, however this species may forage or fly over the Sutter Basin from time to time.
Loggerhead Shrike (*Lanius ludovicianus*)	CSSC	Forages in a variety of open habitats including grasslands. Nests in large trees near open spaces.	**Likely (Alternatives A-E).** Suitable nesting and foraging habitat is present within the ruderal/developed, slough, agricultural field, and unknown upland habitats/land uses that occurs in some or all of the alternatives.

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

California Animal Species of Special Concern and Fully Protected Species (continued)

Species	Status	Habitat/Range	*Occurrence in the APEs
Yellow Warbler (*Setophaga petechia*)	CSSC	Widely distributed throughout California during migration, this species typically nests in the Coast Ranges and Sierra Nevada. Preferred nesting habitat is riparian vegetation close to water. It rarely nests in the Central Valley.	**Possible (Alternatives A-E).** This species rarely nests within the Central Valley; however, it may forage or fly over the Sutter Basin from time to time.
Townsend's Big-Eared Bat (*Corynorhinus townsendii*)	CSSC	Found throughout California. Roosts most frequently in caves and cave-like structures, but has also been reported to utilize bridges, buildings, rock crevices, and hollow trees.	**Possible (Alternatives A-E).** This species may roost within bridges, buildings, and hollow trees potentially occurring within the ruderal/developed land use of these alternatives and hollow trees that may be present within the slough, agricultural field, unknown upland, and mixed riparian forest habitats/land uses of these alternatives. It may forage in flight over any of the APEs.
Pallid Bat (*Antrozous pallidus*)	CSSC	Found in grasslands, chaparral, and woodlands, where it feeds on ground- and vegetation-dwelling arthropods. Roosts in crevices in rocky outcrops and cliffs, caves, mines, buildings, bridges, and sometimes, hollow trees.	**Possible (Alternatives A-E).** This species may roost within bridges, buildings, and hollow trees potentially occurring within the ruderal/developed land use of these alternatives and hollow trees that may be present within the slough, agricultural field, unknown upland, and mixed riparian forest habitats/land uses of these alternatives. It may also use the APEs for foraging.
Western Red Bat (*Lasiurus blossevillii*)	CSSC	Roosts in tree or shrub foliage, although will occasionally use caves.	**Likely (Alternatives A-E).** This species likely roosts within shrubs and trees potentially occurring within ruderal/developed, slough, agricultural field, unknown upland, and mixed riparian forest habitats/land uses in these alternatives. It may also use the APEs for foraging.
Western Mastiff Bat (*Eumops perotis*)	CSSC	Found in open, arid to semi-arid habitats, where it feeds on insects in flight. Roosts most commonly in crevices in cliff faces, but may also use high buildings, trees, and tunnels.	**Possible (Alternatives A-E).** Roosting habitat is marginal within the Sutter Basin; however, this species may forage within the area.
American Badger (*Taxidea taxus*)	CSSC	Found in drier open stages of most shrub, forest and herbaceous habitats with friable soils.	**Possible (Alternatives B, D, and E).** This species may be present within grasslands occurring in unknown upland habitat that may be present within these alternatives. **Unlikely (Alternatives A and C).** The habitats within these alternatives are marginal for this species; however, this species may cross through these alternatives in route to more suitable habitats.

OCCURRENCE DESIGNATIONS AND STATUS CODES

Present:	Species observed on the site at time of field survey 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 due to absence of suitable habitat

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 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 JURISDICTIONAL WATERS

As will be discussed in greater detail in Section 3.2.8, the USACE has regulatory authority over certain rivers, creeks, lakes, ponds, reservoirs, wetlands, and in some cases irrigation canals ("waters of the U.S."). The CDFW asserts jurisdiction over waters in California that have a defined bed and bank, including engineered channels that replace, and/or connect to, natural drainages. The State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) assert jurisdiction over California's oceans, lakes, and rivers, and some, but not all, of California's wetland features.

The alternatives contain Robbins Canal and various other canals that may be regulated by the USACE, CDFW, and/or RWQCB. In addition, Alternatives A, D, and E would likely impact the Sutter Bypass, Sacramento Slough, and/or Sacramento River, which are all Waters of the U.S.

2.6 SENSITIVE NATURAL COMMUNITIES

California contains a wide range of natural communities, or unique assemblages of plants and animals. These communities have largely been classified and mapped by CDFW as part of its natural heritage program. Natural communities are assigned state and global ranks according to their rarity and the magnitude and trend of the threats they face. Any natural community with a

state rank of 1 to 3 (on a 1 to 5 scale) is considered "sensitive" and must be considered in CEQA review.

The mixed riparian forest occurring within and adjacent to the Sutter Basin is likely classified as Great Valley Mixed Riparian Forest, a sensitive natural community. This mixed riparian forest is likely composed exclusively of native trees, is structurally diverse, and occurs adjacent to water. It has high value for native wildlife. The areal extent of this natural community in California's Central Valley has been substantially reduced. By one estimate, riparian forests of all types occupied 921,000 acres of the Central Valley prior to the Gold Rush (Katibah 1983). By the early 1980s, approximately 100,000 acres, or slightly more than 11% of the original extent of this habitat remained in the Central Valley. The wholesale loss of this habitat in the Central Valley is, no doubt, a primary reason that this natural community has a state ranking of 2.2.

2.7 WILDLIFE MOVEMENT CORRIDORS

Wildlife movement corridors are routes that animals regularly and predictably follow during seasonal migration, dispersal from native ranges, daily travel within home ranges, and inter-population movements. Movement corridors in California are typically associated with valleys, ridgelines, and rivers and creeks supporting riparian vegetation, however other manmade features, such as canals and levees, may also be used as movement corridors.

Numerous potential wildlife movement corridors occur within the Sutter Basin and would be expected to be impacted by each alternative. They would include various levees along canals, sloughs, and the areas adjacent to the Sutter Bypass, Sacramento Slough, and Sacramento River.

2.8 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 Sutter Basin, the alternative APEs, and adjacent lands. The nearest unit of critical habitat is located approximately 10 miles west of the Sutter Basin, and is designated for the protection of the California tiger salamander (*Ambystoma californiense*).

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.

CEQA

In California, any project carried out or approved by a public agency that will result in a direct or reasonably foreseeable indirect physical change in the environment must comply with CEQA. The purpose of CEQA is to ensure that a project's potential impacts on the environment are evaluated, and methods for avoiding or reducing these impacts are considered, before the project is allowed to move forward. A secondary aim of CEQA is to provide justification to the public for the approval of any projects involving significant impacts on the environment.

According to Section 15382 of the CEQA Guidelines, a significant effect on the environment means 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." Although the lead agency may set its own CEQA significance thresholds, project impacts to biological resources are generally considered to be significant if they would meet any of the following criteria established in Appendix G of the CEQA Guidelines:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS.

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

- 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.

- 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, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Furthermore, CEQA Guidelines Section 15065(a) requires the lead agency to make "mandatory findings of significance" if there is substantial evidence that a project may:

- Substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare or threatened species.

- Achieve short-term environmental goals to the detriment of long-term environmental goals.

- Produce environmental effects that are individually limited but cumulatively considerable, meaning that the incremental effects of the project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects.

3.2 RELEVANT GOALS, POLICIES, AND LAWS

3.2.1 Sutter County General Plan Policies

In compliance with CEQA, the lead agency must consider conformance with applicable goals and policies of the Sutter County General Plan. The Sutter County General Plan released an update in 2011 that is valid through 2030. Implementation of goals in the Sutter County General Plan is accomplished via a set of policies specific to each goal. Relevant biological resource goals include:

- Support a comprehensive approach for the conservation, enhancement, and regulation of Sutter County's significant habitat and natural open space resources;

- Conserve, protect, and enhance Sutter County's significant natural wetland and riparian habitats;

- Conserve, protect, and enhance Sutter County's varied wildlife and vegetation resources; and

- Conserve, protect, and enhance Sutter County's unique natural open space lands and resources.

3.2.2 Habitat Conservation Plans and Natural Community Conservation Plans

Section 10 of the federal Endangered Species Act establishes a process by which non-federal projects can obtain authorization to incidentally take listed species, provided take is minimized and thoroughly mitigated. A Habitat Conservation Plan (HCP), developed by the project applicant in collaboration with the USFWS and/or NMFS, ensures that such minimization and mitigation will occur, and is a prerequisite to the issuance of a federal incidental take permit. Similarly, a Natural Community Conservation Plan (NCCP), developed by the project applicant in collaboration with CDFW, provides for the conservation of biodiversity within a project area, and permits limited incidental take of state-listed species.

3.2.3 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. Projects that may result in the "take" of federally listed species must generally enter into consultation with the USFWS and/or National Marine Fisheries Service (NMFS) pursuant to FESA. Projects that may result in the take of state listed species must generally enter into consultation with CDFW

CESA. In some cases, incidental take authorization(s) from these agencies may be required before the project can be implemented.

3.2.4 California Fully Protected Species

The classification of certain animal species as "fully protected" was the State of California's initial effort in the 1960s, prior to the passage of the California Endangered Species Act, to identify and provide additional protection to those species that were rare or faced possible extinction. Following CESA enactment in 1970, many fully protected species were also listed as California threatened or endangered. The list of fully protected species are identified, and their protections stipulated, in California Fish and Game Code Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and fish (5515). Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take, except in conjunction with necessary scientific research and protection of livestock.

3.2.5 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.

Native birds are also protected under California state law. The 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. Moreover, the California Migratory Bird Protection Act, enacted in September 2019, clarifies native bird protection and increases protections where California law previously deferred to federal law.

3.2.6 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.

3.2.7 Nesting Birds

In California, protection is afforded to the nests and eggs of all birds. California Fish and Game Code (Section 3503) states that it is "unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Breeding-season disturbance that causes nest abandonment and/or loss of reproductive effort is considered a form of "take" by the CDFW.

3.2.8 Wetlands and Other Jurisdictional Waters

The USACE regulates the filling or grading of waters of the U.S. under the authority of Section 404 of the Clean Water Act (CWA). Drainage channels and adjacent wetlands may be considered "waters of the United States" or "jurisdictional waters" subject to the jurisdiction of the USACE.

Waters of the U.S. are defined by the Navigable Waters Protection Rule. The new rule was published in the Federal Register on April 21, 2020, and took effect on June 22, 2020.

The Navigable Waters Protection Rule (33 CFR Part 328) identifies four categories of Waters of the U.S.: (1) territorial seas and traditional navigable waters, (2) tributaries, (3) lakes, ponds, and impoundments of jurisdictional waters, and (4) adjacent wetlands. These categories are defined as follows:

<u>Territorial Seas and Traditional Navigable Waters (TNWs)</u>

- The territorial seas and traditional navigable waters include large rivers and lakes and tidally-influenced waterbodies used in interstate or foreign commerce.

Tributaries

- Tributaries include perennial and intermittent rivers and streams that contribute surface flow to traditional navigable waters in a typical year. These naturally occurring surface water channels must flow more often than just after a single precipitation event—that is, tributaries must be perennial or intermittent.

- Tributaries can connect to a traditional navigable water or territorial sea in a typical year either directly or through other "waters of the United States," through channelized non-jurisdictional surface waters, through artificial features (including culverts and spillways), or through natural features (including debris piles and boulder fields).

- Ditches are to be considered tributaries only where they satisfy the flow conditions of the perennial and intermittent tributary definition and either were constructed in or relocate a tributary or were constructed in an adjacent wetland and contribute perennial or intermittent flow to a traditional navigable water in a typical year.

Lakes, Ponds, and Impoundments of Jurisdictional Waters

- Lakes, ponds, and impoundments of jurisdictional waters are jurisdictional where they contribute surface water flow to a traditional navigable water or territorial sea in a typical year either directly or through other "waters of the United States," through channelized non-jurisdictional surface waters, through artificial features (including culverts and spillways), or through natural features (including debris piles and boulder fields).

- Lakes, ponds, and impoundments of jurisdictional waters are also jurisdictional where they are flooded by a "water of the United States" in a typical year, such as certain oxbow lakes that lie along the Mississippi River.

Adjacent Wetlands

- Wetlands that physically touch other jurisdictional waters are "adjacent wetlands,"

- Wetlands separated from a "water of the United States" by only a natural berm, bank or dune are also "adjacent."

- Wetlands inundated by flooding from a "water of the United States" in a typical year are "adjacent."

- Wetlands that are physically separated from a jurisdictional water by an artificial dike, barrier, or similar artificial structure are "adjacent" so long as that structure allows for a direct hydrologic surface connection between the wetlands and the jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature.

- An adjacent wetland is jurisdictional in its entirety when a road or similar artificial structure divides the wetland, as long as the structure allows for a direct hydrologic surface connection through or over that structure in a typical year.

The final rule also outlines what are not "waters of the United States." The following waters/features are not jurisdictional under the rule:

- Waterbodies that are not included in the four categories of "waters of the United States" listed above.

- Groundwater, including groundwater drained through subsurface drainage systems, such as drains in agricultural lands.

- Ephemeral features, including ephemeral streams, swales, gullies, rills, and pools.

- Diffuse stormwater run-off and directional sheet flow over upland.

- Many farm and roadside ditches.

- Prior converted cropland retains its longstanding exclusion, but is defined for the first time in the final rule. The agencies are clarifying that this exclusion will cease to apply when cropland is abandoned (i.e., not used for, or in support of, agricultural purposes in the immediately preceding five years) and has reverted to wetlands.

- Artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease.

- Artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters.

- Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel.

- Stormwater control features excavated or constructed in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater run-off.

- Groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention and infiltration basins and ponds, that are constructed in upland or in non-jurisdictional waters.

- Waste treatment systems have been excluded from the definition of "waters of the United States" since 1979 and will continue to be excluded under the final rule. Waste treatment systems include all components, including lagoons and treatment ponds (such as settling

or cooling ponds), designed to either convey or retain, concentrate, settle, reduce, or remove pollutants, either actively or passively, from wastewater or stormwater prior to discharge (or eliminating any such discharge).

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 IMPACTS AND MITIGATION

The improvement alternatives (A – E) considered in this evaluation of impacts to biological resources are, A) modernize the existing Karnak Drainage Facility (preferred option), B) capture and store drainage water in a series of RD-owned retention basins, C) capture and store drainage water on farms, D) construct a RD-owned retention basin, and small pumping facility at the existing Karnak site, and E) construct a new pumping facility at a different location to replace the existing Karnak facility. Potential impacts to these resources from each of the five alternatives and mitigation measures to reduce potentially significant impacts to a less than significant impact are described in detail below and summarized in Table 2.

Table 2. Summary of Potential Impacts to Biological Resources from Each Improvement Alternative					
Project-Related Impacts	Alternatives and Potentially Significant Impacts				
	A	B	C	D	E
3.3.1 Special Status Plants	X	X	X	X	X
3.3.2 Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp					
3.3.3 Valley Elderberry Longhorn Beetle		X		X	X
3.3.4 Green Sturgeon, Chinook Salmon, Steelhead, and White Sturgeon	X			X	X
3.3.5 Giant Garter Snake	X	X	X	X	X
3.3.6 Western Pond Turtle	X	X	X	X	X
3.3.7 Swainson's Hawk	X	X	X	X	X
3.3.8 Burrowing Owl	X	X	X	X	X
3.3.9 Nesting Bank Swallow, Western Yellow-Billed Cuckoo, Tricolored Blackbird, Northern Harrier, White-Tailed Kite, Modesto Song Sparrow, Long-Eared Owl, Short-Eared Owl, Loggerhead Shrike, and Other Nesting Raptors and Migratory Birds	X	X	X	X	X
3.3.10 Special-Status and Other Roosting Bats	X	X	X	X	X
3.3.11 American Badger		X		X	X
3.3.12 Special Status Animals that Would Use Alternatives A – E only for Foraging					
3.3.13 Other Special Status Animals Absent or Unlikely to Occur within the Study Area					
3.3.14 Native Wildlife Nursery Sites	X	X	X	X	X
3.3.15 Wildlife Movement Corridors	X	X	X	X	X
3.3.16 Potential Waters of the United States	X	X	X	X	X
3.3.17 Degradation of Water Quality in Seasonal Drainages and Downstream Waters	X	X	X	X	X
3.3.18 Sensitive Natural Communities					X
3.3.19 Local Policies or Habitat Conservation Plans					

3.3.1 Project-Related Impacts to Special Status Plants

Potentially Significant Impacts

Project-related impacts to special status plants are potentially significant under CEQA and NEPA for **Alternatives A-E.**

Potential Impacts. Nine of the special status plant species occurring in the region have the potential to occur in various habitats of the alternatives, as summarized below in Table 3.

Table 3. Potential Occurrence of Special Status Plant Species in Habitats of the Alternative APEs.

Species	Potential Occurrence by Habitat Type (Applicable Alternatives)						
	Ruderal/ Developed (A-E)	Canal (A-E)	Slough (A, D, E)	Ag. Field (B-E)	Unknown Upland (B, D, E)	Mixed Riparian Forest (E)	Wetland (B, D, E)
Palmate-bracted Salty Bird's-beak					X		
Alkali Milk-vetch					X		
Brittlescale					X		
San Joaquin Spearscale					X		
Wooly Rose-mallow		X	X				X
Sanford's Arrowhead		X	X				X
Suisun Marsh Aster		X	X				X
Wright's Trichocoronis						X	X
Saline Clover					X		X

Should the chosen alternative impact habitats that support special status plants, many individual plants could be damaged or destroyed. This would be considered a significant impact under CEQA and NEPA.

Mitigation. If a project alternative other than Alternative A is selected, a qualified biologist will identify and map the habitats of the corresponding APE. The habitat mapping effort for Alternative A has already been completed and is included in this report as Figure 3. Should the chosen alternative's APE contain habitats with the potential to support one or more rare plant species (as summarized in Table 3 above), protocol-level surveys for the applicable species are required in order to adequately assess the impacts of the project on special status plants. If the assessment determines that the project will result in a significant impact to special status plant species, then the following mitigation measures will be implemented.

> ***Mitigation Measure 3.3.1a (Avoidance).*** If any special status plants are detected during the rare plant surveys, the project should be designed to avoid direct (i.e. species removal) and indirect impacts to these populations. Avoidance of indirect impacts would entail establishing a suitable disturbance-free buffer of at least 25 to 50 feet from any special status plants.

Mitigation Measure 3.3.1b (Relocation). If it is not possible to avoid populations of rare plants identified within construction zones, a qualified biologist will remove all individual plants to be impacted and relocate them to suitable habitat in the vicinity of the planning area. For the Palmate-bracted Salty Bird's-beak, consultation with the CDFW and USFWS will be completed prior to relocation activities.

Mitigation Measure 3.3.1c (Compensation). To compensate for unavoidable project-related impacts to Palmate-bracted Salty Bird's-beak plants, the project will provide compensatory mitigation. Two compensation alternatives are available. The applicant will acquire and protect off-site habitat from future disturbance. Compensation ratios will be 3:1, meaning that three acres of compensatory endangered species habitat will be preserved and protected under conservation easement. Alternatively, the applicant will purchase credits in a local conservation bank if a local bank exists with the required credits for sale. An additional alternative could consist of compensation at 2:1 as described above and the restoration/relocation of the impacted plant population at a 1:1 ratio according to a restoration/relocation plan prepared by a qualified biologist.

Implementation of the above mitigation measure will mitigate impacts to special status plant species to a less then significant level under CEQA and NEPA.

3.3.2 Project-Related Impacts to Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Less Than Significant Impacts

Project-related impacts to the vernal pool fairy shrimp and vernal pool tadpole shrimp are less than significant for **Alternatives A – E**.

Potential Impacts. LOA's field survey confirmed the absence of vernal pools from Alternative A. Aerial imagery indicates that vernal pools are absent from Sutter Basin as a whole. Because habitat capable of supporting the vernal pool fairy shrimp and vernal pool tadpole shrimp appear to be absent from all project alternatives, no impacts to these species are anticipated.

Mitigation. No mitigation is warranted.

3.3.3 Project-Related Impacts to the Valley Elderberry Longhorn Beetle

Potentially Significant Impacts

Project-related impacts to the valley elderberry longhorn beetle (VELB) are potentially significant for **Alternatives B, D, and E**, all of which may include unknown upland habitats supporting elderberry shrubs. Alternative E may also contain mixed riparian forest within which elderberry shrubs almost certainly occur.

Potential Impacts. Should elderberry shrubs be present within the APE of the chosen alternative, and damage occurs to these shrubs, individual VELBs could be killed and VELB habitat could be lost. Mortality of individual VELBs would constitute a violation of the federal Endangered Species Act. Construction mortality and loss of VELB habitat by the project are considered potentially significant impacts under CEQA and NEPA.

Mitigation. The following avoidance, minimization, and mitigation measures have been adapted from the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999). These measures will be implemented for Alternatives B, D, and E.

> ***Mitigation Measure 3.3.3a (Preconstruction Survey).*** Prior to project implementation, a qualified biologist will survey the alternative APE and surrounding lands within 100 feet for blue elderberry shrubs.
>
> ***Mitigation Measure 3.3.3b (Establish Buffers).*** Prior to project implementation, construction setbacks of 20 feet from the drip line of any elderberry shrubs with a stem of one-inch diameter or greater at ground level will be established in consultation with the USFWS. These elderberry avoidance areas will be clearly marked with signs, fencing, and/or flagging, and maintained for the duration of work in that area. No construction personnel or equipment shall enter the elderberry avoidance areas, except for as provided under *Mitigation Measure 3.3.3d* or *Mitigation Measure 3.3.3e* below.
>
> ***Mitigation Measure 3.3.3c (Employee Education Program).*** Prior to project implementation, construction personnel will receive worker environmental awareness training in the identification of the VELB and its host plant.
>
> ***Mitigation Measure 3.3.3d* (*Construction and Trimming Monitoring*).** If project activities necessitate temporary entry into the 20-ft. setback or trimming of elderberry shrubs, approval will first be obtained from the USFWS and a qualified biologist will be on-site to monitor such activities for their duration within the avoidance areas.
>
> ***Mitigation Measure 3.3.3e (Transplantation and Planting Additional Seedlings or Cuttings).*** If project activities necessitate removal of elderberry shrubs with a stem of one-inch diameter or greater at ground-level, these shrubs must be relocated to a conservation bank and additional seedlings or cuttings of elderberry shrubs and

associated native plant species shall be planted, as described in *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999).

Implementation of the above measures will reduce potential project impacts to the valley elderberry longhorn beetle to a less than significant level under CEQA and NEPA and will ensure that the chosen alternative is in compliance with federal laws protecting this species.

Less Than Significant Impacts

Project-related impacts to the valley elderberry longhorn beetle are less than significant for **Alternatives A and C**.

Potential Impacts. Elderberry shrubs are absent from Alternative A and likely absent from Alternative C, due to lack of suitable habitat. These alternatives are not expected to result in any impacts to the valley elderberry longhorn beetle.

Mitigation. No mitigation is warranted.

3.3.4 Project-Related Impacts to Green Sturgeon, Chinook Salmon (Central Valley spring-run ESU), Steelhead (Central Valley DPS), and White Sturgeon

Potentially Significant Impacts

Project-related impacts to green sturgeon, Chinook salmon (Central Valley spring-run ESU), steelhead (Central Valley DPS), and white sturgeon could potentially occur if **Alternatives A, D, and E impact the Sacramento River or any waters outside of Sutter Basin**. These species likely occur within the Sacramento River or other waters adjacent to Sutter Basin when they are on their way upstream to breed and downstream during outmigration. Any construction work within the Sacramento River or waters outside of Sutter Basin would have the potential to result in resuspension of silt and other sediment in the water column or the deposition of chemicals in the water (i.e. from the curing of concrete), with associated adverse effects to any individuals of these fish species that may be present. Project-related impacts to green sturgeon, Chinook salmon (Central Valley spring-run ESU) and steelhead (Central Valley DPS) would be a violation of the federal and/or state Endangered Species Act, and impacts to any of these species,

including white sturgeon, by Alternatives A, D, and E are considered potentially significant impacts under CEQA and NEPA.

Mitigation. The following measures will be implemented during or prior to the start of any Alternative A, D, or E activities occurring within the Sacramento River or other waters outside of the Sutter Basin.

> ***Mitigation Measure 3.3.4a (Avoidance).*** Peak outmigration of sturgeon juveniles occurs during the spring and early summer. Peak outmigration of salmon and steelhead smolts occurs during the spring. Few, if any juvenile sturgeon, salmon, or steelhead would be present in the Sacramento River or waters outside of Sutter Basin between August 15th and October 31st. Therefore, to the extent possible, all Alternative A, D, and E activities in the Sacramento River and waters outside of Sutter Basin will occur during that time frame, to avoid possible project impacts to these species.
>
> ***Mitigation Measure 3.3.4b (Fish Rescue and Relocation).*** Should Alternative A, D, or E activities be required to be conducted between November 1 and August 14 in the Sacramento River or waters outside of the Sutter basin, a fish rescue and relocation plan shall be prepared and implemented in consultation with the National Marine Fisheries Service (NMFS) to minimize impacts to these species.

Implementation of the above measures will reduce potential alternative impacts to the green sturgeon, Chinook salmon (Central Valley – spring run ESU), steelhead (Central Valley DPS), and white sturgeon to a less than significant level under CEQA and NEPA and will ensure that Alternatives A, D, and E are in compliance with federal laws protecting this species.

Less than Significant Impacts

Project-related impacts to the green sturgeon, Chinook salmon (Central Valley spring-run ESU), steelhead (Central Valley DPS), and white sturgeon are less than significant for **Alternatives B - C**.

Potential Impacts. Green sturgeon, Chinook salmon (Central Valley spring-run ESU), steelhead (Central Valley DPS), and white sturgeon are unlikely to occur in Alternatives B - C. Therefore, these alternatives are not expected to result in any impacts to these species.

Mitigation. No mitigation is warranted.

3.3.5 Project-Related Impacts to Giant Garter Snake

Potentially Significant Impacts

Project-related impacts to the giant garter snake are potentially significant for **Alternatives A – E**.

Potential Impacts. Habitats for giant garter snake are present within the canal, slough, wetland, and agricultural fields (rice fields) of Sutter Basin, and this species has been observed 0.25 miles to the east of Sutter Basin. They may enter Sutter Basin from anywhere adjacent to the area. During the inactive season (October 1 – April 30), giant garter snakes usually reside in burrows and could be impacted by ground disturbance. During the active season (May 1 – September 30), giant garters snakes could be present within the aquatic and terrestrial habitats of the area and could be impacted by construction activities. If giant garter snakes are present within the APE of the chosen alternative at the time of construction, individuals could be injured or killed. Construction-related injury or mortality of giant garter snakes would violate FESA and CESA, and be considered a significant impact under CEQA and NEPA.

Mitigation. The following mitigation measures will be implemented during or prior to the start of activities associated with Alternatives A-E.

> ***Mitigation Measure 3.3.5a* (*Pre-construction Surveys*).** If work will occur during the active season for giant garter snake (between May 1 and September 30), a qualified biologist will conduct two giant garter snake pre-construction surveys of the alternative APE (including any accessible suitable habitat adjacent to the APE) with the first occurring within 15 days and the second occurring within 24-hours of the onset of construction. The information collected from this first pre-construction survey will serve primarily to alert the biologist and construction crews of the general level of giant garter snake activity at the site, and the second survey will serve to minimize potential for take of giant garter snakes.
>
> ***Mitigation Measure 3.3.5b (Education Program).*** Prior to any work occurring within the chosen alternative, an education program shall be prepared and delivered by a qualified biologist to all personnel working on the site. It shall include a description on the regulations protecting this species, implications for impacting this species, the biology of this species, and who to contact should personnel potentially observe this species.
>
> ***Mitigation Measure 3.3.5c* (*Exclusion*).** If work will occur during the inactive season for giant garter snake (between October 1 and April 30), an exclusion fence will be installed

around the work areas prior to the start of the inactive season. The design of the fence will be approved by the CDFW and USFWS prior to installation. Fence installation will be supervised by a qualified biologist.

Mitigation Measure 3.3.5d (Monitoring). A qualified biological monitor will inspect the exclusion fence each day to ensure it is functional for the intended purpose and monitor all in-water construction activities. The biologist will conduct a daily survey of the project site (morning). The purpose of daily monitoring is to ensure that the exclusion fence remains in good repair as long as construction is occurring at the project site. Any wildlife, including giant garter snakes, observed in the project area will be allowed to passively leave the site.

***Mitigation Measure 3.3.5e (Vegetation Removal*).** Clearing of herbaceous vegetation (i.e., grasses and forbs) will be confined to the minimal area necessary to facilitate construction activities and preserve native vegetation.

Implementation of Mitigation Measures 3.3.5a through 3.3.5e will reduce potential project impacts to giant garter snakes to a less than significant level under CEQA and NEPA, and will ensure that the chosen alternative remains in compliance with state and federal laws protecting this species.

Less Than Significant Impacts

Project-related impacts to giant garter snake habitat are less than significant for **Alternatives A - E**.

Potential Impacts. All alternatives will either slightly change or increase the amount of giant garter snake habitat, resulting in no net loss of habitat. Therefore, these alternatives are not expected to result in any permanent impacts to giant garter snake habitat.

Mitigation. No mitigation is warranted.

3.3.6 Project-Related Impacts to Western Pond Turtle

Potentially Significant Impacts

Project-related impacts to the western pond turtle are potentially significant for **Alternatives A – E**.

Potential Impacts. All alternatives appear to provide suitable habitat for the western pond turtle in the form of inundated agricultural fields, canals, sloughs, wetlands, and adjacent unknown

uplands. Each alternative will either maintain the suitable habitat within Sutter Basin, or potentially increase the amount of suitable habitat; therefore, the western pond turtle will not be adversely affected by project-related loss or degradation of habitat.

However, should western pond turtles occur within the chosen alternative's APE at the time of construction, individuals may be at risk of construction-related injury or mortality. For example, individual turtles could be injured or killed if they seek cover in or under parked equipment, move through the site during the operation of trucks and other heavy equipment, or hide underwater during in-water work. Project-related mortality of western pond turtles is therefore considered a potentially significant adverse environmental impact of the chosen alternative under CEQA and NEPA.

Mitigation. The following measures will be implemented during or prior to the start of activities associated with Alternatives A-E.

> ***Mitigation Measure 3.3.6a* (*Pre-construction Survey*).** Within 24-hours of the start of construction activities, a qualified biologist will complete a preconstruction survey for western pond turtle.
>
> ***Mitigation Measure 3.3.6b* (*Avoidance*).** Should any western pond turtles be observed on the site, they shall be allowed to leave the project on their own.

Implementation of Mitigation Measures 3.3.6a through 3.36b will reduce potential project impacts to western pond turtle to a less than significant level under CEQA and NEPA.

3.3.7 Project-Related Impacts to Swainson's Hawk

Potentially Significant Impacts

Project-related impacts to the Swainson's hawk are potentially significant for **Alternatives A – E**.

Potential Impacts. Nesting habitat is likely present within Alternatives A – E in the form of large trees scattered throughout all habitats. While none of the alternatives are likely to require the removal of large trees, construction activities have the potential to disturb nesting Swainson's hawks such that they could abandon their nests, resulting in the mortality of nestlings or eggs.

Such an event would be considered a form of "take" by CDFW and USFWS. In the absence of the appropriate permits, "take" of Swainson's hawks would violate the California Endangered Species Act, California Fish and Game Code, and the federal Migratory Bird Treaty Act. "Take" of nesting Swainson's hawks is considered a potentially significant impact for each alternative.

In addition, **Alternatives B – D** would potentially contribute to a regional loss of foraging habitat for the Swainson's hawk. Alternative B would remove approximately 10,000 acres of potential foraging habitat, Alternative C would remove over 30,000 acres of potential foraging habitat, and Alternative D would remove an unknown amount of potential foraging habitat. Depending on the number of Swainson's hawk nesting pairs within the vicinity of Alternatives B – D and how much habitat will be lost in relation to these nesting pairs, this loss of foraging habitat could be considered a potentially significant impact under CEQA and NEPA.

Mitigation. The following avoidance and minimization measures have been adapted from *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (SHTAC 2000), and are required for Alternatives A-E.

> ***Mitigation Measure 3.3.7a (Avoidance).*** In order to avoid project-related "take" of Swainson's hawk, project-related activities will occur, where possible, outside of the Swainson's hawk nesting season, or between September 16th and the end of February.
>
> ***Mitigation Measure 3.3.7b (Swainson's Hawk Surveys).*** Prior to the start of Alternatives B – E activities a qualified biologist will conduct protocol-level Swainson's hawk nesting surveys for active Swainson's hawk nests within ½ mile of the APE in accordance with guidelines set by the Swainson's Hawk Technical Advisory Committee (SHTAC 2000). The SHTAC (2000) guidelines define five survey periods for Swainson's hawk: Period I: January 1-March 20; Period II: March 20-April 5; Period III: April 5-April 20; Period IV: April 21-June 10; and Period V: June 10-July 30. The guidelines prescribe a minimum of three surveys per survey period for at least the two survey periods immediately prior to a project's initiation, and specifically recommend that surveys be completed in Periods II, III, and V. The purpose of these surveys will be to establish a base understanding of the location of nesting Swainson's hawks within the vicinity of the chosen alternative, and to determine if foraging habitat compensation (Measure 3.3.5d) and/or a cumulative impact analysis (Measure 3.3.5e) are required.
>
> ***Mitigation Measure 3.3.7c (Establish Buffers).*** Should any active Swainson's hawk nests be discovered within ½ mile of alternative impact areas, the biologist will consult with CDFW to determine an appropriate construction setback distance. Construction-free buffers will be identified on the ground with flagging, fencing, or by other easily visible

means, and will be maintained until the biologist has determined that the young have fledged.

Mitigation Measure 3.3.7d (Foraging Habitat Compensation). Should any active Swainson's hawk nests be discovered within ½ mile of alternative impact areas, and the chosen alternative may remove any potential foraging habitat for Swainson's hawk (i.e. agricultural fields suitable for foraging or unknown upland habitats), an amount of habitat management land, to be determined in consultation with CDFW, shall be required to mitigate for loss of Swainson's hawk foraging habitat. The amount of habitat management land set aside for impacts to Swainson's hawk foraging habitat may range from 0.5 – 1.0 acres of habitat management for every acre of Swainson's hawk foraging habitat removed by the chosen alternative.

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

3.3.8 Project-Related Mortality/Disturbance of the Burrowing Owl

Potentially Significant Impacts

Project-related impacts to burrowing owl are potentially significant for **Alternatives A – E**.

Potential Impacts. While there are no CNDDB burrowing owl locations within the Sutter Basin, this species may utilize small mammal burrows along levees of the canal and slough habitats within Alternatives A – E. Some of the canal habitats may be adjacent to agricultural field and unknown upland habitats, which they would utilize for roosting, nesting, and foraging. They would also potentially utilize the unknown upland habitat for roosting, nesting, and foraging. Burrowing owls are highly mobile while foraging, and it is anticipated that any burrowing owls attempting to forage within the chosen alternative APE at the time of construction would simply fly away from construction disturbance. However, if burrowing owls are occupying burrows on the chosen alternative APE at the time of construction or ground-disturbing operations, owls could be vulnerable to project-related injury or mortality. If construction or ground-disturbing operations activities occur during the nesting season, burrowing owls could be disturbed by such activities such that they would abandon their young. Project-related injury, mortality, or disturbance of burrowing owls is considered a potentially significant impact under CEQA and

NEPA. Project-related injury or mortality of burrowing owls would also constitute a violation of the federal Migratory Bird Treaty Act and related state laws.

Changes to potential foraging opportunities for burrowing owls may occur as a result of some of the alternatives. Alternative A would not alter any potential foraging areas. Alternative B may remove up 10,000 acres of agricultural field foraging habitat when constructed basins are inundated. Alternative C may remove up to 30,000 acres of agricultural field foraging habitat when the fields are inundated. Alternative D may remove an unknown number of acres of potential foraging acres when the basin is inundated. Alternative E is unlikely to remove a significant amount of foraging habitat. Should burrowing owls be present within or adjacent to Alternatives B – D, this loss of foraging habitat could be considered a potentially significant impact under CEQA.

Mitigation. The following measures are required for Alternatives A - E.

> ***Mitigation Measure 3.3.8a (Take Avoidance Surveys).*** Take avoidance surveys for burrowing owls shall be conducted by a qualified biologist within 30 days prior to the start of construction and activities involving ground disturbance. The surveys will be conducted according to methods described in the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). Each survey is to cover the work area(s) in question and adjacent lands within 200 meters, where potential nesting or roosting habitat is present ("survey area").
>
> ***Mitigation Measure 3.3.8b (Avoidance of Nest Burrows).*** If construction or ground-disturbing activities are to occur during the breeding season (February 1-August 31) and active nest burrows are identified within the survey area, a disturbance-free buffer will be established by a qualified biologist around each burrow, following the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). The buffers will be enclosed with temporary fencing to prevent encroachment by construction equipment and workers. Buffers will remain in place for the duration of the breeding season, unless otherwise arranged with CDFW. After the breeding season, passive relocation of any remaining owls may take place as described below.
>
> ***Mitigation Measure 3.3.8c (Avoidance or Passive Relocation of Resident Owls).*** During the non-breeding season (September 1-January 31), resident owls occupying burrows in work areas associated with construction or ground-disturbing activities may either be avoided, or passively relocated to alternative habitat. If the applicant chooses to avoid active owl burrows within the work area during the non-breeding season, a 50-meter disturbance-free buffer will be established around these burrows. 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.

Mitigation Measure 3.3.8d (Impact Evaluation and Habitat Compensation). Should Alternatives B, C, or D be chosen, a Burrowing Owl Impact Evaluation shall be conducted according to the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). It shall include repeated surveys during the breeding and non-breeding season, an impact assessment, and establishing mitigation goals. Should it be found that there will be impacts to burrowing owl habitat, habitat compensation shall be determined based on the results of the Impact Evaluation and in consultation with CDFW.

Compliance with the above mitigation measures will reduce potential impacts to the burrowing owl from project-related injury, mortality, or disturbance to a less than significant level under CEQA and NEPA and will ensure that the project is in compliance with state and federal laws protecting this species.

3.3.9 Project-Related Impacts to Nesting Bank Swallow, Western Yellow-billed Cuckoo, Tricolored Blackbird, Northern Harrier, White-tailed Kite, Modesto Song Sparrow, Long-eared Owl, Short-eared Owl, Loggerhead Shrike and other Nesting Raptors and Migratory Birds.

Potentially Significant Impacts

Potential Impacts. Alternatives A - E have the potential to be used for nesting by a variety of birds and raptors, including the federally- and state-listed western yellow-billed cuckoo, the state-listed bank swallow and tricolored blackbird, the California Fully Protected white-tailed kite, and the California Species of Special Concern northern harrier, Modesto song sparrow, long-eared owl, short-eared owl, and loggerhead shrike, as summarized below in Table 4.

Table 4. Potential Special Status Avian Nesting in Habitats of the Alternative APEs.

Species	Potential Nesting by Habitat Type (Applicable Alternatives)						
	Ruderal/ Developed (A-E)	Canal (A-E)	Slough (A, D, E)	Ag. Field (B-E)	Unknown upland (B, D, E)	Mixed Riparian Forest (E)	Wetland (B, D, E)
Bank Swallow		X	X				
Western Yellow-bellied Cuckoo						X	

Tricolored Blackbird		X	X	X			X
Northern Harrier					X	X	X
White-tailed Kite					X	X	
Modesto Song Sparrow						X	X
Long-eared Owl						X	
Short-eared Owl				X	X		X
Loggerhead Shrike	X		X	X	X	X	

Moreover, all habitats of **Alternatives A – E** have the potential to be used for nesting by other birds and raptors afforded protections by the federal Migratory Bird Treaty Act and related state laws. If nesting birds or raptors are present at the time of construction, individual birds could be injured or killed, or could be disturbed such that they would abandon their nests. Alternative activities that injure or kill federal and/or state threatened or endangered bird species or adversely affect their nesting success would violate FESA and/or CESA. Alternative activities that injure or kill any native bird would violate the FMBTA and/or related state laws. Impacts to any of these birds or their nests would be considered a potentially significant impact under CEQA and NEPA.

Mitigation. The following measures are required for Alternatives A – E.

***Mitigation Measure 3.3.9a* (*Avoidance*).** When possible, project construction activities will occur outside of the February 1-August 31 avian nesting season such that project activities will have no potential to disrupt active nests.

***Mitigation Measure 3.3.9b (Preconstruction Surveys*).** If project construction activities must occur during the nesting season, a qualified biologist will conduct preconstruction surveys for active nests within 14 days of the onset of these activities. The survey will include the proposed work area(s) and surrounding lands within 500 feet. If no active nests are found within the survey area, no further mitigation would be required.

Mitigation Measure 3.3.9c (Special Status Bird Nest Consultation, Nest Buffers, and other Minimization or Mitigation Measures). Should any active nests of federal or state threatened or endangered birds be discovered on or near proposed work areas, a qualified biologist will consult with the CDFW and/or USFWS (depending on their listing status) to determine an appropriate disturbance-free nest buffer and any other minimization or mitigation measures. Should any active nests of bird species of special concern be discovered near proposed work areas, a qualified biologist will determine an appropriate disturbance-free nest buffer and any other minimization or mitigation measures. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other

easily visible means, and will be maintained until the biologist has determined that the young have fledged.

Mitigation Measure 3.3.9d (Other Nesting Raptor and Migratory Bird Nest Buffers). Should the active nests of any non-special-status birds or raptors be discovered near proposed work areas, a qualified biologist will determine appropriate no-disturbance nest buffers based on applicable CDFW guidelines and/or the biology of the affected species. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist has determined that the young have fledged.

Implementation of Mitigation Measures 3.3.9a through 3.3.9d will reduce potential project impacts to nesting birds and raptors, including special status avian species, to a less than significant level under CEQA and NEPA, and will ensure that the project remains in compliance with state and federal laws protecting these species.

3.3.10 Project-Related Impacts to Special-Status and Other Roosting Bats

Potentially Significant Impacts

Project-related impacts to Townsend's big-eared bat, pallid bat, western red bat, and other roosting bats are potentially significant for **Alternatives A – E.**

Potential Impacts. Townsend's big-eared bat, pallid bat, western red bat, and other roosting bats have the potential to roost in a variety of features that may be present within all alternatives. Features such as bridges, buildings, hollow trees, and shrub and tree foliage may be utilized by bat species for winter and/or maternal roosting. Roosting bats could be injured or killed by alternative activities should such activities disturb or remove a roost. Alternative activities that impact these bat roosts are considered a potentially significant impact under CEQA.

Mitigation. The following measures are required for Alternatives A – E.

***Mitigation Measure 3.3.10a (Preconstruction Survey*).** Prior to alternative activities that will impact potentially suitable roosting habitat for special-status bats (e.g. removal or modification of buildings or bridges, removal of shrubs or trees) a qualified biologist will conduct preconstruction surveys within 14 days of the onset of these activities. The surveys will include inspecting any suitable roost sites for bat sign (guano, etc.) and completing an acoustic monitoring survey and evening emergence survey at all locations suitable for bats, as determined by the qualified biologist. The bat acoustic monitoring survey will include setting up bat detectors adjacent to the suitable structures the afternoon before the emergence

survey, which will be left in place for at least two nights, and will be used to determine which species are utilizing the area. The evening emergence surveys will include watching for bats emerging from suitable structures over two consecutive nights. If no emerging bats are found within the survey area, no further mitigation would be required.

Mitigation Measure 3.3.10b (Avoidance, Consultation, and/or Establish Buffers). Should active roosts for special-status bats be observed, or active roosts for other bat species are observed during the bat winter roosting season (November 1 through April 15) or maternity roosting season (May 15 through August 15), these bat roosts will be avoided and buffers will be established. If any active special-status bat roosts are discovered near proposed work areas, the biologist will consult with CDFW to determine appropriate disturbance-free setback distances and other minimization measures. Should any other bat winter or maternal roosts be discovered near proposed work areas, the biologist will determine appropriate disturbance-free setback distances. Disturbance-free buffers will be identified on the ground with flagging, fencing, or by other easily visible means, and will be maintained until the biologist and/or CDFW has determined the roost is no longer active.

Mitigation Measure 3.3.10c (Exclusion). Should active roosts for bats be identified, bats may be excluded from occupied features outside of the bat winter roosting season (August 15-November 1) and maternity roosting season (April 15-May 15 and). An exclusion plan would be developed in consultation with CDFW for any special-status bat roosts, and may include compensation, exclusion methods, and roost removal methods to safely exclude roosting bats from the roosting structure to be removed, monitoring the roost during eviction, and a discussion of type, amount, and distance of suitable habitat near the habitat to be removed. Should any other bat winter or maternal roosts be discovered near proposed work areas, the biologist will develop the exclusion plan. Exclusion methods may include the use of one-way doors at roost entrances, or sealing roost entrances when a site can be confirmed to contain no bats.

Implementation of Mitigation Measures 3.3.10a through 3.3.10c will reduce potential alternative impacts to special-status and other roosting bats to a less than significant level under CEQA and NEPA.

3.3.11 Project-Related Impacts to American Badger

Potentially Significant Impacts

Project-related impacts to the American badger are potentially significant for **Alternatives B, D, and E.**

Potential Impacts. Unknown upland habitat potentially present within Alternatives B, D, and E, may have grasslands or other areas that may be utilized for denning and foraging by American

badger. If one or more badgers were present in the Alternative B, D, or E APEs at the time of construction, then construction activities would have the potential to injure or kill these individuals. Project-related injury or mortality of the American badger is considered a potentially significant impact under CEQA and NEPA.

Given the lack of unknown upland habitat within the Sutter Basin, the loss of this habitat type from development of Alternatives B, D, or E would be expected to negatively impact local populations of this species, if present. Loss of habitat for the American badger is considered a potentially significant impact of these alternatives under CEQA.

Mitigation. The following mitigation measures are required for Alternatives B, D, and E.

> ***Mitigation Measure 3.3.11a (Pre-construction Surveys).*** A pre-construction survey for American badgers will be conducted by a qualified biologist within 30 days of the onset of construction. The survey area will encompass all areas within and immediately adjacent to the unknown upland habitats.
>
> ***Mitigation Measure 3.3.11b (Avoidance and Mitigation).*** Should an active den be identified during the preconstruction surveys the den will be avoided until the den is no longer active. Based on the final projects design, and what the associated impacts to suitable American badger habitat will be, a qualified biologist shall consult with CDFW to determine if additional mitigation measures are necessary, such as avoiding any impacts to unknown upland habitats, compensating for loss of habitat, or some other alternative.

Less Than Significant Impacts

Project-related impacts to the American badger are less than significant for **Alternatives A and C.**

Potential Impacts. Alternatives A and C do not offer suitable foraging or denning habitat for the American badger. Badgers are highly unlikely to occur within these APEs and would therefore not be at risk of construction-related injury or mortality. Moreover, development of these APEs would not result in the loss of habitat for this species.

Mitigation. No mitigation is warranted.

3.3.12 Project-Related Disturbance to Special Status Animals that Would Use Alternatives A - E Only for Foraging

Less Than Significant Impacts

Project-related impacts to special status animals that may use the **Alternative A – E** APEs for foraging, but are not expected to breed, nest, or den on site, are less than significant under CEQA and NEPA.

Potential Impacts. Of the 40 special status animals potentially occurring in the vicinity of the alternatives and the Sutter Basin, nine may regularly or occasionally utilize some or all of **Alternatives A – E** for foraging, but would breed elsewhere. These species include the bald eagle, golden eagle, peregrine falcon, mountain plover, lesser sandhill crane, black swift, Vaux's swift, yellow warbler, and western mastiff bat. The foraging behaviors of these species are such that they would not be at risk of project-related injury or mortality.

Following completion of one of the alternatives, the land uses may change in a way that may increase or decrease the amount of suitable foraging habitat that is available for these species. Due to the vast amount of similar habitats in the region, degradation or loss of foraging habitat for these species is considered a less than significant impact for Alternatives A – E.

Mitigation. No mitigation is warranted.

3.3.13 Project-Related Impacts to Other Special Status Animals Absent or Unlikely to Occur within the Study Area

Less Than Significant Impacts

Project-related impacts to other special status animals that are absent or unlikely to occur within **Alternatives A – E** are less than significant under CEQA and NEPA.

Potential Impacts. Of the 40 special status animal species potentially occurring in the vicinity of Sutter Basin, eight species would be absent from one or more of the alternative APEs due to unsuitable habitat conditions, or unlikely to occur except as transient or during migration events.

These include the delta smelt, longfin smelt, euchalon, Sacramento splittail, California black rail, willow flycatcher, mountain plover, and lesser sandhill crane. The delta smelt, longfin smelt, euchalon, and Sacramento splittail are unlikely to occur within Alternatives A – E because the Sutter Basin does not contain suitable breeding habitat and/or the Sutter Basin is out of their known range. California black rail is unlikely to occur within Alternatives B, D, and E because there is not a large enough area of suitable habitat for this species, and they would be absent from Alternatives A and C due to the lack of suitable habitat. Willow flycatcher may pass through or over Alternatives A – E during migration. Although the mountain plover and lesser sandhill crane are likely to forage from time to time in Alternatives B – E, they are both considered absent from Alternative A due to lack of suitable habitat. These species are not at risk of injury or mortality from alternative activities because of the extreme unlikelihood of their occurring within these alternatives. Similarly, these alternatives will not result in a loss of habitat for these species, because there is little or no likelihood that they utilize these particular alternatives. Therefore, potential project-related impacts to these species are less than significant under CEQA and NEPA.

Mitigation. No mitigation is warranted.

3.3.14 Project-Related Impacts to Native Wildlife Nursery Sites

Potentially Significant Impacts

Project-related impacts to native wildlife nursery sites are potentially significant for **Alternatives A – E.**

Potential Impacts. Wildlife nursery sites may occur within the Alternative A – E APEs in the form of swallow nest colonies or bat roosts. Swallows can nest in the banks of vertical dirt banks or under bridges and other horizontal surfaces within canal and slough habitat. Bats can roost in buildings, hollow trees, and in trees and shrubs within a variety of habitats potentially occurring in Alternatives A – E. Alternative activities in the vicinity of these areas may disturb nesting swallows or roosting bats such that they would abandon their nest or roost, respectively.

Therefore, each alternative has the potential to impede the use of swallow nest and/or roosting bat colonies.

Mitigation. Project-related mortality of nesting swallows was considered in Section 3.3.9 and fully mitigated with *Mitigation Measures 3.3.9a-d* and project-related mortality of roosting bats was considered in Section 3.3.10 and fully mitigated with *Mitigation Measures 3.3.10a-c*. *Mitigation Measures 3.3.9a-d* will also ensure that the project does not impede the use of swallow nest colonies and *Mitigation Measures 3.3.10a-c* will ensure that the project does not impede the use of bat roosting colonies, which reduces potential project-related impacts to native wildlife nursery sites to a less than significant level under CEQA and NEPA.

3.3.15 Project-Related Impacts to Wildlife Movement Corridors

Less Than Significant Impacts

Project-related impacts to wildlife movement corridors are less than significant for **Alternatives A – E.**

Potential Impacts. As discussed in Section 2.7, the canal and slough habitats of Alternatives A - E may function as wildlife movement corridors. The adjacent lands are mostly agricultural fields, and canals and sloughs would provide more potential for cover for wildlife and may serve as direct routes of travel for wildlife between more suitable habitats. However, if any of the alternatives involve impacts to any of these potential wildlife movement corridors, the impacts would likely be temporary in nature. After development of the chosen alternative these potential wildlife corridors would likely continue to be suitable for wildlife use.

Mitigation. No mitigation is warranted.

3.3.16 Project-Related Impacts to Jurisdictional Waters

Potentially Significant Impacts

Project-related impacts to waters of the U.S. and other jurisdictional waters and wetlands are potentially significant for **Alternatives A – E**.

Potential Impacts. Robbins Canal is a potential waters of the U.S. and extends along the length of Sutter Basin. Additional canals within the Sutter Basin are also potential waters of the U.S. The Sacramento Slough, Sutter Bypass, and Sacramento River may be impacted by some of the alternatives (A, D, and E). It appears that each alternative will impact at least the Robbins Canal in one way or another. Some of the alternatives may impact other canals and wetlands. The level of impact will depend on the alternative that is chosen.

Project-related impacts to some or all of these waters from development of the chosen alternative are considered potentially significant. Impacts to waters of the U.S. are also subject to the permit requirements of Section 404 and 401 of the Clean Water Act. The placement of fill within any wetlands or other jurisdictional features will require 1) a 404 permit from the USACE, and 2) a 401 Water Quality Certification from the RWQCB, and likely also 3) a Streambed Alteration Agreement from CDFW. Given the possible extent of impacts to potential waters of the U.S., these impacts are considered potentially significant under CEQA and NEPA.

Mitigation. The following measures are required for Alternatives A - E.

> ***Mitigation Measure 3.3.16a (Delineation).*** Once the final alternative is chosen, an aquatic resources delineation will be prepared for the project area, to determine the boundaries of all potentially jurisdictional waters present.
>
> **Mitigation Measure 3.3.16b *(Minimization).*** Based on the results of the aquatic resources delineation, the chosen alternative will be designed to minimize impacts to potentially jurisdictional waters to the maximum extent practicable while still achieving its goal of flood control.
>
> ***Mitigation Measure 3.3.16b (Permits).*** If the final project design requires impacts to areas of jurisdictional waters, permits under Section 404 and 401 of the Clean Water Act and a Streambed Alteration Agreement will be obtained for the project, and the project will adhere to all conditions of the permits, such as compensatory mitigation requirements, survey requirements, monitoring requirements, timing requirements and reporting requirements.

Implementation of the above measures would reduce potential impacts to jurisdictional waters to a less-than-significant level under CEQA and NEPA and ensure that the chosen alternative remains in compliance with state and federal laws protecting this resource.

3.3.17 Degradation of Water Quality in Seasonal Drainages and Downstream Waters

Potentially Significant Impacts

Degradation of water quality in seasonal drainages and downstream waters is a potentially significant project-related impact for **Alternatives A - E**.

Potential Impacts. Sedimentation and transport of polluted runoff could occur from construction activity associated with each alternative. Impacts can be reduced to a less than significant level through implementation of measures to protect water quality during construction, as described below.

Mitigation. The following measures are required for Alternatives A - E.

> ***Mitigation Measure 3.3.17a (Preparation of a Storm Water Pollution Prevention Plan).*** The applicant will have a certified contractor prepare a Storm Water Pollution Prevention Plan (SWPPP) that includes erosion and sedimentation control Best Management Practices (BMP's) to protect water quality and measures to prevent contaminants from entering storm water. The plan would include, at a minimum, provisions that the limits of construction be defined and wattles or other appropriate erosion controls be placed downstream and/or downslope of areas where ground disturbance will occur, to prevent flows and/or surface runoff from causing erosion. The plan will also require all exposed graded slopes to be stabilized.
>
> ***Mitigation Measure 3.3.17b (Spill Containment and Material Storage).*** The applicant shall store fuel used for contractor equipment and hazardous materials away from the chosen alternative APE. When possible, the applicant shall not refuel construction equipment when working adjacent to potential waters of the U.S. or state. If refueling is necessary near potential waters of the U.S. or state, the applicant shall use portable spill containment equipment or maintain a spill containment kit during construction.

Implementation of the above measures will reduce potential project-related impacts to water quality to a less than significant level under CEQA and NEPA and ensure that all alternatives remain in compliance with state and federal laws protecting this resource.

3.3.18 Project-Related Impacts to Sensitive Natural Communities

Potentially Significant Impacts

Project-related impacts to sensitive natural communities are potentially significant for **Alternative E**, and for any other alternative that may impact mixed riparian forest habitats.

Potential Impacts. Depending on specific APE location, Alternative E and possibly some of the other alternatives may impact mixed riparian forest habitat, which is likely considered Great Valley Mixed Riparian Forest, a sensitive natural community. At this time, it is unknown how much of this habitat will be impacted. Potential impacts to this habitat are considered potentially significant under CEQA and NEPA.

Mitigation. The following measures will be implemented for any chosen alternative that may impact mixed riparian forest habitat.

> ***Mitigation Measure 3.3.18a (Vegetation Survey).*** Prior to alternative construction, a qualified biologist will survey all mixed riparian forest habitat with the potential to be impacted by construction and will record the species, location, and diameter at breast height (DBH) of each tree and the general flora present within this habitat. Upon project completion, a qualified biologist will survey the mixed riparian forest habitat again to determine if any of this habitat was impacted.
>
> ***Mitigation Measure 3.3.18b (Revegetation).*** The applicant will prepare a revegetation plan to provide compensation for removal of any riparian trees and associated riparian vegetation. It will include replacement tree plantings at a ratio of 3:1 for trees with a DBH between 4 and 24 inches, and at a ratio of 10:1 for trees with a DBH greater than 24 inches. Associated species of Great Valley mixed riparian forest will also be included in the revegetation plan. The revegetation plan will also detail the methods for planting, irrigating, and maintaining any replacement revegetation planted. All plantings will be monitored annually for a minimum of five years.

Implementation of the above measures would reduce potential impacts to sensitive natural communities to a less than significant level under CEQA and NEPA.

<u>Less Than Significant Impacts</u>

Project-related impacts to sensitive natural communities are less than significant for **Alternatives A – D**, as long as these alternatives do not impact riparian habitat.

Potential Impacts. Sensitive natural communities are likely absent from Alternatives A - D. As discussed, designated critical habitat are absent from Alternatives A – E. Therefore, project-

related impacts to sensitive natural communities for Alternatives A - D, including designated critical habitat for Alternatives A – E, would be considered less than significant under CEQA and NEPA.

Mitigation. No mitigation is warranted.

3.3.19 Conflict with Local Policies or Habitat Conservation Plans

Less Than Significant Impacts

Project-related impacts associated with conflict with local policies or habitat conservation plans are less than significant for **Alternatives A - E**.

Potential Impacts. The alternatives will be implemented in accordance with the goals and policies of the Sutter County General Plan. No known HCPs or NCCPs are in effect for the area. Therefore, the alternatives are not expected to conflict with local policies or habitat conservation plans.

Mitigation. No mitigation is warranted.

3.4 SECTION 7 EFFECTS DETERMINATIONS FOR FEDERALLY LISTED SPECIES

Table 5, below, summarizes Section 7 effects determinations for federally listed species returned in the USFWS IPaC and/or CNDDB queries. The incorporated mitigation measures (MM) are also referenced. An official species list generated by the IPaC system is included in Appendix E.

Table 5. Section 7 Effects Determinations for Federally Listed Species.

Species	Determination for Each Alternative	Rationale for the Determination
Palmate-bracted Salty Bird's-Beak* (*Chloropyron palmatum*)	***B, D, and E: May affect, not likely to adversely affect A and C: No effect***	B, D, and E: MM 3.3.1a will be included in the proposed action. A and C: Habitats absent
Hartweg's Golden Sunburst (*Pseudobahia bahiifolia*)	***A – E: No effect***	A – E: Habitats absent
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	***A – E: No effect***	A – E: Habitats absent
Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)	***A – E: No effect***	A – E: Habitats absent
Valley Elderberry Longhorn Beetle *(Desmocerus californicus dimorphus*)	***B, D, and E: May affect, not likely to adversely affect A and C: No effect***	B, D, and E: MM 3.3.3a-e will be included in the proposed action. A and C: Habitats absent
Green Sturgeon (Southern DPS)* (*Acipenser medirotris*)	***A – E: No effect***	A – E: Habitats absent
Chinook Salmon (Central Valley spring-run ESU)* (*Oncorhynchus tshawytscha*)	***E: May affect, not likely to adversely affect A - D: No effect***	E: MM 3.3.4a-b will be included in the proposed action. A – D: Habitats absent
Steelhead (Central Valley DPS)* (*Oncorhynchus mykiss irideus*)	***E: May affect, not likely to adversely affect A - D: No effect***	E: MM 3.3.4a-b will be included in the proposed action. A – D: Habitats absent
Delta Smelt (*Hypomesus transpacificus*)	***A – E: No effect***	A – E: Habitats absent
Longfin Smelt* (*Spirnchus thaleichthys*)	***A – E: No effect***	A – E: Habitats absent
Eulachon* (*Thaleichthys pacificus*)	***A – E: No effect***	A – E: Habitats absent
California Tiger Salamander (*Ambystoma californiense*)	***A – E: No effect***	A – E: Habitats absent
California Red-legged Frog (*Rana aurora draytonii*)	***A – E: No effect***	A – E: Habitats absent
Giant Garter Snake (*Thamnophis gigas*)	***A – E: May affect, not likely to adversely affect***	A – E: MM 3.3.5a-e will be included in the proposed action.
Western Snowy Plover* (*Charadrius alexandrines nivosus*)	***A – E: No effect***	A – E: Nesting habitat is absent. Foraging habitat is present; however, it is not of high quality and similar habitat is regionally abundant.
Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)	***E: May affect, not likely to adversely affect A – D: No effect***	E: MM 3.3.9a-c will be included in the proposed action. A – D: Habitats absent

*Federally-listed Species that occur regionally based on CNDDB, but did not appear on the IPaC list.

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APPENDIX A: RD 1500 FLOOD CONTROL AND FLOOD SAFETY REHABILITATION PROJECT NRCS WATERSHED PLAN – PROJECT ALTERNATIVES FOR ANALYSIS

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Memorandum

To:	Brad Mattson – RD 1500 Ernesto De La Riva - NRCS
From:	Kevin Johansen
Subject:	RD 1500 Flood Control and Flood Safety Rehabilitation Project NRCS Watershed Plan – Project Alternatives for Analysis
Date:	November 20, 2020

Comments:

As part of the Watershed Plan and environmental analysis, a number of project alternatives must be considered before proceeding with the preferred alternative. A total of five (5) alternatives have been identified as potential effective flood management solutions for the Reclamation District (RD) 1500 service area. Each of these five potential project alternatives will be evaluated for technical and economic feasibility in addition to the No-Action alternative.

RD 1500 - one of the largest reclamation districts in California - provides drainage and flood control to an area of approximately 67,850 acres within it's service area, including protecting the community of Robbins. Drainage of the RD 1500 service area is currently provided by the existing Karnak Holding and Drainage Facility, shown below in Figures 1 and 2. The existing Karnak Drainage Facility consists of three separate pumping plants. Pumping Plant 1 (PP1) was constructed in 1914 during development of the Sutter Basin Reclamation Project to drain the area of low-lying land protected by levees between the Sacramento and Feather Rivers, commonly known as the Sutter Basin, an area of approximately 67,850 acres. PP1 consists of six large centrifugal pumps capable of pumping approximately 1,200 cubic feet per second (cfs) out of the Sutter Basin. At the time of construction, Karnak PP1 was one of the largest, if not the largest, centrifugal pumping plants in the United States. A second pumping plant, known as PP2 and consisting of three vertical pumps, was constructed in 1929 but was poorly designed and has never been operated. A third pumping plant, known as PP3 and consisting of four vertical pumps capable of pumping approximately 700 cfs, was constructed in 1952 to expand the capacity of the drainage facility and provide the possibility of gravity drainage. The Karnak Drainage Facility is located in the southeast corner of the Basin.

The existing Karnak facilities are antiquated and subject to frequent and potentially extended breakdowns due to lack of available parts resulting in increasingly frequent equipment outages and repairs, which greatly impair the facility from providing it's intended purpose of flood management in the Sutter Basin. The Karnak facility provides flood protection for over 65,000 acres of rural farmland, the entire town of Robbins (a rural low-income community), and State Route 113 which serves as a primary emergency evacuation route serving 150,000 residents in the Yuba City / Marysville metro area. Figure 3 below indicates the area that would be inundated without drainage as a result of a 100-year storm in the Sutter Basin. As seen in Figure 3, the community of Robbins would be completely flooded, and State Route 113 is cutoff

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as an evacuation route. The flooded area would be over 20,000 acres, with a volume of approximately 26,500 acre-feet (AF).



Figure 1 – Aerial view of existing Karnak Drainage Facility



Figure 2 – Existing Karnak Drainage Facility

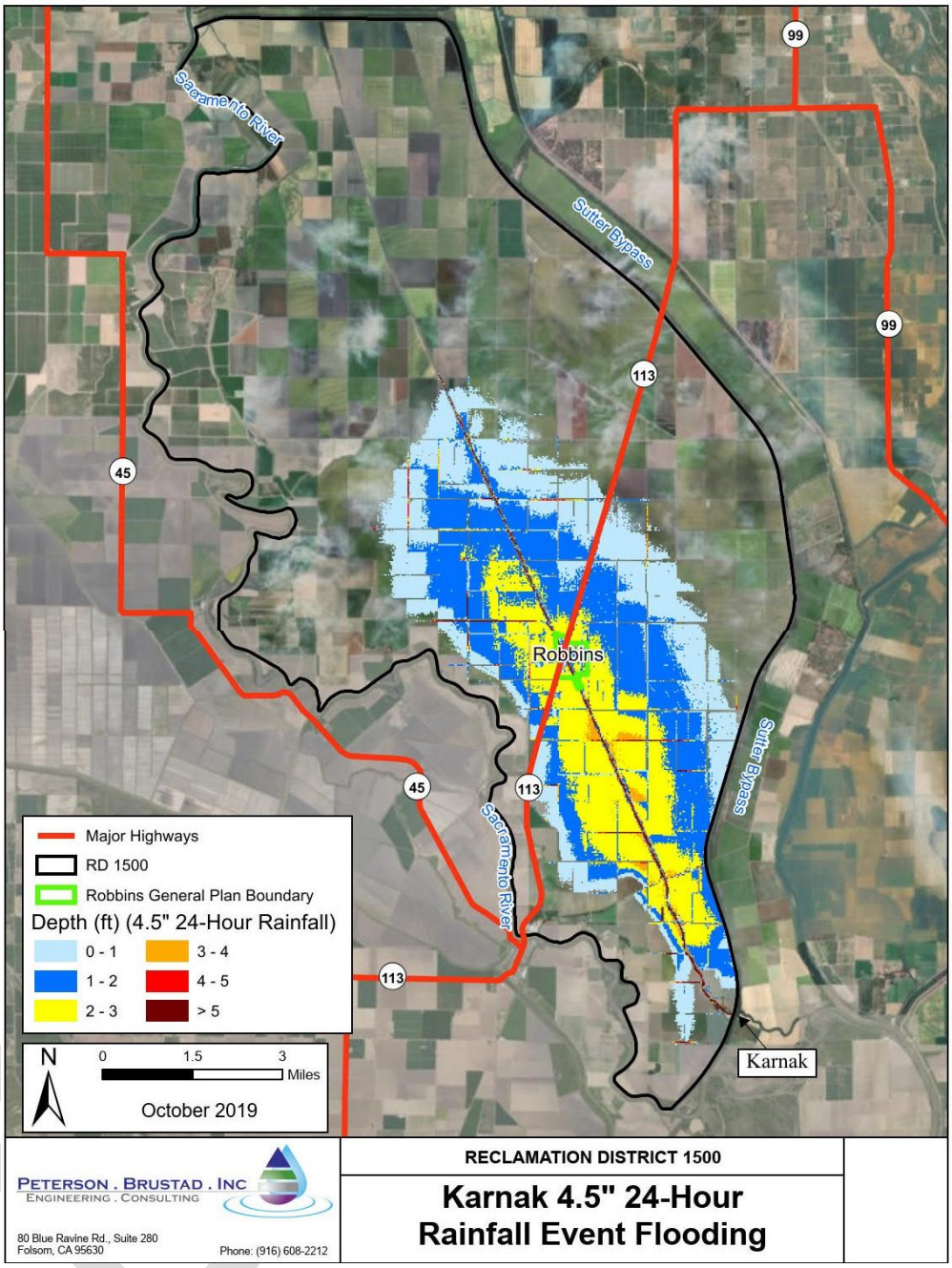


Figure 3 – Inundation Map from 100-year storm in Sutter Basin

The largest drainage flows discharged at the Karnak facility occur in the winter months of wet years, although the facility operates generally all year long providing flood protection in the winter months and tailwater discharge during the irrigation season. Table 1 indicates the daily volume of water pumped out of the basin by the existing Karnak Drainage Facility for the months of January, February and March 2017, along with the daily precipitation recorded at the Verona CIMIS (California Irrigation Management Information System) station located near the Karnak drainage facility. 2017 was an above average year for precipitation and the 2017 water year ended up being the second wettest on record since 1906 (behind only 1983) based on the Sacramento Valley Water Year Index. As can be seen in Table 1, there is a daily base flow even

when there is no precipitation, but the drainage discharge ramps up and then drops back down after each storm event. The largest amount of water pumped in the winter months is rainwater, with a certain amount of seepage through the levees.

Table 1 – Recent winter month discharge from Karnak Drainage Facility during a wet year

RD 1500 Karnak Drainage Facility Discharge and Corresponding Precipitation

Date	Drainage Discharge to River AF	CIMIS Precip Verona #235 inches
1/1/2017	428	0
1/2/2017	399	0.35
1/3/2017	402	0.74
1/4/2017	574	0.28
1/5/2017	666	0
1/6/2017	656	0.02
1/7/2017	1,118	0.95
1/8/2017	2,215	1.94
1/9/2017	2,538	0.23
1/10/2017	2,626	1.41
1/11/2017	2,860	0.02
1/12/2017	2,400	0.23
1/13/2017	1,988	0
1/14/2017	1,509	0
1/15/2017	1,248	0
1/16/2017	996	0.01
1/17/2017	891	0
1/18/2017	1,051	0.69
1/19/2017	1,480	0.06
1/20/2017	1,947	0.54
1/21/2017	1,707	0.25
1/22/2017	2,127	0.52
1/23/2017	1,720	0.04
1/24/2017	1,378	0
1/25/2017	1,096	0
1/26/2017	829	0
1/27/2017	877	0
1/28/2017	787	0
1/29/2017	783	0
1/30/2017	769	0
1/31/2017	839	0
Totals	40,904	8.28

Date	Drainage Discharge to River AF	CIMIS Precip Verona #235 inches
2/1/2017	908	0
2/2/2017	925	0.44
2/3/2017	1,284	0.63
2/4/2017	1,105	0.04
2/5/2017	1,063	0.46
2/6/2017	1,411	0.03
2/7/2017	2,234	0.39
2/8/2017	2,415	0.20
2/9/2017	2,092	0.41
2/10/2017	2,049	0
2/11/2017	1,548	0
2/12/2017	1,228	0
2/13/2017	1,065	0
2/14/2017	1,160	0
2/15/2017	1,057	0
2/16/2017	1,068	0.20
2/17/2017	1,585	1.03
2/18/2017	2,387	0.10
2/19/2017	1,968	0.13
2/20/2017	2,227	1.11
2/21/2017	2,276	0.03
2/22/2017	1,721	0
2/23/2017	1,379	0
2/24/2017	1,293	0
2/25/2017	1,293	0
2/26/2017	1,025	0
2/27/2017	959	0
2/28/2017	848	0
Totals	41,573	5.20

Date	Drainage Discharge to River AF	CIMIS Precip Verona #235 inches
3/1/2017	818	0
3/2/2017	709	0
3/3/2017	591	0
3/4/2017	668	0.24
3/5/2017	773	0
3/6/2017	663	0
3/7/2017	580	0
3/8/2017	517	0
3/9/2017	489	0
3/10/2017	363	0
3/11/2017	475	0
3/12/2017	425	0
3/13/2017	401	0
3/14/2017	0	0
3/15/2017	479	0
3/16/2017	334	0
3/17/2017	266	0
3/18/2017	340	0
3/19/2017	296	0
3/20/2017	297	0.53
3/21/2017	414	0.64
3/22/2017	956	1.02
3/23/2017	677	0.01
3/24/2017	539	0.33
3/25/2017	621	0
3/26/2017	525	0.05
3/27/2017	470	0
3/28/2017	461	0
3/29/2017	419	0.01
3/30/2017	411	0.02
3/31/2017	340	0
Totals	15,317	2.85

As can be seen in Table 1 above, a total of nearly 97,800 acre-feet of water was discharged out of the Sutter Basin by the existing Karnak pumping facilities during the three month period of January through March 2017.

Project alternatives that have been identified for consideration during preparation of the Watershed Plan and environmental analysis include the following:

No-Action Alternative

- Continue to use antiquated pumping facility and repair as needed until failure occurs
- As replacement parts become harder and harder to get, eventually parts will not be available to repair the facility and pumping capacity will be reduced until pumping facility is no longer able to pump the required volume of water to protect the Basin from flood damages
- The No-Action alternative is not a viable alternative

Alternative A – Modernize the existing Karnak Drainage Facilities

- Various modernization options will be considered to determine the most cost-effective option, including some combination of the following:
  - replacement of existing pumps and motors with new energy efficient pumping equipment in the existing buildings
  - increase pumping capacity from current 1,900 cfs to 2,200 cfs
  - upgrade or replacement of the existing pump station buildings and structures
  - flood protect pumping facilities to an elevation 2 feet above flood stage
  - rehabilitate the existing discharge facilities in the levee or construct new
  - upgraded electrical service
  - install modernized SCADA and controls
  - install variable frequency drives to provide a wider range of pumping capacity
  - provide backup electrical power and connect to an on-site solar array to reduce operating costs and provide for resilient operation in the event of power outages
- Anticipated fewer environmental impacts from modernizing the existing facility
- This is the preferred alternative

Alternative B – Capture and store drainage water in a series of District owned retention basins

- Construct a number of District owned retention basins that would be partially excavated and partially above ground
- Because of low percolation rates in the area and limited evaporation in the winter months, the holding basins would need to store at least 100,000 AF of water – if the water depth in the basin was 10 feet, this would require 10,000 acres of ponds
- If basin levees exceed 6 feet in height, basins would be subject to Division of Safety of Dams (DSOD) jurisdiction
- A number of pump stations would be required to lift water into the basins and/or remove water from the basins
- Water would need to be discharged, or used for irrigation, to empty the basins prior to the next winter season
- Would take a significant amount of farm land out of production, upwards of 10,000 acres
- Potentially requires extensive environmental review
- Technically feasible, but not considered to be a viable alternative because it would not be economically feasible

Alternative C – Capture and store drainage water on farm

- Construct small levees around farm fields to allow storage of drainage water on-farm
- Would require numerous pumps to lift the drainage water onto the farm fields
- Water would be expected to eventually seep into the ground
- If water was stored on-farm to a depth of 3 feet, would require over 30,000 acres to be flooded, removing over half of the District acreage from agricultural production
- Technically feasible, but not considered to be a viable alternative as there would be tremendous socioeconomic impacts

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Alternative D – Construct a District owned retention basin with smaller Karnak pumping facility

- Construct a District owned retention basin and construct a new smaller Karnak pumping facility - retention basin would be used to shave off the peak flow by storing and then releasing water in a more uniform manner for discharge by smaller pumping facility
- Ideally the basin would be excavated to allow gravity drainage in, but conditions may not allow significant excavation – whether the basin is excavated or located above ground, a pump station would be required to lift water into the basin and/or remove water
- If basin levees exceed 6 feet in height, basins would be subject to DSOD jurisdiction
- The required size of the retention basin would depend on the pumping capacity of the new discharge facility – an example is shown in Table 2 below for 2017 discharge flows and an assumed discharge facility capacity of 1,000 cfs or approximately 2,000 AF/day
- In example shown in Table 2 below, if the water depth in the basin was 10 feet then approximately 300 acres of land would be needed for the basin
- Construct a new VFD controlled pumping facility at the Karnak site, likely by removing the existing PP3 pumping plant and building a new facility in the same location to utilize the existing PP3 discharge pipes and maintaining gravity drainage option
- Potentially requires extensive environmental review
- Technically feasible, may or may not be economically feasible

Table 2 – Example Retention Basin Storage with smaller Karnak Drainage Facility

Alternative for building a retention basin to smooth out peaks and allow construction of a smaller pump station

Assumed smaller discharge facility capacity 1,000 cfs => 2,000 ± AF/day

Example

Date	Drainage Discharge to River AF	Volume to basin AF	Cumulative Basin Storage AF
1/1/2017	428	0	0
1/2/2017	399	0	0
1/3/2017	402	0	0
1/4/2017	574	0	0
1/5/2017	666	0	0
1/6/2017	656	0	0
1/7/2017	1,118	0	0
1/8/2017	2,215	215	215
1/9/2017	2,538	538	753
1/10/2017	2,626	626	1,379
1/11/2017	2,860	860	2,239
1/12/2017	2,400	400	2,639
1/13/2017	1,988	0	2,627
1/14/2017	1,509	0	2,136
1/15/2017	1,248	0	1,384
1/16/2017	996	0	380
1/17/2017	891	0	0
1/18/2017	1,051	0	0
1/19/2017	1,480	0	0
1/20/2017	1,947	0	0
1/21/2017	1,707	0	0
1/22/2017	2,127	127	127
1/23/2017	1,720	0	0
1/24/2017	1,378	0	0
1/25/2017	1,096	0	0
1/26/2017	829	0	0
1/27/2017	877	0	0
1/28/2017	787	0	0
1/29/2017	783	0	0
1/30/2017	769	0	0
1/31/2017	839	0	0
Totals	40,904		

Date	Drainage Discharge to River AF	Volume to basin AF	Cumulative Basin Storage AF
2/1/2017	908	0	0
2/2/2017	925	0	0
2/3/2017	1,284	0	0
2/4/2017	1,105	0	0
2/5/2017	1,063	0	0
2/6/2017	1,411	0	0
2/7/2017	2,234	234	234
2/8/2017	2,415	415	649
2/9/2017	2,092	92	741
2/10/2017	2,049	49	790
2/11/2017	1,548	0	338
2/12/2017	1,228	0	0
2/13/2017	1,065	0	0
2/14/2017	1,160	0	0
2/15/2017	1,057	0	0
2/16/2017	1,068	0	0
2/17/2017	1,585	0	0
2/18/2017	2,387	387	387
2/19/2017	1,968	0	355
2/20/2017	2,227	227	582
2/21/2017	2,276	276	858
2/22/2017	1,721	0	579
2/23/2017	1,379	0	0
2/24/2017	1,293	0	0
2/25/2017	1,293	0	0
2/26/2017	1,025	0	0
2/27/2017	959	0	0
2/28/2017	848	0	0
Totals	41,573		

Date	Drainage Discharge to River AF	Volume to basin AF	Cumulative Basin Storage AF
3/1/2017	818	0	0
3/2/2017	709	0	0
3/3/2017	591	0	0
3/4/2017	668	0	0
3/5/2017	773	0	0
3/6/2017	663	0	0
3/7/2017	580	0	0
3/8/2017	517	0	0
3/9/2017	489	0	0
3/10/2017	363	0	0
3/11/2017	475	0	0
3/12/2017	425	0	0
3/13/2017	401	0	0
3/14/2017	0	0	0
3/15/2017	479	0	0
3/16/2017	334	0	0
3/17/2017	266	0	0
3/18/2017	340	0	0
3/19/2017	296	0	0
3/20/2017	297	0	0
3/21/2017	414	0	0
3/22/2017	956	0	0
3/23/2017	677	0	0
3/24/2017	539	0	0
3/25/2017	621	0	0
3/26/2017	525	0	0
3/27/2017	470	0	0
3/28/2017	461	0	0
3/29/2017	419	0	0
3/30/2017	411	0	0
3/31/2017	340	0	0
Totals	15,317		

Maximum required basin storage = 2,640 AF

Alternative E – Construct a new pumping facility at a different location to replace the existing Karnak facility

- Construct a new facility capable of pumping 2,200 cfs
- Would require re-routing the drainage flows to send water to a new pumping plant, which must be located in an area adjacent to the river or slough for discharge – see Figure 4 below for one possible location for consideration
- Topography may not be favorable at new site, as existing Karnak facility is located where it is because that was the location of the historic slough
- Would take some farm land out of production for re-routed drainage channel and for the pumping facility itself
- If constructed in location shown below, would bypass recently updated debris screen
- Likely requires extensive environmental review and could have a significant environmental impact
- Extensive levee work would be required if gravity drainage is to be provided, which is important for energy cost savings
- Potentially technically feasible if environmental impacts can be addressed, but likely not economically feasible

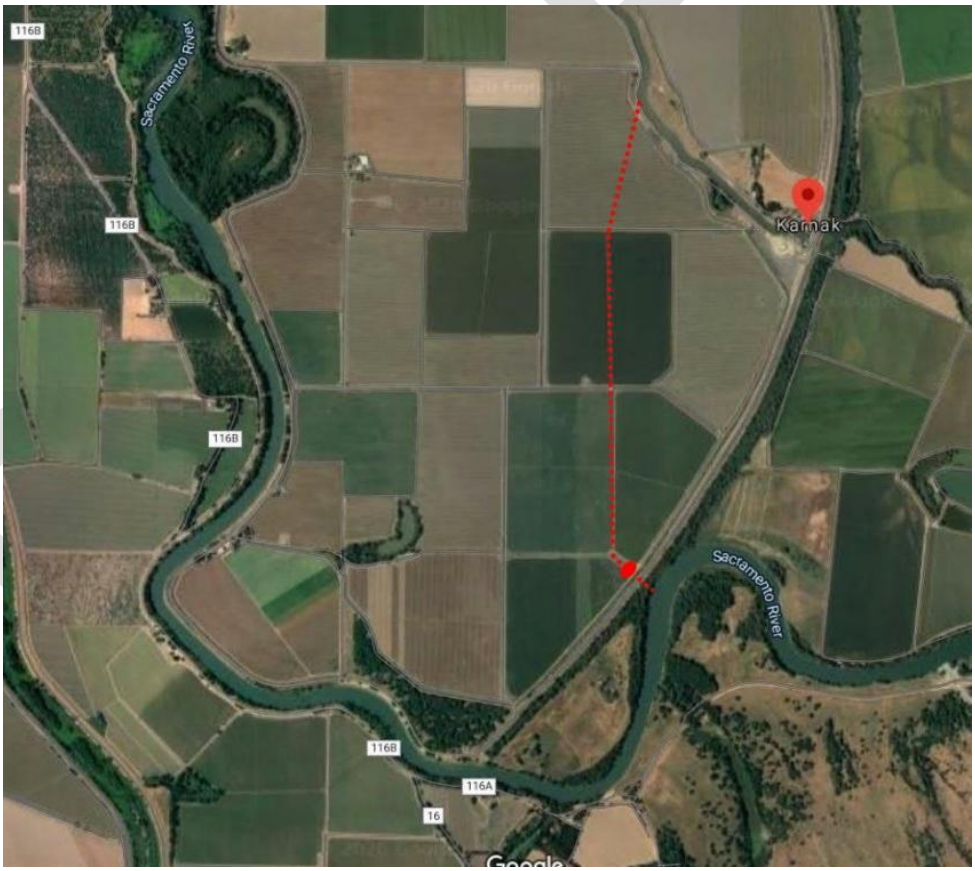


Figure 4 – Potential site of new pumping facility for consideration

Each of these five alternatives are anticipated to be included in the Watershed Plan as considered, but several will likely be eliminated from detailed evaluation because they are expected to be either technically infeasible or economically infeasible.

APPENDIX B: VASCULAR PLANTS OF THE ALTERNATIVE A APE

The plants species listed below have been observed on the site during surveys conducted by Live Oak Associates, Inc. on January 21, 2021. The wetland indicator status of each plant as listed in the U.S. Army Corps of Engineers 2018 National Wetland Plant list is shown following its common name (USACE 2018).

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL – Upland

AMARANTHACEAE – Amaranthus Family		
Amaranthus albus	Tumbleweed	FACU
Alternanthera philoxeroides	Alligator weed	OBL
APIACEAE – Carrot Family		
Foeniculum vulgare	Sweet Fennel	FACU
Torilis arvensis	Spreading Hedgeparsley	UPL
ASTERACEAE – Sunflower Family		
Centaurea solstitialis	Yellow Star Thistle	UPL
Conium maculatum	Poison Hemlock	FACW
Erigeron canadensis	Canada Horseweed	UPL
Helianthus annuus	Common Sunflower	FACU
Helminthotheca eschoides	Bristly Oxtongue	FAC
Lactuca serriola	Prickly Lettuce	FACU
Xanthium strumarium	Rough Cocklebur	FAC
BRASSICACEAE – Mustard Family		
Brassica nigra	Black Mustard	UPL
Hirschfeldia incana	Summer Mustard	UPL
CHENOPODIACEAE – Chenopod Family		
Chenopodium album	Lamb's Quarters	FACU
Salsola tragus	Russian Thistle	UPL
Atriplex sp.	Saltbush	-
CUPRESSACEAE – Cypress Family		
Calocedrus decurrens	Incense cedar	-
CYPERACEAE – Sedge Family		
Cyperus eragrostis	Tall Flatsedge	FACW
FAGACEAE – Oak Family		
Quercus lobata	Valley Oak	FACU
GERINACEAE – Geranium Family		
Erodium botrys	Broad-leave Filaree	FACU
Genanium dissectum	Cut-leaf Geranium	UPL
JUNCACEAE- Rush Family		

Juncus effussus	Soft rush	FACW
MALVACEAE – Mallow Family		
Malva parviflora	Cheeseweed	UPL
PINACEAE – Pine Family		
Pinus sp.	Pine	-
POACEAE - Grass Family		
Avena fatua	Wild oat	UPL
Bromus arvensis	Soft brome	FACU
Panicum dichotomiflorum	Fall panic grass	FACW
Cynodon dactylon	Bermuda Grass	FAC
Festuca perennis	Italian Ryegrass	UPL
Sorhgum halepense	Johnson grass	FACU
POLYGONACEAE – Buckwheat Family		
Polygonum arenastrum	Prostrate Knotweed	UPL
Rumex sp.	Dock	-
PONTEDERIACEAE- Water Hyacinth Family		
Eichhornia crassipes	Water Hyacinth	OBL
TAMARIACEAE- Tamarisk Family		
Tamarix chinensis	Chinese Tamarisk	FACW
TYPHACEAE- Cattail Family		
Typha latifolia	Narrow leaf cattail	OBL
VITACEAE – Grape Family		
Vitis sp.	Cultivated Grape	-
ZYGOPHYLLACEAE – Caltrop Family		
Tribulus terrestris	Puncture Vine	-

APPENDIX C: TERRESTRIAL VERTEBRATE SPECIES THAT POTENTIALLY OCCUR ON ALTERNATIVES A - E

The species listed below are those that may reasonably be expected to use the habitats of the Sutter Basin, and the Alternative A – E APEs. The list was not intended to include birds that are vagrants or occasional transients. Its purpose was rather to include those species that may be expected to routinely and predictably use the APEs during some or all of the year.

CLASS: AMPHIBIA
ORDER: SALIENTIA (Frogs and Toads)
FAMILY: BUFONIDAE
Western Toad (*Anaxyrus boreas*)
FAMILY: HYLIDAE (Treefrogs and Relatives)
Pacific Chorusfrog (*Pseudacris regilla*)
ORDER: SALIENTIA (Frogs and Toads)
FAMILY: RANIDAE (True Frogs)
Bullfrog (*Lithobates catesbeiana*)

CLASS: REPTILIA
ORDER: TESTUDINES (Turtles)
FAMILY: EMYDIDAE (Box and Water Turtles)
Western Pond Turtle (*Actinemys marmorata*)
ORDER: SQUAMATA (Lizards and Snakes)
SUBORDER: SAURIA (Lizards)
FAMILY: PHRYNOSOMATIDAE
Western Fence Lizard (*Sceloporus occidentalis*)
FAMILY: ANGUIDAE (Alligator Lizards and Relatives)
California Alligator Lizard (*Elgaria multicarinata nulticarinata*)
SUBORDER: SERPENTES (Snakes)
FAMILY: COLUBRIDAE (Colubrids)
Western Yellow-bellied Racer (*Coluber constrictor mormon*)
Gopher Snake (*Pituophis catenifer*)
California Kingsnake (*Lampropeltis callifornіae*)
Long-nosed Snake (*Rhinocheilus lecontei*)
FAMILY: NATRICIDAE (Live-bearing Snakes)
Giant Garter Snake (*Thamnophis gigas*)
Valley Garter Snake (*Thamnophis sirtalis fitchi*)
FAMILY: VIPERIDAE
Northern Pacific Rattlesnake (*Crotalus oreganus oreganus*)

CLASS: AVES
ORDER: PODICIPEDIFORMES (Grebes and Relatives)
FAMILY: PODICIPEDIDAE (Grebes)
Pied-billed Grebe (*Podilymbus podiceps*)

ORDER: CICONIIFORMES (Herons, Storks, Ibises and Relatives)

FAMILY: ARDEIDAE (Herons and Egrets)

Great Egret (*Casmerodius albus*)
Great Blue Heron (*Ardea herodias*)
Green Heron (*Butorides virescens*)
*Snowy Egret (*Egretta thula*)
Cattle Egret (*Bubulcus ibis*)

FAMILY: CATHARTIDAE (New World Vultures)

*Turkey Vulture (*Cathartes aura*)

ORDER: ANSERIFORMES (Geese and Ducks)

FAMILY: ANATIDAE (Geese and Ducks)

*Canada Goose (*Branta canadensis*)
Wood Duck (*Aix sponsa*)
Gadwall (*Anas strepera*)
American Wigeon (*Anas americana*)
Mallard (*Anas platyrhynchos*)
Cinnamon Teal (*Anas cyanoptera*)
Green Winged Teal (*Anas crecca*)
Ring-necked Duck (*Athya collaris*)
Bufflehead (*Bucephala albeola*)
Common Goldeneye (*Bucephala clangula*)
Hooded Merganser (*Lophodytes cucullatus*)
Common Merganser (*Mergus merganser*)

ORDER: ACCIPITRIFORMES (Hawks, Kites, Eagles, and Allies)

FAMILY: ACCIPITRIDAE (Hawks, Old World Vultures, and Harriers)

*Northern Harrier (*Circus hudsonius*)
Sharp-shinned Hawk (*Accipiter striatus*)
*Cooper's Hawk (*Accipiter cooperi*)
Red-shouldered Hawk (*Buteo lineatus*)
*Red-tailed Hawk (*Buteo jamaicensis*)
Swainson's Hawk (*Buteo swainsoni*)
Bald Eagle (*Haliaeetus leucocephalus*)
Golden Eagle (*Aquila chrysaetos*)
White-tailed Kite (*Elanus leucurus*)

FAMILY: PANDIONIDAE (Ospreys)

Osprey (*Pandion haliaetus*)

FAMILY: FALCONIDAE (Caracaras and Falcons)

American Kestrel (*Falco sparverius*)
Peregrine Falcon (*Falco peregrinus*)

ORDER: GRUIFORMES (Cranes and Rails)

FAMILY: GRUIDAE (Cranes)

Lesser Sandhill Crane (*Grus canadensis canadensis*)

FAMILY: RALLIDAE (Rails)

American Coot (*Fulica americana*)

ORDER: CHARADRIIFORMES (Plovers, Sandpipers, Gulls, and Terns)

FAMILY: CHARADRIIDAE (Plovers)
*Killdeer (*Charadrius vociferus*)
Western Snowy Plover (*Charadrius nivosus*)
Mountain Plover (*Charadrius montanus*)
FAMILY: SCOLOPACIDAE (Sandpipers)
Greater Yellowlegs (*Tringa melanoleuca*)
Spotted Sandpiper (*Actitis macularia*)
Common Snipe (*Gallinago gallinago*)
FAMILY: LARIDAE (Skuas, Gulls, Terns and Skimmers)
Ring-Billed Gull (*Larus delawarensis*)
California Gull (*Larus californicus*)
ORDER: COLUMBIFORMES (Pigeons and Doves)
FAMILY: COLUMBIDAE (Pigeons and Doves)
Rock Pigeon (*Columba livia*)
Mourning Dove (*Zenaida macroura*)
ORDER: CUCULIFORMES (Cuckoos)
FAMILY: CUCULIDAE (Cuckoos)
Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)
ORDER: STRIGIFORMES (Owls)
FAMILY: STRIGIDAE (Typical Owls)
Western Screech Owl (*Otus kennicottii*)
Great Horned Owl (*Bubo virginianus*)
Long-Eared Owl (*Asio otus*)
Short-Eared Owl (*Asio flammeus*)
Burrowing Owl (*Athene cunicularia*)
ORDER: CAPRIMULGIFORMES (Goatsuckers and relatives)
ORDER: APODIFORMES (Swifts and Hummingbirds)
FAMILY: APODIFORMES (Swifts)
Black Swift (*Cypseloides niger*)
Vaux's Swift (*Chaetura vauxi*)
FAMILY: TROCHILIDAE (Hummingbirds)
Black-chinned Hummingbird (*Archilochus alexandri*)
Anna's Hummingbird (*Calypte anna*)
Rufous Hummingbird (*Selasphorus rufus*)
ORDER: CORACIIFORMES (Kingfishers and Relatives)
FAMILY: ALCEDINIDAE (Kingfishers)
Belted Kingfisher (*Ceryle alcyon*)
ORDER: PICIFORMES (Woodpeckers and Relatives)
FAMILY: PICIDAE (Woodpeckers and Wrynecks)
Nuttall's Woodpecker (*Picoides nuttallii*)
Downy Woodpecker (*Picoides pubescens*)
Northern Flicker (*Colaptes auratus*)
ORDER: PASSERIFORMES (Perching Birds)
FAMILY: TYRANNIDAE (Tyrant Flycatchers)
*Black Phoebe (*Sayornis nigricans*)

Say's Phoebe (*Sayornis saya*)
Ash-throated Flycatcher (*Myiarchus cinerascens*)
Western Kingbird (*Tyrannus verticalis*)

FAMILY: LANIIDAE (Shrikes)

Loggerhead Shrike (*Lanius ludovicianus*)

FAMILY: VIREONIDAE (Typical Vireos)

Hutton's Vireo (*Vireo huttoni*)
Warbling Vireo (*Vireo gilvus*)

FAMILY: CORVIDAE (Jays, Magpies, and Crows)

Western Scrub-Jay (*Aphelocoma californica*)
American Crow (*Corvus brachyrhynchos*)
Common Raven (*Corvus corax*)

FAMILY: HIRUNDINIDAE (Swallows)

Tree Swallow (*Tachycineta bicolor*)
Violet-green Swallow (*Tachycineta thalassina*)
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
Barn Swallow (*Hirundo rustica*)
Cliff Swallow (*Petrochelidon pyrrhonota*)
Bank Swallow (*Riparia riparia*)

FAMILY: PARIDAE (Titmice and Relatives)

Oak Titmouse (*Baeolophus inornatus*)

FAMILY: AEGITHALIDAE (Bushtit)

Bushtit (*Psaltriparus minimus*)

FAMILY: SITTIDAE (Nuthatches)

White-Breasted Nuthatch (*Sitta carolinensis*)

FAMILY: TROGLODYTIDAE (Wrens)

Bewick's Wren (*Thryomanes bewickii*)
House Wren (*Troglodytes aedon*)

FAMILY: REGULIDAE (Kinglets)

Ruby-Crowned Kinglet (*Regulus calendula*)

FAMILY: TURDIDAE (Thrushes)

Western Bluebird (*Sialia mexicana*)
American Robin (*Turdus migratorius*)

FAMILY: TIMALIIDAE (Babblers)

Wrentit (*Chamaea fasciata*)

FAMILY: MIMIDAE (Mockingbirds and Thrashers)

California Thrasher (*Toxostoma redivivum*)
Northern Mockingbird (*Mimus polyglottos*)

FAMILY: STURNIDAE (Starlings and Allies)

European Starling (*Sturnus vulgaris*)

FAMILY: MOTACILLIDAE (Wagtails and Pipits)

American Pipit (*Anthus rubrescens*)

FAMILY: BOMBYCILLIDAE (Waxwings)

Cedar Waxwing (*Bombycilla cedrorum*)

FAMILY: PARULIDAE (Wood Warblers and Relatives)

Common Yellow-throat (*Geothlypis trichas*)
Orange-Crowned Warbler (*Vermivora celata*)
Yellow Warbler (*Dendroica petechia*)
Yellow-Rumped Warbler (*Dendroica coronata*)

FAMILY: EMBERIZIDAE (Emberizines)

Spotted Towhee (*Pipilo maculatus*)
California Towhee (*Pipilo crissalis*)
Lark Sparrow (*Chondestes grammacus*)
Fox Sparrow (*Passerella iliaca*)
*Modesto Song Sparrow (*Melospiza melodia*)
Lincoln's Sparrow (*Melospiza lincolnii*)
White-Crowned Sparrow (*Zonotrichia leucophrys*)
Golden-Crowned Sparrow (*Zonotrichia atricapilla*)
Dark-Eyed Junco (*Junco hyemalis*)

FAMILY: CARDINALIDAE (Cardinals, Grosbeaks and Allies)

Black-Headed Grosbeak (*Pheucticus melanocephalus*)
Blue Grosbeak (*Passerina caerulea*)
Lazuli Bunting (*Passerina amoena*)

FAMILY: ICTERIDAE (Blackbirds, Orioles and Allies)

Red-Winged Blackbird (*Agelaius phoeniceus*)
*Brewer's Blackbird (*Euphagus cyanocephalus*)
Tricolored Blackbird (*Agelaius tricolor*)
Great-Tailed Grackle (*Quiscalus mexicanus*)
Brown-Headed Cowbird (*Molothrus ater*)
Bullock's Oriole (*Icterus bullockii*)

FAMILY: FRINGILLIDAE (Finches)

House Finch (*Carpodacus mexicanus*)
Lesser Goldfinch (*Carduelis psaltria*)
American Goldfinch (*Carduelis tristis*)

FAMILY: PASSERIDAE (Old World Sparrows)

House Sparrow (*Passer domesticus*)

CLASS: MAMMALIA

ORDER: DIDELPHIMORPHIA (Marsupials)

FAMILY: DIDELPHIDAE (Opossums)

Virginia Opossum (*Didelphis virginiana*)

ORDER: INSECTIVORA (Shrews and Moles)

FAMILY: SORICIDAE (Shrews)

Ornate Shrew (*Sorex ornatus*)

FAMILY: TALPIDAE (Moles)

Broad-footed Mole (*Scapanus latimanus*)

ORDER: CHIROPTERA (Bats)

FAMILY: VESPERTILIONIDAE (Vespertilionid Bats)

Yuma Myotis (*Myotis yumanensis*)
Fringed Myotis (*Myotis thysanodes*)

California Myotis (*Myotis californicus*)
Long-legged Myotis (*Myotis volans*)
Small-footed Myotis (*Myotis leibii*)
Western Pipistrelle (*Pipistrellus hesperus*)
Western Red Bat (*Lasiurus borealis*)
Hoary Bat (*Lasiurus cinereus*)
Big Brown Bat (*Eptesicus fuscus*)
Townsend's Big-eared Bat (*Corynorhynus townsendii*)
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)

Brush Rabbit (*Sylvilagus bachmani*)
Desert Cottontail (*Sylvilagus audubonii*)

ORDER: RODENTIA (Squirrels, Rats, Mice, and Relatives)

FAMILY: SCIURIDAE (Squirrels, Chipmunks, and Marmots)

Western Gray Squirrel (*Sciurus griseus*)
California Ground Squirrel (*Spermophilus beecheyi*)

FAMILY: GEOMYIDAE (Pocket Gophers)

Botta's Pocket Gopher (*Thomomys bottae*)

FAMILY: MURIDAE (Mice, Rats and Voles)

Western Harvest Mouse (*Reithrodontomys megalotis*)
California Mouse (*Peromyscus californicus*)
Deer Mouse (*Peromyscus maniculatus*)
Dusky-footed Woodrat (*Neotoma fuscipes*)
California Vole (*Microtus californicus*)
House Mouse (*Mus musculus*)

FAMILY: CRICETIDAE (Muskrats)

Muskrat (*Ondatra zibethicus*)

FAMILY: CASTORIDAE (Beavers)

*****North American Beaver (*Castor canadensis*)

ORDER: CARNIVORA (Carnivores)

FAMILY: CANIDAE (Foxes, Wolves, and Relatives)

Red Fox (*Vulpes vulpes*)
Coyote (*Canis latrans*)
Gray Fox (*Urocyon cinereoargenteus*)

FAMILY: PROCYONIDAE (Raccoons and Relatives)

Raccoon (*Procyon lotor*)

FAMILY: MUSTELIDAE (Weasels, Badgers, and Relatives)

Northern River Otter (*Lontra canadensis*)
Long-tailed Weasel (*Mustela frenata*)
American Badger (*Taxidea taxus*)

FAMILY: MEPHITIDAE
Spotted Skunk (*Spilogale gracilis*)
Striped Skunk (*Mephitis mephitis*)
FAMILY: FELIDAE
Feral Cat (*Felis catus*)
Bobcat (*Felis rufus*)

APPENDIX D: SELECTED PHOTOGRAPHS OF ALTERNATIVE A



Picture 1: Developed/Ruderal land use of Alternative A and the existing Karnak Pumping Facility



Picture 2: Developed/Ruderal land use and canal habitat of Alternative A and the existing Karnak Pumping Facility



Picture 3: Canal habitat of Alternative A and the existing Karnak Pumping Facility



Picture 4: Slough habitat of Alternative A and the existing Karnak Pumping Facility

APPENDIX E: LIST OF FEDERALLY THREATENED AND ENDANGERED SPECIES THAT MAY OCCUR IN SUTTER BASIN

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: March 29, 2021
Consultation Code: 08ESMF00-2021-SLI-1377
Event Code: 08ESMF00-2021-E-03999
Project Name: RD 1500 FLOOD CONTROL AND FLOOD SAFETY REHABILITATION PROJECT

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the

Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2021-SLI-1377
Event Code: 08ESMF00-2021-E-03999
Project Name: RD 1500 FLOOD CONTROL AND FLOOD SAFETY REHABILITATION PROJECT
Project Type: LAND - FLOODING
Project Description: Modernization of the existing Karnak Drainage Facility
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.89262115,-121.7218988292419,14z



Counties: Colusa, Sutter, and Yolo counties, California

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus*	Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
Species profile: https://ecos.fws.gov/ecp/species/321

Insects

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

There is **final** critical habitat for this species. The location of the critical habitat is not available.
Species profile: https://ecos.fws.gov/ecp/species/7850

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
Species profile: https://ecos.fws.gov/ecp/species/498

Vernal Pool Tadpole Shrimp *Lepidurus packardi*	Endangered

There is **final** critical habitat for this species. The location of the critical habitat is not available.
Species profile: https://ecos.fws.gov/ecp/species/2246

Flowering Plants

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

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

Critical habitats

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

Biological Evaluation Memo

PROVOST&PRITCHARD
CONSULTING GROUP

455 W Fir Ave • Clovis, CA 93611 • (559) 449-2700
www.provostandpritchard.com

MEMORANDUM

To:	Roger Cornwell, General Manager Reclamation District 1500
From:	Shaylea Stark, Biologist, Provost & Pritchard
Subject:	Biological Evaluation for RD1500 Flood Control and Flood Safety Rehabilitation Project - Addendum
Date:	February 27, 2026

BACKGROUND

The United States Bureau of Reclamation's Reclamation District (RD) 1500 Flood Control and Flood Safety Rehabilitation Project (Project) is evaluating alternatives to continue providing flood management in the RD 1500 service area. Five improvement alternatives and a no-action alternative are currently under consideration. A biological resources investigation of the five alternatives for the Project was completed in August 2021 by Live Oak Associates (Inc.) in support of the Watershed Plan - Environmental Impact Statement. A Biological Evaluation (BE) was completed in compliance with the California Environmental Quality Act, the National Environmental Protection Act, as well as the Endangered Species Act. The BE evaluated potential impacts and effects to sensitive biological resources resulting from Project implementation of the five alternatives. The Preferred Alternative, also known as Alternative A, proposes to rehabilitate and modernize the existing Karnak Drainage Facility to continue providing flood protection for the Sutter Basin, similar to current operations. This memorandum serves as an addendum to the original BE in order to address updates to plant and animal species designated under the ESA as threatened, endangered, proposed threatened or endangered, and candidate, as well as Essential Fish Habitat.

CALIFORNIA AND FEDERALLY LISTED SPECIES – 2026 UPDATE

A query of the California Department of Fish and Wildlife California Natural Diversity Database (CNDDB) for occurrences of special status plant and animal species was conducted on January 22, 2026, for the *Knights Landing* United States Geological Survey (USGS) 7.5-minute quadrangle that contained Alternative A, and for the eight surrounding USGS quadrangles: *El Dorado Bend*, *Grays Bend*, *Kirkville*, *Nicolaus*, *Sutter Causeway*, *Taylor Monumnet*, *Verona*, and *Woodland* (**Attachment A**). A query of the Unites States Fish and Wildlife Service Information for Planning and Consultation (IPaC) was completed for the entire Sutter Basin on January 23, 2026 (**Attachment B**).

The generated lists were compared to Table 1. List of Special Status Species that could Occur in the Project Vicinity and Table 5. Section 7 Effects Determinations for Federally Listed Species within the BE to identify newly listed species or those whose status has been updated. These species, and their potential to occur within the site, are listed in Table 1. In addition to the occurrence analysis performed in Table 1, Table 2 summarizes project effect determinations for federally-listed species not previously addressed in the BE, in accordance with Section 7 of the Endangered Species Act.

Table 1. Additional Special Status Species with Potential to Occur on the Site and/or in the Vicinity

Species	Status*	Habitat	Occurrence within the Site
Crotch's bumble bee (*Bombus crotchii*)	CCE	Occurs throughout coastal California, as well as east to the Sierra Nevada-Cascade crest, and south into Mexico. Food plant genera include snapdragons, scorpionweeds, primroses, poppies, and buckwheats. Nests are often located underground in abandoned rodent nests, or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees. This species overwinters under leaf litter or soft soil.	**Unlikely.** There was marginal to low overwintering habitat as no leaf litter was present and only a few small mammal burrows occurred. Habitats within the site were generally disturbed from ongoing activities and included compacted roads. If an individual were foraging in the area, it would be expected to fly away during Project activities. The nearest recorded observation of this species was 1.5 miles southeast of the site along the Sacramento River in 2021.
Monarch butterfly (*Danaus plexippus*)	FPT	Roosts in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Larval host plants consist of milkweeds. Winter roost sites extend along the Pacific Coast from northern Mendocino to Baja California, Mexico.	**Unlikely.** Alternative A is not in range for overwintering habitat for this species. Additionally, there was marginal to no host plants and habitats within the site were generally disturbed from ongoing activities and included compacted roads. If an individual were foraging in the area, it would be expected to fly away during Project activities. There are no recorded observations of this species on CNDDB within the regional vicinity of the project.
Northwestern pond turtle (*Actinemys marmorata*)	FPT, CSSC	An aquatic turtle of ponds, marshes, slow-moving rivers, streams, and irrigation ditches with riparian vegetation. Requires adequate basking sites and sandy banks or grassy open fields to deposit eggs.	**Possible.** Alternative A appears to provide suitable habitat for this species. While the Project would maintain and/or increase suitable habitat for this species, there is the potential for this species to be injured or killed during Project activities. The nearest recorded observation of this species was 1.5 miles south of the site along the Sacramento River in 2014.
Western spadefoot (*Spea hammondii*)	FPT, CSSC	The majority of the time this species is terrestrial and occurs in small mammal burrows and soil cracks, sometimes in the bottom of dried pools. Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Vernal or seasonal pools, that hold water for a	**Absent.** Suitable habitat is absent from Alternative A, and this species would not be expected to occur in the site. There are no recorded observations of this species on CNDDB within the regional vicinity of the project.

Species	Status*	Habitat	Occurrence within the Site
		minimum of three weeks, are necessary for breeding.	

Table 2. Federally Listed Species Determinations

Species	Status	Determination	Rationale for Determination
Monarch butterfly (*Danaus plexippus*)	Proposed Threatened	No effect.	Habitat absent. Alternative A is not in range for overwintering habitat for this species. Additionally, no host plants for this species were identified during the field survey. If an individual were foraging in the area, it would be expected to fly away during Project activities.
Northwestern pond turtle (*Actinemys marmorata*)	Proposed Threatened	May effect, but not likely to adversely affect	Habitat present. Alternative A appears to provide suitable habitat for this species. While the Project would maintain and or increase suitable habitat for this species, there is the potential for this species to be injured or killed during Project activities. Mitigation measures 3.3.20a and 3.3.20b would reduce potential effects to this species.
Western spadefoot (*Spea hammondii*)	Proposed Threatened	No effect	Habitat absent. Suitable habitat is absent from Alternative A, and this species would not be expected to occur in the site.

NORTHWESTERN POND TURTLE (*ACTINEMYS MARMORATA*)

The only new species with habitat present in Alternative A is the federally listed northwestern pond turtle. This species was previously addressed in the BE due to its status as a California Species of Special concern. The following mitigation measures were included in the BE to reduce potential Project impacts and effects to a less than significant level:

> Mitigation Measure 3.3.20a (Pre-construction Survey). Within 24 hours of the start of construction activities, a qualified biologist will complete a preconstruction survey for western pond turtle.
>
> Mitigation Measure 3.3.20b (Avoidance). Should any western pond turtles be observed on the site, they shall be allowed to leave the project on their own.

ESSENTIAL FISH HABITAT

A query of the National Marine Fisheries Service Essential Fish Habitat (EFH) Mapper was conducted on January 23, 2026 (**Attachment C**). The query identified Pacific Salmon EFH for Chinook Salmon in the Sacramento-Stone Corral watershed. The BE identified Chinook Salmon (Central Valley spring-run ESU) (*Oncorhynchus tshawytscha*) as unlikely to be impacted by Alternative A. The following occurrence analysis was included in the BE:

> *Adults migrate up the main channel of the Sacramento River to spawning habitat in upstream tributaries. Robbins Canal and Sacramento Slough provide no spawning habitat for this species*

and are therefore unlikely to be used. During outmigration, juveniles are unlikely to enter Sutter Basin.

Additionally, the following mitigation measures were included in the BE to reduce potential Project impacts and effects to a less than significant level to Potential Waters of the United States:

Mitigation Measure 3.3.21a (Delineation). An aquatic resources delineation has been prepared for the Alternative A project area, identifying the boundaries of all potentially jurisdictional waters present.

Mitigation Measure 3.3.21b (Minimization). Based on the results of the aquatic resources delineation, the Project will be designed to minimize impacts to potentially jurisdictional waters to the maximum extent practicable while still achieving its goal of flood control.

Mitigation Measure 3.3.21c (Permits). If the final project design requires impacts to areas of jurisdictional waters, permits under Section 404 and 401 of the Clean Water Act and a Streambed Alteration Agreement will be obtained for the project, and the project will adhere to all conditions of the permits, such as compensatory mitigation requirements, survey requirements, monitoring requirements, timing requirements, and reporting requirements.

Finally, the following mitigation measures were included in the BE to reduce potential Degradation of Water Quality in Seasonal Drainages and Downstream Waters:

Mitigation Measure 3.3.22a (Preparation of a Storm Water Pollution Prevention Plan). The applicant will have a certified contractor prepare a Storm Water Pollution Prevention Plan (SWPPP) that includes erosion and sedimentation control Best Management Practices (BMP's) to protect water quality and measures to prevent contaminants from entering storm water. The plan would include, at a minimum, provisions that the limits of construction be defined and wattles or other appropriate erosion controls be placed downstream and/or downslope of areas where ground disturbance will occur, to prevent flows and/or surface runoff from causing erosion. The plan will also require all exposed graded slopes to be stabilized.

Mitigation Measure 3.3.22b (Spill Containment and Material Storage). The applicant shall store fuel used for contractor equipment and hazardous materials away from the Project APE. When possible, the applicant shall not refuel construction equipment when working adjacent to potential waters of the United States or state. If refueling is necessary near potential waters of the United States or state, the applicant shall use portable spill containment equipment or maintain a spill containment kit during construction.

Implementation of these measures would reduce potential effects to EFH to a less than significant level.

CONCLUSION

Based on the queries of both the IPaC and EFH Mapper, Project activities from Alternative A are not anticipated to affect either recently CESA or ESA listed species or EFH. Mitigation measures have been prescribed for both northwestern pond turtles as well as potential Waters of the United States. Measures were also prescribed to reduce the potential to degrade water quality in seasonal drainages and downstream waters during Project activities. Existing measures are sufficient to protect federally listed species and sensitive resources, and additional measures are not proposed at this time.

Attachment A- CNDDB 9-Quad Species List

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Kirkville (3812187) OR Sutter Causeway (3812186) OR Nicolaus (3812185) OR Eldorado Bend (3812177) OR Knights Landing (3812176) OR Verona (3812175) OR Woodland (3812167) OR Grays Bend (3812166) OR Taylor Monument (3812165))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
alkali milk-vetch *Astragalus tener var. tener*	PDFAB0F8R1	None	None	G2T1	S1	1B.2
American badger *Taxidea taxus*	AMAJF04010	None	None	G5	S3	SSC
American bumble bee *Bombus pensylvanicus*	IIHYM24260	None	None	G3G4	S2	
Antioch Dunes anthicid beetle *Anthicus antiochensis*	IICOL49020	None	None	G3	S3	
bank swallow *Riparia riparia*	ABPAU08010	None	Threatened	G5	S3	
black-crowned night heron *Nycticorax nycticorax*	ABNGA11010	None	None	G5	S4	
brittlescale *Atriplex depressa*	PDCHE042L0	None	None	G2	S2	1B.2
burrowing owl *Athene cunicularia*	ABNSB10010	None	Candidate Endangered	G4	S2	SSC
California alkali grass *Puccinellia simplex*	PMPOA53110	None	None	G2	S2	1B.2
California linderiella *Linderiella occidentalis*	ICBRA06010	None	None	G2G3	S2S3	
chinook salmon - Central Valley spring-run ESU *Oncorhynchus tshawytscha pop. 11*	AFCHA0205L	Threatened	Threatened	G5T2Q	S2	
Coastal and Valley Freshwater Marsh *Coastal and Valley Freshwater Marsh*	CTT52410CA	None	None	G3	S2.1	
Crotch's bumble bee *Bombus crotchii*	IIHYM24480	None	Candidate Endangered	G2	S2	
eulachon *Thaleichthys pacificus*	AFCHB04010	Threatened	None	G4	S1	SSC
giant gartersnake *Thamnophis gigas*	ARADB36150	Threatened	Threatened	G2	S2	
great blue heron *Ardea herodias*	ABNGA04010	None	None	G5	S4	
great egret *Ardea alba*	ABNGA04040	None	None	G5	S4	
Great Valley Mixed Riparian Forest *Great Valley Mixed Riparian Forest*	CTT61420CA	None	None	G2	S2.2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
green sturgeon - southern DPS *Acipenser medirostris pop. 1*	AFCAA01031	Threatened	None	G2T1	S1	SSC
Heckard's pepper-grass *Lepidium latipes var. heckardii*	PDBRA1M0K1	None	None	G4T1	S1	1B.2
hoary bat *Lasiurus cinereus*	AMACC05032	None	None	G3G4	S4	
longfin smelt - San Francisco Bay-Delta DPS *Spirinchus thaleichthys pop. 2*	AFCHB03040	Endangered	Threatened	G5TNRQ	S1	
merlin *Falco columbarius*	ABNKD06030	None	None	G5	S3S4	WL
mountain plover *Anarhynchus montanus*	ABNNB03100	None	None	G3	S2	SSC
northwestern pond turtle *Actinemys marmorata*	ARAAD02031	Proposed Threatened	None	G2	SNR	SSC
pallid bat *Antrozous pallidus*	AMACC10010	None	None	G4	S3	SSC
palmate-bracted bird's-beak *Chloropyron palmatum*	PDSCR0J0J0	Endangered	Endangered	G1	S1	1B.1
Sacramento anthicid beetle *Anthicus sacramento*	IICOL49010	None	None	G4	S4	
Sacramento splittail *Pogonichthys macrolepidotus*	AFCJB34020	None	None	G3	S3	SSC
Sacramento Valley tiger beetle *Cicindela hirticollis abrupta*	IICOL02106	None	None	G5TH	SH	
saline clover *Trifolium hydrophilum*	PDFAB400R5	None	None	G2	S2	1B.2
San Joaquin spearscale *Extriplex joaquinana*	PDCHE041F3	None	None	G2	S2	1B.2
Sanford's arrowhead *Sagittaria sanfordii*	PMALI040Q0	None	None	G3	S3	1B.2
silver-haired bat *Lasionycteris noctivagans*	AMACC02010	None	None	G4	S3S4	
snowy egret *Egretta thula*	ABNGA06030	None	None	G5	S4	
song sparrow ("Modesto" population) *Melospiza melodia pop. 1*	ABPBXA3013	None	None	G5T3?Q	S3?	SSC
steelhead - Central Valley DPS *Oncorhynchus mykiss irideus pop. 11*	AFCHA0209K	Threatened	None	G5T2Q	S2	SSC
Suisun Marsh aster *Symphyotrichum lentum*	PDASTE8470	None	None	G2	S2	1B.2
Swainson's hawk *Buteo swainsoni*	ABNKC19070	None	Threatened	G5	S4	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
tricolored blackbird *Agelaius tricolor*	ABPBXB0020	None	Threatened	G1G2	S2	SSC
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	IICOL48011	Threatened	None	G3T3	S3	
Valley Oak Woodland *Valley Oak Woodland*	CTT71130CA	None	None	G3	S2.1	
vernal pool fairy shrimp *Branchinecta lynchi*	ICBRA03030	Threatened	None	G3	S3	
vernal pool tadpole shrimp *Lepidurus packardi*	ICBRA10010	Endangered	None	G3	S3	
western red bat *Lasiurus frantzii*	AMACC05080	None	None	G4	S3	SSC
western ridged mussel *Gonidea angulata*	IMBIV19010	None	None	G3	S2	
western snowy plover *Anarhynchus nivosus nivosus*	ABNNB03031	Threatened	None	G3T3	S3	SSC
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
white-faced ibis *Plegadis chihi*	ABNGE02020	None	None	G5	S3S4	WL
woolly rose-mallow *Hibiscus lasiocarpos var. occidentalis*	PDMAL0H0R3	None	None	G5T3	S3	1B.2
Wright's trichocoronis *Trichocoronis wrightii var. wrightii*	PDAST9F031	None	None	G4T3	S1	2B.1

Record Count: 51

Attachment B- IPaC Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: 02/27/2026 19:30:01 UTC
Project Code: 2026-0040209
Project Name: RD 1500 Flood Control and Flood Safety Rehabilitation Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

PROJECT SUMMARY

Project Code: 2026-0040209
Project Name: RD 1500 Flood Control and Flood Safety Rehabilitation Project
Project Type: Water Supply Facility - Maintenance / Modification
Project Description: Modernization of the existing Karnak Drainage Facility.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.89381175,-121.71135482903038,14z



Counties: Sutter and Yolo counties, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

BIRDS

NAME	STATUS
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911 General project design guidelines: https://ipac.ecosphere.fws.gov/project/ZG53BMPMEZB33JUXSBO5B6AIGM/documents/generated/11238,11271.pdf	Threatened

REPTILES

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened
Northwestern Pond Turtle *Actinemys marmorata* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1111 General project design guidelines: https://ipac.ecosphere.fws.gov/project/ZG53BMPMEZB33JUXSBO5B6AIGM/documents/generated/11238,11271.pdf	Proposed Threatened

AMPHIBIANS

NAME	STATUS
Western Spadefoot *Spea hammondii* Population: Northern DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5425 General project design guidelines: https://ipac.ecosphere.fws.gov/project/ZG53BMPMEZB33JUXSBO5B6AIGM/documents/generated/11238,11271.pdf	Proposed Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743 General project design guidelines: https://ipac.ecosphere.fws.gov/project/ZG53BMPMEZB33JUXSBO5B6AIGM/documents/generated/11238,11271.pdf	Proposed Threatened
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat.	Threatened

NAME STATUS

Species profile: https://ecos.fws.gov/ecp/species/7850

CRUSTACEANS

NAME STATUS

Vernal Pool Fairy Shrimp *Branchinecta lynchi* Threatened

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/498
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/ZG53BMPMEZB33JUXSBO5B6AIGM/documents/generated/11238,11271.pdf

Vernal Pool Tadpole Shrimp *Lepidurus packardi* Endangered

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
Species profile: https://ecos.fws.gov/ecp/species/2246
General project design guidelines:
https://ipac.ecosphere.fws.gov/project/ZG53BMPMEZB33JUXSBO5B6AIGM/documents/generated/11238,11271.pdf

FLOWERING PLANTS

NAME STATUS

Hartweg's Golden Sunburst *Pseudobahia bahiifolia* Endangered

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

CRITICAL HABITATS

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

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

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.

The following FWS National Wildlife Refuge Lands and Fish Hatcheries lie fully or partially within your project area:

FACILITY NAME	ACRES
STEVE THOMPSON NORTH CENTRAL VALLEY WILDLIFE MANAGEMENT AREA https://www.fws.gov/our-facilities?$keywords="%5C%22STEVE+THOMPSON+NORTH+CENTRAL+VALLEY+WILDLIFE+MANAGEMENT+AREA%5C%22"	15,437.86
SUTTER NATIONAL WILDLIFE REFUGE https://www.fws.gov/our-facilities?$keywords="%5C%22SUTTER+NATIONAL+WILDLIFE+REFUGE%5C%22"	2,615.216

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information

on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

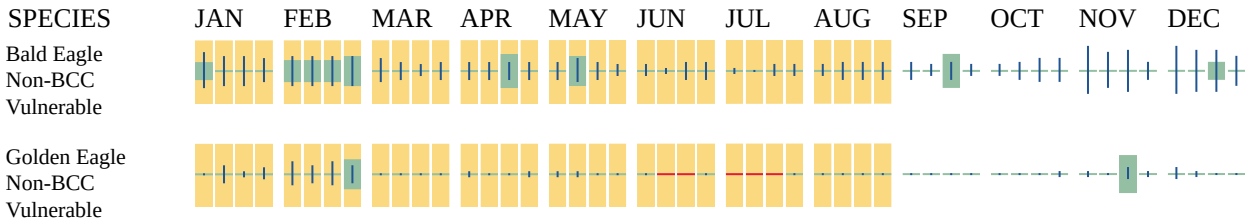
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Jan 1 to Aug 31

NAME	BREEDING SEASON
Belding's Savannah Sparrow *Passerculus sandwichensis beldingi* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15
Black Tern *Chlidonias niger surinamenisis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Bullock's Oriole *Icterus bullockii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9458	Breeds Mar 21 to Jul 25
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10955	Breeds Mar 1 to Jul 31
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10575	Breeds Jun 1 to Aug 31
Common Yellowthroat *Geothlypis trichas sinuosa* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Lawrence's Goldfinch *Spinus lawrencei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Mountain Plover *Charadrius montanus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3638	Breeds elsewhere

NAME	BREEDING SEASON
Northern Harrier *Circus hudsonius* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8350	Breeds Apr 1 to Sep 15
Nuttall's Woodpecker *Dryobates nuttallii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse *Baeolophus inornatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Santa Barbara Song Sparrow *Melospiza melodia graminea* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/5513	Breeds Mar 1 to Sep 5
Short-billed Dowitcher *Limnodromus griseus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Tricolored Blackbird *Agelaius tricolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10
Western Grebe *Aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Western Screech-owl *Megascops kennicottii cardonensis* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11923	Breeds Mar 1 to Jun 30
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds elsewhere

NAME	BREEDING SEASON
Wrentit *Chamaea fasciata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10668	Breeds Mar 15 to Aug 10
Yellow-billed Magpie *Pica nuttalli* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9726	Breeds Apr 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

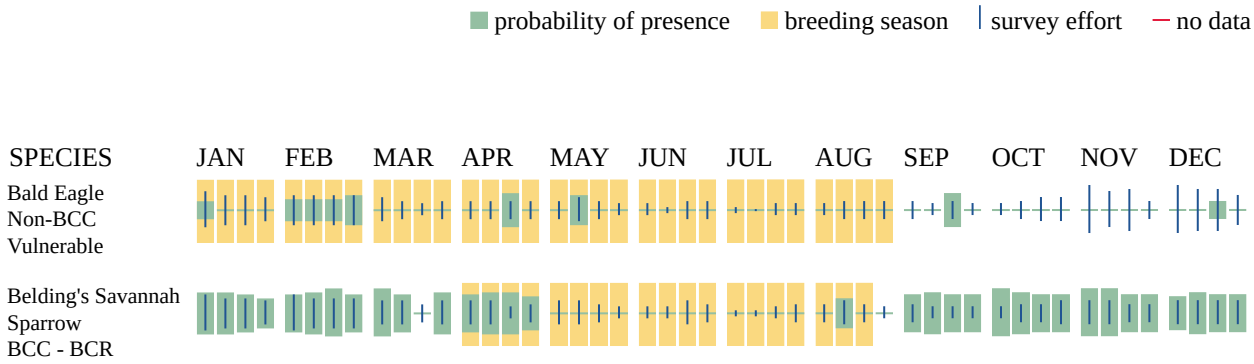
Probability of Presence (■)

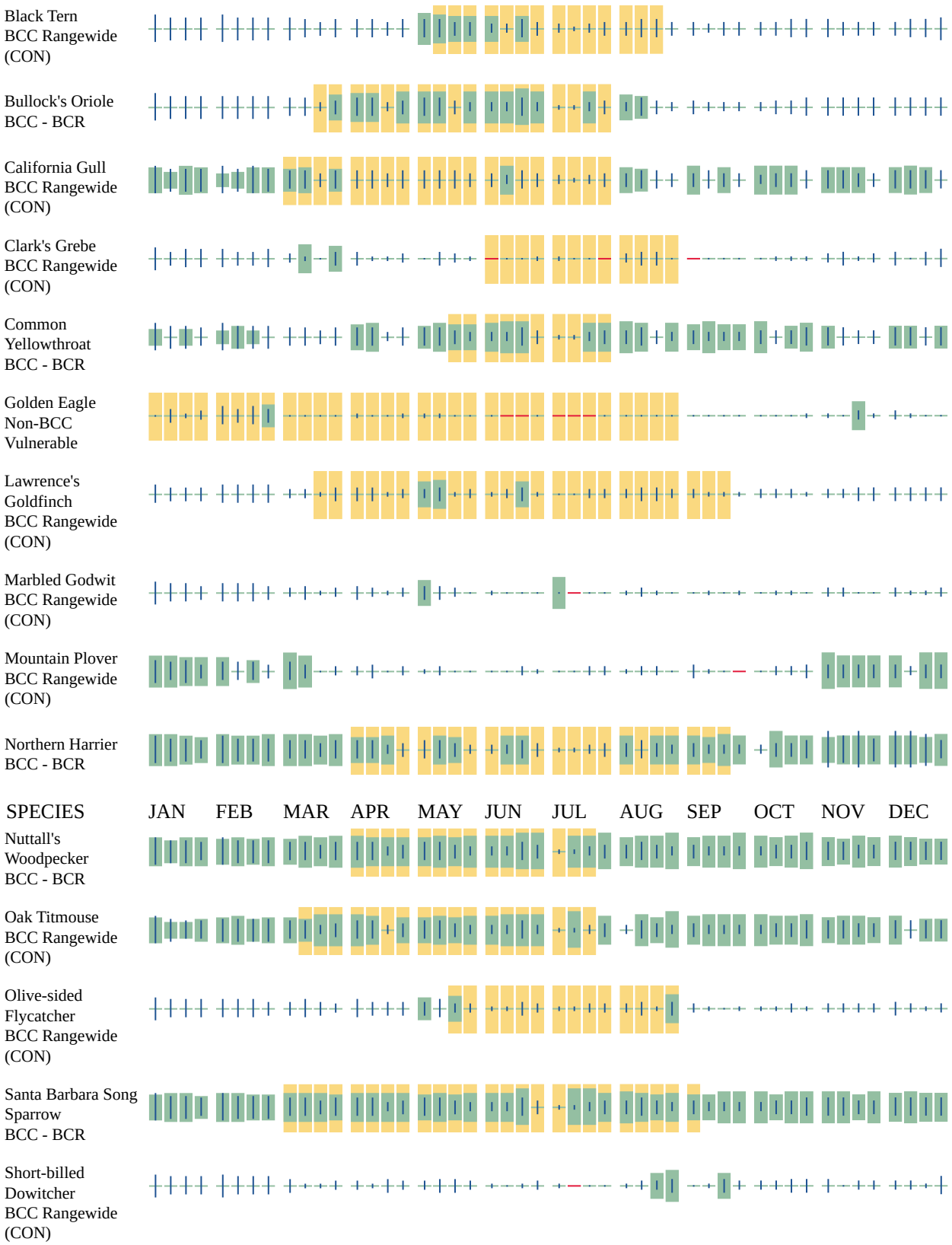
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

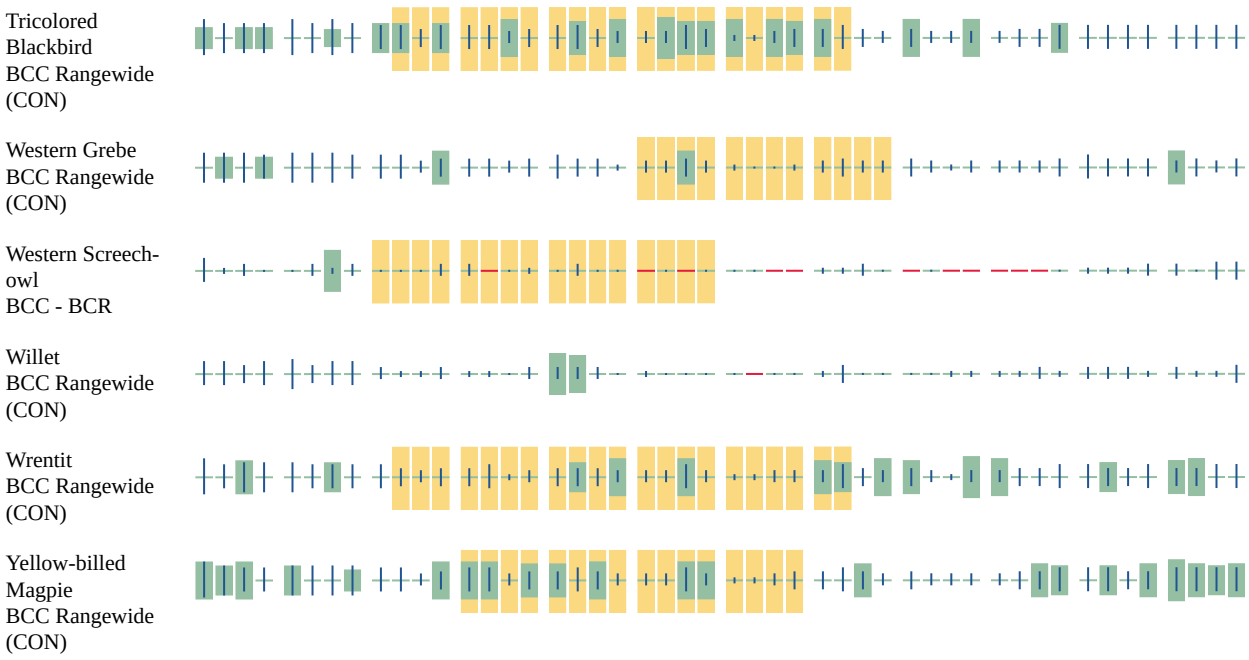
Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.




Black Tern BCC Rangewide (CON)
Bullock's Oriole BCC - BCR
California Gull BCC Rangewide (CON)
Clark's Grebe BCC Rangewide (CON)
Common Yellowthroat BCC - BCR
Golden Eagle Non-BCC Vulnerable
Lawrence's Goldfinch BCC Rangewide (CON)
Marbled Godwit BCC Rangewide (CON)
Mountain Plover BCC Rangewide (CON)
Northern Harrier BCC - BCR
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Nuttall's Woodpecker BCC - BCR
Oak Titmouse BCC Rangewide (CON)
Olive-sided Flycatcher BCC Rangewide (CON)
Santa Barbara Song Sparrow BCC - BCR
Short-billed Dowitcher BCC Rangewide (CON)



Additional information can be found using the following links:

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- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

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.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Shaylea Stark
Address: 455 W Fir Ave
City: Clovis
State: CA
Zip: 93612
Email sstark@ppeng.com
Phone: 5594492700

Attachment C- NMFS EFH Mapper

EFH Mapper Report

EFH Data Notice

Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional fishery management councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.

West Coast Regional Office

Query Results

Degrees, Minutes, Seconds: Latitude = 38º 47' 4" N, Longitude = 122º 20' 41" W
Decimal Degrees: Latitude = 38.784, Longitude = -121.655

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

EFH

No additional Essential Fish Habitats (EFH) were identified at the report location.

Pacific Salmon EFH

Link	HUC Name	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
	Sacramento-Stone Corral	Chinook Salmon	All	Pacific	Pacific Coast Salmon Plan

Atlantic Salmon

No Atlantic Salmon were identified at the report location.

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.
****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**

Pacific Coastal Pelagic Species,
Jack Mackerel,
Pacific (Chub) Mackerel,
Pacific Sardine,
Northern Anchovy - Central Subpopulation,
Northern Anchovy - Northern Subpopulation,
Pacific Highly Migratory Species,
Bigeye Thresher Shark - North Pacific,

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data. ****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**
Bluefin Tuna - Pacific, Dolphinfish (Dorado or Mahimahi) - Pacific, Pelagic Thresher Shark - North Pacific, Swordfish - North Pacific

Aquatic Resources Delineation Report

LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

KARNAK PUMP STATION
AQUATIC RESOURCES DELINEATION
SUTTER COUNTY, CALIFORNIA

Prepared by

LIVE OAK ASSOCIATES, INC.

Rick Hopkins, Ph.D., Principal and Senior Wildlife Ecologist
Davinna Ohlson, M.S. Director of Ecological Services and Ecologist
Arren Allegretti, Ph.D., Senior Project Manager and Wetland Ecologist

Prepared for
Provost & Pritchard Consulting Group
130 North Garden Street
Visalia, CA 93291

March 22, 2021 PN 2525-01

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1 INTRODUCTION

Live Oak Associates, Inc. (LOA), surveyed the approximately 40-acre Karnak pump station project area (hereafter referred to as "site" or "study area"), for aquatic resources, including areas meeting the technical criteria of wetlands. This aquatic resources delineation will be used in determining the extent of waters of the United States present on the site.

The site is in the unincorporated town of Karnak, Sutter County, just southeast of Ensley on the west bank of the East Canal (i.e., Sutter Bypass), and approximately 1.6 miles from the confluence of the Feather River with the Sacramento River (Figure 1). The Sutter Bypass flows into the Sacramento Slough, a known water of the U.S., and borders the site's western boundary. The Karnak Pump station primarily discharges agricultural water into the Sacramento Slough and Sutter Bypass. The site can be found on the Knights Landing USGS 7.5-minute quadrangle, in Sections 20, Township 11 North, and Range 3 East (Figure 2). The site consists of an irrigation canal, ruderal areas, and one homesite. The site is also bounded by agricultural land interspersed with rural development.

The Department of the Army, acting through the U.S. Army Corps of Engineers (USACE), is authorized to issue permits for the discharge of dredged or fill material into waters of the United States under section 404 of the Clean Water Act (CWA). They may also regulate activities in or on navigable waters under the authority of sections 9 and 10 of the Rivers and Harbors Act.

1.1 REGULATORY DEFINITION OF WATERS OF THE U.S.

The USACE regulates the filling or grading of waters of the U.S. under the authority of Section 404 of the Clean Water Act. 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 and clarified in federal courts.

The definition of waters of the U.S. have changed several times in recent years. In January 2020, the Environmental Protection Agency (EPA) and USACE jointly issued the Navigable Waters Protection Rule (NWPR). The new rule was published in the Federal Register on April 21, 2020 and took effect on June 22, 2020.

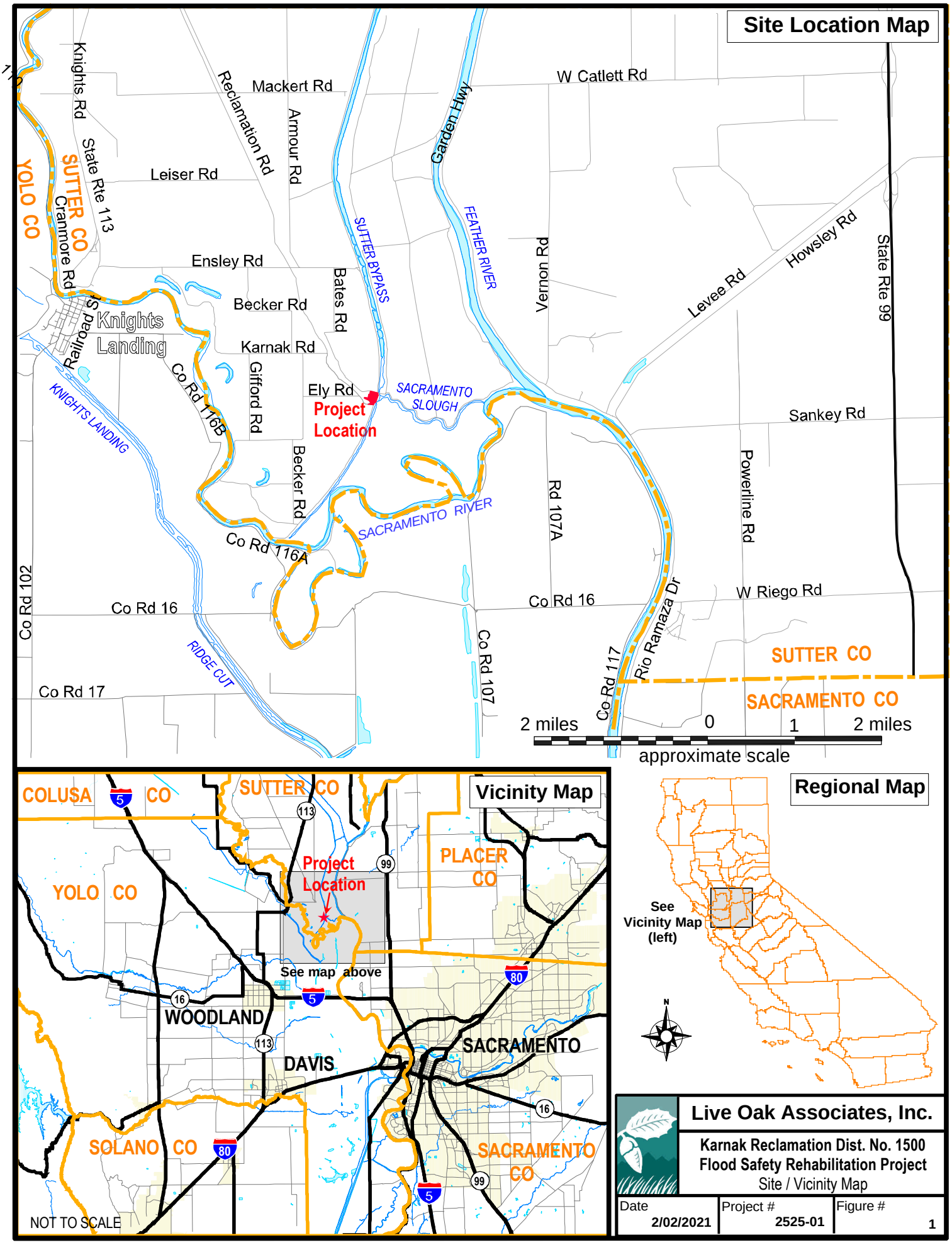
The Navigable Waters Protection Rule (33 CFR §328.3(a)) defines waters of the U.S. as:

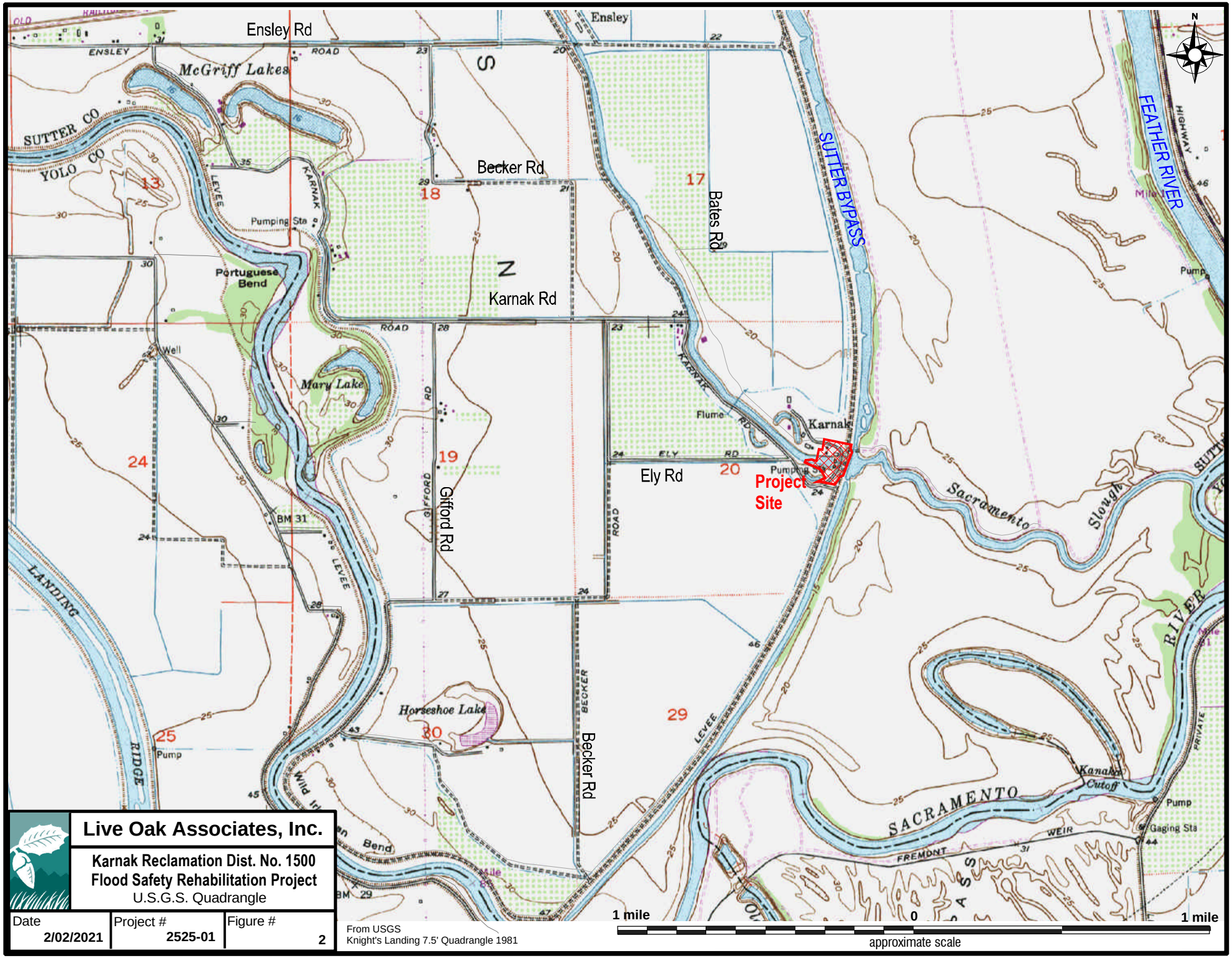
<u>Territorial Seas and Traditional Navigable Waters (TNWs)</u>

- The territorial seas and traditional navigable waters include large rivers and lakes and tidally influenced waterbodies used in interstate or foreign commerce.

<u>Tributaries</u>

- Tributaries include perennial and intermittent rivers and streams that contribute surface flow to traditional navigable waters in a typical year. These naturally occurring surface water channels must flow more often than just after a single precipitation event—that is, tributaries must be perennial or intermittent.


Site Location Map
Knights Rd
Reclamation Rd
Mackert Rd
Armour Rd
W Catlett Rd
Garden Hwy
State Rte 113
Leiser Rd
YOLO CO
SUTTER CO
Cranmore Rd
SUTTER BYPASS
FEATHER RIVER
Vernon Rd
Howsley Rd
State Rte 99
Ensley Rd
Bates Rd
Becker Rd
Levee Rd
S Pearl St
Railroad
Knights Landing
Karnak Rd
Co Rd 116B
Gifford Rd
Ely Rd
Project Location
SACRAMENTO SLOUGH
KNIGHTS LANDING
Sankey Rd
Becker Rd
Rd 107A
Powerline Rd
SACRAMENTO RIVER
Co Rd 116A
Co Rd 102
Co Rd 16
Co Rd 16
W Riego Rd
Co Rd 107
Rio Ramaza Dr
RIDGE CUT
SUTTER CO
Co Rd 17
Co Rd 117
SACRAMENTO CO
2 miles
0
1
2 miles
approximate scale
Vicinity Map
COLUSA CO
SUTTER CO
PLACER CO
YOLO CO
Project Location
See map above
WOODLAND
DAVIS
SACRAMENTO
SOLANO CO
SACRAMENTO CO
NOT TO SCALE
Regional Map
See Vicinity Map (left)
N
Live Oak Associates, Inc.
Karnak Reclamation Dist. No. 1500
Flood Safety Rehabilitation Project
Site / Vicinity Map
Date 2/02/2021
Project # 2525-01
Figure # 1



Live Oak Associates, Inc.

Karnak Reclamation Dist. No. 1500
Flood Safety Rehabilitation Project
U.S.G.S. Quadrangle

Date	Project #	Figure #
2/02/2021	2525-01	2

From USGS
Knight's Landing 7.5' Quadrangle 1981

- Tributaries can connect to a traditional navigable water or territorial sea in a typical year either directly or through other "waters of the United States," through channelized jurisdictional surface waters, through artificial features (including culverts and spillways), or through natural features (including debris piles and boulder fields).
- Non-jurisdictional surface waters, through artificial features (including culverts and spillways), or through natural features (including debris piles and boulder fields).
- Ditches are to be considered tributaries only where they satisfy the flow conditions of the perennial and intermittent tributary definition and either were constructed in or relocate a tributary or were constructed in an adjacent wetland and contribute perennial or intermittent flow to a traditional navigable water in a typical year.

Lakes, Ponds, and Impoundments of Jurisdictional Waters

- Lakes, ponds, and impoundments of jurisdictional waters are jurisdictional where they contribute surface water flow to a traditional navigable water or territorial sea in a typical year either directly or through other waters of the United States, through channelized non-jurisdictional surface waters, through artificial features (including culverts and spillways), or through natural features (including debris piles and boulder fields).
- Lakes, ponds, and impoundments of jurisdictional waters are also jurisdictional where they are flooded by a water of the United States in a typical year, such as certain oxbow lakes that lie along the Mississippi River.

Adjacent Wetlands

- Wetlands that physically touch other jurisdictional waters are "adjacent wetlands."
- Wetlands separated from a water of the United States by only a natural berm, bank or dune are also "adjacent."
- Wetlands inundated by flooding from a water of the United States in a typical year are "adjacent."
- Wetlands that are physically separated from a jurisdictional water by an artificial dike, barrier, or similar artificial structure are "adjacent" so long as that structure allows for a direct hydrologic surface connection between the wetlands and the jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature.
- An adjacent wetland is jurisdictional in its entirety when a road or similar artificial structure divides the wetland, if the structure allows for a direct hydrologic surface connection through or over that structure in a typical year.

The Navigable Waters Protection Rule also outlines what do not constitute waters of the United States. The following waters/features are not jurisdictional under the rule:

- Waterbodies that are not included in the four categories of waters of the United States listed above.

- Groundwater, including groundwater drained through subsurface drainage systems, such as drains in agricultural lands.
- Ephemeral features, including ephemeral streams, swales, gullies, rills, and pools.
- Diffuse stormwater run-off and directional sheet flow over upland.
- Many farm and roadside ditches.
- Prior converted cropland retains its longstanding exclusion. However, prior converted cropland is defined for the first time in the NWPR. The agencies are clarifying that this exclusion will cease to apply when cropland is abandoned (i.e., not used for, or in support of, agricultural purposes in the immediately preceding five years) and has reverted to wetlands.
- Artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease.
- Artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters.
- Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel.
- Stormwater control features excavated or constructed in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater run-off.
- Groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention and infiltration basins and ponds, that are constructed in upland or in non-jurisdictional waters.
- Waste treatment systems have been excluded from the definition of waters of the United States since 1979 and will continue to be excluded under the NWPR. Waste treatment systems include all components, including lagoons and treatment ponds (such as settling or cooling ponds), designed to either convey or retain, concentrate, settle, reduce, or remove pollutants, either actively or passively, from wastewater or stormwater prior to discharge (or eliminating any such discharge).

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 under Section 404 of the Clean Water Act. 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.

1.2 SUPREME COURT DECISIONS AFFECTING THE DEFINITIONS OF WATERS OF THE UNITED STATES

The reach and extent of Clean Water Act jurisdiction over aquatic features has been the subject of several U.S. Supreme Court decisions, in *United States v. Riverside Bayview Homes* (Riverside),

Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (SWANCC) and *Rapanos v. United States* and *Carabell v. U.S. Army Corps of Engineers* (referred together as the Rapanos decision). In general, these decisions address the jurisdictional status of aquatic features that are not hydrologically connected to navigable waters or their tributaries, or have such an insubstantial hydrologic connection that destruction or modification of the aquatic feature would have little effect on downstream waters of the United States.

1.2.1 United States v. Riverside Bayview Homes, Inc. (Riverside)

In Riverside (1985), the Supreme Court unanimously ruled that adjacent wetlands are "inseparably bound up" with the waters that they are adjacent to. Therefore, wetlands, including intrastate wetlands, adjacent to waters of the United States were, themselves, waters of the United States (80 Fed. Reg. 37076, 2015).

1.2.2 SWANCC Decision

In January of 2001, the U.S. Supreme Court ruled in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (the SWANCC decision) that "non-navigable, isolated, intrastate" waters could not be claimed as jurisdictional by the USACE on the basis of their use by migratory birds. Although the Court did not specifically address the meaning of the word "isolated," it upheld the jurisdictional status of "adjacent" wetlands (and other waters), which are by definition wetlands that are "bordering, contiguous, or neighboring" other jurisdictional waters. Therefore, the term "isolated wetland" has implicitly been defined as 'wetlands that are not bordering, contiguous, or neighboring' other jurisdictional waters. This definition does not, however, address the degree of proximity necessary to establish that one wetland (or other water) is "adjacent" to a known jurisdictional water. As established by the Supreme Court in their Riverside (1985) decision, "wetlands separated from other waters by man-made dikes or barriers, natural river berms, beach dunes, and the like are 'adjacent wetlands.'"

1.2.3 Consolidated Carabell/Rapanos Decision

In June of 2006, the U.S. Supreme Court ruled in the consolidated cases of June Carabell v. U.S. Army Corps of Engineers and John Rapanos v. United States that wetlands are waters of the United States "if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.'" When, in contrast, a wetland's effects on water quality are speculative or insubstantial, they fall outside the zone fairly encompassed by the statutory term 'navigable waters.'

On June 5, 2007, the Environmental Protection Agency (EPA) and the USACE jointly issued guidance in interpreting the Carabell/Rapanos cases as they apply to the extent of federal jurisdiction covered by Section 404 of the Clean Water Act. The agencies revised this guidance memorandum on December 2, 2008. The key points of this guidance are that the EPA and the USACE: 1) will assert jurisdiction over traditional navigable waters, wetlands adjacent to

traditional navigable waters, relatively permanent non-navigable tributaries of traditional navigable waters where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), and wetlands that directly abut such tributaries; 2) will decide jurisdiction over relatively impermanent non-navigable tributaries of navigable waters, wetlands adjacent to such tributaries, and wetlands adjacent to but not directly abutting a relatively permanent non-navigable tributary, based on a fact-specific analysis to determine whether they have a "significant nexus" with a traditional navigable water; and 3) generally will not assert jurisdiction over swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow) or ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water. In applying the "significant nexus" standard, the EPA and USACE will "assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters." "Significant nexus" includes consideration of hydrologic and ecologic factors.

The court rulings and subsequent guidance provided by the EPA and USACE discussed above are germane to the delineation of jurisdictional waters summarized in this report. They are presently the basis for determining the jurisdictional status of drainage features and wetlands of the study area.

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.

1.3 STATE OF CALIFORNIA JURISDICTION OVER AQUATIC FEATURES

The State of California also asserts jurisdiction over drainages, wetlands, and other aquatic features. The limits of State jurisdiction differ from those of the USACE. The California Department of Fish and Wildlife (CDFW) and the Regional Water Quality Control Board (RWQCB) are the two state regulatory agencies responsible for implementing state regulations that identify and protect waters of the state.

According to Section 1602 of the California Fish and Game Code, public and private entities may not substantially divert or obstruct the natural flow of any river, stream, or lake within the state. This section of the Fish and Game Code establishes the State's interest in regulating construction activities in the "bed, channel, or bank" of a natural drainage or stream. A "stream" subject to the jurisdiction of the CDFW has been defined as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life" (California Code of Regulations, Title 14).

Under the Porter-Cologne Water Quality Control Act of 1969, the State Water Resources Control Board (SWRCB) and nine local RWQCBs have regulatory authority over activities affecting water quality in all surface waters of the State, consisting of rivers, streams, lakes, and wetlands of the State.

Shortly after the U.S. Supreme Court rendered its SWANCC Decision, the SWRCB notified the Regional Boards that isolated waters, including wetlands, were subject to the jurisdiction of the State of California per provisions of the Porter-Cologne Water Quality Control Act. The Regional Boards, therefore, now assert jurisdiction over isolated wetlands disclaimed as jurisdictional by the USACE.

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.

2 METHODS

LOA wetland ecologist Arren Allegretti surveyed the site for aquatic resources on January 21, 2021. Survey methods were consistent with guidelines found in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008), *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2008), and *Minimum Standards for Acceptance of Aquatic Resources Delineations Reports* (USACE 2016). Color photographs of the site were taken from several locations (Appendix A).

2.1 AREAS MEETING THE TECHNICAL CRITERIA OF WETLANDS

Wetlands are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (Environmental Laboratory 1987). Wetlands are characterized by the presence of hydrophytic vegetation (i.e., an association of plants adapted to saturated soils), hydric soils (i.e., soils which have developed under the anaerobic conditions imposed by soil saturation), and wetland hydrology (i.e., surface inundation or saturated soils). Accordingly, LOA surveyed the site for wetland indicator plants, positive indicators of hydric soils, and wetland hydrology.

LOA established several sample points to document current site conditions. The sample locations were assessed for the diagnostic environmental characteristics of wetlands, and the dominant vegetation species, soils, and hydrology conditions were recorded onto USACE-designated data sheets (Appendix B). Vegetation species were identified using the *Jepson Manual: Vascular Plants of California* (Baldwin et al. 2012) to the lowest taxonomic level necessary to obtain their wetland indicator status from the U.S. Army Corps of Engineers 2018 National Wetland Plant list (USACE 2018). A list of vascular plant species observed on the site is provided in Appendix C.

Wetland indicator species are designated according to their frequency of occurrence in wetlands:

OBLIGATE (OBL)	Probability to occur in wetland is >99%
FACULTATIVE WETLAND (FACW)	Probability to occur in wetland is >67 to 99%
FACULTATIVE (FAC)	Probability to occur in wetland is 33 to 67%
FACULTATIVE UPLAND (FACU)	Probability to occur in wetland is 1 to <33%.
UPLAND (UPL)	Probability to occur in wetland is <1%

Hydrophytic vegetation is considered present when "inundation or soil saturation is either permanent or of sufficient frequency and duration to exert a controlling influence on the plant species present" (USACE 2008). The presence of hydrophytic vegetation is typically determined using the dominance test. This occurs when a "prevalence" (i.e., more than 50%) of the dominant species across all vegetative strata (i.e., trees, shrubs, herbs, and woody vines) at a given location

are composed of obligate (OBL), facultative wetland (FACW), and facultative (FAC) plant species. On sites where the vegetation initially fails the dominance test but indicators of hydric soil and wetland hydrology are present, a plot-based prevalence index is calculated. The prevalence index is a weighted-average wetland indicator status of all plant species in the sampling plot, and hydrophytic vegetation is considered present when the prevalence index is 3.0 or less.

LOA also examined each sample location for positive indicators of wetland hydrology and hydric soils. Evidence of wetland hydrology consists of primary indicators including, but not limited to, the presence of surface water, saturation, water marks in non-riverine systems, water-stained leaves, and a biotic crust. Secondary indicators of wetland hydrology include, but are not limited to, water marks in riverine systems, drainage patterns, and a dry season water table. Wetland hydrology is considered present when either one or more primary indicators is present, or two or more secondary indicators are present. LOA examined the soil profile at each sample point for indicators of hydric soils, including, but not limited to, low chromas, gleying, mottling, concretions, and sulfidic odors.

2.2 TRADITIONAL NAVIGABLE WATERS AND TRIBUTARY WATERS

Pursuant to USACE regulations (33 CFR §329), navigable waters are those waters that 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. Such waters are referred to as "traditional navigable waters" in the USACE and EPA guidance regarding the *Rapanos* decision.

Tributary waters are waters that contribute flow to a navigable water, interstate water, or the territorial seas. Tributaries are generally characterized by the presence of the physical indicators of a bed and bank and an ordinary high water mark. Such features may carry a permanent or intermittent flow of water. Perennial streams are those with surface water flowing continuously year-round. Intermittent streams have surface water flowing continuously during certain times of the year and more than in direct response to precipitation (i.e., both precipitation and groundwater provide part of the stream's flow) (33 CFR §328.3).

In the absence of adjacent wetlands, the limit of CWA jurisdiction of traditional navigable waters, rivers, streams, and their tributaries extends to the "ordinary high water mark" (OHWM). The OHWM refers to "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (33 CFR §328.3).

While there were no onsite traditional navigable waters, the site contains a canal that was examined for meeting the definition of a tributary water. LOA mapped the canal in the field using the ArcGIS Collector application.

2.3 OTHER WATERS

For the purposes of this report, other waters refer to waters that are not waters of the U.S. as defined in 33 CFR §328.3(a). The study area was surveyed for the presence of other waters.

3 RESULTS

3.1 EXISTING CONDITIONS

The site is located within the McGriff Lakes-Sutter Basin subwatershed, which is part of the Sacramento-Stone Corral watershed. The principal drainages in the vicinity are the Feather and Sacramento Rivers, which generally flow south, but mainly meander to the east and west. The Feather River is approximately 1.6 miles east of the site, and the Sacramento River is approximately 0.9 miles south of the site at its closest point.

Other drainages such as the Sacramento Slough, Sutter Bypass, and various canals including the onsite canal flow into Sacramento River. The confluence of the Sutter Bypass and Sacramento Slough occurs in the eastern portion of the site. The Sacramento Slough flows east into the Sacramento River and eventually meets the Feather River. The onsite canal carries agricultural water from the town of Robbins and is regularly managed. Additionally, the onsite canal is also mostly devoid of riparian habitat, in contrast to the rich riparian habitat present in confluence of the Sacramento Slough and Sutter Bypass.

The site is in the center of the southern Sacramento Valley. The Sacramento Valley is nestled within the Sierra Nevada to the east, the Sacramento-San Joaquin Delta and San Joaquin Valley to the south, the Northern Coast Ranges to the west, and the southern Siskiyou Mountains to the north. The site is located in a portion of the Sacramento Valley that has experienced intensive agricultural disturbance for several decades. Current agricultural endeavors in the region include orchards, row crops, and dairies.

The site is situated within a matrix of agricultural and residential uses. It is bordered by various agricultural fields, some residences, a farm equipment maintenance and storage yard, and the riparian habitats of the Sacramento Slough and Sutter Bypass.

The site's topography is fairly level, apart from the levee between the onsite canal and the Sacramento Slough. The site has elevations ranging from approximately 17 to 43 feet National Geodetic Vertical Datum (NGVD).

3.1.1 Soils

The site contains one soil mapping unit from one soil series: Capay silty clay, 0 to 2 percent slopes. This soil is hydric, referring to the soil's capacity to pond water and support the growth of wetland vegetation. The soil in this area has been identified as slightly alkaline, with a pH of 7.5 (Calflora 2021).

3.1.2 Climate

Like most of California, the southern Sacramento Valley has a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures commonly exceed 90

degrees Fahrenheit, and the relative humidity is generally very low. Winter temperatures rarely rise much above 70 degrees Fahrenheit, with daytime highs often below 60 degrees Fahrenheit. Annual precipitation within the vicinity of the site is about 18 inches, almost all of which falls between September and May. Nearly all precipitation falls in the form of rain, and stormwater readily infiltrates soils of the region.

3.2 AQUATIC RESOURCES AND POTENTIAL WATERS OF THE UNITED STATES

The onsite aquatic resources include the canal and wetlands present at the confluence of the canal with the Sacramento Slough and Sutter Bypass (Figure 3). The canal is approximately 366 linear feet and covers an area of 55,732 square feet below the ordinary high water mark (OHWM). The canal's vegetation, soils, and hydrology characteristics are detailed in LOA's established sample points documented in USACE wetland determination datasheets (Appendix B). A complete list of vascular plant species, including observed hydrophytic species may be found in Appendix C. Details documenting the canal's hydrological features using the Cowardin System is provided in the USACE Aquatic Resources Table (Appendix D) (Cowardin et al. 1979).

The onsite canal met the definition of waters of the United States. Flows from this canal are pumped into the Sutter Bypass and Sacramento Slough. The confluence of the onsite canal with the Sutter Bypass and the Sacramento Slough flow east to the Sacramento River, a known water of the U.S. The USFWS National Wetlands Inventory (NWI) map categorizes the onsite canal as riverine in-stream wetland (Appendix E). Although the northern banks and bed of the managed canal were mostly unvegetated, the southern banks supported sparse hydrophytic vegetation including narrow-leaved cattail (*Typha latifolia*) (OBL), soft rush (*Juncus effusus*) (FACW), and tall flat sedge (*Cyperus eragrostis*) (FACW).

An in-stream wetland covering an area of 15,604 square feet occurred at the confluence of the canal with the Sutter Bypass and Sacramento Slough (Figure 3). A sample point was established to document conditions that met the technical criteria for wetlands (sample point 1). Dominant hydrophytic vegetation included alligator weed (*Alternanthera philoxeroides*) (OBL) and cocklebur (*Xanthium strumarium*) (FAC). Other non-dominant vegetation included invasive species such as the common water hyacinth (*Eichhornia crassipes*) (OBL) and tamarisk (*Tamarix aphylla*) (FAC) commonly documented to occur in disturbed wetlands.

Soils within the in-stream wetland had a loamy/clayey texture and were saturated at the time a soil pit was dug at sample point 1. The soil profile displayed a Munsell color notation of 10 YR 3/1 in the first four inches and 10 YR 4/1 between 4 to 12 inches in depth. Redoximorphic concentrations were present between 4 and 12 inches of the soil profile. Stratified organic material, including alligator weed remnants, were present at 12 inches of the soil profile. The soils met the hydric soil criteria of stratified layers, considering the presence of organic material in distinct layers within the soil profile.

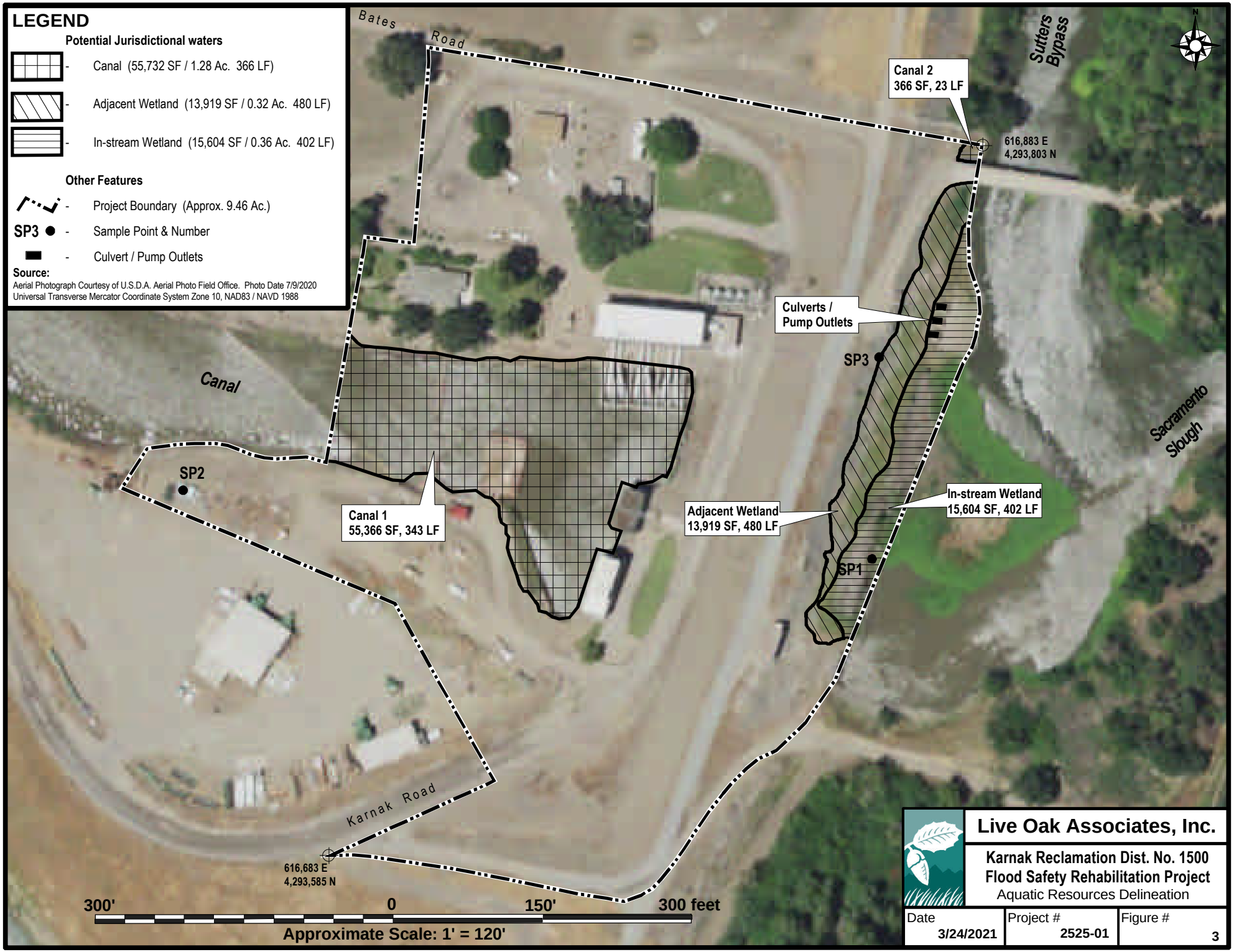
Primary hydrophytic indicators present in the in-stream wetland included surface water, saturation, inundation visible on aerial imagery, and water stained leaves (sample point 1). The

in-stream wetland also displayed secondary wetland hydrology indicators such as water marks, sediment deposits, and drift deposits. In sum, the in-stream wetland met the hydrology, soils, and vegetation criteria of wetland.

An adjacent wetland covering 13,919 square feet occurred just above the ordinary high water mark and the Karnak pumps that discharge flows in the Sacramento Slough (Figure 3). Vegetation was relatively dense and included dominant hydrophytic species such as (*Panicum dichotiflorum* ssp. *dichotiflorum*) (FACW), common sunflower (*Helianthus annuus*) (FAC), and rough cocklebur (*Xanthium strumarium*) (FAC). Wetland hydrology indicators included drainage patterns and some saturation on aerial imagery during flood years. Although soils are mapped by the NRCS as hydric, soils have been manipulated extensively from pump station maintenance and levee construction.

3.3 UPLAND AREAS

Areas above the OHWM level of the canal were comprised of ruderal upland habitats that did not meet any of the definitions of a jurisdictional water of the U.S. (Sample Point 2, 3; Figure 3; Appendix B). Vegetation coverage was relatively sparse (<5% absolute cover of area in sample point 1) and dominated by non-native grasses and forbs such as Fall Panic grass (FACW), summer mustard (*Hirschfeldia incana*) (UPL), yellow star thistle (*Centaurea solstitialis*) (UPL), and cutleaf geranium (*Geranium dissectum*) (UPL). Soils had a clay texture and a moist Munsell color notation of 10 YR 4/2 in the first 12 inches of the soil profile. There were no redoximorphic features or any other hydric soil indicators present in the soil profile. Indicators of wetland hydrology were also absent. Therefore, these areas failed to meet the technical criteria for jurisdictional wetlands.


LEGEND
Potential Jurisdictional waters
- Canal (55,732 SF / 1.28 Ac. 366 LF)
- Adjacent Wetland (13,919 SF / 0.32 Ac. 480 LF)
- In-stream Wetland (15,604 SF / 0.36 Ac. 402 LF)
Other Features
- Project Boundary (Approx. 9.46 Ac.)
SP3 - Sample Point & Number
- Culvert / Pump Outlets
Source:
Aerial Photograph Courtesy of U.S.D.A. Aerial Photo Field Office. Photo Date 7/9/2020
Universal Transverse Mercator Coordinate System Zone 10, NAD83 / NAVD 1988
Bates Road
Sutters Bypass
Canal 2
366 SF, 23 LF
616,883 E
4,293,803 N
Culverts /
Pump Outlets
SP3
Canal
Sacramento Slough
SP2
Canal 1
55,366 SF, 343 LF
Adjacent Wetland
13,919 SF, 480 LF
In-stream Wetland
15,604 SF, 402 LF
SP1
Karnak Road
616,683 E
4,293,585 N
300' 0 150' 300 feet
Approximate Scale: 1' = 120'
Live Oak Associates, Inc.
Karnak Reclamation Dist. No. 1500
Flood Safety Rehabilitation Project
Aquatic Resources Delineation
Date 3/24/2021
Project # 2525-01
Figure # 3

4 DISCUSSION

It is our opinion that the onsite canal, adjacent wetland, and in-stream wetland meet the regulatory definition of waters of the United States. Adjacent and in-stream wetlands also meet the vegetation, soils, and hydrological criteria of a jurisdictional wetland. Based on the Navigable Waters Protection Rule, the onsite canal, adjacent wetland, and in-stream wetland are subject to CWA jurisdiction as a tributary to the Sacramento Slough and Sacramento River, a known water of the U.S. The canal has a defined bed and bank with indicators of OHWM.

The USACE has the sole authority to determine the jurisdictional status of waters on any given project site. If the USACE disclaims jurisdiction over the canal, it may still be subject to regulation by the RWQCB under the Porter-Cologne Water Quality Control Act and by the CDFW under section 1600 of the California Fish and Game Code.

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APPENDIX A: SELECTED PHOTOGRAPHS OF THE STUDY AREA



Photo 1. In-stream wetland located by the confluence of the onsite canal with the Sutter Bypass and Sacramento Slough (Sample point 1). Photo is facing northeast.



Photo 2. Photo of upland ruderal area used as a staging area for pump station equipment. Photo is facing southwest (sample point 2).



Photo 3. Upland area located above the ordinary high water mark of the canal's confluence with the Sacramento Slough and Sutter Bypass (sample point 3).



Photo 4. Northern bank of the onsite canal that carries agricultural water from the town of Robbins to the Sacramento Slough. The southern bank sections of the onsite canal are vegetated with hydrophytic plants as narrow-leaf cattails (*Typha latifolia*) and soft rush (*Juncus effusus*).

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APPENDIX B: WETLAND DATA SHEETS

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Karnak Pump Station City/County: Sutter Sampling Date: 1/22/21
Applicant/Owner: Provost & Pritchard Consulting Group State: CA Sampling Point: 1
Investigator(s): Arren Allegretti Section, Township, Range: S 20, 21, T11N , R 3E
Landform (hillside, terrace, etc.): valley flloor Local relief (concave, convex, none): slightly concave Slope (%): 0-5
Subregion (LRR): LRR C Lat: 38.78410071 Long: -121.65460228 Datum: wgs84
Soil Map Unit Name: Capay NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No _____ (If no, explain in Remarks.)
Are Vegetation_____, Soil_____, or Hydrology_____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____
Are Vegetation_____, Soil_____, or Hydrology_____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No _____
Hydric Soil Present? Yes X No _____
Wetland Hydrology Present? Yes X No _____

Is the Sampled Area within a Wetland? **Yes** X **No** _____

Remarks:
Sample point is taken by confluence of an irrigation canal with the East Canal that form the Sacramento Slough. The sample point is also taken immediately east of the Karnak pumping station that pumps canal water to the Sacramento Slough.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 10x10 m)			
1. *Xanthium strumarium*	75	Yes	FAC
2. *Helianthus annuus*	10	No	FACU
3. *Tamarix aphylla*	1	No	FAC
4. *Panicum dichotomiflorum*	5	No	FACW
5.			
	91 =Total Cover		
Herb Stratum (Plot size: 10x10 m)			
1. *Alternanthera philoxeroides*	50	Yes	OBL
2. *Hirschfeldia incana*	3	No	UPL
3. *Eichhornia crassipes*	1	No	OBL
4. *Conium sp*	10	No	UPL
5.			
6.			
7.			
8.			
	64 =Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** _____

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-4	10YR 3/1	95					Loamy/Clayey	
4-12	10YR 4/1			5	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- X Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- X Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soil pit dug to 12 inches and water level rose to 6 inches. Stratified organic material (i.e., alligator weed remnants) found at 12 inches of soil profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Water Marks (B1) **(Riverine)**
- X Sediment Deposits (B2) **(Riverine)**
- X Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 24

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? Yes x No ___ Depth (inches): 1

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sample point is 20 feet south of culverts carrying pumped irrigation water to East Canal and Sacramento Slough.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Karnak Pump Station City/County: Sutter Sampling Date: 1/22/21
Applicant/Owner: Provost & Pritchard Consulting Group State: CA Sampling Point: 2
Investigator(s): Arren Allegretti Section, Township, Range: S 20, 21, T11N , R 3E
Landform (hillside, terrace, etc.): valley floor Local relief (concave, convex, none): none Slope (%): 0
Subregion (LRR): LRR C Lat: 38 47.03 Long: 121 39 24 Datum: WGS 84
Soil Map Unit Name: Capay clay loam NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ____ (If no, explain in Remarks.)
Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____
Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Sample point is taken wihint ruderla area that is used as a staging area for pump and excavation equipment. Sample point is mostly devoid of vegetation.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 25x25 m)			
1. *Panicum dichotomiflorum*	3	Yes	FACW
2. *Hirschfeldia incana*	1	Yes	UPL
3. *Centaurea solstitialis*	1	Yes	UPL
4. *Geranium dissectum*	1	Yes	UPL
5.			
6.			
7.			
8.			
	6 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 94 % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	3	x 2 =	6
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	3	x 5 =	15
Column Totals:	6 (A)		21 (B)
Prevalence Index = B/A =			3.50

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-12	10YR 4/2	95					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- X Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? Yes ____ No X Depth (inches): ____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Karnak Pump Station City/County: Sutter Sampling Date: 1/22/21
Applicant/Owner: Provost & Pritchard Consulting Group State: CA Sampling Point: 3
Investigator(s): Arren Allegretti Section, Township, Range: S 20, 21, T11N , R 3E
Landform (hillside, terrace, etc.): hillslope (artificial) Local relief (concave, convex, none): slightly concave Slope (%): 5
Subregion (LRR): LRR C Lat: 38 47.04 Long: 121 39.16 W Datum: wgs84
Soil Map Unit Name: Capay clay loam NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No ____ (If no, explain in Remarks.)
Are Vegetation____, Soil____, or Hydrology____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation____, Soil____, or Hydrology____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Sample point is taken just upland of Karnak pumps that feed into Sacramento slough. Site is very disturbed

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 25x25 m)			
1. *Panicum dichotomiflorum*	75	Yes	FACW
2. *Hirschfeldia incana*	10	No	UPL
3. *Helianthus annuus*	5	No	FACU
4. Unknown Conium	3	No	UPL
5.			
6.			
7.			
8.			
	93 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 94 % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	75	x 2 =	150
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	13	x 5 =	65
Column Totals:	93 (A)		235 (B)
Prevalence Index = B/A =			2.53

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soil is mapped by NRCS as hydric, however soils have been manipulated tto the extent that a levee was built associated with a pump station. Investigator was unable to dig soil pit due to dense conditions of vegetation and weather.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX C: VASCULAR PLANTS OF THE STUDY AREA

The plants species listed below have been observed on the site during surveys conducted by Live Oak Associates, Inc. on January 21, 2021. The wetland indicator status of each plant as listed in the U.S. Army Corps of Engineers 2018 National Wetland Plant list is shown following its common name (USACE 2018).

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL – Upland

AMARANTHACEAE – Amaranthus Family		
Amaranthus albus	Tumbleweed	FACU
Alternanthera philoxeroides	Alligator weed	OBL
APIACEAE – Carrot Family		
Foeniculum vulgare	Sweet Fennel	FACU
Torilis arvensis	Spreading Hedgeparsley	UPL
ASTERACEAE – Sunflower Family		
Centauria solstitialis	Yellow Star Thistle	UPL
Conium maculatum	Poison Hemlock	FACW
Conyza canadensis	Canada Horseweed	UPL
Helianthus annuus	Common Sunflower	FACU
Helminthotheca eschoides	Bristly Oxtongue	FAC
Xanthium strumarium	Rough Cocklebur	FAC
BRASSICACEAE – Mustard Family		
Brassica nigra	Black Mustard	UPL
Hirschfeldia incana	Summer Mustard	UPL
CHENOPODIACEAE – Chenopod Family		
Salsola tragus	Russian Thistle	UPL
Atriplex sp.	Saltbush	-
CUPRESSACEAE – Cypress Family		
Cupressus sp.	Cypress	-
CYPERACEAE – Sedge Family		
Cyperus eragrostis	Tall Flatsedge	FACW
FAGACEAE – Oak Family		
Quercus lobata	Valley Oak	FACU
GERINACEAE – Geranium Family		
Erodium botrys	Broad-leave Filaree	FACU
Genanium dissectum	Cut-leaf Geranium	UPL
JUNCACEAE- Rush Family		
Juncus effussus	Soft rush	FACW

MALVACEAE – Mallow Family		
Malva parviflora	Cheeseweed	UPL
PINACEAE – Pine Family		
Pinus sp.	Pine	-
POACEAE - Grass Family		
Panicum dichotomiflorum	Fall panic grass	FACW
Cynodon dactylon	Bermuda Grass	FAC
Festuca perennis	Italian Ryegrass	UPL
Sorhgum halepense	Johnson grass	FACU
POLYGONACEAE – Buckwheat Family		
Polygonum arenastrum	Prostrate Knotweed	UPL
Rumex sp.	Dock	-
PONTEDERIACEAE- Water Hyacinth Family		
Eichhornia crassipes	Water Hyacinth	OBL
TAMARIACEAE- Tamarisk Family		
Tamarix chinensis	Chinese Tamarisk	FACW
TYPHACEAE- Cattail Family		
Typha latifolia	Narrow leaf cattail	OBL
VITACEAE – Grape Family		
Vitis sp.	Cultivated Grape	-

APPENDIX D: AQUATIC RESOURCES TABLE

Aquatic Resources Table for Karnak Pump Station										
Waters Name	**State**	**Cowardin Code**	**HGM Code**	**Meas Type**	**Amt**	**Unit**	**Water Type***	**Latitude**	**Longitude**	**Local Water way**
Canal 1	CA	R5	Riverine	Area	55,366	SQ FT	RPW	38.77784	-121.65682345	Sutter Bypass and Sacramento Slough
Canal 2	CA	R5	Riverine	Area	366	SQ FT	RPW	38.7845	-121.654167	Sutter Bypass and Sacramento Slough
Adjacent wetland	CA	PEM	Palustrine	Area	13,919	SQ FT	RPWWN	38.78417	-121.65722	Sutter Bypass and Sacramento Slough
In-stream wetland	CA	R5	Riverine	Area	15,604	SQ FT	RPWWD	38.78389	-121.654444	Sutter Bypass and Sacramento Slough

APPENDIX E: USFWS NATIONAL WETLANDS INVENTORY MAP

U.S. Fish and Wildlife Service

National Wetlands Inventory

Karnak Pump Station



January 22, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Appendix C – Cultural Resources Information

Cultural Resources Identification Report

Cultural Resources Identification Report for the McGriff Lakes – Sutter Basin Watershed Flood Control & Safety Project in Karnak, Sutter County, California

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Acronyms and Abbreviations

AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
AD	anno domini
AF	acre-feet
amsl	above mean sea level
APE	area of potential effect(s)
ASAE	American Society of Agricultural Engineers
B.A.	Bachelor of Arts
BCE	before common era
BR	Bureau of Reclamation
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHRIS	California Historical Resources Information System
Commission	California Debris Commission
CRHR	California Register of Historical Resources
CY	cubic yards
District	Reclamation District 1500
DPR	Department of Parks and Recreation
EIR	Environmental Impact Report
hp	horsepower
GANDA	Garcia and Associates
GE	General Electric
GIS	geographic information system
GLO	Bureau of Land Management General Land Office
HUC	Hydrologic Unit Code
M.A.	Master of Arts
MND	Mitigated Negative Declaration
NAHC	Native American Heritage Commission
NCHS	Napa County Historical Society
NEIC	Northeast Information Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
No.	number
NOP	Notification of Preparation
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PG&E	Pacific Gas and Electric Company
PH	pumphouse
PRC	Public Resources Code
Project	McGriff Lakes – Sutter Basin Watershed Flood Control & Flood Safety Project
RD	Reclamation District
RPA	Register of Professional Archaeologists
rpm	rotations per minute
SBC	Sutter Basin Company
SHPO	California State Historic Preservation Officer
SLF	Sacred Lands File
SR	State Route
TCR	tribal cultural resource(s)
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Management Summary

Provost & Pritchard Consulting Group proposes the McGriff Lakes – Sutter Basin Watershed Flood Control & Flood Safety Project (Project) in the unincorporated locality of Karnak in Sutter County, California. The Project will involve modernizing the existing Karnak Drainage Facility or installing a suitable alternative that provides the same level of protection in order to provide drainage for the RD 1500 service area.

The Project will be funded by a United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) federal grant and may affect waters of the United States (US) and federal flood control structures. As a result, the Project proponent must meet requirements of Sections 401 and 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act as well as Section 106 of the National Historic Preservation Act (NHPA), which requires that federal agencies "take into account" the effect of its undertakings on historic properties. The US Army Corps of Engineers (USACE) is a federal agency and since the Project is an "undertaking" as defined at 36 Code of Federal Regulations (CFR) §800.16(y), and the undertaking has the potential to cause effects on historic properties (36 CFR §800.3[a]), it is necessary to identify cultural resources within the Area of Potential Effects (APE). This Cultural Resources Identification Report has been prepared in accordance with the USACE Section 106 Standards. In addition to meeting federal regulations as it pertains to the California Environmental Quality Act (CEQA).

This report provides a summary of the efforts and results of the California Historical Resources Information System (CHRIS) records search with the Northeast Information Center (NEIC) at California State University, Chico; a review of the Sutter County Museum historic properties records database; a historical map and archival research; and Native American Heritage Commission Sacred Lands File (NAHC SLF)search; as well as, the methods, results, resource eligibility, and management recommendations.

The Sutter County Museum historic properties database search identified one previously documented cultural resource within the APE (the Karnak Drainage Facility). One previous cultural resources study has been completed within the APE and four previous cultural resources studies have been conducted within the 0.5-mile radius. The NAHC SLF records search resulted in negative findings within the search area. The NAHC did provide a list of Native American contacts to be contacted for additional outreach regarding the Project area. This list has been included in the appendices for use by the lead agency for background information in completing their Section 106 Native American consultation.

An intensive pedestrian survey was conducted in January 2021, by Kleinfelder archaeologists, Jessica Neal, M.A., RPA, and Samantha Dunham, B.A. Six new cultural resources were identified (the East Levee, RD 1500 Canal, East Canal, a historical bridge, and two houses) and one previously recorded resource was updated (Karnak Drainage Facility) within the APE. All seven resources were recorded on Department of Parks and Recreation (DPR) 523-series forms.

The Karnak Drainage Facility consists of three pump houses constructed between 1914 and 1952, associated structures, infrastructure, and equipment. The Karnak Drainage Facility has been evaluated and are recommended eligible for inclusion in the National Register of Historic Properties (NRHP) and the California Register of Historical Resources (CRHR) under Criteria A/1.

The bridge, canals, levee, and houses have not been individually evaluated at this time, as the project design is undetermined and may result in avoidance of these resources. However, the East Levee, Karnak Drainage Facility, RD 1500 Canal, the East Canal, and House 1 are recommended as contributor to the Reclamation District 1500 proposed historic district. Kleinfelder recommends that once a final Project design and potential impacts to these resources are known that these resources be individually evaluated for eligibility for inclusion on the NRHP and CRHR. The lead federal agency will complete consultation with the State Historic Preservation Office (SHPO) for effects to Historic Properties and to determine mitigation measures for adverse effects that cannot be avoided.

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1.0 Introduction

The following provides an overview of the McGriff Lakes – Sutter Basin Watershed Flood Control & Flood Safety Project (Project) description, background and objectives, location, and Area of Potential Effect (APE).

1.1 Description

The following description details the watershed planning area, the setting, and current infrastructure.

1.1.1 Project Setting

The Project is located northwest of Sacramento in an area of low-lying land protected by levees between the Sacramento and Feather rivers, commonly known as the Sutter Basin. RD 1500 is one of the largest reclamation districts in California and provides drainage and flood control to an area of approximately 67,850 acres within its service area, including protecting the community of Robbins from flood damage. The area was reclaimed for farming as part of the Sutter Basin Reclamation Project in the early part of the 20th century and is located between the Sacramento River on the west and south and the Sutter Bypass and Feather River on the east. The entire District boundary is leveed to prevent flooding from the nearby river systems; however, during large rainfall events, the area acts as a bathtub filling up from precipitation that falls within its boundaries. The Sutter Basin is a closed basin with no natural outlet because of the extensive levee system, so drainage and flood control must be provided.

1.1.2 Current Infrastructure

The Karnak Drainage Facility is located in the southeast corner of the Sutter Basin. The existing Karnak Drainage Facility consist of three separate pumphouses which discharge drainage water to the Sacramento Slough (State Waterbody ID: CAR519220001998081411320 8) for ultimate discharge to the Sacramento River. More specifically the current infrastructure includes:

- Pump House (PH) 1, constructed in 1914 during the development of the Sutter Basin Reclamation Project and consists of six large centrifugal pumps capable of pumping approximately 1,200 cubic feet per second (cfs) out of the Sutter Basin.
- Pumphouse 2 (PH 2) consists of three vertical pumps and was constructed in 1929 but was poorly designed and was never operational.
- Pumphouse 3 (PH 3) consists of four vertical pumps capable of pumping approximately 700 cfs and was constructed in 1952 to expand the capacity of Karnak Drainage Facility and provide the possibility of gravity drainage.

All three pumphouses have existing discharge pipes that are installed through the East Levee for discharge to the Sacramento Slough. Antiquated equipment and lack of available parts has caused frequent and potentially extended outages which greatly impairs the existing Karnak Drainage Facility from providing its intended purpose of drainage control and flood management in the Sutter Basin.

1.2 Project Purpose and Need

The purpose of the Project is to prevent damage from floodwater to homes and other property by providing flood protection to the community of Robbins and surrounding rural residential

property, State Route (SR) 113 and other local roadways, and over 65,000 acres of rural farmland; to manage erosion and sediment issues; and, to prevent displacement of fish and wildlife by rehabilitating the existing Karnak Drainage Facility or installing a suitable alternative that provides the same level of protection. The purposes of this Project include flood prevention and flood damage reduction caused by above average precipitation within the Sutter Basin through facility improvements to control and direct impounded surface water out of the basin and reduce runoff frequency, depth, and velocity of flood waters.

Floods can be catastrophic to an area while burdening a large recovery cost. Additionally, California has more flood years and more drought years on average than any other part of the country and this variability would most likely increase with anticipated climate change (Lund 2019). Flood control maintenance must be reliable and consistent. Replacement of current infrastructure at the Karnak Drainage Facility would provide reliability and safety to the watershed by reducing the risk of catastrophic flooding and associated damage, now and in the future.

1.3 Area of Potential Effects

The APE measures approximately 9.37 acres and includes the Project footprint and the Project's maximum extent of ground disturbance. The APE is located at the Karnak Drainage Facility, Sutter County, approximately 3.5 miles east-southeast of Knights Landing, in the Sutter Basin, approximately 0.7-mile northwest of the Yuba County and Sutter County boundary. The APE is located on multiple Accessor Parcel Numbers (34-170-030, -031, -022, -028, -024, and -033), within Township 11 North, Range 3 East, Section 20 on the Knights Landing, California, 7.5-minute United States Geological Survey (USGS) quadrangle (USGS 1981). Refer to Appendix A, Figures 1, 2, and 3.

The elevation at the APE is approximately 20 feet above mean sea level (amsl). Adjacent land is used primarily for agriculture. The northwest-to-southeast-trending RD 1500 Canal bisects the APE. The north-to-south-trending East Canal and the east-to-west-trending Sacramento Slough make up the eastern boundary of the APE. The north-to-south-trending East Levee intersects the eastern half of the APE. Reclamation Road, Bates Road, and the Karnak Drainage Facility are located within the APE.

1.4 Background and Objectives

The purpose of this assessment is to inventory the APE for potential cultural resources that may be present and identify measures to avoid or mitigate potential impacts to such resources. Cultural resources include archaeological, architectural history, and Native American (tribal) cultural resources.

Kleinfelder conducted a cultural resources literature search through the California Historical Resources Information System (CHRIS) records search with the Northeast Information Center (NEIC) at California State University, Chico to assess potential presence of cultural resources within the APE and a 0.5-mile radius around the APE. The records review and literature search included reviews of the Sutter County Museum historic properties records database, historical maps, previous survey reports, and registers of historical resources. This was followed by a review of the Sutter County Museum historic properties records database and a Sacred Lands File (SLF) search with the Native American Heritage Commission (NAHC). Once background research had been completed, Kleinfelder completed an intensive pedestrian survey of the APE in order to

identify and/or update cultural resources within the APE. The Project has been conducted in accordance with Section 106 of the National Historic Preservation Act (NHPA) and California Environmental Quality Act (CEQA).

2.0 Regulatory Context

The following section provides the federal, State of California (State), and local laws, regulations, and ordinances that are applicable to cultural resources compliance on the Project.

2.1 Section 106 of the National Historic Preservation Act

Section 106 of the NHPA (36 CFR §800) requires that projects undertaken by federal agencies (and/or federally funded projects or projects requiring federal approval) consider the effects of their actions on properties that may be eligible for listing or are listed in the National Register of Historic Places (NRHP). To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological and architectural properties) must be inventoried and evaluated for listing in the NRHP. Although compliance with Section 106 is the responsibility of the lead federal agency, consultants in support of the agency or project proponent may be delegated all or portions of the Section 106 process. The RD 1500 Project is subject to Section 106 because it will require a United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) federal grant to fund this Project as well as a U.S. Army Corps Section 404 permit. The Section 106 process includes four primary steps, listed below.

1. Initiation of consultation with consulting parties (36 CFR §800.3).
2. Identification and evaluation of historic properties within the APE (36 CFR §800.4).
3. Assessment of adverse effects on historic properties within the APE (36 CFR §800.5). If there are historic properties that will be affected, consult with the California State Historic Preservation Officer (SHPO) regarding adverse effects, both direct and indirect, on historic properties. If there are no historic properties that will be affected, implementation of the project in accordance with the findings of no adverse effect shall proceed (36 CFR 36 §800.5[d][1]).
4. Resolve adverse effects on historic properties within the APE (36 CFR 800.6). Continue consultation among the federal agency and consulting parties to avoid and mitigate adverse effects. The Advisory Council on Historic Preservation (ACHP) provides comments to head of the federal agency, and the ACHP comments must be considered when final agency decision on the undertaking is made (move forward with the project, stop pursuant to mitigation, step back through Section 106 process) (36 CFR 800.7).

2.2 California Environmental Quality Act of 1970, as Amended

CEQA requires State and local agencies to identify and reduce, if feasible, the significant, negative environmental impacts of land use decisions.

CEQA Guidelines: Title 14 California Code of Regulations (CCR) Section 1427

This section of CEQA recognizes that California's archaeological resources are endangered by urban development; the legislature finds that these resources need preserving; it is a misdemeanor to alter any archaeological evidence found in any cave, or to remove any such materials from a cave.

CEQA Guidelines: Title 14 CCR Section 15064.4 subsection (b)

This section of CEQA defines "historical resource," addresses reburial options for Native American remains, and presents the preferred mitigation of historical resources.

CEQA Guidelines: Title 14 CCR Section 15064.5

This section of CEQA identifies which resources are considered cultural resources, as stated below.

- Resource(s) listed or eligible for listing on the California Register of Historic Places (CRHR) (Title 14 CCR Section 15064.5(a)(1).
- Resource(s) either listed in the NRHP or in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant," (Title 14 CCR Section 15064.5(a)(2)).
- Resources identified as significant in a historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code (PRC) [Title 14 CCR Section 15065.5(a)(2)].

In addition, Subdivision (g) provides the guidelines referenced below regarding historical surveys.

A resource identified as significant in a historical survey may be listed in the CRHR if the survey meets all the following criteria:

- The survey has been or will be included in the State Historic Resources Inventory,
- The survey and the survey documents were prepared in accordance with procedures and requirements of the California Office of Historic Preservation (OHP),
- The resource is evaluated and determined by OHP to have a significance rating of Category 1 to 5 on the Department of Parks and Recreation (DPR) Historic Resources Inventory Form,
- If the survey is five years or older at the time of its nomination for inclusion in the CRHR, the survey is updated to identify historic resources that have become eligible or ineligible due to changed circumstances or further documentation and those which have been demolished or altered in a manner that substantially diminished the significance of the resource, and
- Resources identified during such surveys are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates otherwise.
- A final category of "historical resources" may be determined at the discretion of the lead agency when: Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, education, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record [Title 14 CCR Section 15064.5(a)(3)].

When an Initial Study identifies the existence of, or the probable likelihood of, Native American human remains within a project, the lead agency shall work with the appropriate Native Americans as identified by NAHC. An applicant may develop an agreement for treating or disposing of, with appropriate dignity; the human remains and any items associated with Native American burials with the appropriate Native Americans as identified by NAHC (Title 14 CCR Section 15064.5(d)).

CEQA Guidelines: Title 14 CCR Section 15064.5(b)

Section 15124(b) addresses mitigation, and states that the preferred mitigation for historical resources is treatment in a manner consistent with Secretary's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings. The preferred mitigation for archaeological sites is preservation in place.

CEQA Guidelines: Title 14 CCR Section 15064.7 "Thresholds of Significance"

This section encourages agencies to develop thresholds of significance to be used in determining potential impacts and defines the term "cumulatively significant".

CEQA Guidelines: Title 14 CCR Section 15126.4 "Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects", sub-section (b) "Mitigation Measures Related to Impacts on Historical Resources"

Subsection (b) discusses:

- Impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource,
- Documentation as a mitigation measure, and
- Mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible; data recovery must be conducted in accordance with an adopted data recovery plan.

CEQA Appendix G Section V

This appendix is a checklist that identifies potential impacts to historical and archaeological resources, and/or human remains. The checklist includes the following questions, which are used to determine if a potential project would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5,
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5,
- Disturb any human remains, including those interred outsides of formal cemeteries.

Questions on the checklist are answered to assess whether impacts associated with a project would be potentially significant, less than significant with mitigation, less than significant, or have no impact. The final determination of project-related impacts is made by the lead agency on a project.

CEQA Assembly Bill 52 –Tribal Consultation and Tribal Cultural Resources

Assembly Bill (AB) 52 amended CEQA to address California Native American tribal concerns regarding how cultural resources of importance to tribes are treated under CEQA. CEQA now specifies that a project that may cause a substantial adverse change in the significance of a "tribal cultural resource" [as defined in PRC 21074(a)] is a project that may have a significant effect on the environment. According to AB 52, tribes may have expertise in tribal history and "tribal

knowledge about land and tribal cultural resources (TCR) at issue should be included in environmental assessments for projects that may have a significant impact on those resources."

The AB 52 process entails the following:

- The CEQA lead agency must begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project if the tribe has requested such notification to the lead agency, in writing. The notification request requires that the lead agency inform these tribes of proposed projects in the geographic area provided by the representative tribe; and within set timeframes. Specifically, the lead state agency is required to notify tribe(s) that have requested project notification under AB 52 within 15 days of determining there is a project; the tribe(s) then have 30 days to respond to this notification and request consultation: upon receipt of a request for consultation the lead agency must then initiate consultation with the tribe(s) within 30 days.
- AB 52 applies to the following CEQA documents: Negative Declaration (ND), Mitigated Negative Declaration (MND), or Notification of Preparation (NOP) of an Environmental Impact Report (EIR). Such documents cannot be released for public review before tribal consultation has concluded and shall not contact any confidential information that the Tribe has requested be omitted from public review.

AB 52 further defines the following legislative terms:

Public Resource Code (PRC) 21074 (TCR): The statute identifies TCR as separate and distinct category of resource, separate from a historical resource. New PRC Section 21074 further defines a TCR as any of the following under its subsections (a) through (c):

a) Sites, features, places, and objects with cultural value to descendant communities or cultural landscapes that are any of the following:
    - Listed on the CRHR.
    - Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.
    - Deemed to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1.

b) Sacred places, including, but not limited to, Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines that meet either of the following criteria:
    - Listed on the California NAHC's SLF pursuant to Section 5097.94 or 5097.96 and a California Native American tribe has submitted sufficient evidence to the lead agency demonstrating that significance to the California Native American tribe or contain known graves and cemeteries of California Native Americans.
    - Listed or determined pursuant to criteria set forth in subdivision (g) of Section 5024.1 to be eligible for listing in the CRHR.

c) A cultural landscape is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

d) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "non-unique archaeological resource" as defined in subdivision (h) of Section 21083.2 also may be a TCR if it conforms with the criteria of subdivision (a).

2.2.2 Public Resources Codes

The following provides a summary of California PRC that apply to cultural resources.

PRC Section 5020.1

This section defines several terms, including those provided below.

> "Historical resource" includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.
>
> "Substantial adverse change" means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired.

PRC Section 5024.1

This section establishes the CRHR. A resource may be listed as a historical resource in the CRHR if it meets the NRHP criteria or the following state criteria:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage,
- is associated with the lives of persons important in our past,
- 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, or
- has yielded, or may be likely to yield, information important in prehistory or history.

PRC Section 5097.5

This section states that any unauthorized removal or destruction of archaeological or paleontological resources on sites located on public land is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the State, or any city, county, district, authority or public corporation, or any agency thereof.

PRC Section 5097.98

This section discusses the procedures that need to be followed upon the discovery of Native American human remains. NAHC, upon notification of the discovery of human remains by the County coroner, is required to notify those persons it believes to be most likely descended from the deceased Native American. It enables the descendant to inspect the site of the discovery of the Native American human remains and to recommend to the landowner (or person responsible for the excavation) means of treating, with dignity, the human remains and any associated grave goods.

PRC Sections 5097.99, 5097.991

These sections establish that it is a felony to obtain or possess Native American artifacts or human remains taken from a grave or cairn and sets penalties for these actions. The sections also mandate that it is the policy of the State to repatriate Native American remains and associated grave goods.

PRC Section 21083.2

This section states that under CEQA, the lead agency is responsible for determining whether a project may have a significant effect on historical and archaeological resources. Section 21083.2 states that if the lead agency determines that the project may have a significant effect on "unique" archaeological resources, an EIR shall be prepared to address these resources. A unique archaeological resource is an artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that the resource meets one of the following criteria:

- contains information needed to answer important research questions and that a demonstrable public interest exists in that information,
- has a special and particular quality, such as being the oldest or best example of its type, and/or
- is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require that reasonable efforts be taken to preserve these resources in place or provide conditions or mitigation measures.

PRC Section 21084.1

This section sets forth that a project that may cause a significant adverse change in a significant historical resource is a project that may be considered to have adverse effects on the environment. Historical resources not listed on the CRHR or other local lists may still be considered historical resources at the discretion of the lead agency on the project.

Senate Concurrent Resolution Number 43

This resolution requires state agencies to cooperate with archaeological survey and excavation programs, and to preserve known archaeological resources whenever reasonable.

Senate Bill 18 (Burton 2004)

This bill required protection and preservation of Native American traditional cultural places during city and county general plan development.

Health and Safety Code Section 7050.5

This code establishes that any person who knowingly mutilates, disinters, wantonly disturbs, or willfully removes any human remains in or from any location without authority of the law is guilty of a misdemeanor. It further defines procedures for the discovery and treatment of Native American remains.

Health and Safety Code Sections 8010-8011

This code is intended to provide consistent state policy to ensure that all California Native American human remains, and cultural materials are treated with dignity and respect. The code extends policy coverage to non-federally recognized tribes, as well as federally recognized groups.

California Penal Code Section 622.5
This code states that anyone who willfully damages an object or thing of archaeological or historic interest can be found guilty of a misdemeanor.

2.3 Sutter County General Plan

The Sutter County General Plan was adopted in 2011 and is intended to provide a framework for planning and the future of Sutter County. California law requires every city and county in the state to prepare and adopt a general plan "for the physical development of the county or city and any land outside its boundaries which bears relation to its planning" (California Government Code, Section 65300). The Sutter County General Plan expresses the community's goals, visions, and policies for future land uses. The general plan provides adequate background information about the kinds, locations, and intensities of land uses as well as applicable resource protection and development policies. According to California law, a general plan must contain at least seven elements: land use, open space, conservation, housing, circulation, noise, safety, and other elements that a county wishes to adopt. The Sutter County General Plan also includes the optional elements of economic development, infrastructure, and community services. Cultural resources are taken into consideration under the cultural resources section (Chapter 6.7) of the Sutter County General Plan (PBS&J 2010); cultural resources are defined as buildings, sites, districts, structures, or objects having historical, architectural, archaeological, or cultural significance. The applicable goals, policies, standards, and implementation measures are included below.

Environmental Resources Element (ER): Cultural Resources.

The goal of ER 8 is to identify, protect, and enhance Sutter County's important cultural resources to increase awareness of the County's heritage. The applicable policies and implementation programs of ER 8 are detailed below:

Policies

ER 8.1 **Identification.** Identify cultural resources, which include prehistoric, historic, and archeological resources, throughout the County to provide adequate protection of these resources.

ER 8.2 **Preservation.** Ensure the preservation of significant cultural resources, including those recognized at the national, state, and local levels.

ER 8.4 **Inclusion on Historic Registers and District.** Promote the registration of historic resources under the National and State registers and within the County's Historic Preservation Combining District.

ER 8.5 **Consultation.** Consult with the appropriate organizations and individuals early in the development process (e.g., Information Centers of the California Historical Resources Information System, Native American Heritage Commission, and Native American groups and individuals) to minimize potential impacts to cultural resources.

ER 8.6 **Compatible New Development.** Review proposed new development, rehabilitation efforts, and remodels for compatibility with the surrounding historic context.

ER 8.7 **Adaptive Reuse.** Encourage the adaptive reuse of historic resources when the original use of the resource is no longer feasible.

ER 8.8 **Financial Incentives.** Consider providing financial incentives to private owners and development in order to maintain, rehabilitate, and preserve cultural resources.

ER 8.9 **Public Awareness.** Educate the public on the County's important cultural resources to increase awareness for protection.

Implementation Programs

ER 8-A For projects subject to discretionary approval involving the demolition, relocation, or alteration of a building or structure over 45 years old or that would result in a change to the building or structure's immediate setting, the County shall require an assessment by a professional historic resource consultant to determine if the action would cause a substantial adverse change in the significance of an historical resource pursuant to CEQA Guidelines section 15064.5.

ER 8-B If the historical resource assessment determines that the proposed action would cause a substantial adverse change in the significance of an historical resource, the County shall require as a condition of project approval the implementation of appropriate and feasible measures to reduce the potential impact, including the appropriate level of written and photographic documentation of significant historical resources that would be demolished.

ER 8-C For projects subject to discretionary approval, which involve grading, excavation, or construction, require the applicant to hire a professional that meets the Secretary of Interior's professional qualifications standards for archaeology to conduct an archaeological resource investigation. As determined necessary by the archaeologist and the County, the investigation may include, but not be limited to, an updated records search, pre-construction field surveys, research, and testing, and/or other methods that identify whether a substantial adverse impact on significant archaeological resource would occur. If cultural resources are discovered, the resource shall be examined by a qualified archaeologist to determine its significance and develop appropriate protection and preservation measures.

ER 8-D Require that when any subsurface cultural resources, paleontological resources, or human remains are encountered, all work within 100 ft of the discovery be stopped and the area protected from further disturbance until the discovery is evaluated. The appropriate County personnel shall be notified immediately. The resources shall be examined by qualified personnel to determine their significance and develop appropriate protection and preservation measures. If

human remains are discovered, they shall be treated in compliance with applicable State and federal laws, including notifying the County Coroner and consulting with the California Native American Heritage Commission, as appropriate.

ER 8-E Update Zoning Code to allow for adaptive reuse of historic resources.

ER 8-F Maintain, rehabilitate, and preserve cultural resources by implementing the County's Historic Preservation Combining District.

ER 8-G Pursue local, State, and federal funding opportunities to rehabilitate, support, or provide incentives to maintain cultural resources.

3.0 Natural and Cultural Context

This section presents background information pertaining to the natural and cultural context of the APE, as well as an overview of regional prehistory, ethnography, and history.

3.1 Natural Context

The Project is located in Sutter County, in the central portion of the Sacramento Valley. Sutter County is comprised of approximately 607 square miles of land (378,875 acres) and its boundaries are defined by Yolo and Colusa counties to the west, with the Sacramento River and Butte Sink forming the western boundary; Butte County to the north; Yuba and Placer counties to the east with the Feather and Bear rivers forming a portion of the eastern boundary; and Sacramento County to the south, with the southern boundary south of Riego Road. Sutter County's topography is primarily flat, with the exception of the Sutter Buttes (often referred to as the world's smallest mountain range) in the northern part of the county. It is divided into two geographic areas: the Sutter Buttes and the valley area. The valley area covers the majority of Sutter County and is flat with open row or field crop style agriculture use and extremely low population density. Approximately 98 percent of the county is designated for agriculture and open space uses. Sutter County's climate has hot, dry summers with relatively moderate wet winters. The average temperature ranges from 39.2 degrees Fahrenheit in the winter to 97 degrees Fahrenheit in the summer; the average annual rainfall is 22 inches (Sutter County 2021; PBS&J 2010).

The APE is plotted within the McGriff Lakes-Sutter Basin subwatershed, where the Sutter Bypass and Sutter Basin converge and in land zoned for agricultural and open space use. The Sutter Bypass is a major flood control canal and runs north-to-south through the center of Sutter County and is connected to the Sacramento River by the Tisdale Bypass. The Sutter Bypass is a major manmade flood control area that acts as an overflow collector of flood flows in the Sacramento River after passing through the Butte Slough and the Butte Sink; it is a closed basin with no natural outlet because of the extensive levee system, so drainage and flood control must be provided. The Sutter Bypass and the drainage canals generally run south from the Butte Sink and through the center of the county until they meet with the Sacramento River west of its convergence with the Feather River. The Sutter Basin is bounded by the Feather River to the east and the Sacramento River to the west. It consists of a combination of natural topography and constructed levees that aid in the collection and discharge of water from the Basin in natural waterways managed by RD 1500, an approximate 67,850-acre area and one of the largest reclamation districts in California. The soil in the Sutter Basin is alluvial deposit known as river bottom land with Columbine silt loam covering Sacramento clay loam in varying amounts, which proved ideal for farming (Isbell 2009; NRCS 2014; PBS&J 2010).

Historically, the natural habitats in Sutter County included perennial grasslands, riparian woodlands, oak woodlands, and a variety of wetlands including vernal pools, seasonal wetlands, freshwater marshes, ponds, streams, and rivers. However, most of the environments have been disturbed by development for agriculture, irrigation, flood control, and urbanization. Numerous streams and channels have also been channelized, riparian and oak woodlands cleared, and marshes have been drained and converted to agricultural or urban lands. Many invasive annual grass species have replaced native perennial species. The Sutter Buttes are relatively undisturbed and undeveloped parcels along the Sacramento River, Feather River, Bear River, and Sutter Bypass

retain habitats similar to historical ones. Regional vegetation includes black willow, Fremont cottonwood, button willow, blue elderberry, white alder, round stem bulrush, California blackberry, California wild grape, and western raspberry. Regional animal species include deer, American badgers, skunk, beaver, fox, rabbit, bats, burrowing owls, western pond turtles, giant garter snakes, salmon, catfish, longfin smelt, bullheads, largemouth bass, bluegill, sunfish, and black crappie (California Department of Fish and Wildlife 2021; PBS&J 2010)

The soils within the APE consist of Capay silty clay (0 to 2 percent slopes) (California Soil Resource Lab 2021). The elevation at the APE is approximately 20 feet amsl. The APE is bisected by the northwest-to-southeast-trending RD 1500 Canal. An unnamed intermittent stream is approximately 536 feet north of the APE, an unnamed intermittent stream is located approximately 395 feet southwest of the APE, respectively, the Sacramento River is approximately 0.72 mile southeast of the APE, and the East Canal runs perpendicular on east side of the APE. Most of the APE has been developed for use as Karnak Drainage Facility (see Appendix A, Figure 2).

3.2 Prehistoric Context

The Central Valley is characterized by multiple cultural-historical frameworks with some cultural chronologies being highly detailed in certain locations and being poorly defined in other areas. Most local sequences are built on a few radiocarbon dates, relying on cross-dating stylistically distinct artifact types and cultural patterns. The applicable archaeological chronology is based on a system developed by Fredrickson's (1973, 1974) California adaptation of the Willey and Phillips (1958) period and stage integrative scheme with radiocarbon determinations (Groza 2002, LaJeunesse and Pyor 1996, Meyer and Rosenthal 1997) adjusting Frederickson's proposed periods with modern calibration curves. The following chronological framework is relevant to the APE: Paleo-Indian (11,550 to 8,550 cal before common era [BCE]), Lower Archaic (8,550 to cal 5,550 BCE), Middle Archaic (5,550 to 550 cal BCE), Upper Archaic (550 cal BCE to cal anno domini [AD] 1,100), and Emergent Period (cal AD 1,100 to historic) (Jones and Klar 2007; Rosenthal et al. 2007).

3.2.1 Paleoindian Period (11,550–8,550 cal BCE)

Paleoindian Period occupation is poorly represented in the archaeological record with most artifacts encountered as isolated finds. The few Paleoindian sites in California mainly occur on remnant Pleistocene landforms. This period is typically marked by an abundance of small, leaf-shaped and lanceolate projectile points, casual flake tools, ochre, and hammerstones. Some of the earliest evidence of human occupation in the Central Valley consists of concave base projectile points, basally thinned projectile points, and fluted projectile points which are well dated elsewhere in North America to an interval between 11,550 and 9,550 BCE. Assemblages range from a single projectile point to hundreds of projectile points and human remains (Jones and Klar 2007; Rosenthal. et al. 2007).

3.2.2 Lower Archaic Period (8,550–cal 5,550 BCE)

The Lower Archaic Period in the Central Valley is primarily defined by isolated finds. Stemmed points, chipped stone crescents, distinctive flaked stone artifacts, and early concave base points have been identified along Tulare Lake's ancient shore. Representation of milling tools, subsidiary processing tools, and other direct evidence of plant food is generally lacking in the Central Valley. Sites in adjacent regions have abundant milling equipment and other indications of reliance on plant food (e.g., handstones, millingslabs, various cobble cores, acorn and pine nut remains). The

woodlands in these regions were expanding at the time, thus similar behaviors and exploitations likely expanded into the Central Valley. There are no marine shell beads or obsidian in the Central Valley dated to the Lower Archaic Period, but during this period, marine shell beads have been identified in the western and central Great Basin and obsidian from the eastern Sierra Nevada has been identified on both sides of the Central Valley (Jones and Klar 2007; Rosenthal et al. 2007).

3.2.3 Middle Archaic Period (5,550–550 cal BCE)

During the Middle Archaic Period, the climate became warmer and drier, with large lakes reducing in size and desiccating. The Sacramento-San Joaquin Delta developed as a result of the rising sea level pushing inland into the Central Valley. Local populations in the foothills and valley floor began to adapt and differentiate from each other (Jones and Klar 2007; Rosenthal et al. 2007).

Foothill sites have abundant expedient cobble-based pounding, chopping, scraping, and mulling tools; flaked and ground stone tools used in food procurement and processing; minimal but widespread amounts of bone or shell artifacts, beads, or ornaments; small amounts of tabular pendants, incised slate and perforated stone plummets; notched, stemmed, and thick-leaf projectile points; narrow concave base darts with local and regional morphological variability; rock filled hearths and ovens; and, several graves capped by cairns of unmodified rock and milling equipment. Most tool materials are locally sourced with a small amount of obsidian procured from quarries in the North Coast Ranges, Cascades, and eastern Sierra Nevada. Acorns and pine nuts show up in botanical remains. Similar assemblages have been identified as far north as the Sacramento River Canyon and as far south as the Kings River in southern San Joaquin Valley (Jones and Klar 2007; Rosenthal et al. 2007).

Valley sites are rare in the Central Valley due to the geomorphic changes that occurred; four sites in the Central Valley date to the early Middle Archaic and about nine sites are represented in the later Middle Archaic in the Sacramento Valley. Central Valley sites reflect distinct adaptive patterns, organized subsistence practices, and increased residential stability along river corridors of the Sacramento and San Joaquin valleys. They are characterized by refined and specialized tool assemblages and features; a wide range of nonutilitarian artifacts (personal adornments); abundant trade objects (obsidian, shell beads and ornaments, and other perishable items); mortars and pestles found in marsh and riparian settings in northern San Joaquin and southern Sacramento valleys and North Diablo Range; fishing technologies (gorge hooks, composite bone hooks, spears); baked clay impressions of fine twisted cordage and twined basketry, basketry awls, simple pottery and other baked clay objects; finely made stone plummets and perforated “pencils”; bird bone tubes; shell beads; and, plant and animal remains indicative of year-round occupation). Acorn and pine nut remains are in most archaeobotanical assemblages. Faunal assemblages show a heavy reliance on marshes, riparian forests, and grasslands and include evidence of tule elk, mule deer, pronghorn, large and small fish, rabbits, hares, water birds, other terrestrial carnivores, raptors, and rodents. Obsidian was quarried from the eastern Sierra Nevada, North Coast Ranges, and southern Cascades (Jones and Klar 2007; Rosenthal et al. 2007).

The Windmiller Pattern is archetypical of the Central Valley during the Middle Archaic. Windmiller Pattern sites are widespread in the San Joaquin Valley and have been identified on old levee ridges adjacent to freshwater marshes and well-watered riparian settings near the confluence of the Mokelumne and Consumnes rivers in the Delta region. With the exception of one early component site, Windmiller Pattern sites date from 1,850 to 750 cal BCE. They are westerly

oriented, have ventrally and dorsally extended burials, and have sophisticated material culture found primarily as grave offerings. Windmiller Pattern sites reflect a seasonal adaptation with valley sites occupied in the winter and foothill sites occupied in the summer (Jones and Klar 2007; Rosenthal et al. 2007).

3.2.4 Upper Archaic Period (550 cal BCE–cal AD 1,100)

During the Upper Archaic Period, the Central Valley environment stabilized and evolved to be cooler and wetter with greater freshwater flows into the Delta watershed. Cultural developments are represented through the improvement and proliferation of many specialized technologies and manufactured goods (e.g., bone implements, polished stone plummets, saucer and saddle-shaped Olivella beads, Haliotis ornaments, obsidian bifacial rough-outs, and ceremonial blades). Economies varied regionally and focused on seasonally structured resources that could be harvested and processed in bulk like acorns, salmon, shellfish, rabbits, and deer. The Upper Archaic Period is characterized by mortars and pestles and handstones and millingslabs on the margins of the valleys; large mounded villages related to the Berkeley Pattern developed in the Delta region of the lower Sacramento Valley. Berkeley Pattern sites contain extensive accumulations of habitation debris and features (fire-cracked rock heaps, shallow hearths, rock-lined ovens, house floors, and flexed burials). Windmiller Pattern descendants continued to occupy the San Joaquin Valley, but groups from the valley and coast may have periodically colonized the western margins of the San Joaquin Valley. Sites in the San Joaquin Valley may have included year-round villages with house floors and extensive accumulations of aquatic- and terrestrial-based dietary debris; people in this area continued to use obsidian from the eastern Sierra Nevada. Sites in the far northern Sacramento Valley appear to be related to the Whiskeytown Pattern which is technologically conservative with mobile adaptation in the adjoining foothills, a lack of developed middens and residential features, and rare/absent fishbone and other riverine resources. Sites in the northeast Sacramento Valley included more substantial village settlements with domestic and processing features, human graves, bone implements, shell beads and ornaments, and faunal assemblages that represent occupation through winter. Sites in the southern Sacramento Valley had obsidian primarily procured from quarries in the North Coast Ranges. Sites in the northern and eastern Sacramento Valley had obsidian primarily obtained from the southern Cascade ranges (Jones and Klar 2007; Rosenthal et al. 2007).

3.2.5 Emergent Period (cal AD 1,100–historic)

During the Emergent Period, the climate was relatively stable with a few localized flood and drought events. Assemblages during this time are substantial, comprehensive, and diverse. Patterns that occur during this Period are the Augustine Pattern in the lower Sacramento Valley/Delta region, the Sweetwater and Shasta complexes in the northern Sacramento Valley, and the Pacheco Complex along the western edge of the Central Valley. The Emergent Period is characterized by the replacement of the dart and atlatl by the bow and arrow between cal AD 1,000 and 13,000; more complex social forms indicated by increased variation in burial type and furnishings; grave offerings (e.g., shell beads, ornaments, pestles and mortars); twined and coiled basketry; house floors and structural remains; localization of shell bead industries including clam shell disk beads; Stockton serrated, desert side notched, and Gunther-barbed points; and, increased importance in fishing and plant harvesting. Most sites from this period contain large quantities of fish bone and a diverse assortment of mammal and bird remains. Raw obsidian cobbles and flake blanks were primarily procured from the Napa Valley. Sites in the Sacramento

Valley included large populous towns with fish weirs along the river; mound villages and smaller hamlets established in the Delta region and along major tributaries; elaborate and diverse fishing equipment (e.g., harpoons, bone fish hooks, netting, and gorge hooks); human and animal effigies of baked clay; and, acorns, pine nuts, manzanita, and small seed remains in middens. Sites in the San Joaquin Valley included villages and smaller residential communities along streams of the foothills and along the river channels and sloughs of the valley bottom. The Emergent Occupation Period is also divided into the Lower and Upper Emergent phases. The Lower Emergent is marked by banjo type Haliotis ornaments in the southern Sacramento Valley/Delta region; elaborately incised bird bone whistles and tubes; flanged soapstone pipes; rectangular Olivella sequin beads; and, crematory burial practices reserved for high-status individuals. The Upper Emergent is marked by small corner-notched and desert serries arrow points; Olivella lipped and clam disk beads; bead drills; magnesite cylinders; hopper mortars; village sites with house pits; and, crematory burial practices that were generally wide-spread (Jones and Klar 2007; Rosenthal et al. 2007).

3.3 Ethnographic Context

The APE is situated within the ethnographic group territory of the Nisenan and is located approximately one mile east of the ethnographic group territory of the Patwin.

3.3.1 Nisenan

Ethnographically, the APE was part of the territory of the Nisenan (Kroeber 1925; Wilson and Towne 1978). Nisenan is part of the California Penutian linguistic family, which is further divided into four subfamilies: Wintuan, Maiduan, Yokutsan, and Utian. Nisenan belongs to the Maiduan subfamily along with Maidu and Konkow (Shipley 1978). The territory of the Nisenan, which included the drainage of the American River, extended from the crest of the Sierra Nevada in the east to the Sacramento River in the west, as far south as the Cosumnes River, and north to the divide of the North Fork of the Yuba River and Middle Fork of the Feather River (Wilson and Towne 1978).

Nisenan is divided into the Hill and Valley socio-political groups, which were further divided into "tribelets" that exerted political control over particular geographical areas. Valley Nisenan usually located their settlements on low, natural rises, knolls along streams and rivers, or on gentle slopes with southern exposures. Nisenan lived in semi-permanent settlements, consisting of one village, or a number of smaller villages clustered around one large village. Family groups often lived away from the main village and had seasonal camps for resource procurement (Wilson and Towne 1978:388-389). Nisenan lived in houses that were conical-shaped with coverings of bark, skins, and brush. Brush shelters were used in the summer and during gathering excursions. Most villages had bedrock mortar resources and acorn granaries. Olo, Yokol, Wollok, and Leuchi are the closest villages, all east of the APE (Wilson and Towne 1978:387-389).

Nisenan relied heavily on acorns, local game, and fish for subsistence. Acorns were gathered communally or individually. Deer, bear, salmon, birds, and rabbits were important in the Nisenan diet, along with insects, such as grasshoppers, crickets, and locusts. Freshwater mussels were also eaten, along with a variety of berries, wild plums, and grapes; manzanita cider was a preferred beverage (Kroeber 1925:409-411; Wilson and Towne 1978:388).

Stone tools used by the Nisenan included knives, projectile points, arrow straighteners, scrapers, pestles, mortars, and pipes (Wilson and Towne 1978:391). Wooden digging sticks were used for procuring roots and other food resources, and wooden mortars were used for food preparation (Kroeber 1925:413-414). Tule was used for mats, netting, fish nets, and canoes. Willow and redbud were preferred materials for weaving baskets. Baskets were used for food storage, cooking, cradles, seed beaters, and cages (Wilson and Towne 1978:391).

Nisenan first came into contact with Europeans upon the arrival of the Spanish in the late 1700s. Contact was limited to the southern edge of this territory and the effect was minimal (Wilson and Towne 1978:396). It was not until 1833, when a malaria epidemic swept through the Sacramento Valley, that the Nisenan began to feel the effects of encroaching Europeans. The epidemic was estimated to have killed 75 percent of the Valley Nisenan population, eliminating entire villages (Wilson and Towne 1978:396). Nisenan suffered further during the years following the Gold Rush when non-native peoples competed for land and resources, killing and persecuting the Nisenan, and driving survivors into the hills (Wilson and Towne 1978:396).

3.3.2 Patwin

The Patwin ethnographic tribal group lies east of the APE. The Patwin were to the east in the Suisun, Berryessa, and Green valleys, extending into the Sacramento Valley around present-day Vacaville. The name Patwin is derived from the Wintuan word for 'people' and was ascribed first to the broader Wintuan speakers until subsequent ethnographic data further distinguished the Patwin, or Southern Wintuan, from Central (Nomlaki) and Northern (Wintu) Wintuan speakers (Johnson 1978). Wintuan languages belong to the broader Penutian Language family which includes the Miwok to the west and south, Maidu to the east, Costanoan (Ohlone) to the south, and Yokuts to the southeast, among others (Powers 1976 McKern 1922; Kroeber 1925; Kroeber 1932; Johnson 1978; Milliken 1978).

The arrival of Spanish missionaries and subsequent settlement of Patwin ancestral territories resulted in a steep decline in native population. The proliferation of Mexican and Euro-American settlement, first felt in Sacramento and Suisun valleys, reached the hills surrounding the APE by the 1850s despite many Patwin who survived or evaded the mission system having fruitful relationships with newcomers, including Chief Solano who was lieutenant and friend to General Mariano Vallejo (Johnson 1978). Kroeber (1925) and Heizer (1953) estimated the Patwin population to be at less than 200 in the early twentieth century. Estimates of Patwin populations at the time of European contact varies widely. Kroeber (1925) placed an overall estimate on the greater Wintuan language group at around 12,000 at the time of contact, with subsequent estimates relating directly to the Patwin placed around 6,000 (Cook 1976). Based on the distribution of recorded ethnographic and archaeological village sites in the valleys to the east, it is likely that populations were less concentrated in the rugged hills. Yo-doi is the nearest Patwin village, located northwest of the APE (Johnson 1978; Kroeber 1932)

Patwin villages consisted of semi-subterranean and earth-covered homes, with a dance house and separate sweat house of the same construction at the edge of the village, and a menstrual hut placed furthest away (Johnson 1978). Shelters consisted of grass thatch over a framework of bent poles. These structures typically provided shelter for between one to six households, but houses documented in the Geyserville area averaged about nine people each and ranged from four to 21 persons. A chief would be selected to direct many community decisions within a single village,

though the overall political structure was largely democratic. McKern (1922) noted that social distinctions were generally patrilineal, with the household centered around the man and his paternal family and married sisters (Driver 1936).

Patwin settlement patterns were typical of their neighbors throughout the San Francisco Bay Area (Driver 1936; Sawyer 1978; Johnson 1978). Communities were centered in larger permanent villages, typically housing 100 to 200 people, with large towns populated by as many as 400 people. Villages were not laid out in particular schemes. However, seasonal (typically summer) camps were usually used throughout the territory for hunting and foraging expeditions (Driver 1936).

Patwin subsistence was based on food gathering and harvesting activities with the greatest emphasis placed on vegetable foods. Most plants and animals had multiple uses including subsistence, religious, and material necessities. Acorns from various oak species were the primary source of nutmeats and were heavily relied on as a dietary staple. Deer was the primary game animal, though various animals were hunted and trapped. Hunting was typically conducted by the men, while woman gathered and prepared the vegetable foods. There was, however, little occupational specialization, members of each family ate meals together and both sexes commonly shared in the gathering of acorns, water, and firewood (Heizer 1953).

The Patwin manufactured an array of primary and secondary implements for hunting and processing resources. Tools were constructed for the most part of stone, wood, and shell. A type of universal currency existed in the form of clamshell disk beads and magnesite cylinders (each with different values) that were worn decoratively and ceremoniously. Glass Mountain in northern Napa Valley was the primary source of obsidian for the manufacture of projectile points and cutting tools, though there has been obsidian sourced from as far as the eastern Sierra Nevada. Patwin were also known for their sophisticated basketry, which was both artistic and utilitarian (Kroeber 1925; Johnson 1978). Twining and coiling techniques were used for creating transportation, milling, and storage baskets and numerous other apparatuses.

3.4 Historic Context

Northern California saw significant changes to the region starting in the 1700s with European conquest occurring in the 1800s and resulting in the majority of native populations being displaced or killed by the 1850s. The California Gold Rush quickly followed with high immigration and landscape development. Logging and ranching continued this trend of expansion through the 1900s. The following historical framework is relevant to the Project area: The Contact Period (1500-1769), Mission Period (1769-1822), Rancho Period (1822-1850), and American Period (1850 to present).

3.4.1 Contact Period (1500–1769)

In 1542, Juan Sebastian Cabrillo was the first of the exploring Europeans to sail along the California coast. During the next 125 years, the Native Americans of California had sporadic contact with European explorers. The Portolá expedition left San Diego on July 14, 1769, becoming the first Europeans to explore by land what is now California (Browning 1992).

3.4.2 Mission Period (1769–1822)

The arrival of the Spanish and establishment of the missions marked the start of the rapid decline of Native American tribal life across California. Many factors impacted native culture, including the significant decimation of the population from introduced European diseases and the replacement of the traditional social, subsistence, and settlement patterns by newly introduced mission systems. The introduction of European plants and animals also resulted in the alteration of the landscape. The mission system was partly initiated as a way for Spain to manage indigenous populations of Alta California and to convert the native people of California into Catholic citizens of Spain (known as neophytes). In the charter of the Alta California Missions, a stipulation stated that 10 years after the establishment of a mission, the land and holdings would be transferred to the Native Americans for their benefit; this never came to pass (Lightfoot 2005). The northernmost missions in California were established as follows: Mission Dolores (San Francisco de Asís) in San Francisco in 1776, Mission San Rafael Arcángel in San Rafael in 1817, and Mission San Francisco Solano in Sonoma in 1823. A mission planned in Santa Rosa was abandoned in 1827. All three of the existing missions are located 50 miles or more from the APE. In 1808, while looking for locations for mission sites, Gabriel Moraga was the first recorded European to see the Sutter Buttes. Although there was no direct association between the missions and the Maidu tribes, native peoples fleeing the missions and soldiers did spread disease, which likely eventually affected native populations throughout California (Lightfoot 2005; Milliken 1995; PBS&J 2010; Silliman 2000).

3.4.3 Rancho Period (1822-1850)

In 1821, the same year Mexico declared independence from Spain, Governor Sola sent an exploration party under the command of Captain Luis Arguello to parts of northern California. The expedition was known as “Arguello’s Expedition to the Columbia.” Arguello traveled north across the Carquinez Straight, up the Central Valley along the east bank of the Sacramento River, into the Sierra Nevada, then west and returning via a southern route (Lewis Publishing Company 1891).

Although California was Spanish territory, the Spanish did not have a significant presence in northern California. The Sacramento River Valley was briefly occupied by fur trappers, from as early as 1820 (Lewis Publishing Company 1891). These early explorations made inroads into the region that were later followed by settlers and gold seekers, resulting in the introduction of foreign diseases to the native populations. A devastating epidemic that occurred between 1831 and 1833 reduced the native population by approximately 75 percent. When the Mexican and American people immigrated into the area, native populations were already significantly weakened (Cook 1960).

California became a Mexican territory in 1822 and secularization of the mission occurred in 1834. Following this, Mexican government representatives distributed large land grants to selected individuals. The closest land grant to the APE is Rancho Rio de Jesus Maria, about 1 mile south of the APE in Yolo County. The Rio de Jesus Maria area, settled in the 1840s, was one of the earliest places to be settled in the Sacramento Valley. the Rancho was a six square league land grant named after Rio de Jesus Maria (currently known as Cache Creek), which ran through its middle. The Rancho was north of Woodland and extended along Cache Creek from Rancho Quesesoni on the east to the Sacramento River. Rancho Rio de Jesus Maria was given to Thomas M. Hardy by Governor Manuel Micheltoreno in 1843. Hardy was a native to England who arrived in Veracruz,

Mexico in 1825, served in the Battle of San Jacinto in Mexico in 1836, and was naturalized as a citizen of Mexico for his service. Hardy arrived in California as early as 1843, when he was granted Rancho Rio de Jesus Maria. He was also a known carpenter but made few improvements to his land and lived in a reed hut. Hardy was reportedly very antisocial. He drowned mysteriously while on a sailing trip on the Sacramento River in 1848 and his estate was sold by a public administrator to James M. Harbin, George Tyler, and John Parish (EIP Associates et al. 1995; Surhone et al. 2010).

The land use pattern of Alta California during this period expanded to include cattle ranches, which were used for the hide and tallow trade. Native Americans and immigrant artisans worked in adobe workshops and engaged in manufacturing items like leather, soap, saddles, harnesses, blankets, shoes, and wagons (Marschner 2002:154). California was officially annexed to the United States (US) in 1848 and officially became a state in 1850 (Cornford 1999:86-87; Kyle et al. 2002).

3.4.4 American Period (1850 to Present)

About 90,000 people arrived in California in 1849 and 300,000 people arrived by 1850 from the US, Mexico, South America, China, United Kingdom, Hawaii, and other locations. The influx of non-native people further disrupted the indigenous populations' cultures and significantly impacted the natural environment. The discovery of gold in the Sierra Nevada by Euro-Americans ignited a major population increase in the northern half of California, specifically throughout the Sacramento River Valley. Native Americans made up roughly half of the mining labor force but were driven out of the mines as early as 1849 and eventually relegated to the margins as competition for mining rights grew (Cornford 1999:86-87). Gold mining camps and settlements sprang up overnight, drastically altering freshwater systems and creating a shortage of ranch workers who rushed off to participate in the Gold Rush. Although there were few mines in Sutter County, the sudden loss of the ranch workforce and significant increase in Euro-American squatters on the ranch lands ultimately contributed to the disintegration of the Mexican land grant system as well as the division and sale of land grant properties (Robinson 1979). Throughout the American Period, the APE and Project vicinity underwent large modifications through land reclamation and water control.

Sutter County

Sutter County was one of California's original 27 counties, created in 1850. It was named after General Augustus John Sutter, a Swiss native, who had obtained a land grant from the Mexican government and called his first settlement New Helvetia (currently known as Sacramento). In 1850 and 1851, portions of Sutter County were used to create Placer County and Butte County, although parts were returned in 1852, 1854, and 1866. Territory from Sutter County was also used to form Colusa County. Early newspapers occasionally referred to the general Sutter County area as Marysville (California State Association of Counties 2014; Genealogy Trails 2021; Ryan 1971).

Reclamation District 1500 Establishment

The Sutter Basin is a low elevation triangular land mass between the Sacramento River to the west and the Feather River to the east. Its wide northern boundary is generally marked by the Sutter Buttes and its southern point is the confluence of the Sacramento and Feather rivers. Historically, these rivers overflowed their banks during annual freshets, resulting in the Sutter Basin being covered by water during the spring, then becoming swampy and tule covered in the summer. During this time, the main development in the Sutter Basin was by farmers who cultivated rice on

private lands bordering the riverbanks; these locations were ideal for rice cultivation due to being wet and low-lying areas. Flooding spread sediment across the Sacramento Valley with the greatest amount deposited closer to the rivers. The sediment build-up influenced the orientation of these rivers in relation to each other and their slopes, creating a natural basin ideal for irrigation and drainage if natural flooding could be eliminated.

The Sacramento Slough was a natural outlet of flood waters in the south end of the Sutter Basin. Prior to the development of RD 1500, the slough ran a natural course from approximately 3.5 miles northeast of Knights Landing to its confluence with the Sacrament River approximately 2,700 feet west of its confluence with the Feather River. RD 1500 would be the fruition of decades long discussions and efforts regarding reclaiming the basin's tule areas and controlling the frequent, devasting floods of the Sacramento and Feather rivers (American Society of Agricultural Engineers [ASAE] 1922; Bureau of Reclamation [BR] 1983; Guise 1965).

One of the first documented plans to reclaim land within the Sutter Basin was proposed in 1856 by US Surveyor General John A. Brewster. His plan proposed to construct internal navigation canals, aqueducts for drainage of tule marshes and prevention of overflows (Hagwood 1981). However, before any meaningful change had occurred, hydraulic mining methods for the extraction of gold exploded in the Sierra Nevada and Northern California. As a result, untold amounts of earth were deposited downstream, carried by high-velocity water flow in mountain tributaries before slowing in the Sacramento River and Feather River valleys. This pattern, along with farming in the basin, re-channelized and raised riverbeds, contributing to consistent, destructive flooding and navigation issues as far away as San Francisco. In the absence of a basin-wide plan, property owners could reclaim their land within the basin as they saw fit. This eventually resulted in an "every man for himself" condition in which landowners only protected lands against inundation flowing from immediate neighbors. The levees of the basin gradually elevated until there was no capacity to bypass flood waters; if all the individual levees were to crest at the same time, 600,000 second feet (the common measurement for flow of irrigation water moving by gravity from streams and reservoirs) of water would detrimentally discharge to the tidewater in the bay, further contributing to the hazardous flooding problems (ASAE 1922; Guise 1965; BR 1983).

State Engineer William Hammond Hall first suggested the actual concept of the bypass as a means to control flooding in the Sutter Basin in 1880. In 1894, Engineer Carl E. Grunsky of the State Engineer's staff recommended a similar plan. However, no action came of either Hall or Grunsky's plans. Nonetheless, the California Debris Commission (the Commission), established by the federal government the year before in 1893, addressed the detrimental conditions on the Sacramento and Feather rivers. Reclamation districts of the Central Valley were established by the Commission specifically to address the flood exacerbation and navigation challenges caused by the damaging practice of hydraulic mining. The Commission wanted an economic plan with a definite schedule to control the Sacramento River and improve navigation (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983).

The Commission established a plan to dredge the Yuba River and deposit the dredge materials on the riverbanks as barriers to the flood waters, which would effectively become levees. The plan included enlargement of existing channels, overflow of surplus water at specific channel points, bypass channels, and means to get water into Suisun Bay quickly. The Commission's consultants

created the Jackson Plan which identified 10 means to accomplish the goal, including "reconstructing the Tisdale Weir…and connecting it by means of the Sutter-Butte Bypass, the weir and bypass to have a capacity of about 35,000 cubic [ft] per second or sufficient to carry the excess water that reaches that point." The Commission's entire plan was estimated to cost $33 million. While Congress funded only a small part of the plan, it did accept the whole plan, thus California did as well. Joseph J. Hagwood noted in his history of the Commission that "from that point on, the report became the very foundation of all work on the Sacramento River" (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983).

One of the California companies that based their work on the report was the Sutter Basin Company (SBC), established by J. Ogden Armour. Armour was a nationally known Chicago meatpacking magnate. His impact among US industry was significant, having grown his father's business from $182 million to $1 billion and he was believed to be the second wealthiest man in American after John D. Rockefeller. A brief article regarding his death notes that he went on to develop similar stock yard and meatpacking subsidiaries in South America. As with many magnates of the time, Ogden had a reputation of dubious business practices, some of which were documented by author Upton Sinclair, who worked in Armour plants while researching for his seminal work, The Jungle. Sinclair also published articles regarding the conditions observed. In 1903, the Sacramento Bee noted that Armour been subpoenaed to testify in a case regarding shorting, or rebates, surrounding the Fruit Growers Express Company. In 1904, Armour was deeded a large 6,000-acre parcel of land west of Sacramento to secure his cash payment to the previous deed holder, however, the Natoma Water Company had bonded the land. The Sacramento Star also noted that Armour was "heavily interested in gold dredging" in the area. He reconveyed the property five years later, presumably after the cash advance was repaid (Sacramento Star 1904, 1909).

Armour led a group that founded the SBC in 1911; they had the intent of draining and developing 45,000 acres of land in the Sutter Basin. As Armour turned his sights on to the Sutter Basin, he and other meatpackers were subject to overturned rulings under anti-trust, food safety, and labor relations legislation in the Midwest that had been in the works since 1903. This likely resulted in significant revenue drops for the companies. When Armour entered the California market, he was seeking to expand his influence on commodities. From 1917 to 1921, Armour made his company publicly traded through $60 million in bonds (SBC was also bonded during this time), his company lost $125 million in two years, and was $144 million in debt. He lost most of his personal fortune and at one point he lost $1 million a day for a month straight. He was ousted from the company in 1923. The financial ruin trailed him in death as well. His widow elected not to pursue financial recovery from SBC bonds, rather absorbed the debt owed to her from lessors, who then assumed ownership of the land upon the bond debt relief (Britton 2018; Intelligencer 1911; Lake Forest College 2020; Lead Daily Call 1927; Sacramento Bee 1903).

Later in 1915, the Commission vested authority in the California Reclamation Board as part of its plan to control flood waters of Sacramento and San Joaquin valleys. The US deeded all swamp and overflow land to the State of California under the condition that it reclaim the land with the goal of controlling the flood waters. The California Reclamation Board created the Sacramento and San Joaquin District as a means to complete levee assessments for the project, which encompassed RD 1500. Armour and a group of businessmen in Sacramento lobbied the state and federal governments to create RD 1500 as a means for paying for the development. In 1915, RD

1500 was officially created under California Law with a special act of the State Legislate. The SBC and subsidiaries were incorporated, and the project started with the majority of the costs being funded by the SBC. RD 1500 was bounded on the west by the Sacramento River, on the north by Tisdale Bypass, and on the east by the west levee of the Sutter Bypass (refer to Appendix A Figure 5 for a 1916 map depicting RD 1500) (California State Library 1916). RD 1500 was 19 miles long and 18 miles wide at its max. It would bring 66,000 acres into cultivation, 45,000 of which were owned by SBC. The project promoters acquired the land by either purchasing it or obtaining options. The land owned the system with each acre representing one share of stock in Sutter Mutual Water Company and most of the high lands along the Sacramento River being in private ownership. SBC was moderately successful – Armour and company were able to establish reclamation and a massive agricultural enterprise; however, failed bonding attempts and other factors disallowed for the profit initially assumed. In fact, it is documented that Armour lost upwards of $17 million. SBC paid $600,000 for Sutter Basin land that would eventually fall within RD 1500 (ASAE 1922; Marysville Evening Democrat 1915; McKinney 2016; BR 1983).

RD 1500 operations fell under two classes: 1) concerns with operation and maintenance of drains and pumping plants for the de-watering of RD 1500; and 2) concerns with operation and maintenance of the levees. Levee maintenance and operation projects were performed under the supervision of Public Works in accordance with rules and regulations prescribed by the Secretary of War as provided by the Federal and State laws. Before work began, a full topographic survey and plan table survey with a contour interval of 6 inches were completed. The surveys established accurate benchmarks over the entirety of RD 1500 and the resulting maps made it possible to plan out an irrigation system. Two of the major RD 1500 projects were the construction of the Tisdale Bypass and the Sutter Bypass. The Tisdale Bypass would eventually become the northernmost property boundary for the SBC, while Sutter Bypass was a more complex project (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983; Sutter County Farmer 1912).

Reclamation District 1500 Litigations, Injunctions, and Land Assessments

From 1913 to 1915, the levee, drainage canals, pumping plant, and other reclamation components were progressing in their construction as ongoing court injunction and litigations held up other components of work. The Sutter County Board of Supervisors brought a suit against RD 1500 with the intent of preventing construction of the East Levee. Although an injunction was obtained from the lower court, RD 1500 appealed to the State Supreme Court and the case was set aside with a writ of prohibition. Not long after, a second suit was brought against RD 1500 by Samuel Gray and a number of Sutter County landowners with the same goals as the first suit. No injunction was issued, and the lower court ruled in favor of RD 1500, but then the appeal was taken to the State Supreme Court where the decision of the lower court was unanimously reversed. As a result, the Tarke Bill was introduced to State Legislature, with the intent of preventing levee construction, but did not pass (ASAE 1922; BR 1983).

As controversy surrounded RD 1500, and therefore regarding SBC's influence on it, Armour remained resolute in his vision. In 1913, SBC issued $2.75 million in bonds with six percent interest for 40,000 acres within Sutter Basin through Louis Sloss & Company in Chicago and the Continental and Commercial Trust and Savings Bank, secured with $6 million of SBC. The land was valued at $11 million (Marysville Evening Democrat 2013). However, with Armour as the majority owner of 75 percent of the land within the Basin that would be developed, it was clear that

Armour would benefit the most. The Sutter County Farmer reported Armour's visit to the area in April 1914.

> "With regard to the reclamation work in which I am interested, I can only say that extensive colonization plans have been laid, and that we are looking for the co-operation [sic] of the entire valley. We are not engaged in a philanthropic enterprise. Our plans are strictly commercial but the benefits resulting therefrom will reach every citizen and every resident in the vicinity…we are doing all we can." (Sutter County Farmer 1914a).

The reclamation project was of such scale and enamor that families would come "sightseeing among the dredging settlement at Sutter Basin." (Sutter County Farmer 1914b). The size and scope of the work also proved so expansive that RD 1500 had to be issued stock warrants to continue paying for the large costs of construction. In January 1914, Board of Trustees petitioned the Sutter County Board of Supervisors to appoint commissioners to assess the RD 1500 lands so calls could be made to provide funds to pay the stock warrants. Three assessments of RD 1500 took place from 1919 through 1930 (ASAE 1922; BR 1983).

In August 1919, the assessment commissioners completed the first assessment, valuing the land at $5,000,000; it was approved by the Sutter County Board of Supervisors and became a lien on RD 1500 lands. Some landowners paid cash in the accumulated amount of $447,013.22, but after 30 days, the remaining $4,952,986.78 became subject to an interest rate of seven percent per year. In January 1920, the Board of Trustees issued six percent bonds to mature in annual installments over the course of 11 years with the first maturity occurring in January 1930. The entirety of the bonds sold at face value to SBC. Although the bonds had been paid without default through 1923, the Board of Trustees anticipated that adverse trends in agriculture would make it difficult for landowners to pay the first maturity in addition to interest. The Board of Trustees pushed to amend a reclamation law so RD 1500 could refund bonds, provide for long term amelioration of bonds, and left the fixing of maturities in the discretion the Board of Trustees, provided that they be paid within 50 years of issuance. In 1929, the Bondholders Protective Committee was formed at the request of the Board of Trustees with the purpose of soliciting deposit of outstanding original bonds to be exchanged for refund bonds and was funded by RD 1500. The refunding program was a success, the bonds were refunded in the amount of $4,778,986.77, and maturity periods were changed to 22 years. In February 1930, a second assessment of RD 1500 lands was approved with the intention of providing funds to pay the stock warrants issued after the first assessment and RD 1500 construction costs. The assessment had a net worth of $736,946 after paying the costs of debt assessments for reclamation work and stock warrant costs. In July 1930, the third assessment had the intention of completing maintenance valuation for each parcel of land in RD 1500 and was not a lien on the land. Though the Board of Trustees occasionally made calls on the third valuation as funds became necessary for operation, maintenance, and incidental expenses of RD 1500, at which point the calls became liens (ASAE 1922; BR 1983).

When landowners in RD 1500 failed to meet the calls on valuation, their lands were sold for delinquency to the County Treasurer, who was the RD 1500 Trustee and Trust of the RD 1500 bond fund. The landowners had a year following the sale to make a redemption. If they did not, the title of the land was passed to the County Treasurer. These delinquencies occurred from 1925 to 1928 and the County Treasurer acquired approximately 4,900 acres of land. Delinquencies

under the first assessment could be sold for the total delinquency amount plus a 20 percent penalty and seven percent annually compounded interest. Delinquencies under the second and third assessments cost the full delinquency amount plus a 10 percent penalty and seven percent annually compounded interest. Statutes prior to 1931 did not allow crop production on delinquent lands. These factors made it nearly impossible for anyone to buy back their property and resulted in much of the land going to waste (ASAE 1922; BR 1983).

In 1931, the State Legislature passed an amendment to the reclamation law making it so that after the lapse of one year after the redemption period of any land sold to the County Treasurer as trustee, the land could be sold at fair market value as ascertained by the highest cash bidder, subject to any district assessments. The amendment also gave the Board of Trustees possession of the delinquent lands after the one-year redemption period. The Board of Trustees could spend funds to retire liens on lands superior to the title of the County Treasurer as trustee to manage, control, and lease to tenants for a reasonable rent. The money collected from this was applied to incidental expenses of hold and leasing lands; maintenance assessments against such lands; and other incidental expenses, legal charges against RD 1500, or bonds and interest coupon purchases of RD 1500 for retirement. The majority of leased lands had no water rights and were leased on a dry farming basis with tenants paying to furnish water for irrigated crops. Some tenants made irrigation arrangements with people who owned land on the Sacramento River while others pumped water from RD 1500 drains, resulting in many being excluded from renting land lest they could afford to irrigate it (ASAE 1922; BR 1983).

Reclamation District 1500 Irrigation and Drainage System

Reclamation plans included levee construction with levee and bank erosion prevention in order to protect against overflow from flood waters. Levee heights were determined from the maximum high-water plan based off the 1907 flood. The flood runoffs were as follows: 54,000 second-feet in the Sacramento River below Tisdale; 189,000 second-feet in the flooded area above the Feather River; and 385,000 second-feet in the flooded area below the Feather River. Fifty percent was added to the flood's high-water marks to establish the high-water plan, with an additional 5-foot increase to establish the levee heights. The levees had 20-foot-wide crowns with slopes that had a ratio of five to one on the water side and two to one on the land side. The West Levee is 20 to 25 feet tall above ground elevation and the river levees average about 20 feet tall. The ground was cleared of all perishable materials and plowed where the levee base locations were planned. Most levee work was completed with the use of large floating clam shell dredgers with a bucket capacity of 5 cubic yards (CY). During construction, there could be as many as 15 dredgers working on the levees at a time. One dredge, the "Armour", was built at the Stockton Iron Works. Its hull was 160 feet long by 61 feet tall with a 205-foot-long boom. The boom weighed 24,000 pounds and was capable of moving 5 CY. The Armour operated 24 hours a day utilizing three crews. Dredging occurred from 1913 to 1915 before being held up for two years as a result of the aforementioned court injunction and litigations. Dredging resumed in 1917 and the final closure of the levees occurred in December 1918. The Sacramento River Levee is 54.6 miles long, the East Levee is 20.7 miles long, and the North Levee is 4.5 miles long. Timber sheet pilings, brush mattresses, and trees were planted to protect wave action and natural currents that may erode the levees and cause slides in exposed places. In 1928, erosion was also abated in one location by placing trees and using Bignell piles to anchor brush. Shortly after the completion of levee work, RD 1500 focused on drainage (ASAE 1922; BR 1983; Sutter County Farmer 1914b).

A drainage system was designed to provide ample drainage, dispose of seepage and rain waters, and work with an irrigation system. A pumping plant (later called the Karnak Drainage FacilityFacility) was planned near the south end of RD 1500 where a levee was built across Sacramento Slough, utilizing the natural drainage. The overall drainage system included several pumping plants (Tisdale, Portuguese, State Ranch Bend, and Karnak). Tisdale Pumping Plant has the capacity to serve 80 percent of the land and is the northernmost plant. Portuguese Pumping Plant is the southernmost plant and an independent unit built because it could not be reached by the East and West canals. RD 1500 Canal (also historically referred to as the Main Drainage Canal and Central Canal) began at Tisdale, and three primary canals branched from Tisdale Pumping Plant: West Canal on the west side of RD 1500, East Canal on the east side of RD 1500, and the RD 1500 Canal down the center of the eastern half of Sutter Basin. Construction of the entire irrigation system was complete in 1919, shortly after the levees were finished, and cost $1 million to build (ASAE 1922; BR 1983; Sacramento Bee 1915).

Sutter Bypass was originally planned as a trough that would encompass the natural course of the Sacramento Slough through the center of RD 1500 and SBC. However, the California Reclamation Board moved the location of the Sutter Bypass to its current location, further east and closer to the Feather River. Instead, Sacramento Slough was developed into RD 1500 Canal, traversing the entire length of RD 1500 north to south, ending where it met with the Karnak Drainage Facility. RD 1500 Canal declined 10 feet in elevation from the north end to the Karnak Draining Facility, had an average depth of 9 feet, and measured 125 feet wide at the south end. The first ½ mile of the RD 1500 Canal had a velocity of 2.5 feet per second before flattening out to 1 cfs. Sediment pumped into RD 1500 Canal tended to be deposited at this gradient change but could easily be removed. The canal had a 690-second-feet capacity and measured 36 feet wide at the bottom for the first 1 mile but broadened out to 60 feet in more level ground. The canal was dredged so it could be used in conjunction with PH1 during early stages of reclamation (ASAE 1922; Hagwood 1981; BR 1983; Sutter County Farmer 1912).

The drainage system also consisted of laterals and sublaterals, generally located on section and section subdivisional lines, resulting in approximately 50 miles of lateral drains and over 250 miles of sublaterals. They were placed to drain every one-quarter section of land and convey water to the RD 1500 Canal and PH1. A large portion of the lateral drains had to be excavated by Austin trenching machines due to the land being relatively level. The drains were designed to keep the water table at least 5 feet below the surface and were excavated by tracklaying dragline excavators. SBC also built several miles of subsidiary drains in certain locations where seepage conditions were the worst. SBC's subsidiary drains were not as deep as the RD 1500 drains but served for quick run-off of the winter rains and seepage and emptied into the RD 1500 drains, further extending the drainage system. SBC established two small fields to experiment with tile-drains; trenching of these was completed by a Funk power ditcher. These drains were placed at varying depths and distances (3 ½ to 5 ½ feet deep and 50 to 100 feet apart). Tiles ranged in size from 4 to 6 inches in diameter. Gravel replaced tile in some locations to compare how the two functioned. Drainage actions were observed from manholes. In 1922, a gravity outlet works was constructed through the East Levee at the lower end of the RD 1500 Canal. When the Sacramento River subsided to a lower elevation, it would automatically carry off drain water and ensure good drainage. Due to this, PH1 shut down in July until the river rose in late fall or winter during the irrigation season, decreasing the operating costs despite the irrigation season occurring from April 1 to October 31 (210 days) (ASAE 1922; BR 1983).

The irrigation system was designed to carry peak demand of water and deliver water on each 40-acre tract of land at an elevation at least 1 foot higher than the highest land in the tract. Canal capacities were based on a duty of 1 second-feet for 80 acres with a minimum head of 6 second-feet for any 40-acre tract. The top width of the canal banks varied from 3 to 6 feet, many of the canals had a slope of 3 inches to 1 mile, and the bottom width of the canals varied from 5 to 60 feet. Most canal velocities were low with less than 1 cfs in most cases, with the exception of the RD 1500, West, and East canals. The West and the East canals each had a 500 second-feet capacity (ASAE 1922; BR 1983).

During canal construction, dirt borrowed to make embankments was excavated from the canal section. Most of the canal system was built by Fresno scrapers, but a portion of the RD 1500 Canal was excavated by a dragline machine and another portion was constructed by a land dredge. Header ditches and field ditch roads were built with the use of road blades hauled by tractors. Smaller ditches were built with the use of martin ditchers, subsoil plows with V wings attached, and Hottell ditching machines. All lateral irrigation canals, seepage ditches, and drains were built using a Type 204 Pawling and Harnischfeger Dragline excavator. Ditches 10 inches wide and 18 inches deep were dug by a funk power ditcher to be used for subirrigation (ASAE 1922; BR 1983).

Apart from the three main pumping plants, there were about 750 individual structures and 2,500 smaller structures in the main system. Most of the main structures were built of reinforced concrete with the intent of them being permanent. The larger structures were equipped with screw stem gates and the majority of the other structures had wooden flash boards. Timber structures for individual field ditches were made of redwood, standardized, and made in quantities to reduce costs subirrigation. Bridges were necessary for road crossings and culverts for drain crossings; siphons and flumes were important too. Additionally, 100 miles of graded roads, 156 miles of graveled roads, and 4 miles of concrete paved roads were built in RD 1500. SBC used the Southern Pacific Railroad and the Sacramento River for transportation; warehouses were located along the levees and three large, corrugated iron warehouses were located along the railroad. Wells were scattered over the entire Sutter Basin for domestic supply and a complete telephone system traversed the entire basin. SBC also had seven large permanent camps used as headquarters for extensive agricultural operations (ASAE 1922; BR 1983).

In July 1949, landowners called on the Board of Trustees to offer delinquent lands in their existing conditions that were without irrigation Facility and for sale prior to 1949. After an especially rainy winter in 1950, the East Levee experienced considerable damage. As a result, the transporting of livestock and vehicles on the levees was limited in order to reduce damage to the levees. Special permits had to be issued by USACE's State Engineer in order to use the levees for transportation (ASAE 1922; BR 1983; Sutter County Farmer 1920).

Karnak Drainage Facility

The Karnak Drainage Facility includes three pump houses (PH1, PH2, and PH3), their associated components and equipment, and several houses. The facility was established with the erection of PH1 in 1914; it was reported to be one of the biggest in the world and cost an estimated to $220,000 to construct. PH1 was constructed under direction of George Randle, who was noted as the "Chief Engineer Armour people in the Sutter Basin" (Marysville Evening Democrat 1914). PH1 is constructed in the Neo-Classical style and is parallel to the RD 1500 Canal. It is designed so that the building and equipment's total weight would not float during high water levels. It disposes of

daily run-off water 5/8 inches deep from the RD 1500 net area and 2 ½ cfs per mile of levee seepage water. PH1 had six 50-inch Platt centrifugal pumps (each driven by an 800 horsepower [hp] General Electric [GE] meter), a capacity of 1,200 second feet, and used every accessible water source to drain all the water off 60,000 acres within the basin so the area could be cleared of tules to make space for commercial crops. In order to increase irrigation each year, PH1 pumped out surplus rainwater, seepage, irrigation water, and accumulative ground water. It was also designed to withstand future floods by placing windows high above a reasonably anticipated flood elevation. Images from the February 1915 flood show that the design stood, and the pumps could remain functional in times of high water. The words "RECLAMATION" "DISTRICT" "NUMBER 1500" are centered in each entablature, respectively. Parts of PH1 have been upgraded or replaced since the building's original construction. PH2 was built in 1929 to provide more efficient drainage service during low operating head conditions; it is smaller than PH1 and also constructed in the Neo-Classical style. After the construction of Shasta Dam, the operating water levels exceeded the head capability of the pumps, resulting in PH2 being inoperable. Portions of the electrical equipment were removed, and the electrical motors were left in nonoperating condition. PH3 was built in 1952 to improved drainage service to RD 1500; it increased the transformer requirements, resulting in Pacific Gas and Electric Company (PG&E) installing larger transformers at a ground-level substation located along the northern side of the structure. The pumps were designed to discharge 184 cfs (83,000 gallons per minute) at an approximate 17-foot pumping head. Portions of PH3's equipment has been repaired or replaced since the buildings initial construction (ASAE 1922; BR 1983).

Sutter Basin Branch Line

Prior to establishment of the railroads, one of the primary methods of traversing across Sutter County was via river traffic, although the varying water levels created complications. Development of railways to navigate across California began in 1852 with the proposed Sacramento Valley Rail Road Co. which led from Sacramento, across the American River, to the foothills, and then to Marysville. The Central Pacific Railroad Company built the Cal-P branch railway track from Oakland to Sacramento in 1868 and the Marysville Branch from Woodland to Marysville in 1870, the latter of which came within miles of Karnak Drainage Facility (Rifkin 2015; Ryan 1977). The Marysville Branch extended 18 miles and included 11 sidings with a railroad depot at Robin, in the center of the railroad line. SBC owned three large corrugated iron warehouses along the Marysville Branch. The Sutter Basin Branch Line was constructed in 1920 by Southern Pacific Railroad and led from Karnak Drainage Facility to Josephine where it connected to the Marysville Branch. However, the Sutter Basin Branch Line was completely abandoned by 1952 (Joslyn 1928; ASAE 1922; BR 1983; Ryan 1977; Yuba County Archives 2012).

Agriculture

The soil in the Sutter Basin is alluvial deposit known as river bottom land with Columbine silt loam covering Sacramento clay loam in varying amounts. This soil is ideal for farming as it is well suited for most crops grown in the climate. Early agriculture in the area consisted primarily of dry farm grain crops and stock raising. The commercial production of wheat in Sutter County began in 1843 by General Sutter. The early developments of agriculture were often confined in relatively close proximity to the large rivers because steamers in the waterways were the sole method of shipping produce and receiving supplies. The outlying areas were devoted to cattle until the construction of the transcontinental railroad provided an alternative transportation method. Farmers made some diversions for water from the rivers in the late 1800s for irrigation and could access wells

scattered over the entire Sutter Basin that provided enough water for domestic supply, but more rapid irrigation development didn't occur until after 1910 (ASAE 1922; Bryan 1923; BR 1983; Gowans and Lindt 1965).

After PH1 was built in 1914, the structure started to drain most of the water in the region in order to prepare the area for growing commercial crops by removing tules. By 1919, farmers had already began switching over to banner crops. SBC also became directly involved in corporate farming after leasing out farmland for several years. The net receipt for the sale of vegetables in 1919 nearly paid for the construction of the entire irrigation system. SBC encouraged farming due to the profit and return of labor it produced. According to the 1920 records, the major crops produced in the Sutter Basin included wheat, barely, potatoes, onions, green peas, melons, rice, and other vegetables. Crops grown less extensively included sugar beets, oats, celery, asparagus, alfalfa, and tomatoes. Additionally, orchards, vineyards, and miscellaneous crops were planted by landowners who had purchased property from SBC (ASAE 1922; Bryan 1923; BR 1983; Gowans and Lindt 1965)

Farming units of 2,500 to 5,000 acres were set up with camps for each unit. Each camp had a tract foreman and general superintendent hired to supervise farming. By the spring of 1920, there were hundreds of acres of potatoes, onions, lettuce, cantaloupes, beans, asparagus, wheat, barley, rice, and gyp corn. However, that same year, the bottom dropped out of nearly all crops before harvest and the rain came early, resulting in the crops not being harvested. As a result, SBC started to further subdivide their lands and branch out into implementing sheep and turkey grazing. SBC was hired to plants orchards and crops for some of the buyers that lived further away (e.g., Chicago); the company planted orchards (plums, peaches, pears, and prunes) on 40-acre lots as well as vineyards. However, some of the clients believed SBC was charging too much and filed several failed lawsuits (ASAE 1922; Plank 2010).

By the mid-1920s, sugar beet became a promising crop until curly top virus destroyed massive numbers of the crop in 1925. As the Depression continued in 1929, other crops were attempted to be grown including cucumbers for pickles, peas, and cotton. Today, Sutter County is known for its rice, walnut, peach, tomato, and prune production. Additionally, the seedless grape was developed in Sutter County which helped revolutionize the raisin industry (Plank 2010; Sutter County n.d.).

4.0 Background Research and Sources Consulted

The methods and results of the records search, historical map review, and NAHC consultation are described in detail below.

4.1 Records Search Results

A records search of the APE and a 0.5-mile buffer was conducted by the NEIC on January 14, 2021 (I.C. File #D21-11). No previously cultural resources on file with the NEIC were identified within a half mile of the APE. Four previous cultural resources studies have been conducted within the 0.5-mile radius of the APE (Table 2).

A search of the Sutter County Museum historic properties records database was completed on January 20, 2021. The museum records search results found one cultural resource within the APE and none within the 0.5-mile radius (Table 1). One previous cultural resources study conducted by the Sutter County Historic Society intersects the APE (Table 2).

Table 1. Cultural Resources in the APE

Primary No.	Trinomial	Type	Description
None	None	Built environment	Karnak Pumping Station: Pump House 1

The Karnak Pumping Station Pump House 1 was recorded by Carol Bordeaux, a volunteer with Galvin Preservation Associates, Inc, in April 2006 as part of the Sutter County Historic Survey that took place from 2005 to 2007. A draft DPR523 form was created, however, the resource was never formally recorded and was not filed with the NEIC.

Table 2. Studies Conducted within the APE and 0.5 Mile of the APE

Report No.	Date	Author	Title	Relation to the APE
NEIC-001091	1990	Glover, Leslie C. and Paul D. Bouey	Sacramento River Flood Control System Evaluation, Mid-Valley Area Cultural Resources Survey, Colusa, Sacramento, Sutter, Yolo, and Yuba Counties, California.	Within 0.5 mile of the APE.
NEIC-001137	1974	Johnson, Jerald Jay and Patti Johnson	Cultural Resources Along the Sacramento River from Keswick Dam to Sacramento.	Within 0.5 mile of the APE.
NEIC-010792	2009	Piccola, Francis C.	Archaeological Survey of Approximately 97 Acres of Former Agricultural Land on the Sacramento River at River Mile (RM) 83 in Sutter County, California for the Furlan Mitigation Project (FMP).	Within 0.5 mile of the APE.
NEIC-014242	2018	Heffner, Sarah	Historic Property Survey Report for the Tisdale Bridge (18C-0057) Replacement Project, Sutter County, California.	Within 0.5 mile of the APE.
N/A	2006	Galvin Preservation Associates, Inc.	Sutter County Historic Survey	Intersects APE

4.2 Historical Map Review

Kleinfelder reviewed historical maps depicting features such as towns, roads, buildings, and creeks to provide additional information regarding the potential for the presence of historic-era cultural resources within the APE. Historic maps are available at several online repositories, in

particular the USGS repository, the David Rumsey Map Collection, and the U.S. Department of the Interior Bureau of Land Management General Land Office (GLO) Records. Refer to Appendix A, Figure 5 to see where the APE plotted on the historical maps. The following sources were consulted during the historical map review:

- Sutter County (California Division of Highways 1935)
- Historical Aerial of Karnak, California (Historic Aerials 1966, 1968)
- Knights Landing, Calif. 1:31,680 (USGS 1910)
- Knights Landing, Calif. 1:62,500 (USGS 1952 [ed. 1959])
- Knights Landing, Calif 1:24,000 (USGS 1952 [ed. 1964])
- Map of Reclamation District No. 1500, Situated in Sutter County, California (California State Library 1916)
- Township 11 North, Range 3 East, Mount Diablo Meridian (GLO Plat 1870)

4.2.1 Historical Map Review Results

The following summarizes the results of the historic map review of the APE.

An 1870 GLO Plat plots the APE in "Swamp and Overflowed Land" with no features shown in the APE (GLO 1870).

A 1910 map depicts the APE within the Sutter Basin. Sacramento Slough is shown in its natural alignment, bisecting the APE. A northwest-to-southeast-trending unnamed unimproved road runs parallel to and south of Sacramento Slough and adjacent and south of the APE, occasionally overlapping with Reclamation Road's current locations. A second unnamed unimproved road runs parallel to and north of Sacramento Slough, approximately 0.38 mile north of the APE (USGS 1910).

A 1916 map shows the full extent of RD 1500 with a "Pumping Plant" in Karnak Drainage Facility location on land owned by Sutter basin Co. The Sacramento Slough is now shown in its current, channelized alignment in the northern part of the APE. No roads are depicted on the map (California State Library 1916).

A 1935 map depicts the "Main Drainage Canal" in Sacramento Slough's current location. At Karnak, the Main Drainage Canal branches off into the "Bend Main Canal" which trends south, the "East Canal" which trends north, and the "Main Drainage Canal" which continues east. A northwest-to-southeast-trending branch of the Southern Pacific Railroad begins at Marchant and terminates just at Karnak. An unnamed road is in Bates Road's current location (California Division of Highways 1935).

A 1952 map plots the APE where the Sutter Bypass and Sutter Basin converge; Sacramento Slough is labeled east of the East Canal, between Karnak and the Feather River. The community of Karnak is shown in more detail, including a pumping station, five structures, and an unnamed light duty road in Bates Road's current location. A bridge is depicted crossing the East Canal east of Karnak with an unnamed unimproved road leading north from it. The West Levee is shown as "Levee" with an unnamed unimproved road on it; an unnamed intermittent stream runs parallel and west

of this road but diverts in a loop north of Karnak before feeding into the canal that bisects Karnak. Two holding ponds are located west of the APE on opposite sides of this canal; the one on the north side is approximately 356 feet west of the APE and the one on the south side is approximately 772 feet west of the APE. The unnamed road in Bates Road's current location terminates at the northwest end of the northernmost holding pond; one of the previously mentioned structures is located here, approximately 803 feet west of the APE. Karnak Road is depicted in its current location. Approximately 0.36 mile west of the APE, a flume crosses the canal that bisects Karnak. Ely Road is shown but not labeled and orchard land is located southwest of Karnak Road. The "Main Drainage Canal" and "Bend Main Canal" are not labeled; the branch off of the Southern Pacific Railroad is no longer shown (USGS 1952 [ed. 1959]).

Another 1952 map shows similar information with a few key differences. This map labels Ely Road; shows a spur road branching off Bates Road directly southeast of Karnak onto the levee; and plots seven structures north of the northernmost holding pond, as well as three structures directly east of the same pond (USGS 1952 [ed. 1964]).

A 1966 aerial shows, but doesn't label, the canal that bisects Karnak, the East Canal, the West Levee and its associated access route, the Sacramento Slough, Bates Road, Karnak Road, PH1, PH2, PH 3 and its associated flood gate on the levee, the bridge that crosses the East Canal, at least eight structures of varying size northwest of PH 1, and a possible ditch that starts in the north part of Karnak and trends northeast to southwest through the area before feeding into the canal that bisects Karnak (Historic Aerials 1966).

A 1968 aerial reveals that several structures in the northwest part of Karnak are no longer present, including at least two structures located directly north of the canal that bisects Karnak and a structure located directly northwest of PH1 (Historic Aerials 1968).

4.3 Native American Heritage Commission Consultation

On January 12, 2021, Kleinfelder requested from the California Native American Heritage Commission (NAHC) a search of their Sacred Land Files (SLF). The NAHC responded on February 2, 2021, with a list of Native American contacts affiliated with the region to contact for additional information, but that their SLF files resulted negative findings within the vicinity of the APE. Kleinfelder completed no further Native American outreach, as it is the responsibility of the lead federal to conduct Section 106 Native American consultation; and lead state agency to complete CEQA Assembly Bill 52 (AB 52) tribal consultation. The NAHC Native American contacts list is provided in Appendix D.

5.0 Field Methods and Results

On January 21 and 25, 2021, Kleinfelder/GANDA archaeologists, Jessica Neal, M.A., RPA, and Samantha Dunham, B.A., completed an intensive pedestrian survey of the APE. The survey was completed using 10- to 15-meter-spaced transects. Close inspection was given to all exposed ground soils and cut banks for the presence of archaeological materials. The APE was photographed using a high-resolution digital camera (see Appendix B, Survey Photographs) and field observations were captured in written notes. Locational data were collected with Environmental Systems Research Institute Arc Collector application on Android. The APE was accessible by foot and 100 percent of the APE was surveyed. Ground visibility was 75 percent. Soils were a medium silty clay with angular gravel inclusions. Vegetation consisted of grasses and wetlands with occasional oak trees; there were also cedar trees and nonnative landscaping (orange trees, roses, etc.) within the residential area. There is a thin veneer of non-diagnostic broken glass of various colors and metal debris across the entire Project area that seems to be a mix of historical and modern material.

5.1 Observed Resources

Kleinfelder/GANDA identified seven cultural resources including a historic bridge (RD1500-JN-01); a segment of the East Levee (RD1500-JN-02); the Karnak Drainage Facility (RD1500-JN-03); a segment of the RD 1500 Canal (RD1500-JN-04); a segment of the East Canal (RD1500-JN-05); and two houses associated with Karnak Drainage Facility (RD1500-JN-06 and RD1500-JN-07). The resources are summarized in Table 3 below.

Table 3. Cultural Resources Recorded in the APE

Resource Number	Name	Description
RD1500-JN-01	Unnamed Bridge	Concrete slab bridge spanning the East Canal
RD1500-JN-02	East Levee	East Levee of the Reclamation District No. 1500
RD1500-JN-03	Karnak Drainage Facility	Facility including three pump houses constructed between 1914-1952, 3 sheds, a weather station, and a ditch
RD1500-JN-04	Reclamation District 1500 Canal	Channelized portion of Sacramento Slough terminating at the East Levee
RD1500-JN-05	East Canal	Manmade canal paralleling the East Levee in the Sutter Bypass
RD1500-JN-06	House 1	Single-family home associated with the Karnak Drainage Facility, constructed in approximately 1930
RD1500-JN-07	House 2	Single-family home associated with the Karnak Drainage Facility, constructed in approximately 1966

RD1500-JN-01: Bridge

RD1500-JN-01 is an unnamed concrete slab bridge that spans the East Canal. The bridge is approximately 162 feet long and is comprised of a cast-in-place concrete deck carried by concrete beams. The beams extend approximately 6 to 8 inches past the deck, resulting in a minimal curb. The bridge is supported by fifteen 1-foot square concrete piles approximately 30 feet high (over the East Canal bed). The piles are arranged in five rows of three wide. Two steel piles, lateral support, and diagonal bracing have been added at both the second and third (from west) pile locations. The bridge was constructed circa 1935 with the steel supports added within the last 20 years. The bridge accesses agricultural fields within the Sutter Bypass and is located approximately 275 feet northwest of PH1.

RD1500-JN-02: The East Levee

RD1500-JN-02 is an approximately 360-foot segment of an earthen levee known as the East Levee of RD 1500 (commonly referred to as the East Levee). It was constructed as a part of the Sutter Bypass project, beginning in approximately 1913. The levee severed the Sacramento Slough in half; the western half of the slough was channelized into the RD 1500 Canal and PH1-3 were constructed between 1914 and 1952 to pump water through the levee into the eastern unchanneled portion of the slough. A bulkhead was constructed on both the eastern and western walls of the levee where the canal terminates. The bulkhead served as additional support against the water pressure from the canal. During the field survey, wooden piles and deteriorating concrete were visible in the RD 1500 Canal at the toe of the levee. No evidence of the bulkhead was on the eastern side of the levee. Debris has built up in the general area of the bulkhead and it is possibly buried.

The earthen levee is approximately 20 feet high. The crown is between 25 and 60 feet wide; a gravel road runs the length of the segment along the crown. The landside berm of is approximately 22 feet wide with a gravel road running along it.

The recorded segment is located at approximately Levee Mile 2, where the RD 1500 Canal and East Canal converge at the levee and flow into the Sacramento Slough. A gravel road along the crown of the levee spans the length of the segment and two earthen ramps with a gravel road are located at both the northern and southern ends of the segment, allowing vehicular access to farmland in the Sutter Bypass. The waterside of the levee is riprapped with imported rock and some modern and historic refuse. Stairs for pedestrian access to the levee and two utility poles are located on the landside slope. An unnamed concrete bridge connects the levee to agricultural land within the Sutter Bypass. Conduits, flood gates, and discharge outlets from the Karnak Drainage Facility are present on and within the levee. The levee is in good condition, with grassy sides to the east and riprap, pump gates and infrastructure, and outlets on the eastern, waterside of the levee.

The full extent of the levee is approximately 20.72 miles long. Two levee systems, Unit 1 and Unit 2, encircle RD 1500. Unit 1 is approximately 33.15 miles long running from the southernmost point of the RD to the northwestern edge of the Tisdale Bypass, generally following the course of the Sacramento River. Unit 2 is approximately 20.72 miles long and originates at the southernmost point of the RD. It generally follows along the edge of the Sutter Bypass until it terminates at the southeastern edge of the Tisdale Bypass. This segment of the East Levee is part of Levee Unit 2.

RD1500-JN-03: The Karnak Drainage Facility

RD1500-JN-03 consists of the Karnak Drainage Facility which includes three pump houses (PH1, PH2, and PH3), their associated components and equipment, three sheds, a weather station, and a drainage ditch. The facility was established with the erection of PH1 in 1914 with the most recent pump house (PH3) being constructed in 1952.

Pump House 1

PH1 was constructed in 1914 as part of the greater effort to reclaim the Sutter Basin, an area between Sutter Butte and the confluence of the Sacramento and Feather rivers. At the time of construction, it was reported to be one of the, if not the, largest pumping stations in the world,

capable of pumping 1,200 cfs from the RD 1500 Canal that bisected RD 1500 lengthwise south from the Tisdale Bypass.

PH1 is 107 feet, 5 inches long and 34 feet, 5 inches deep (1914 plans) with its length orientated on and parallel to the north bank of the RD 1500 canal. It is constructed of cast concrete in the Neo-Classical style. Water is pumped from the canal and discharged through levee in Sutter Bypass. The building is supported by six concrete trapezoidal footings extending from the beneath the canal bed, through the levee bank, and then incorporated on the facade as minimally projecting pilasters to the tops of windows (ASAE 1922; BR 1983).

A 5-foot-thick reinforced concrete floor is built on top of the piles. The walls are made of reinforced concrete, are 4.5 feet thick at floor level, taper to 2.5 feet thick at the 100-year event flood plain elevation (42 feet), and taper from there to 1.25 feet thick at the roof line. The lower portion of the building doesn't have openings; the windows and doors are above the 43-foot elevation (United States Engineering Department datum). Interestingly, the building features two elevated water tables. Six conduits rise out of the canal before entering the building at the first table, which at 6 feet, is only slightly taller than the conduit diameter. Elevated water tables are expected in Neo-Classical design, but the use of the second is a visual reminder of how the RD 1500 engineers planned for flood events that may overpower the pump capacity. The second water table is 12 feet high and roughly one half of the elevation height. Here, the pilasters change from trapezoidal to rectangular at the top of the second water table. PH1 is designed so that the building and equipment's total weight would not float during high water levels. All of the building's windows are placed above the water table, a design. The district engineers also minimized the possibility of the electric pumps shorting out due to inundation from flooding by placing the windows in the upper half of the elevation. Photos of the 1915 flood show the plan worked - flood waters crested only just below the windowsills. Each window set is framed by a slightly projecting Tuscan surround. The frieze band and cornice of the surround's entablature are extension of those wrapped around the entire building. The words "RECLAMATION" "DISTRICT" "NUMBER 1500" are centered in each entablature, respectively. The window sets are comprised of three 4x8 multi-paned bays with a 2x6 inset casement ventilator topped by a 4x4 multi-pane ventilator with an inset 2x2 casement ventilator. All are separated by concrete mullions and dentils. A metal gooseneck light is centered in the width of each pilaster next to the small bay. The building is surmounted by a flat roof (ASAE 1922; BR 1983).

The reinforced concrete platform built along the east wall of PH1 supports electrical bus equipment, is at the floodplain elevation, and was originally used to support the electrical transformers. PH1 consists of six 50-inch Platt Centrifugal pumps direct connected to 800 hp GE squirrel-cage induction motors, operating at 248 rotations per minute (rpm) through flexible leather link couplings. Each pump produced approximately 197 cfs (88,000 gallons per minute) at a 20-foot pumping head. Two electric-motor-driven vacuum pumps had suctions connected to the top portion of the casings of all the pumps and were used for priming. During pump priming, the gate valve in the discharge line is closed. After priming, the pump is started; once the pump reaches full speed, the electric motor operated gate valve is opened. The suction pipes are about 70 feet long, extend directly from the pumps out through the south wall of the building (a distance of about 30 feet), angle downward into the sump, and increase from 50 inches to 96 inches in diameter at the lower end. These 3/8-inch wall-thickness steel pipes are supported by a steel structure. Portions of the PH1's equipment have been repaired or replaced since it was

constructed. Changes since initial construction of PH1 include the transformers being moved from easterly bays from about 1939 to 1952. Two bays are added to the east end of the former transfer bay in 1950. The connection is visible in between the second and third bay on the south elevation. The installation of 6x3 glass brick windows in the top half of the south and north transformer bay elevations. After 1970, the easternmost lower window bay is partially replaced with a pedestrian door. One row of panes remains as a transom light. The door is accessed by an exterior set of stairs with a landing at the same elevation as the transformer bay roof. Modern operating equipment is installed on the roof and is accessed by the stairs. An exterior walkway is installed slightly above the conduit height along the south elevation. The original ball and pipe railing was replaced at the exterior staircase attached to the west elevation. Overhead cables now extend over the canal and enter the building through exterior mounted conduit or directly through the concrete at the upper southeast corner. Electric metering boxes are attached at the northeast corner of the north elevation and covered by a rudimentary wood or metal flat overhanging roof (ASAE 1922; BR 1983).

Pump House 2

PH2 was built in 1929, fifteen years after the construction of PH1, to provide more efficient drainage service to RD 1500 during low operating head conditions. However, PH2 has never functioned properly. PH2 is smaller than PH1, measuring 41 ft long by 18 ft wide, and is also constructed in the Neo-Classical style. While smaller in massing compared to the PH1, it shares the same style with less refined details. The building is largely intact with little changes since the end of construction. The equipment was manufactured by Westinghouse Electric & Manufacturing. This pumping station sits over the RD 1500 Canal and the intake conduits are vertically positioned under the building. The conduits then extend through the foundation wall and easterly through the levee to discharge into the East Canal and Sacramento Slough. A steel I-beam extends easterly from the roof and through a modern interpretation of a balustrade in a position typically seen in Federal or Neo-Classical architecture. The beam connects to the peak of two connected beams extending diagonally into the ground to form triangular space approximately 30 feet of the entrance. The structure supports a small communications unit (satellite or antenna) thought to have been installed in the last 15 years. After the construction of Shasta Dam, the operating water levels exceeded the had capability of the pumps, resulting in PH2 being inoperable. The conduits were plugged with concrete after the construction of the 1950-1952 Karnak PH3. Portions of the electrical equipment were removed, and the electrical motors were left in nonoperating condition. PH2 is no longer used by RD 1500 (ASAE 1922; BR 1983).

Pump House 3

PH3 was constructed in 1952, 23 years after the construction of PH2, as a means to also improve the drainage of RD 1500. This pump house is larger than PH2 and smaller than PH 1. Despite the difference in massing, PH3 is of the same style and exhibits similar levels of refinement in details as PH2. The building is largely intact with little changes since the end of construction. PH3 sits over the RD 1500 Canal and the intake conduits are vertically positioned under the building. The conduits then extend through the foundation wall and easterly through the East Levee to discharge into the Sacramento Slough. The fenestration arrangement is near identical to PH2; however, the window sets flanking the door each hold two casement ventilation panels that open outwardly. The front door was planned as solid oak with four rectangular panels, symmetrically placed in the width and height. The door has since been replaced with a steel door with three

panes of fixed glass stacked vertically in the top half. The most notable change at the pumping station is the installation of a large steel bunker spanning the width of the roof and running two thirds of the building's length from the north. The structure houses the battery backup for the pump and is accessed from the interior. Electrical conduit has been added to the southeast elevation leading to the bunker. Three chain pulls are attached to the east elevation, used to lift and access the below-grade pumps. Two modern lights are installed at the top corners of the window/entrance bay (ASAE 1922; BR 1983).

Associated Structures and Features

In addition to the three pump houses, the site contains three sheds, a weather station, and a ditch.

Shed 1 is a single pen front gable side shed. It is sheathed in corrugated metal and asphalt shingled. It was on-site after 1967.

Shed 2 is a square single pen building which houses a water pump and discharges into the ditch. It is surmounted by a hipped roof. The entrance faces west. A wing has been added at the north. The shed was on site after 1967; however, the addition was added after 1992.

Shed 3 is a rectangular single pen shed with a sliding door on the south elevation. It is sheathed in corrugated metal. It was on-site circa 1967.

The weather station is elevated on four wood piles set in a square concrete base. Instruments are housed in by four louvered panels, including one hinged access panel. It is surmounted by a gabled roof sheathed in asphalt. Historic aerial photos indicate it was likely on-site by 1966.

This ditch is a 640-foot-long segment located in the northwest section of the Karnak Drainage Facility, starting east of the northernmost residential structure, wrapping around the residential structure, then turning south and west of a second residential structure and a weather station. An access route crosses the ditch where its located west of both residential structures; the ditch goes under the route through an 8-inch diameter corrugated culvert. The ditch measures 3 feet wide by 1 foot deep in the southwest end within the survey area and 9 feet wide by 3 feet deep near the culvert. The ditch is fed by a white polyvinyl chloride pipe that appears to be overflow from a tank in Shed 2. Only the segment of the ditch that fell within the Project survey area was recorded; it was noted that the ditch continues southwest, through a black corrugated pipe under another access route, and lets out into the RD 1500 Canal.

RD1500-JN-04: Reclamation District 1500 Canal

RD1500-JN-04 consists of a 600-foot segment of the RD 1500 Canal (historically referred to as the Main Drainage Canal or Central Canal) at its terminus. The RD 1500 Canal generally follows the original pathway of Sacramento Slough, which followed the entire length of RD 1500 north to south and provided a natural outlet of flood waters at the southern end of the Sutter Basin where it met with Karnak Draining Facility. During the Sutter Basin reclamation project, the slough was developed into RD 1500 Canal. RD 1500 Canal is approximately 18 miles long. Between the canal's north end and the Karnak Drainage Facility, it reportedly declined 10 feet in elevation. It had a 690 second-ft capacity and measured 36 feet wide at the bottom for its first mile and then broadened out to 60 feet wide in more level ground. The average depth was 9 feet and average

width was 125 feet wide at the south end. The first 0.5 mile of the RD 1500 Canal had a velocity of 2.5 feet per second before flattening out to 1 foot per second. Sediment pumped into RD 1500 Canal tended to be deposited at this gradient change but could easily be removed. The canal was dredged so it could be used in conjunction with the Karnak Drainage Facility PH 1 during early stages of reclamation. It provides critical flood protection to prevent damage from floodwater to homes and other properties, the community of Robbins and surrounding rural residential properties, SR 113 and other local roadways, and of over 65,000 acres of rural farmland.

The segment of canal is approximately 125 feet wide and widens to 250 feet at the levee to accommodate the Karnak Drainage Facility pump houses. Portions of the canal segment are lined with sheet pile walls. The canal is in good condition and generally maintains its original form and function. Construction work in 2019 through 2020 installed sheet pile wall along the south bank of the canal and nine new 10-foot-wide automatic conveyor belt-style debris removal screens to replace the existing debris catchment system.

RD1500-JN-05: The East Canal

RD1500-JN-05 is the southernmost segment of the East Canal at its confluence with the RD 1500 Canal, where they merge into the Sacramento Slough, west of the Sacramento River and east of Karnak Drainage Facility. The recorded segment is approximately 600 feet long and runs generally north to south. The canal is located in the Sutter Bypass and is bordered to the west by the East Levee.

The East Canal was constructed in the early 20th century as a part of the Sutter Bypass reclamation project. It flows along the southwestern edge of the Sutter Bypass from Tisdale to Verona. The East Canal terminates and flows into Sacramento Slough, a natural waterway, and then into the Sacramento River. The East Canal is approximately 25 miles long. It begins at the Tisdale Pumping Plant and runs south-southeast and parallel to the Sutter Bypass for the northern half of its length, then parallel to the Feather River for the southern half of its length before merging with the RD 1500 Canal and flowing into the Sacramento Slough. The East Canal has a velocity of 500 second-ft capacity. During canal construction, dirt borrowed to make embankments was excavated from the canal section. The old Karnak Drainage Facility layout depicts bulkheads on the west side of the East Canal at its confluence with the RD 1500 Canal, on the east side of the East Levee.

This segment of the East Canal is approximately 100 feet wide in the north to approximately 200 feet wide at its confluence with the RD 1500 Canal. The west side of the East Canal at the confluence is riprapped with imported rock and some modern and historic refuse and the Karnak Drainage Facility pump house outlets. An unnamed concrete bridge that leads to agricultural land within the Sutter Bypass crosses the East Canal just north of its confluence with the RD 1500 Canal. No evidence of the bulkhead remains on the eastern side of the East Levee and within the East Canal. The segment of the East Canal is in good condition, generally retaining its original form and function. Its form and function have no significant changes since construction.

RD1500-JN-06: House 1

RD1500-JN-06 is a vernacular pumping station keeper residence associated with the Karnak Drainage Facility (RD1500-JN-03). This single-story residence is of the Minimal Traditional style (as defined by McAlester 2013). The house is constructed of brick and sits on an elevated foundation enclosing a vented crawl space. It is surmounted by a hipped roof. The front elevation features

three stepped bays. The side elevations also feature slightly projecting bays. All windows have been replaced. A small, hipped vent extends through the roof above the picture window of the front elevation. The house was likely constructed ca. 1930.

The residential structure serves as housing for employees operating the RD 1500 Karnak Drainage Facility, which consists of three pump houses carrying water from the RD 1500 Canal through a levee into Sacramento Slough. The pumping facility requires staff to be present 24 hours a day. Research for this effort did not reveal the circumstances in which it was constructed; however, it has always been owned by the District. The house is in good condition and appears to have been recently renovated with new windows and paint. The house is located on a slight hill north of the RD 1500 Canal and 150 feet north of PH1.

RD1500-JN-07: House 2

RD1500-JN-07 is a second vernacular pumping station keeper residence associated with the Karnak Drainage Facility (RD1500-JN-03). It was constructed ca. 1966. It is a single-story, vernacular side gable house. The house is three bays wide by two bays deep with centered entrances on each gable side elevation. The windows are modern and the house is sheathed in T1-11. It sits on a concrete slab and the roofing materials is asphalt shingle. The gable ends are vented.

The residential structure serves as housing for employees operating the RD 1500 Karnak Drainage Facility, which consist of three pump houses constructed between 1914-1952. The pumping facility requires staff to be present 24 hours a day, and therefore requires staff housing on-site. The house is in good condition and appears to have new windows. It is located approximately 170 feet northwest of PH1.

6.0 Evaluations and Recommendations

Although the Project design has not yet been finalized, it will likely result in unavoidable impacts to the Karnak Drainage Facility due to the Project's goal of modernizing and/or replacing the existing Facility in order to enhance flood protection. As such, the Karnak Drainage Facility was evaluated for inclusion in the NRHP/CRHR while the Project is still in the planning phase as a means of supporting the project with minimizing unavoidable effects to Historic Properties.

Six additional cultural resources occur within the current APE, but once the final design is complete these resources may be removed from the final design and APE. Once the final Project design has been selected it is recommended that a qualified Architectural Historian evaluate the remaining cultural resources that fall within the final APE to determine if these resources are eligible for inclusion on the NRHP/ CRHR. This stage will also require coordination with lead and/or state agencies to concur with recommendations and determine appropriate measures to minimize, resolve, or mitigate adverse effects to Historic Properties.

Also, RD 1500 is recommended eligible as historic reclamation district, but has not yet been formally recorded on the appropriate DPR 523-series forms. The four resources (the East Levee, RD 1500 Canal, East Canal, and the Karnak Drainage Facility) located within the current APE are presumed eligible contributors to this proposed district. It is recommended that future work would include formal recordation and evaluation of proposed RD 1500 District.

The following provide the evaluation recommendations for the Karnak Drainage Facility. The subsequent Section 6.2 provides an overview of associated resources and whether or not they are presumed contributors to the proposed RD 1500 District.

6.1 The Karnak Drainage Facility Evaluation

Before construction of the Karnak Drainage Facility, the Sutter Basin was flooded in the spring and swampy in the summer; most of the development in the area was by farmers who relied on the flooding for their crops. In 1915, RD 1500 was designed with the intent to drain and develop 45,000 acres of land in the Sutter Basin between Tisdale Bypass and the Karnak Drainage Facility. Various pumping stations were constructed as part of this project. RD 1500 was officially developed by the State of California; however, the district was intertwined with the SBC, which was mostly owned by Ogden Armour and William Gerber. RD 1500 was thought to have the largest capacity out of any other reclamation district in the world. Its construction required two clamshell dredgers at an estimated cost of $100,000 each and at least seven dredgers operated 24 hours a day. Ogden was able to influence a decision by state officials to move the proposed Sutter Bypass east from the middle of his lands (in the general location of the Sacramento Slough) to its current location, thereby allowing Ogden to increase potential profits from reassessment and bonding or leasing of the tracts within the 45,000 acres after reclamation. The SBC sold its last parcel in 1946. Overall, RD 1500 changed the Central Valley in immeasurable ways in regard to both agriculture and flood protection, with the Karnak Drainage Facility being a key component to the operation of the district. It is acknowledged that while some of the absolute language published describing the project could be hyperbole, it reflects the extraordinary event, decades in the making, that was experienced by many (ASAE 1922; BR 1983).

Karnak Drainage Facility (RD1500-JN-03) are not directly associated with the lives of persons significant to the nation's past (Criterion B/2). The architecture and design of the facility, which

employs Neo-Classical and utilitarian elements, are typical of water control Facility constructed during the early to mid-twentieth century. Research has yielded no information to suggest that the facility represents a significant departure from established reclamation design or practices contemporary to period in which it was built. Further the architect and builder for the facility were not identified, however it is unlikely that the facility represents the work of a master (Criterion C/3). It is unlikely that the facility has the potential for additional data that could yield information important to the prehistory or history of the nation (Criterion D/4). However, Karnak Drainage Facility (RD1500-JN-03) is associated with events that have made a significant contribution to the broad patterns of the history and cultural heritage of the United States (Criterion A/1). As a result, the Karnak Drainage Facility (RD1500-JN-03) are recommended as eligible for inclusion in the NRHP at a local level and CRHR under Criteria A/1.

Criterion A/1

The Karnak Drainage Facility (RD1500-JN-03) is recommended eligible for listing in the NRHP and CRHR at a local level of significance under Criterion A/1 for their important contributions to the development of flood control and agriculture in the Sacramento Valley. The facility has a period of significance between 1914 and 1952 when the pump houses were initially constructed. The pumping facility played a critical role in flood control allowing for the Sutter Basin and RD 1500 to be drained, thus resulting in residential and agricultural development within the district. The boundaries for the Karnak Drainage Facility include PH1-3, the pumphouses' associated conduits and gates, three small sheds, a weather station, and a drainage ditch. The sheds, weather station, and ditch appear to have been constructed outside the period of significance. The Karnak Drainage Facility retains historic integrity of original design and material, along with its original location and setting; the facility clearly conveys the cultural resource's historical importance in flood control and agricultural development.

Facility6.2 Reclamation District 1500 Historic District

Reclamation District 1500 represents the emergence of modern corporations as landowners and developers of reclamation districts and is representative of the use of large-scale land-moving and dredging machinery employed for the transformation of the landscape into productive agricultural land. As such, it meets criteria for listing on the NRHP/CRHR. The historic district's primary contributing features are elements of the district's drainage system, road systems, levees, pumping plants, and large-scale land patterns, some of which pass through the Project's APE.

More specifically, the following five resources: The East Levee, Karnak Drainage Facility, RD 1500 Canal, East Canal, and House 1 are recommended as contributor to the RD 1500 proposed district. Two additional resources within the current APE are not within the period of significance and/or do not contribute to the RD 1500 proposed district. These resources include the bridge and House 2. This represents preliminary assumptions on eligibility status, formal evaluation and concurrence with the lead federal and state agency will be required.

In sum, the six resources (in addition to Karnak Drainage Facility) are located within the current APE and five are recommended as contributors to the proposed RD 1500 historic district. Kleinfelder recommends once the final design is realized that the remaining six resources be formally evaluated and determined if they are contributors to the proposed district, and/or if these resource(s) is individually eligible for listing on the NRHP/CRHR.

Table 4. Summary of Recommended Site Eligibility

Resource Number	Name	Description	Induvial Eligibility Recommendation	RD 1500 District Recommendation
RD1500-JN-01	Unnamed Bridge	Concrete slab bridge spanning the East Canal	Unevaluated	Non-contributing
RD1500-JN-02	East Levee	East Levee of the Reclamation District No. 1500	Unevaluated	Contributing
RD1500-JN-03	Karnak Drainage Facility	Facility including three pump houses constructed between 1914-1952, 3 sheds, and a ditch	Recommended eligible	Contributing
RD1500-JN-04	Reclamation District 1500 Canal	Channelized portion of Sacramento Slough terminating at the East Levee	Unevaluated	Contributing
RD1500-JN-05	East Canal	Manmade canal paralleling the East Levee in the Sutter Bypass	Unevaluated	Contributing
RD1500-JN-06	House 1	Single-family home, constructed in approximately 1930	Unevaluated	Contributing
RD1500-JN-07	House 2	Single-family home, constructed in approximately 1966	Unevaluated	Non-contributing

6.3 Recommendations and Potential Mitigation

Kleinfelder recommends the Project be designed to avoid or minimize the undertaking's adverse effects on historic properties. An adverse effect as defined in CFR 800.5(a) (1–2) is any direct or indirect effect that may alter characteristics of a historic property that qualify the property for listing in the NRHP. Adverse effects diminish the integrity of a historic property's location, design, setting, materials, workmanship, feeling, or association.

Adverse effects that cannot be avoided will require additional documentation to address adverse effects to Historic Properties. Mitigation for adverse effects to the drainage Facility, levee, and canals could include recording the structures or other historic-period elements using documentation similar to the Historic American Buildings Survey (HABS)/ Historic American Engineering Record (HAER).

7.0 Conclusion

This section presents the results of cultural resources identification efforts within the APE. A records search at the NWIC and a search of the Sutter County Museum database revealed that one previously identified resource is located within the APE: the Karnak Drainage Facility. A pedestrian survey of the APE resulted in the identification of six new cultural resources (the East Levee, RD 1500 Canal, East Canal, a historical bridge, and two houses) and the update of one previously recorded cultural resource (Karnak Drainage Facility). The Karnak Drainage Facility consists of three pump houses constructed between 1914 and 1952, associated structures, infrastructure, and equipment. The Facility have been evaluated and is recommended eligible for inclusion in the NRHP and the CRHR under Criteria A/1. The bridge, canals, levee, and houses have not been individually evaluated for inclusion in the NRHP and CRHR, however the levee, canals, House 1, and the drainage Facility are recommended as contributors to a proposed historic district, Reclamation District 1500.

Kleinfelder recommends once the final design is realized that the remaining six resources be formally evaluated and determined if they are contributors to the proposed district, and/or if these resource(s) is individually eligible for listing on the NRHP/CRHR. Additionally, in accordance with Section 106 of NHPA a Finding of Effects (FOE) Report may be required to fully identify historic properties that are subject to direct or indirect affects, based on the final project design. The necessity of such a document will be determined in consultation with the lead federal and state agencies. It is anticipated that the lead agency would prepare the FOE with support from the Client's consultant. The final FOE and technical reports will be submitted by the lead federal agency to SHPO for concurrence on eligibility recommendations and proposed measures to avoid, resolve, or mitigate adverse effects to historic properties.

8.0 Preparers' Qualifications

Rachael Nixon has over 20 years of cultural resource management. She has served as principal investigator on projects under CEQA, NEPA, and Section 106 of the National Historic Preservation Act (NHPA). Rachael has directed projects that involved the identification and evaluation of thousands of resources including paleontological, archaeological, and architectural history. She has worked with various agencies on these projects, including but not limited to: Bureau of Land Management, Bureau of Indian Affairs, California Energy Commission, Native American Heritage Commission, State Historic Preservation Office, U.S Army Corp. of Engineers and the U.S. Forest Service. She has also worked closely with Native American Tribal representatives, most likely descendants, Tribal Historic Preservation Officers, and has served as liaison between contract personnel, clients, tribal representatives, technical leads, and agency leads throughout California. She meets the Secretary of Interior's Professional Qualification Standards in archaeology and history and is a Registered Professional Archaeologist (RPA).

Kleinfelder senior archaeologist Jessica Neal contributed to this report. She has a Bachelor of Science degree in anthropology from Loyola University Chicago and a Master of Arts degree in Maritime Archaeology from the University of Southern Denmark. She is a registered professional archaeologist (#17230) and a member of the Society for California Archaeology. She meets the Secretary of the Interior's Standards for prehistoric and historical archaeology. Ms. Neal has nine years of experience in cultural resources management, including project management, personnel management, field survey, excavation and data recovery, laboratory analysis, collections management, and geographic information system (GIS) applications in environmental planning. She has experience in preparation of archaeological research, built environment, and archaeological evaluations for inclusion in the NRHP and CRHR, and survey, testing, excavation, and monitoring reports pursuant to the requirements of CEQA, Section 106 of the NHPA, and National Environmental Policy Act (NEPA).

Kleinfelder senior architectural historian Justin Castells is an architectural historian who exceeds the Secretary of the Interior's Professional Qualification Standards in architectural history and history. Justin has a M.A. in History and over sixteen years of professional experience in historic preservation and cultural resources management. Justin has worked on assessments for properties based on local, CRHR, and NRHP criteria. He has prepared technical reports in compliance with NEPA, CEQA, and Section 106 and 110 of the NHPA. He has completed work for various federal, state, and local agencies.

Kate Willis is a Secretary of the Interior qualified Architectural Historian with a variety of experience in project management, environmental planning and permitting and working with historic resources. She has extensive experience in Section 106 of the National Historic Preservation Act and Section 4(f) of the US Department of Transportation Act compliance and integration into the National Environmental Policy Act. Ms. Willis also has considerable experience with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER). As a trained architectural historian, she has expertise in the history of national and local architectural styles of both industrial and residential developments. Her other responsibilities include working directly with SHPO, sub-consultant management, public and Section 106 consulting parties meeting participation, and consultation with municipalities.

Samantha Dunham is an archaeologist with five years of cultural resources management experience in California. Her training and background meet the California Department of Parks and Recreation qualifications as an Associate State Archaeologist for prehistoric and historic archaeology. Her experience includes archival research; ethnographic and historical research; Native American consultation; field survey; prehistoric and historical excavation; archaeological monitoring; and writing technical documents including permits, archaeological resource management reports, historic property management plans, and archaeological treatment plans, amongst others. She prepares cultural resources technical studies pursuant to the CEQA, Section 106 of the NHPA, and local policies.

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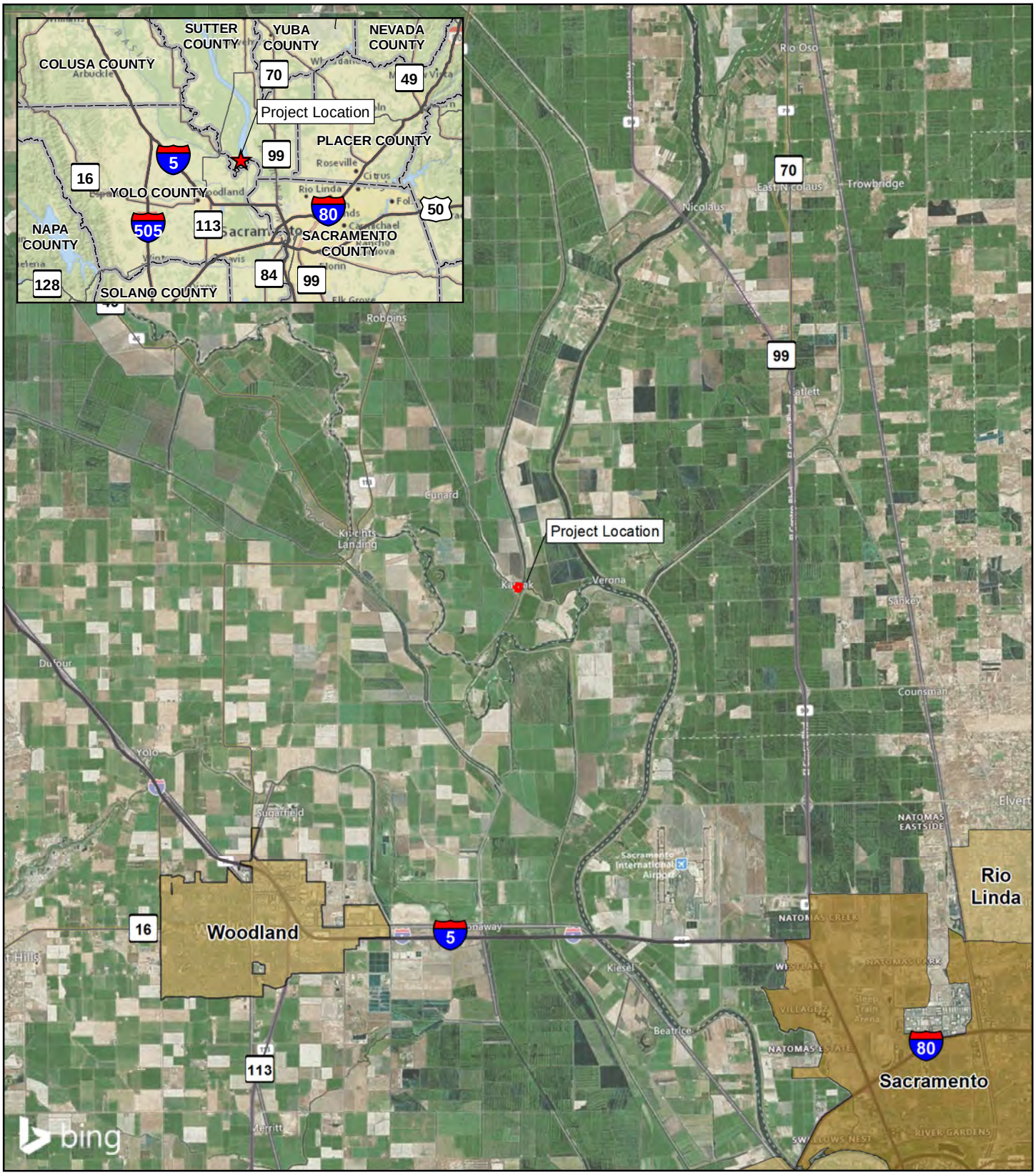
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Appendix A

FIGURES





Source: Bing Maps

0 1.5 3 Miles

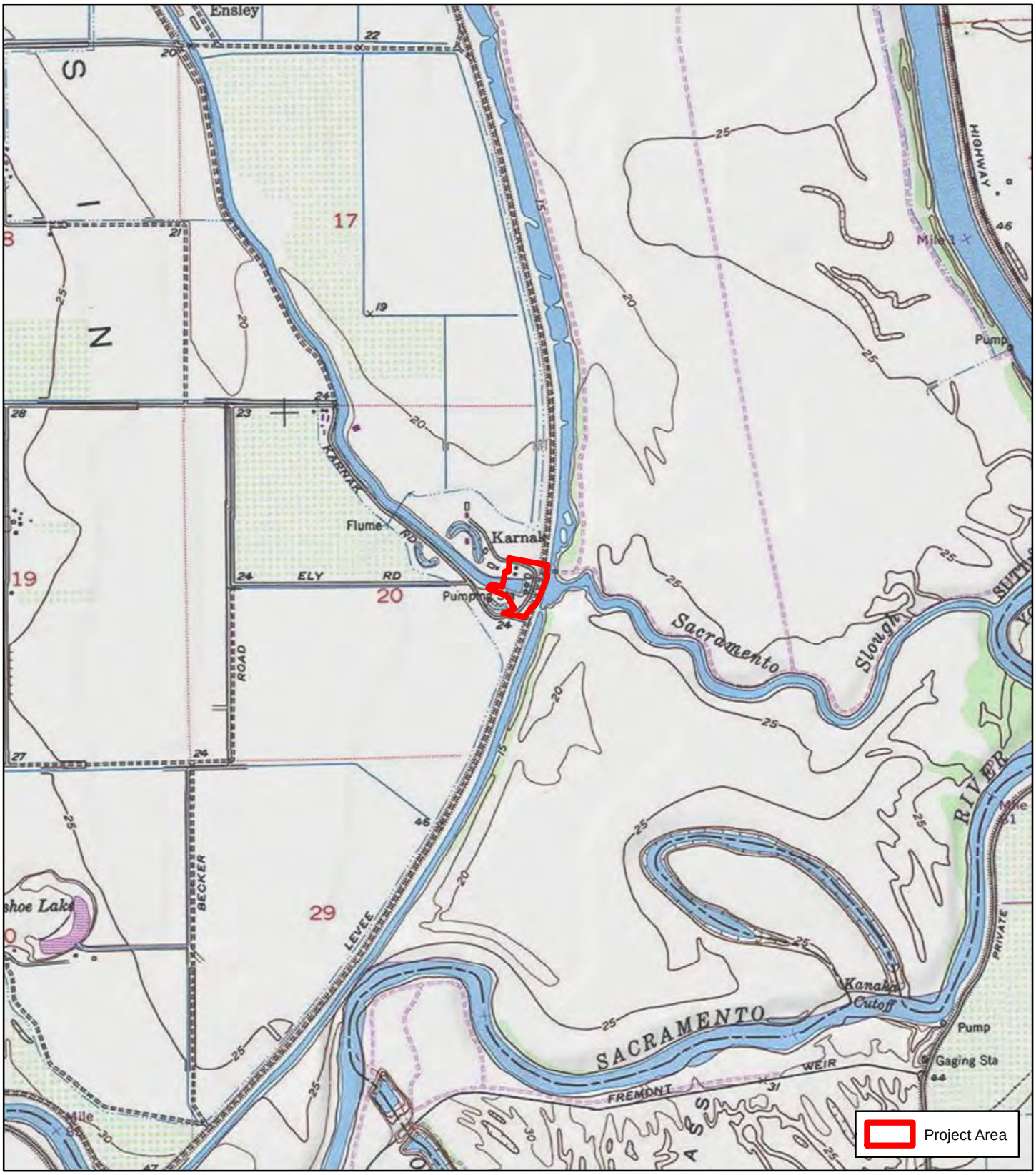
0 2.5 5 Kilometers

N

Scale 1:190,080
1 in = 3 miles

Figure 1. Regional Vicinity
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 20, 21

0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Figure 2. Project Location
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 200 400 Feet

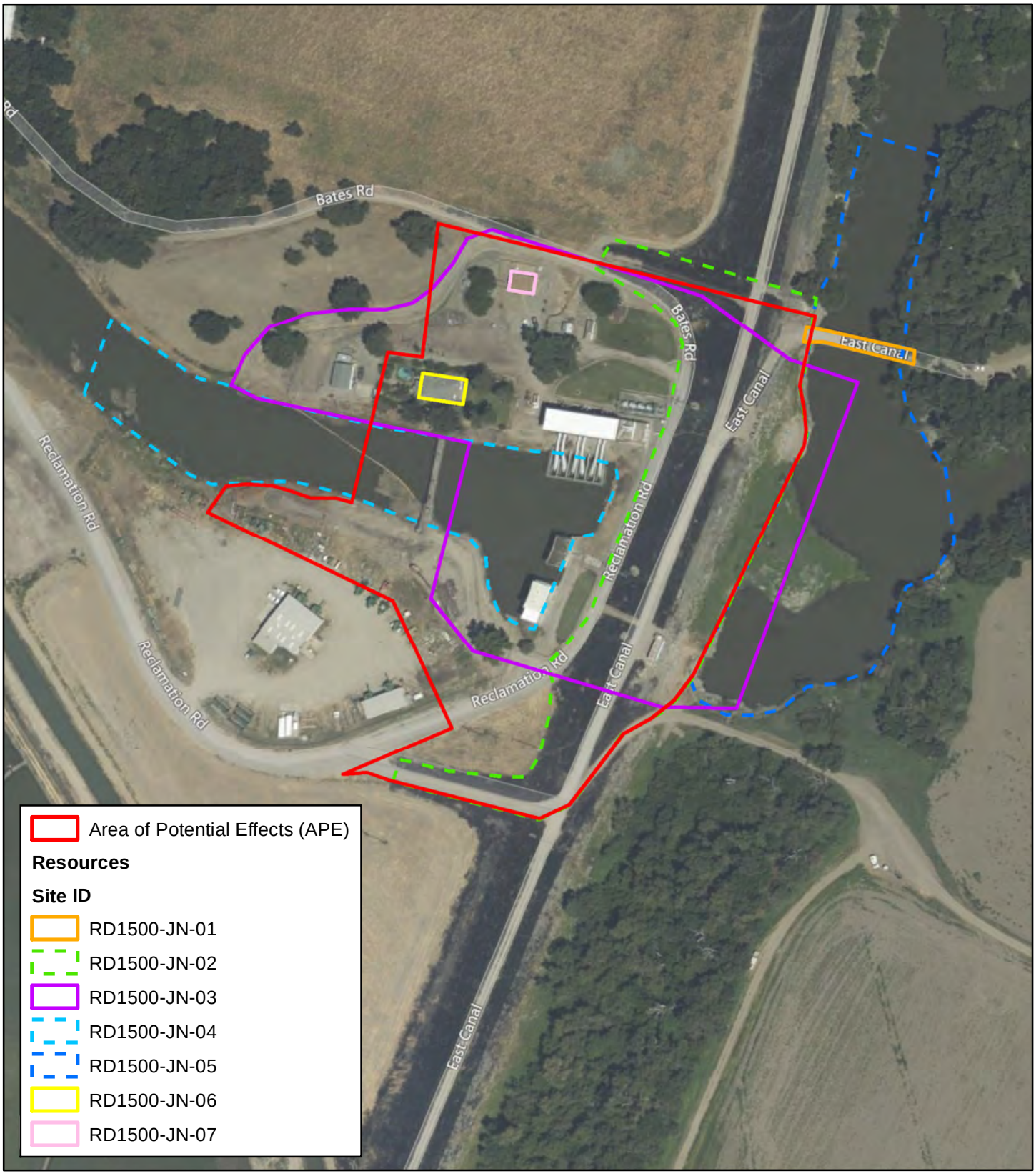
0 75 150 Meters

N

Scale 1:5,000

Figure 3. Area of Potential Effects (APE)
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 100 200 Feet

0 30 60 Meters

N

Scale 1:2,400

Figure 4. Resources Overview
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 1,000 2,000 Feet

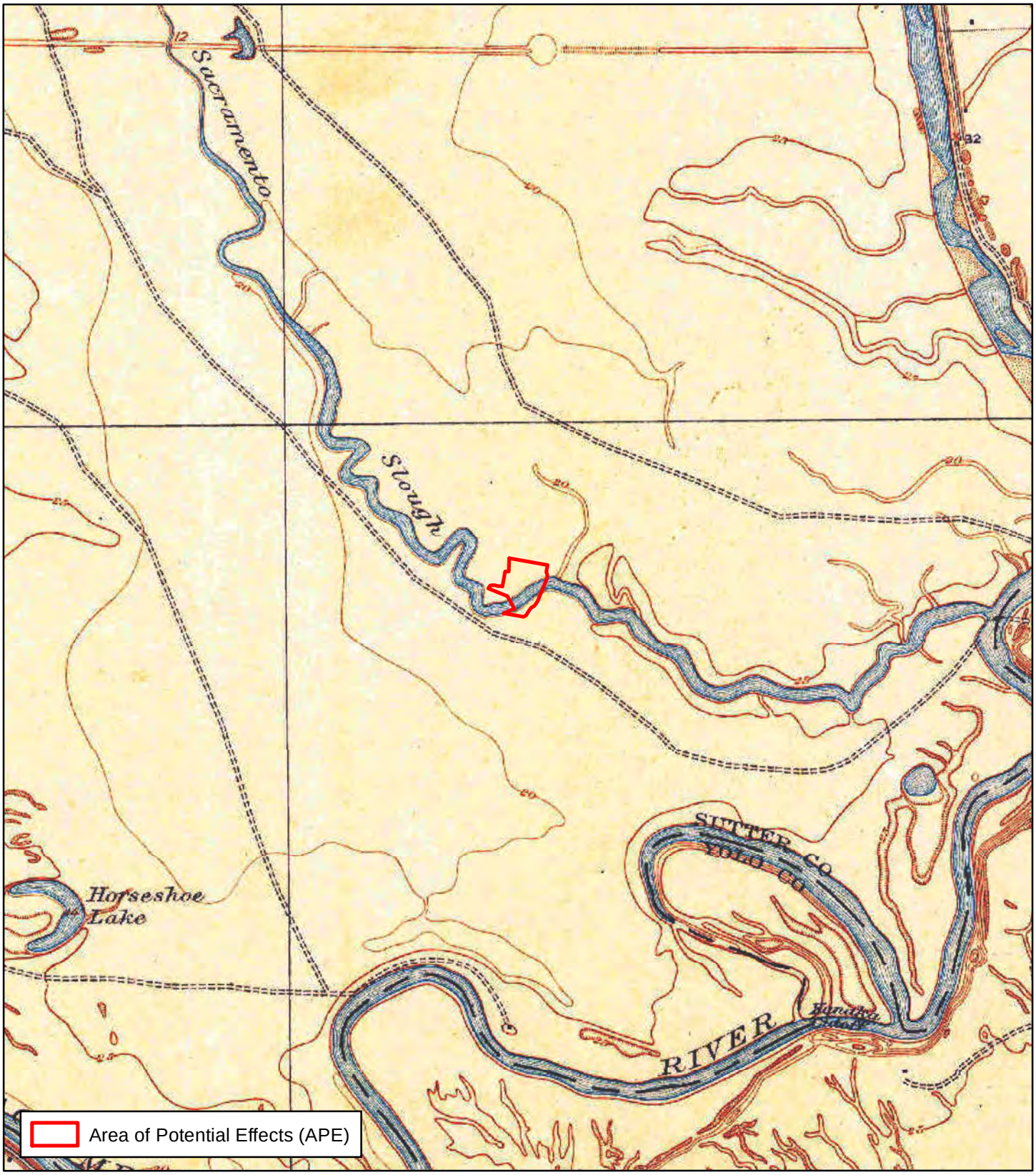
0 300 600 Meters

N

Scale 1:24,000

Figure 5a. T11N R3E, MDBM (GLO Plat 1870)
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

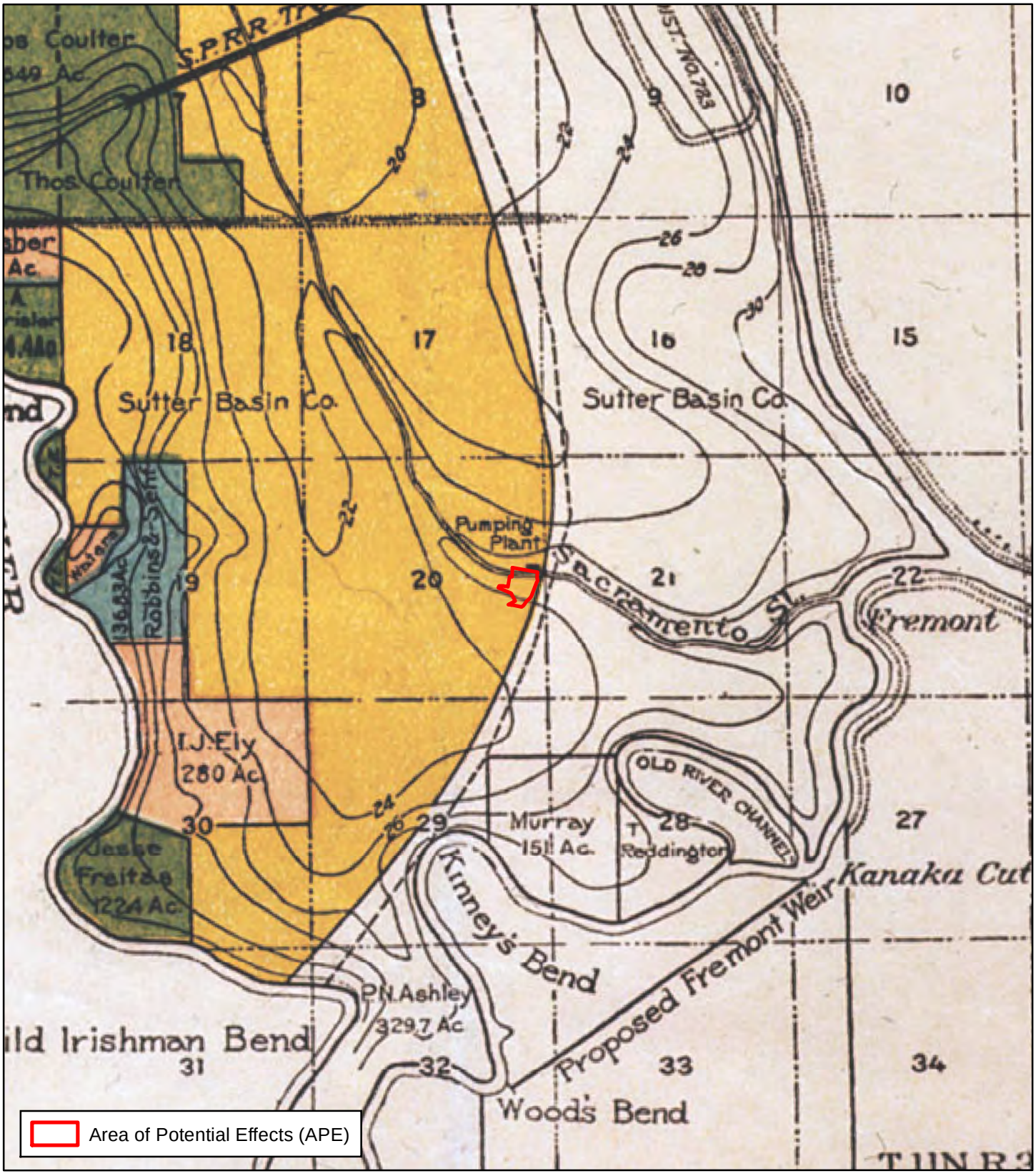
0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000

Figure 5b. Knights Landing (USGS 1910)
Reclamation District
Flood Control Project
Sutter County, California





Source: Bing Maps

0 1,500 3,000 Feet

0 500 1,000 Meters

N

Scale 1:36,000

Figure 5c. Map of Reclamation District No. 1500 (California State Library 1916)
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 2,000 4,000 Feet

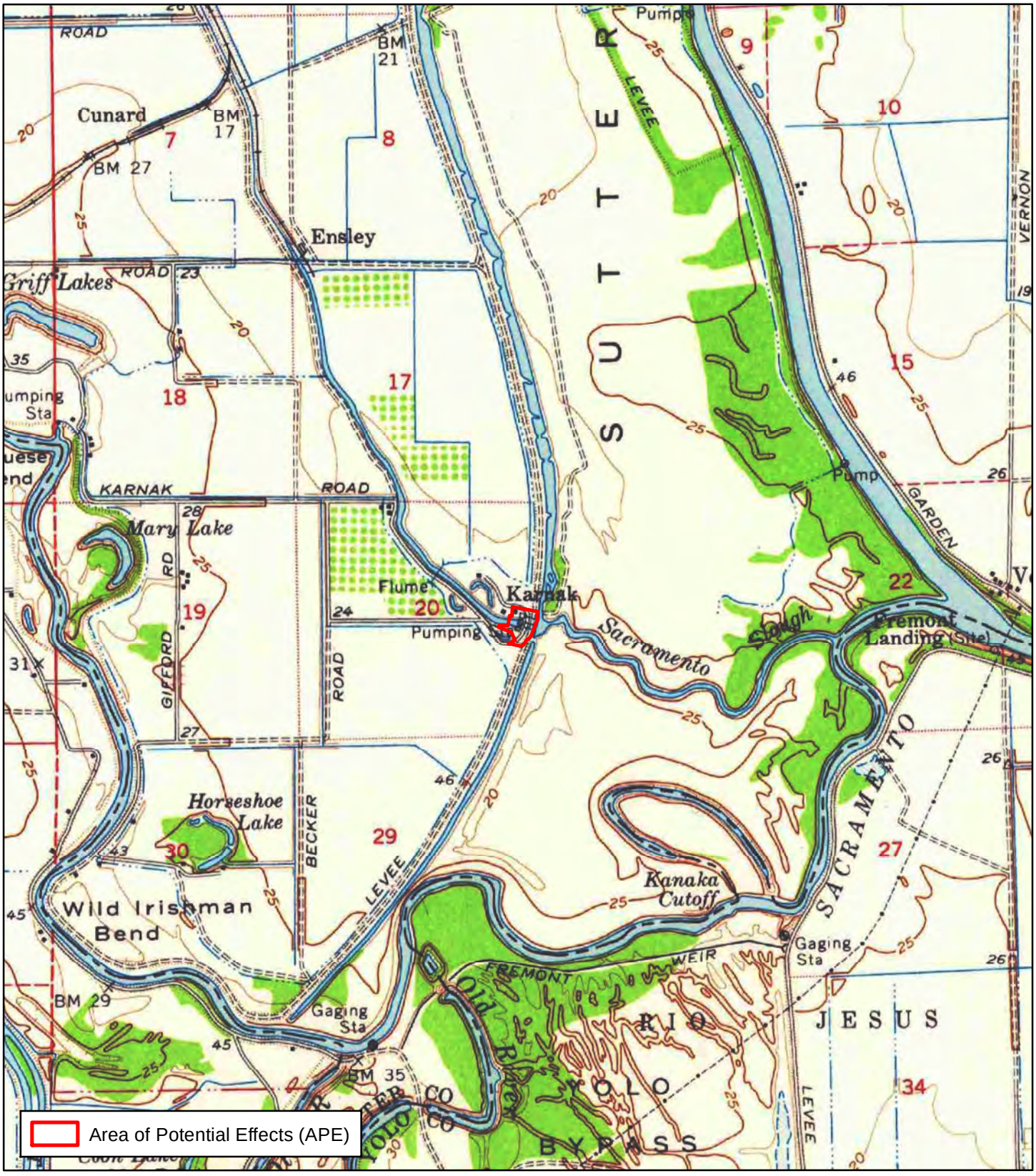
0 600 1,200 Meters

N

Scale 1:48,000

Figure 5d. Sutter County
(California Division of Highways 1935)
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 1,500 3,000 Feet

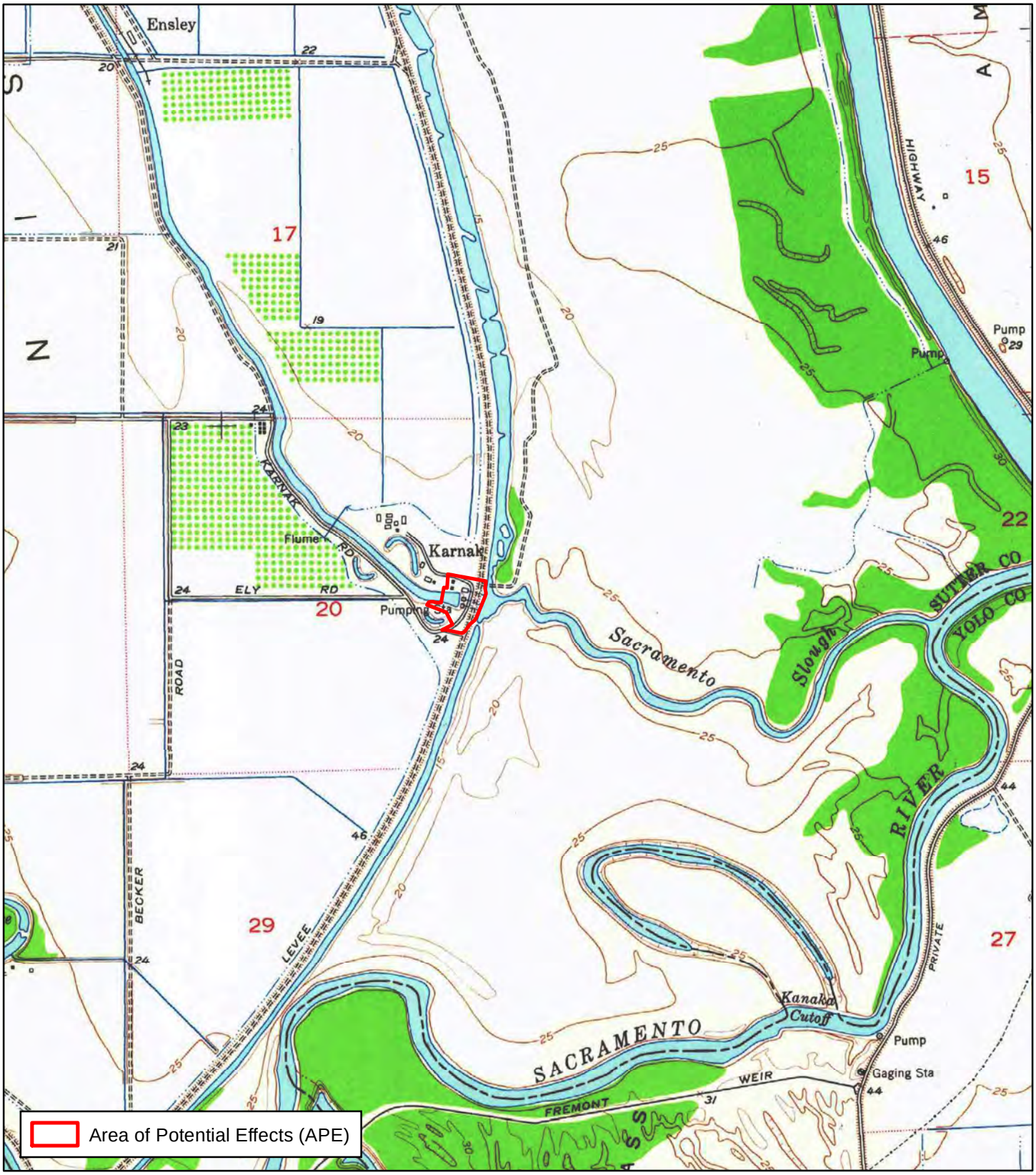
0 500 1,000 Meters

N

Scale 1:36,000

Figure 5e. Knights Landing, Calif. 1:62,500 (USGS 1952 [ed. 1959])
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000

Figure 5e. Knights Landing, Calif. 1:24,000 (USGS 1952 [ed. 1964])
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA

Appendix B

SURVEY PHOTOGRAPHS



Pump House 1, facing northeast



Pump House 1, facing north



Interior of Pump House 1



Pump Houses 1 and 2, facing southwest



Pump house 2, facing northwest



Interior of Pump House 2



Pump house 3, facing northwest



Interior of Pump House 3



Pump house 1 outlets into the East Canal/Sacramento Slough, facing west



Pump house 2 and 3 outlets into the East Canal/Sacramento Slough, facing northwest



Shed 2, facing northeast



Shed 1, facing northeast



Shed 3, facing northeast



Shed 1, Shed 2, and Shed 3, facing northwest.



Weather Station, facing west.



Overview of the ditch, facing northeast.

Appendix C

LOCAL HISTORICAL SOCIETY CONSULTATION

State of California--- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI
Trinomial #
NRHP Status Code
Other Listings
Review Code Reviewer Date

***Resource Name or #** (Assigned by recorder) 23611 Reclamation Road, Knights Landing

P1. Other Identifier: Karnak Pumping Station

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Sutter

and (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** **Date** **T** **;R** ; **¼of** **¼ of Sec** ; **B.M.**

c. Address 23611 Reclamation Road City Knights Landing Zip 95645

d. UTM: (Give more than one for large and/or linear resources) Zone ; mE/ mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

APN: N/A

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The service building (pumping station) at 23611 Reclamation Road in Knights Landing was constructed in 1914 in a modest Neo-Classical Revival style. The building is located near the front of the parcel on the west side of Reclamation Road, facing east within a primarily agricultural area.

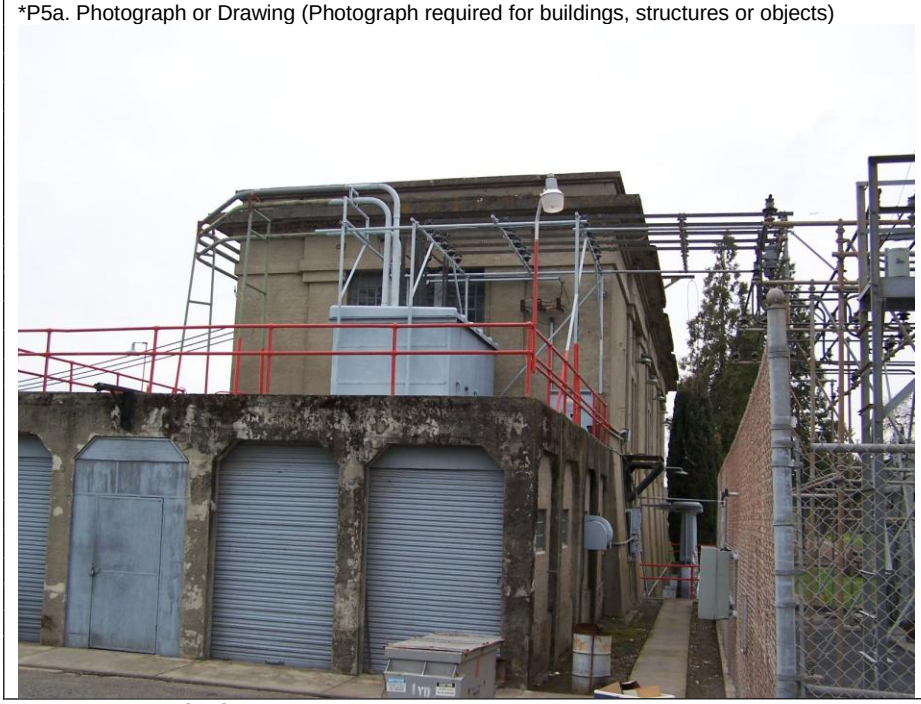
This two-story pumping station has an oversized rectangular floor plan. The façade is symmetrical and the building sits on a concrete foundation. The building has a concrete block structural system and an exterior clad in smooth stucco. The building is covered by a flat roof clad with industrial cool seal (not visible). The slightly-overhanging eaves are boxed.

(continued page 2)

***P3b. Resource Attributes:** (List attributes and codes) HP9. Public utility building

***P4. Resources Present:** ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.):

*P5a. Photograph or Drawing (Photograph required for buildings, structures or objects)



P5b. Description of Photo: (view, date, accession #) View looking west at the façade, July 18, 2006

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
1914

***P7. Owner and Address:**
N/A

***P8. Recorded by:** Name, affiliation, and address)
Carol Bordeaux, volunteer
Galvin Preservation Associates Inc.
1611 S. Pacific Coast Hwy. Suite 104
Redondo Beach CA, 90277

***P9. Date Recorded:** April, 2006

***P10. Survey Type:** (Describe)
☐ Intensive
☒ Reconnaissance

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Sutter County Historic Survey (Galvin Preservation Associates, 2005-2007)

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

*Resource Name or # (Assigned by recorder) 23611 Reclamation Road, Knights Landing

Recorded By: Carol Bordeaux Date: April, 2006 ☒ Continuation ☐ Update

(continued from page 1)

***P3a. Description:**

The primary entry is located at the east elevation. It consists of metal stairs with metal rails that lead to a concrete-floored deck and an entry at the second floor level. The entry is a single five-paneled wood door located within a bank of five windows. There are five windows on the east elevation. They are symmetrically spaced and consist of three steel sixteen-light casement windows over the entry door which is flanked by two steel 32-light casement windows. Other windows throughout the pumping station consist of three banks of six windows on each of the north and south elevations. Each bank of windows consists of three steel sixteen-light casement windows over three steel 32-light casement windows. On the west elevation there is an additional bank of similar casement windows. Other elements of this pumping station include a steel encaged ladder to the north of the entry door that leads to the roof and a concrete addition to the north elevation with apparent drive-through service doors. Decorative elements of this building include poured-in-place concrete pillasters flanking either side of the casement windows and a four-tired concrete cornice.

Landscaping elements include mature trees. Other features include concrete walkways, suspended metal walkways and metal hand rails as well as a secondary pumping station located to the north of the main pumping station facing east. That building was constructed in 1924 in the Neo-Classical Revival style. This one-story pumping station has a rectangular floor plan. The building has a symmetrical façade and sits on a concrete foundation. The pumping station has a similar construction to the primary building but sits on the edge of the levee with part of the building extending into the river. The primary entry is located at the façade. It consists of solid single entry door placed within a bank of windows. There are six windows on the façade. They are symmetrically spaced and consist of three twelve-light windows placed over two 28-light windows which flank an eight-light window over the entry door. All of the windows are steel casement windows. Other windows throughout the secondary pumping station consist of steel casement windows similar to those in the façade. Other elements of this pumping station include a large steel abutment structure located in the middle of the building and in front of the entry.

Alterations to the building include replacement stairs. The condition of the building is good to fair.

*Resource Name or # (Assigned by recorder) 23611 Reclamation Road, Knights Landing

Recorded By: Carol Bordeaux Date: April, 2006 ☒ Continuation ☐ Update



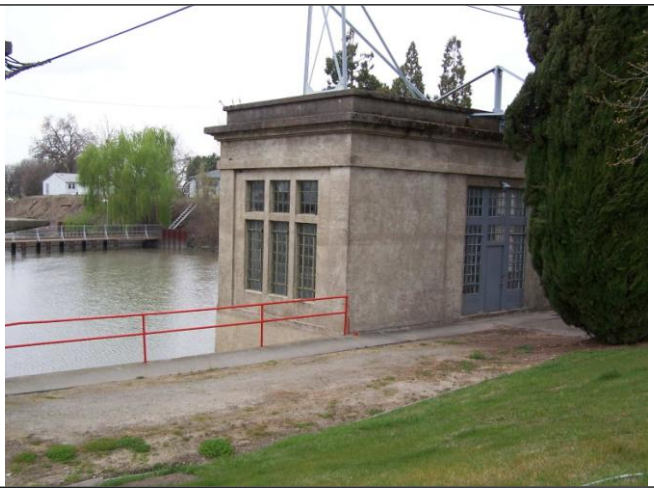
View looking west at the east elevation



View looking south at the north elevation



View looking at the south elevation of the 1924 pumphouse



View looking at the north elevation of the pumphouse



View looking at build date, shown on building

Appendix D

NATIVE AMERICAN HERITAGE COMMISSION CONSULTATION

From:	Samantha Dunham
To:	"nahc@nahc.ca.gov"
Subject:	Reclamation District Flood Control Project: SLF & Native American Contacts List Request
Date:	Tuesday, January 12, 2021 12:19:00 PM
Attachments:	Flood_Control_Location.pdf image001.jpg reclamation district flood control project SLF request.pdf

Hello,

I would like to please submit this SLF and contacts request for a location in Sutter County. Please see the attached request form and let me know if you have any questions.

Thanks,

As of August, 24, 2020, Kleinfelder has acquired Garcia and Associates. Please make note of my new email address and update your contact records accordingly.

Samantha Dunham
Archaeologist
435 Lincoln Way,
Auburn, CA 95603
o| (530) 823-3151
c| (530) 902-0735



This email may contain confidential information. If yoy have received this email, including any attachments, in error, please notify the sender promptly and delte the email and any attachments from all of your systems.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: 20212629.001A Reclamation District Flood Control Project

County: Sutter

USGS Quadrangle Name: KNIGHTS LANDING (1981)

Township: T11N Range: R03E Section(s): SEC 20

Company/Firm/Agency: Kleinfelder/GANDA

Contact Person: Samantha Dunham

Street Address: 435 Lincoln Way

City: Auburn Zip: 95603

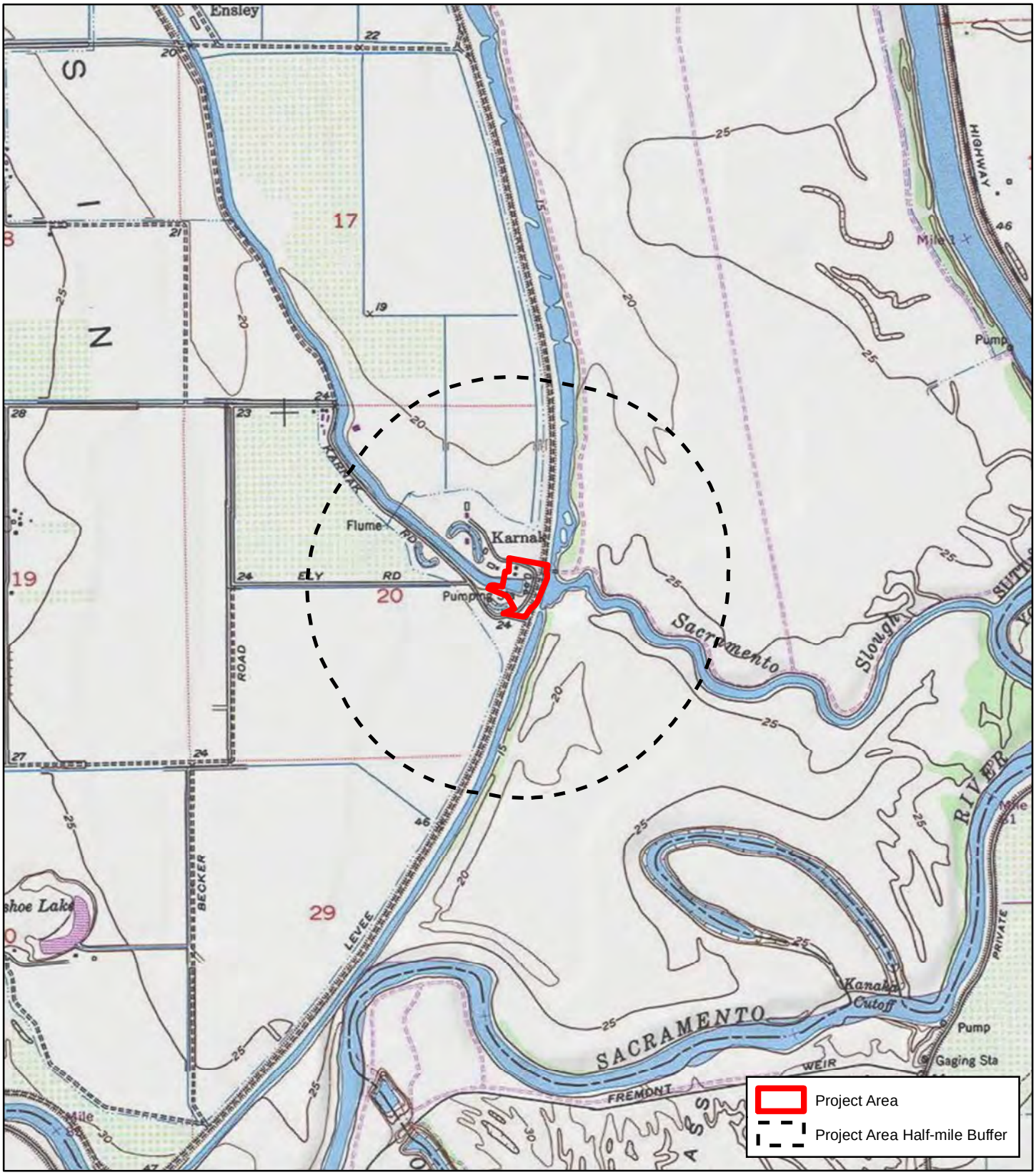
Phone: 530-902-0735 (work cell because not currently in office)

Fax:

Email: sdunham@kleinfelder.com

Project Description:

The Project proposes the rebuild of the existing pumps and replacement of pipelines that run through the levy to the East Canal.





USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 20

0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Record Search
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA

From: Gonzalez-Lopez, Nancy@NAHC
To: Samantha Dunham
Subject: 20212629.001A Reclamation District Flood Control Project, Sutter County
Date: Tuesday, February 2, 2021 2:09:10 PM
Attachments: SLF No 20212629.001A DunhamSutter 2-2-2021 Signed.pdf
20212629.001A DunhamSutter 2-2-2021.pdf

External Email

Regards,

Nancy Gonzalez-Lopez
Cultural Resources Analyst
Native American Heritage Commission
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 573-0168

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Merri Lopez-Keifer
Luiseño

PARLIAMENTARIAN
Russell Attebery
Karuk

COMMISSIONER
William Mungary
Paiute/White Mountain Apache

COMMISSIONER
Julie Tumamait-Stenslie
Chumash

COMMISSIONER
[**Vacant**]

COMMISSIONER
[**Vacant**]

COMMISSIONER
[**Vacant**]

EXECUTIVE SECRETARY
Christina Snider
Pomo

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

February 2, 2021

Samantha Dunham

Garcia & Associates

Via E-mail: sdunham@garciaandassociates.com

Re: 20212629.001A Reclamation District Flood Control Project, Sutter County

Dear Ms. Dunham:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez-Lopez
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Sutter County
2/2/2021

Shingle Springs Band of Miwok Indians
Regina Cuellar, Chairperson
P.O. Box 1340 Maidu
Shingle Springs, CA, 95682 Miwok
Phone: (530) 387 - 4970
Fax: (530) 387-8067
rcuellar@ssband.org

United Auburn Indian Community of the Auburn Rancheria
Gene Whitehouse, Chairperson
10720 Indian Hill Road Maidu
Auburn, CA, 95603 Miwok
Phone: (530) 883 - 2390
Fax: (530) 883-2380
bguth@auburnrancheria.com

Yocha Dehe Wintun Nation
Isaac Bojorquez, Director of Cultural Resources
PO Box 18 Brooks, CA 95606 Patwin
Phone: (530) 796 - 0103
ibojorquez@yochadehe-nsn.gov

Yocha Dehe Wintun Nation
Leland Kinter, THPO
P.O. Box 18 Patwin
Brooks, CA, 95606
Phone: (530) 796 - 3400
thpo@yochadehe-nsn.gov

Yocha Dehe Wintun Nation
Laverne Bill, Site Protection Manager
P.O. Box 18 Patwin
Brooks, CA, 95606
Phone: (530) 796 - 3400
lbill@yochadehe-nsn.gov

Yocha Dehe Wintun Nation
Anthony Roberts, Chairperson
P.O. Box 18 Patwin
Brooks, CA, 95606
Phone: (530) 796 - 3400
aroberts@yochadehe-nsn.gov

This list is current only as of the date of this document. 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 Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 20212629.001A Reclamation District Flood Control Project, Sutter County.

Appendix E

RECORDS SEARCH RESULTS

CHRIS Data Request Form

ACCESS AND USE AGREEMENT NO.: 63 **IC FILE NO.:** _____

To: Northeast Information Center

Print Name: Samantha Dunham Date: 1/12/2021

Affiliation: Kleinfelder/GANDA

Address: 435 Lincoln Way

City: Auburn State: CA Zip: 95603

Phone: 530-902-0735 (wo Fax: _____ Email: sdunham@kleinfelder.com

Billing Address (if different than above): 1 Saunders Ave San Anselmo CA 94960

Billing Email: AccountsPayableUS@Kleinfelder.com. Billing Phone: _____

Project Name / Reference: Reclamation District Flood Control Project

Project Street Address: Community of Karnak

County or Counties: Sutter

Township/Range/UTMs: T11N, R03E, SEC 20

USGS 7.5' Quad(s): KNIGHTS LANDING (1981)

PRIORITY RESPONSE (Additional Fee): yes ■ / no ☐

TOTAL FEE NOT TO EXCEED: $ 650
(If blank, the Information Center will contact you if the fee is expected to exceed $1,000.00)

Special Instructions:

Information Center Use Only

Date of CHRIS Data Provided for this Request: _____

Confidential Data Included in Response: yes ☐ / no ☐

Notes: _____

CHRIS Data Request Form

Mark the request form as needed. Attach a PDF of your project area (with the radius if applicable) mapped on a 7.5' USGS topographic quadrangle to scale 1:24000 ratio 1:1 neither enlarged nor reduced and include a shapefile of your project area, if available. Shapefiles are the current CHRIS standard for submitting digital spatial data for your project area or radius. **Check with the appropriate IC for current availability of digital data products.**

- Documents will be provided in PDF format. Paper copies will only be provided if PDFs are not available at the time of the request or under specially arranged circumstances.
- Location information will be provided as a digital map product (Custom Maps or GIS data) unless the area has not yet been digitized. In such circumstances, the IC may provide hand drawn maps.
- In addition to the $150/hr. staff time fee, client will be charged the Custom Map fee when GIS is required to complete the request [e.g., a map printout or map image/PDF is requested and no GIS Data is requested, or an electronic product is requested (derived from GIS data) but no mapping is requested].

For product fees, see the CHRIS IC Fee Structure on the OHP website.

1. Map Format Choice:

Select One: Custom GIS Maps ☐ GIS Data ☒ Custom GIS Maps **and** GIS Data ☐ No Maps ☐

Any selection below left unmarked will be considered a "no. "

Location Information:

	Within project area	Within 0.50 mi. radius
ARCHAEOLOGICAL Resource Locations[1]	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Locations	yes ☒ / no ☐	yes ☒ / no ☐
Report Locations[1]	yes ☒ / no ☐	yes ☒ / no ☐
"Other" Report Locations[2]	yes ☒ / no ☐	yes ☒ / no ☐

3. Database Information:
(contact the IC for product examples, or visit the SSJVIC website for examples)

	Within project area	Within 0.50 mi. radius
ARCHAEOLOGICAL Resource Database[1]		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☒ / no ☐
Excel Spreadsheet	yes ☐ / no ☒	yes ☐ / no ☒
NON-ARCHAEOLOGICAL Resource Database		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☒ / no ☐
Excel Spreadsheet	yes ☐ / no ☒	yes ☐ / no ☒
Report Database[1]		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☒ / no ☐
Excel Spreadsheet	yes ☐ / no ☒	yes ☐ / no ☒
Include "Other" Reports [2]	yes ☐ / no ☒	yes ☐ / no ☒

4. Document PDFs (paper copy only upon request)**:**

	Within project area	Within 0.50 mi. radius
ARCHAEOLOGICAL Resource Records[1]	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Records	yes ☒ / no ☐	yes ☒ / no ☐
Reports[1]	yes ☒ / no ☐	yes ☐ / no ☒
"Other" Reports[2]	yes ☐ / no ☒	yes ☐ / no ☒

CHRIS Data Request Form

5. Eligibility Listings and Documentation:

	Within project area	Within 0.50 mi. radius
OHP Built Environment Resources Directory[3]:		
Directory listing only (Excel format)	yes ☒ / no ☐	yes ☒ / no ☐
Associated documentation[4]	yes ☒ / no ☐	yes ☒ / no ☐
OHP Archaeological Resources Directory[1,5]:		
Directory listing only (Excel format)	yes ☒ / no ☐	yes ☒ / no ☐
Associated documentation[4]	yes ☒ / no ☐	yes ☒ / no ☐
***California Inventory of Historic Resources* (1976):**		
Directory listing only (PDF format)	yes ☒ / no ☐	yes ☒ / no ☐
Associated documentation[4]	yes ☒ / no ☐	yes ☒ / no ☐

6. Additional Information:

The following sources of information may be available through the Information Center. However, several of these sources are now available on the OHP website and can be accessed directly. The Office of Historic Preservation makes no guarantees about the availability, completeness, or accuracy of the information provided through these sources. Indicate below if the Information Center should review and provide documentation (if available) of any of the following sources as part of this request.

Caltrans Bridge Survey	yes ☒ / no ☐
Ethnographic Information	yes ☐ / no ☒
Historical Literature	yes ☐ / no ☒
Historical Maps	yes ☒ / no ☐
Local Inventories	yes ☒ / no ☐
GLO and/or Rancho Plat Maps	yes ☒ / no ☐
Shipwreck Inventory	yes ☐ / no ☒
Soil Survey Maps	yes ☐ / no ☒

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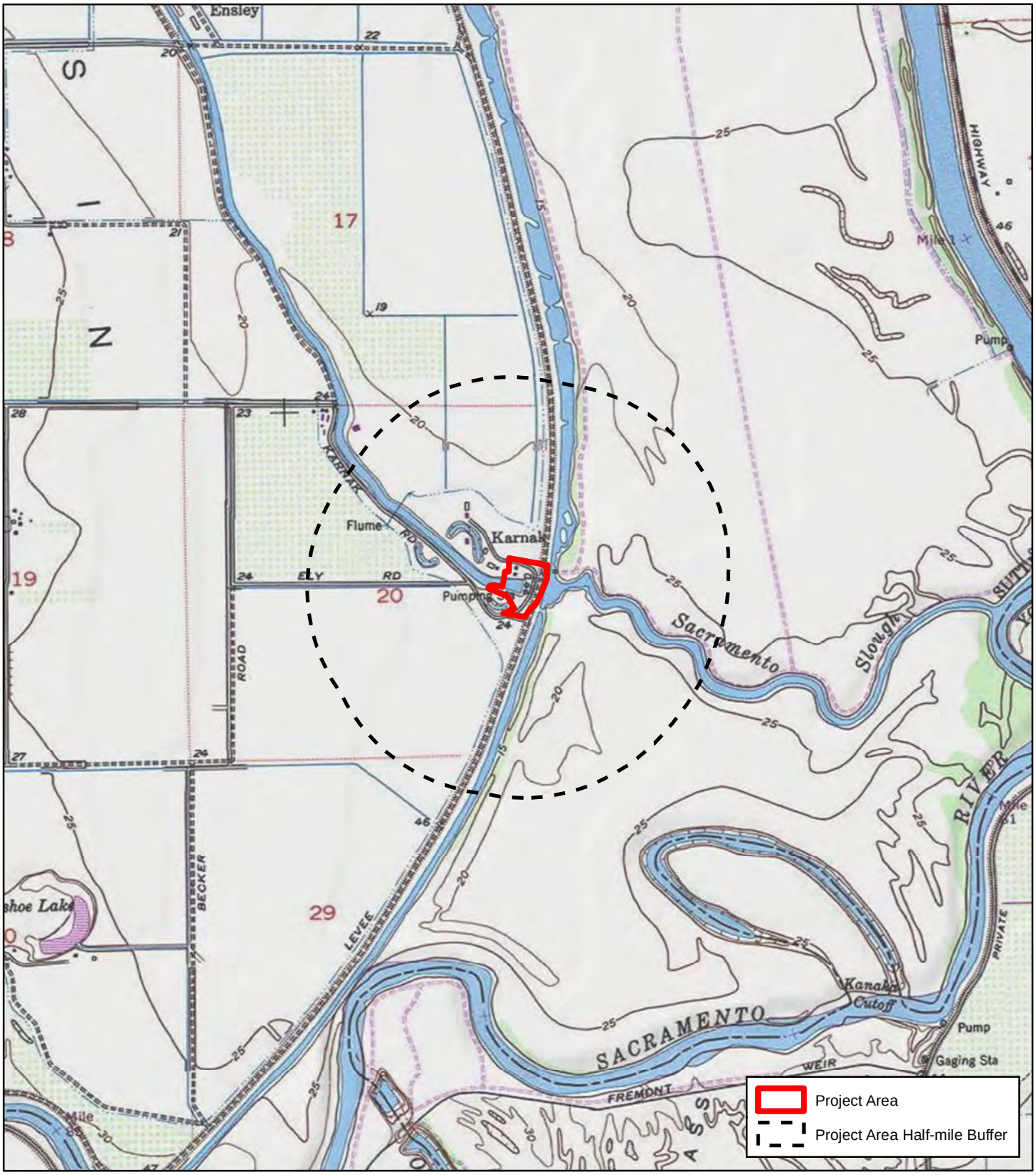
[1] In order to receive archaeological information, requestor must meet qualifications as specified in Section III of the current version of the California Historical Resources Information System Information Center Rules of Operation Manual and be identified as an Authorized User or Conditional User under an active CHRIS Access and Use Agreement.

[2] "Other" Reports GIS layer consists of report study areas for which the report content is almost entirely non-fieldwork related (e.g., local/regional history, or overview) and/or for which the presentation of the study area boundary may or may not add value to a record search.

[3] Provided as Excel spreadsheets with no cost for the rows; the only cost for this component is IC staff time. Includes, but not limited to, information regarding National Register of Historic Places, California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and historic building surveys. Previously known as the HRI and then as the HPD, it is now known as the Built Environment Resources Directory (BERD). The Office of Historic Preservation compiles this documentation and it is the source of the official status codes for evaluated resources.

[4] Associated documentation will vary by resource. Contact the IC for further details.

[5] Provided as Excel spreadsheets with no cost for the rows; the only cost for this component is IC staff time. Previously known as the Archaeological Determinations of Eligibility, now it is known as the Archaeological Resources Directory (ARD). The Office of Historic Preservation compiles this documentation and it is the source of the official status codes for evaluated resources.





USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 20

0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Record Search
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA

Northeast Center of the California Historical Resources Information System

BUTTE
GLENN
LASSEN
MODOC
PLUMAS
SHASTA
SIERRA
SISKIYOU
SUTTER
TEHAMA
TRINITY

123 West 6th Street, Suite 100
Chico CA 95928
Phone (530) 898-6256
neinfocntr@csuchico.edu

January 14, 2021

Kleinfelder/GANDA
435 Lincoln Way
Auburn, CA 95603
Attn: Samantha Dunham

I.C. File # D21-11
Standard Response

RE: Reclamation District Flood Control Project
T11N, R3E, Section 20 MDBM
USGS Knights Landing 7.5' (1981) & Knights Landing 15' (1952) quadrangle maps
9 acres (Sutter County)

Dear Ms. Dunham

In response to your request, a Standard Records Request for the project cited above was conducted by examining the official maps and records for archaeological sites and surveys in Sutter County.

RESULTS:

Prehistoric Resources: According to our records, no sites of this type have been recorded within or adjacent to the project area. In addition, no sites of this type have been recorded within the ½-mile vicinity. The project area is located in a boundary region utilized by Nisenan populations. Unrecorded prehistoric cultural resources may be located in the project area.

Historic Resources: According to our records, no sites of this type have been recorded within or adjacent to the project area. In addition, no sites of this type have been recorded within the ½-mile vicinity. Unrecorded historic resources may be located in the project area.

The USGS Knights Landing 7.5' (1981) & Knights Landing 15' (1952) quadrangle maps indicate archaeologically sensitive regions within the project area such as Sacramento Slough, a pumping station, structures, buildings, and a railroad. Karnak Road, Ely Road, the town of Karnak, structures, foundations, roads, a flume, and additional waterways are located in the general project vicinity.

Previous Archaeological Investigations: According to our records, portions within and adjacent to the project area have not been surveyed for cultural resources. However, portions of the ½-mile project radius have been previously surveyed for cultural resources. A Detail List of the reports is enclosed.

Literature Search: The official records and maps for archaeological sites and surveys in Sutter County were reviewed. Also reviewed: **National Register of Historic Places-Listed Properties and Determined Eligible Properties** (2012); **Built Environment Resource Directory** (2019); **California Register of Historical Resources** (2012); **California Points of Historical Interest** (2012); **California Inventory of Historic Resources** (1976); **California Historical Landmarks** (2012); **Gold Districts of California – Bulletin 193** (2005); **Handbook of North American Indians, Vol. 8, California** (1978); and **Historic Spots in California** (2002).

RECOMMENDATIONS:

We recommend that you contact the appropriate local Native American representatives for information regarding traditional cultural properties that may be located within project boundaries for which we have no records.

The charge for this records search is **$225.00** An invoice will follow from Chico State Enterprises for billing purposes. Thank you for your concern in preserving California's cultural heritage. Please feel free to contact us if you have any questions or need any further information

Thank you,

Ashlyn Weaver

Ashlyn Weaver, M.A.
Assistant Coordinator
Northeast Information Center

Appendix F

DEPARTMENT OF PARKS AND RECREATION 523 FORMS

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

Resource Name or #: RD1500-JN-01
P1. N/A

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10, 616897mE/ 4293791mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road and continue for approximately 70ft. The bridge is located on the east side of the levee.

P3a. Description: This resource is an unnamed concrete slab bridge that spans the East Canal. The bridge is approximately 162 feet (ft) long and is comprised of a cast in place concrete deck carried by concrete beams. The beams extend approximately 6 to 8 inches past the deck, resulting in a minimal curb. The bridge is supported by fifteen 1-ft square concrete piles approximately 30 ft high (over the canal bed). The piles are arranged in five rows of three wide. Two Steel piles, lateral support, and diagonal bracing have been added at both the second and third (from west) pile locations.

The bridge was constructed circa 1935 with the steel supports added within the last 20 years. The bridge is attached to the East Levee to the west and serves as access to agricultural fields within the Sutter Bypass to the east. It is located approximately 275 ft northwest of the Karnak Drainage Facilities Pump House No. 1.

P3b. Resource Attributes: HP19. Bridge

P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of bridge, facing northeast.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by: Kleinfelder
Jessica Neal, Samantha Dunam, and Kate Willis
435 Lincoln Way, Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

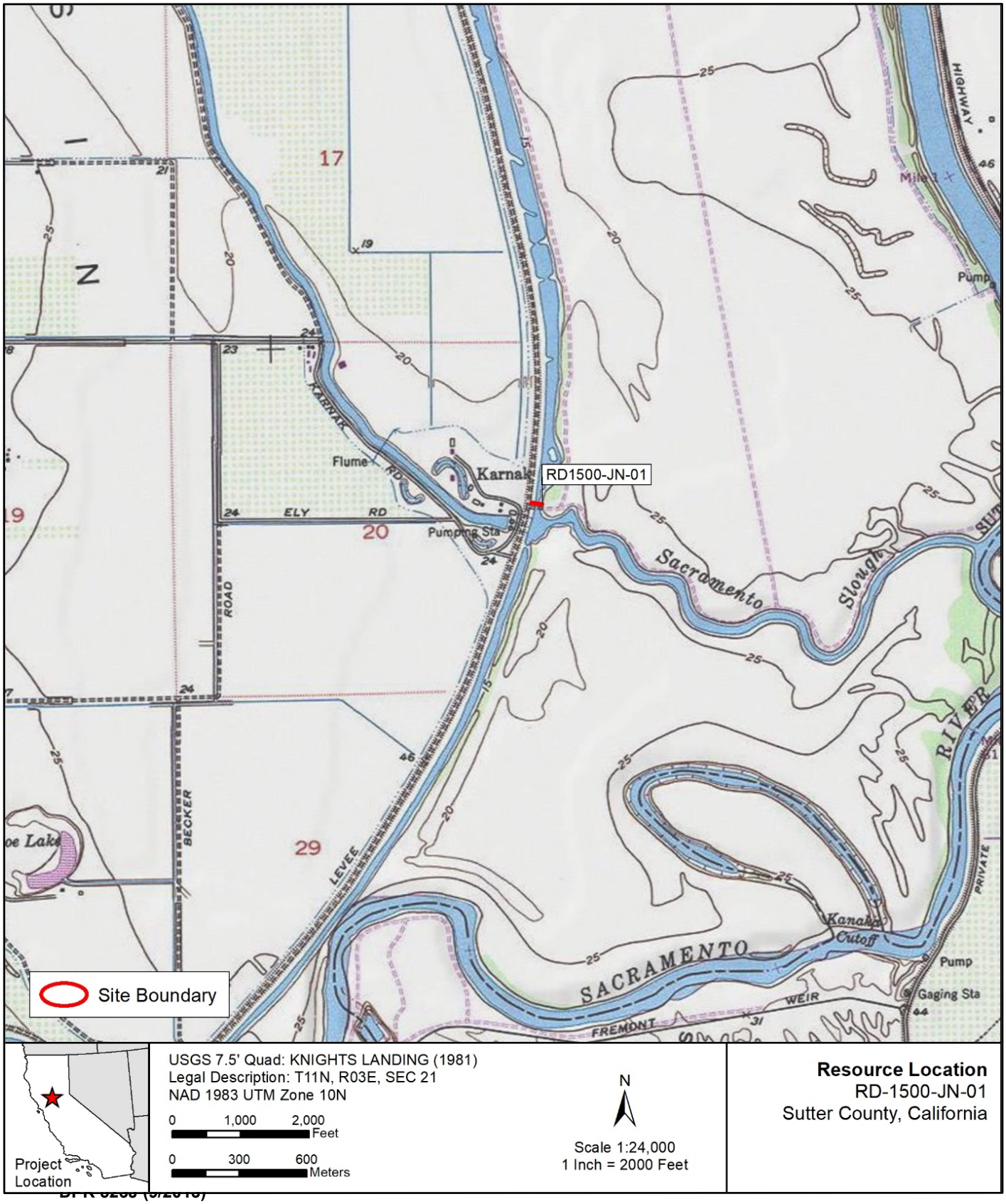
Attachments: ☐NONE ☒Location Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☒Other (List): Sketch Map

State of California - The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI#**

LOCATION MAP

Trinomial

Page 2 **of** 3 **Resource Name or #**: RD1500-JN-01
Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



Project Location

USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
RD-1500-JN-01
Sutter County, California

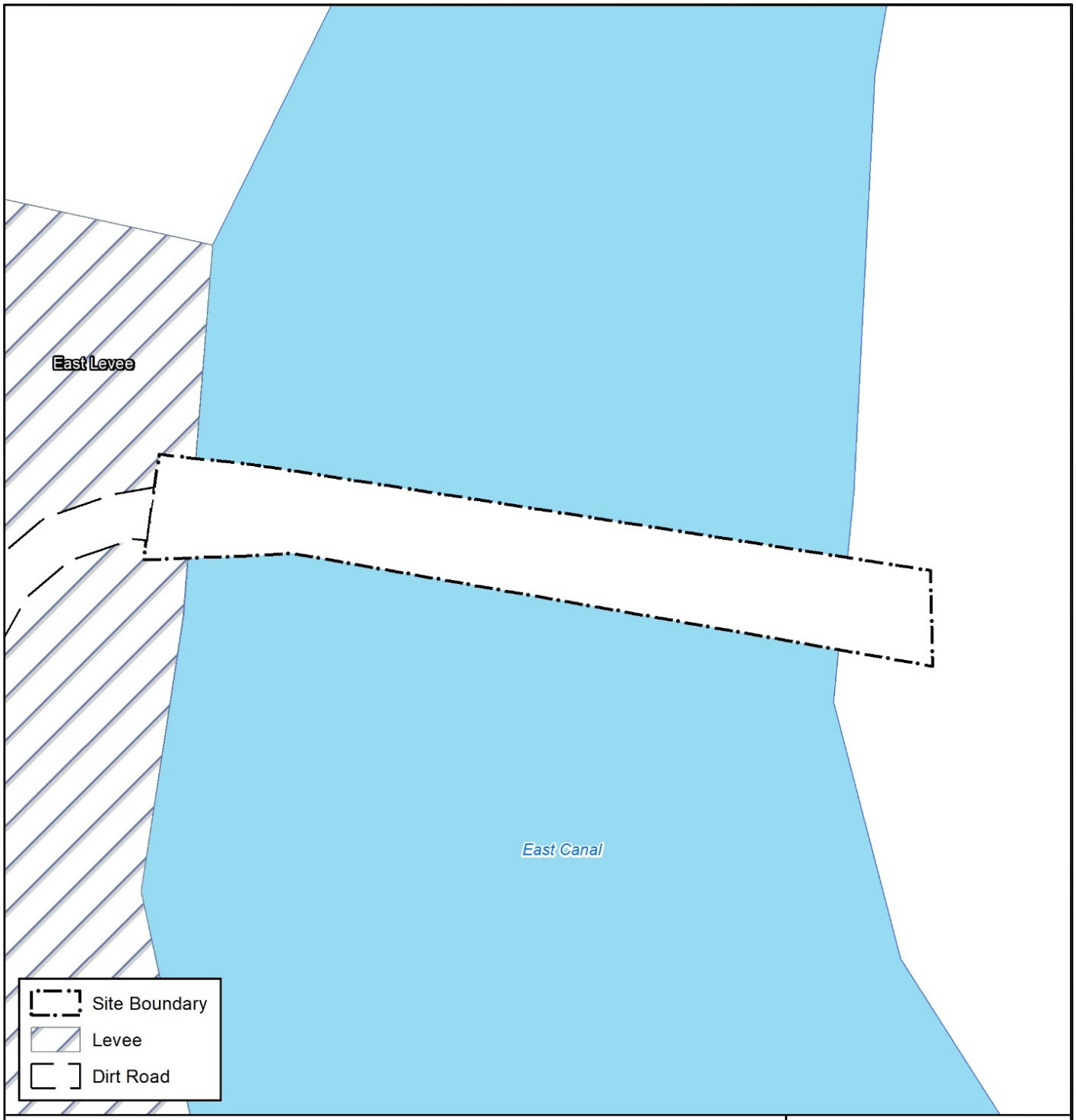
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-01
Date of map: January 21, 2021



Sketch Map
RD1500-JN-01
Sutter County, California

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-02

P1. East Levee of Reclamation District No. 1500

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616825 mE/ 4293698mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road and continue for approximately 70 ft.

P3a. Description: This resource consists of an approximately 360-ft segment of an earthen levee known as the East Levee of the Reclamation District No. 1500 (RD 1500) (commonly referred to as the East Levee). It was constructed as a part of the Sutter Bypass project, beginning in approximately 1913. The levee severed the Sacramento Slough in half; the western half of the slough was channelized (now called the RD 1500 Canal) and three pump houses were constructed between 1914 and 1952 to pump water through the levee into the eastern, unchanneled portion of the slough.

The recorded segment is located at approximately Levee Mile 2, where the RD 1500 Canal and East Canal converge at the levee and flow into the Sacramento Slough. A gravel road along the crown of the levee spans the length of the segment and two earthen ramps with a gravel road are located at both the northern and southern ends of the segment, allowing vehicular access to farmland in the Sutter Bypass. The levee is in good condition, with grassy sides to the east and riprap, pump gates and infrastructure, and outlets on the eastern, waterside of the levee.

P3b. Resource Attributes: HP39. Other

P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of levee, facing north.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by:
Kleinfelder
Jessica Neal and Samantha Dunam
435 Lincoln Way, Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

L1. Historic and/or Common Name: East Levee of Reclamation District No. 1500; East Levee

L2a. Portion Described: ☐Entire Resource ☒Segment ☐Point Observation **Designation:**
Location of point or segment: 360 ft at Levee Mile 2

L3. Description: This is a 360-ft segment of the East Levee of RD 1500. The East Levee makes up the eastern border of RD 1500 and serves as a divider between the RD 1500 Canal and Sutter Bypass. This segment of levee was constructed in 1913 and fits into larger reclamation projects happening in the early 20th century. This segment of the levee bisected a natural waterway, the Sacramento Slough. This portion of the slough was channelized and renamed the RD 1500 Canal at the same time the levee system was constructed. A bulkhead was constructed on both the eastern and western walls of the levee where the canal terminates.

The full extent of the levee is approximately 20.72 miles long. The earthen levee is approximately 20 ft high. The crown is between 25 and 60 ft wide; a gravel road runs the length of the segment along the crown. The landside berm of is approximately 22 ft wide with a gravel road running along it. Two earthen ramps on either side of the levee allow vehicular access to the levee and farmland within the Sutter Bypass. The waterside of the levee is riprapped with imported rock and some modern and historic refuse. Stairs for pedestrian access to the levee and two utility poles are located on the landside slope. An unnamed concrete bridge connects the levee to agricultural land within the Sutter Bypass. Between 1914 and 1952, three separate pump houses were constructed to convey water from the RD 1500 Canal through the levee into the East Canal and Sacramento Slough. Associated conduits, flood gates, discharge outlets are present on and within the levee.

The 1914 plans of the Karnak Drainage Facilities depicts a bulkhead on both the eastern and western slopes of the levee. The bulkhead served as additional support against the water pressure from the canal. During the field survey, wooden piles and deteriorating concrete were visible in the RD 1500 Canal at the toe of the levee. No evidence of the bulkhead was on the eastern side of the levee. Debris has built up in the general area of the bulkhead and is possibly buried. *See Continuation Sheet for additional information.*

L4. Dimensions:

a. **Top Width**: 40 ft
b. **Bottom Width**: 220 ft
c. **Height or Depth**: 25 high; top of levee approximately 48 ft at mean sea level
d. **Length of Segment**: 360 ft
e. **Sketch of Cross-Section:** N/A

L5. Associated Resources:
Unnamed Concrete Bridge (Temp# RD1500-JN-01)
Karnak Drainage Facilities (Temp # RD1500-JN-03)
East Canal (Temp# RD 1500-JN-05)

L6. Setting: The levee is in rural Sutter County. Vegetation includes manicured lawn and riparian vegetation. This segment of levee is encompassed by the Karnak Drainage Facilities. The East Canal parallels the levee to the east. The landside of the levee is made of agricultural land. The RD 1500 Canal abuts the landside of the levee.



L7. Integrity Considerations: The levee is in generally good condition. Its form and function have no significant changes since construction. The bulkhead is in currently in poor condition.

L8b. Description of Photo, Map, or Drawing: Waterside of the East Levee, facing southwest.

L9. Remarks: None

L10. Form Prepared by: J. Neal and S. Dunham

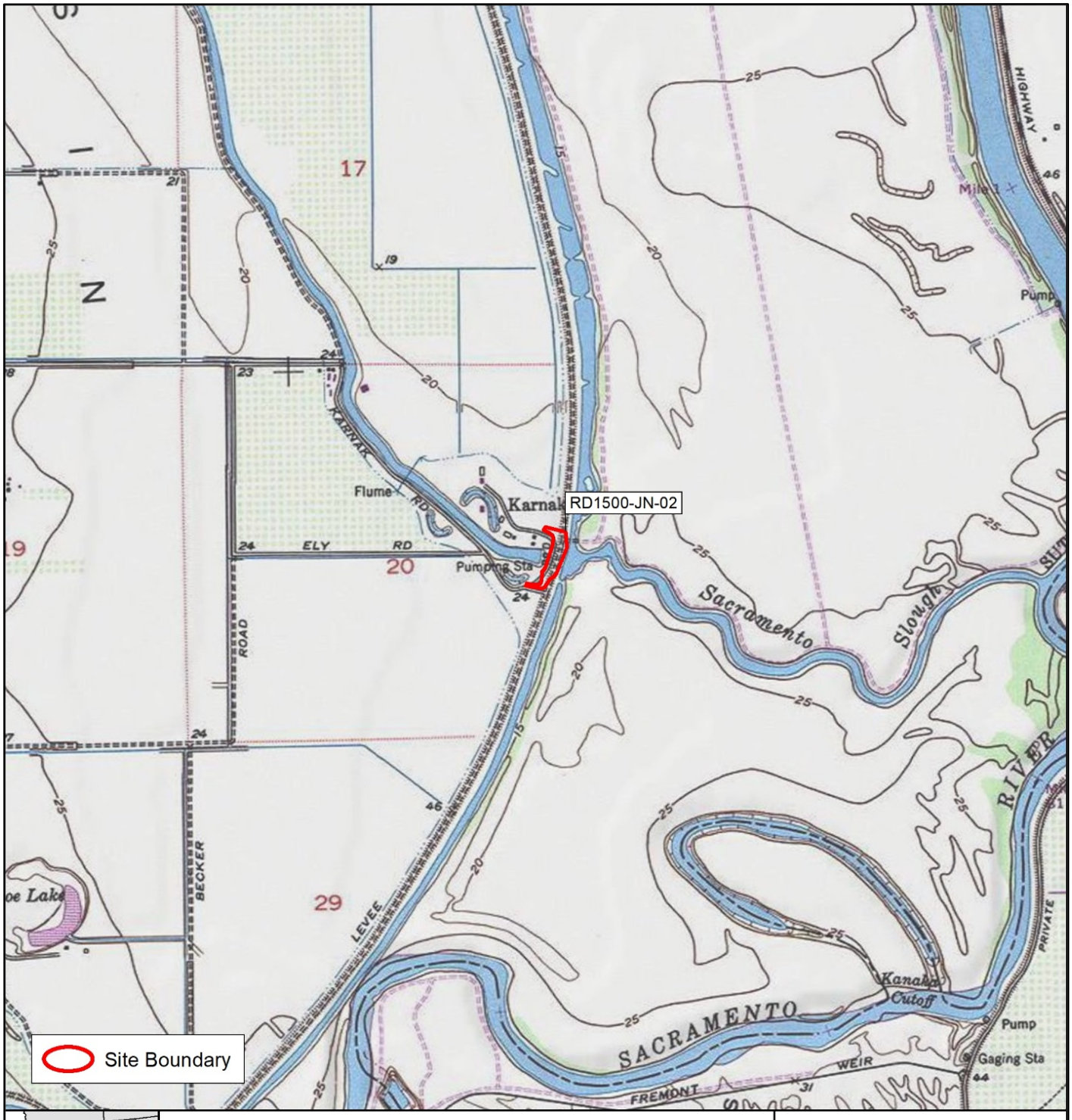
L11. Date: January 21, 2021

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Resource Name or #: RD1500-JN-02
Map Name: Knights Landing, CA
Scale: 1:24,000
Date of map: 1981



USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
RD-1500-JN-02
Sutter County, California

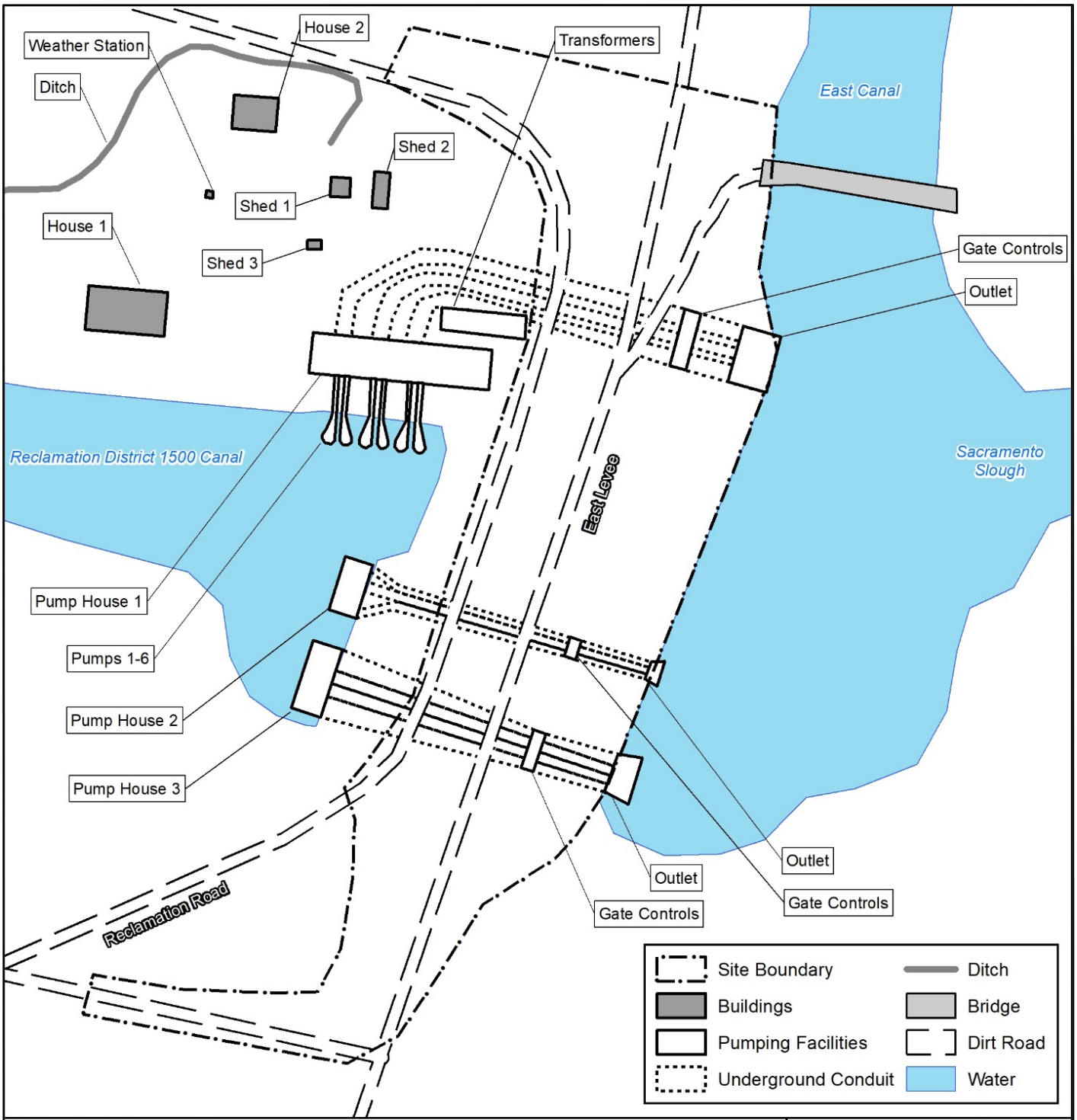
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-01
Date of map: January 21, 2021



NAD 1983 UTM Zone 10N

0 60 120 Feet
0 20 40 Meters

N

Scale 1:1,440
1 inch = 120 feet

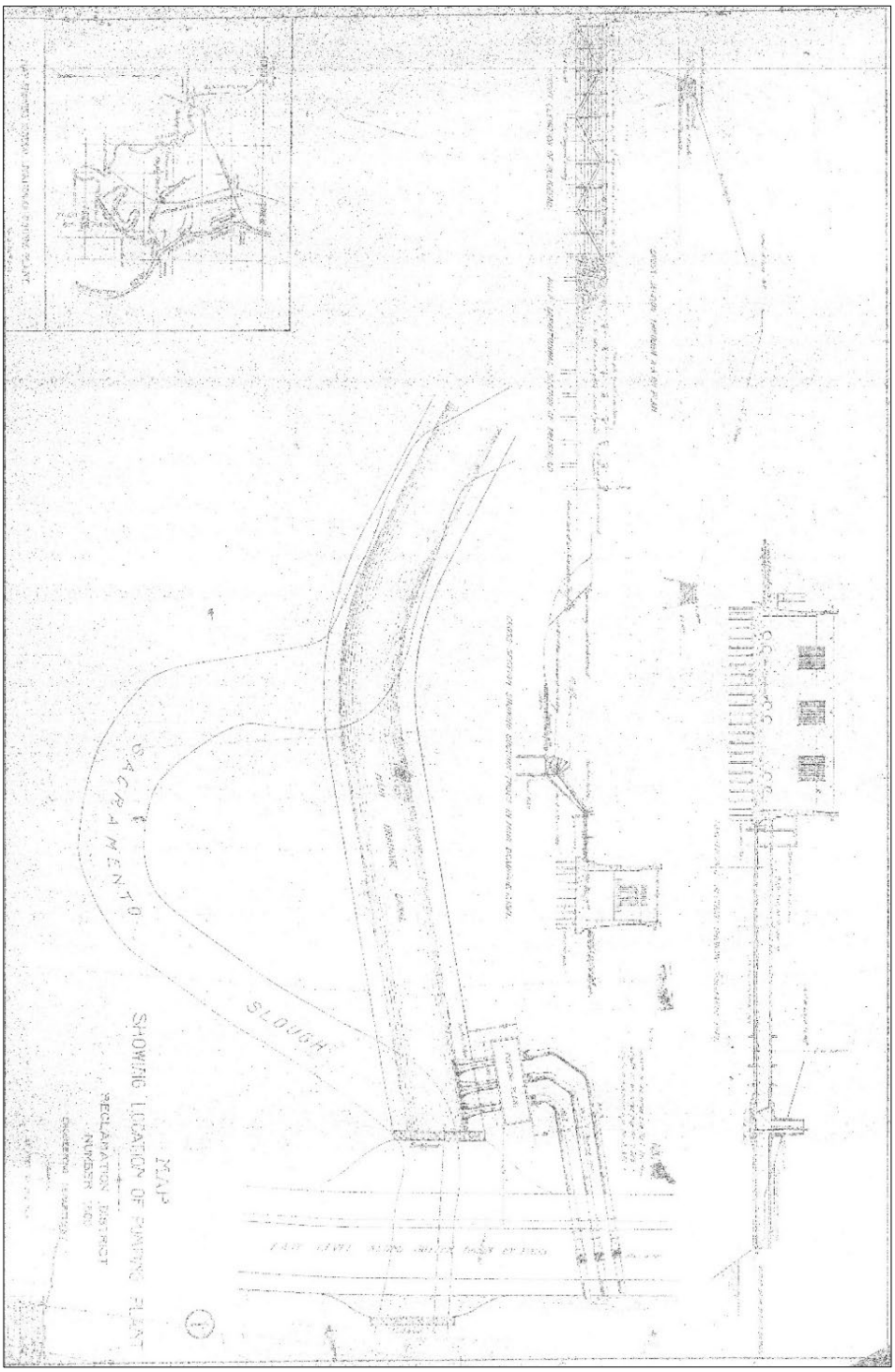
Sketch Map
RD1500-JN-02
Sutter County, California

Levee Context

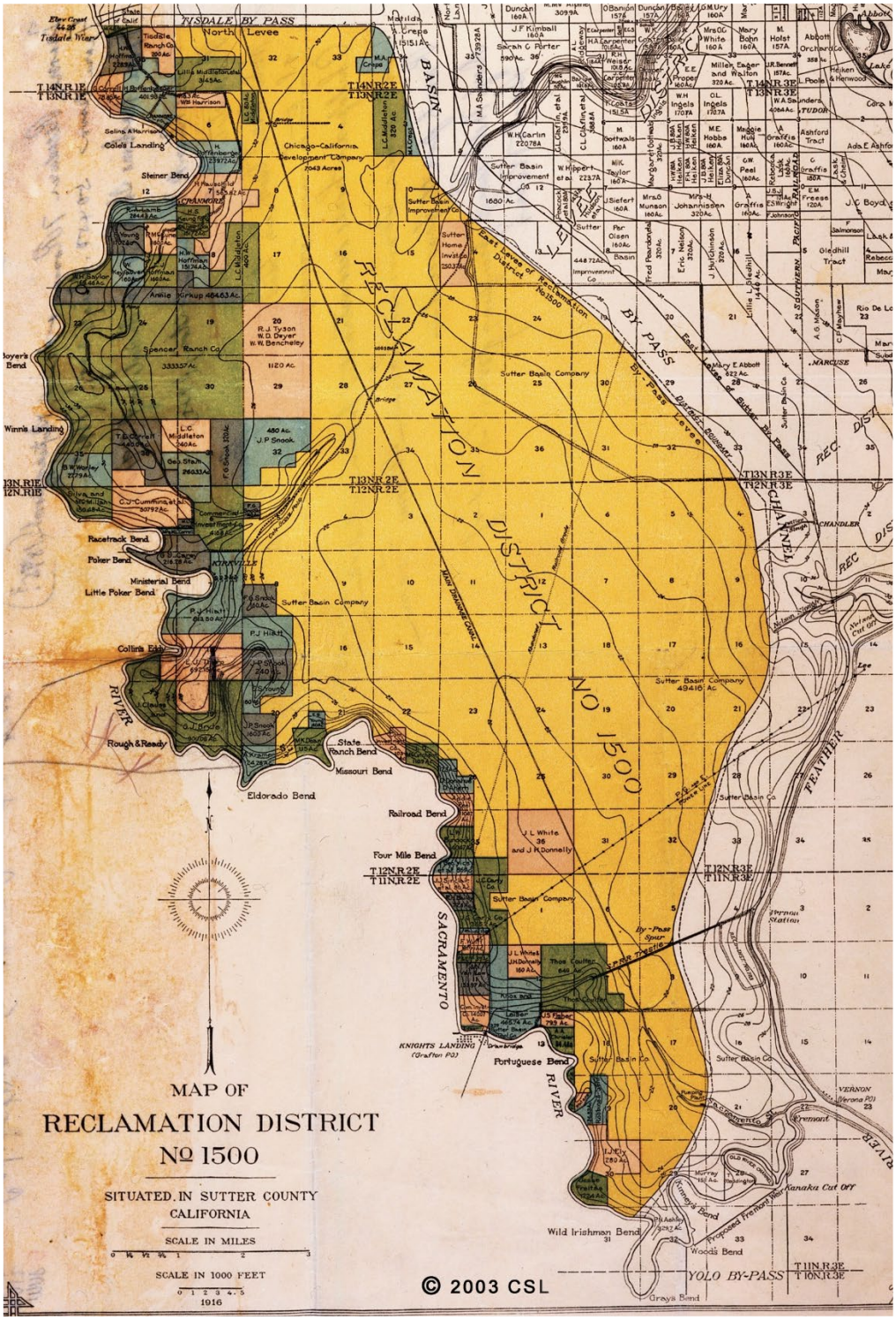
This segment of the East Levee is part of Levee Unit 2. Two levee systems, Unit 1 and Unit 2, encircle RD 1500. Unit 1 is approximately 33.15 miles long running from the southernmost point of the RD to the northwestern edge of the Tisdale Bypass, generally following the course of the Sacramento River. Unit 2 is approximately 20.72 miles long and originates at the southernmost point of RD 1500. It generally follows the along the edge of the Sutter Bypass until it terminates at the southeastern edge of the Tisdale Bypass.



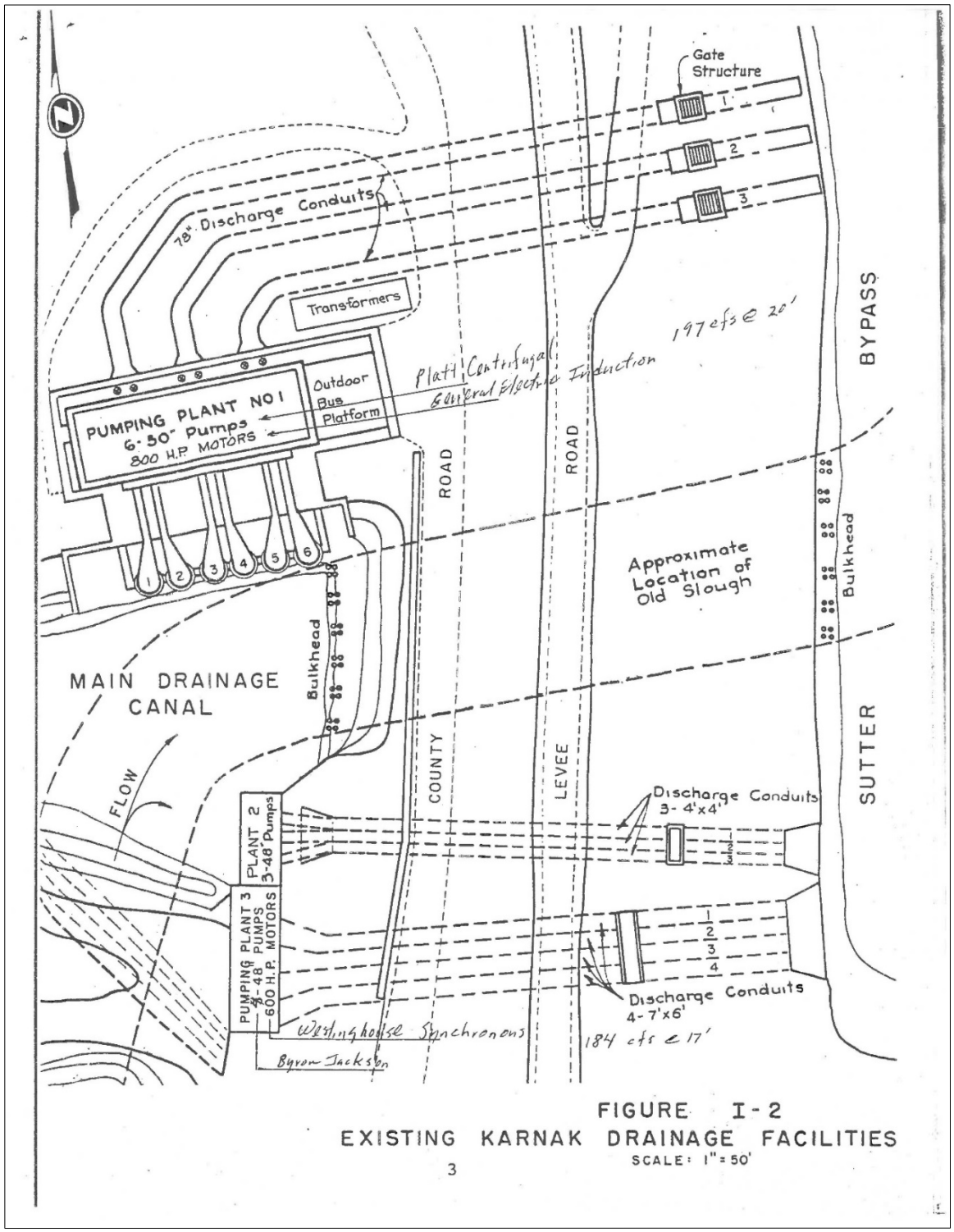
Overview of waterside of the East Levee facing northwest.



"Map Showing Location of Pumping Plant" (RD 1500 Engineering Department 1914). The East Levee is depicted in its current alignment.



"Map of Reclamation District No. 1500, Situated in Sutter County, California" (CSL 1916). The East Levee is depicted in its current location.



"Existing Karnak Drainage Facilities" (BR 1983). The map shows the East Levee in its current alignment.

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-03

P1. The Karnak Drainage Facility

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616779mE/ 4293 748mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road for approximately 70 feet to the Karnak Drainage Facility.

P3a. Description: The Karnak Drainage Facility includes three pump houses (PH1, PH2, and PH3), their associated components and equipment, three sheds, a weather station, and a drainage ditch. The Facility were established with the erection of PH1 in 1914 with the most recent pump house (PH3) being constructed in 1952. PH1 is 107 ft 5 inches long and 34 ft 5 inches deep (per 1914 plans) with its length orientated on the north bank of Reclamation District No. 1500 (RD 1500) Canal. It is constructed of cast concrete in the Neo-Classical style. PH2 was built in 1929 to provide more efficient drainage service during low operating head conditions. It is 41 ft long by 18 ft wide and, like PH1, it is constructed in the Neo-Classical style. After the construction of Shasta Dam, the operating water levels exceeded the capability of the pumps, resulting in PH2 being inoperable. PH3 was built in 1952 to improved drainage service to RD 1500; it increased the transformer requirements, resulting in PG&E installing larger transformers at a ground-level substation located along the northern side of the structure. PH3 is located south and alongside PH2. PH3 is a 57 ft long by 22 ft wide reinforced concrete pumphouse, similar to PH 2.

P3b. Resource Attributes: HP11. Engineering structure; HP9. Public utility building

P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☒Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of Karnak Drainage Facility showing all three pump houses, facing northeast.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by: Kleinfelder
J. Neal, S. Dunham, and K. Willis
435 Lincoln Way
Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

B1. Historic Name: Karnak Drainage Facilities of RD 1500
B2. Common Name: Karnak Drainage Facility of RD 1500
B3. Original Use: Reclamation District Pump Facility
B4. Present Use: Reclamation District Pump Facility
B5. Architectural Style: Neo-Classical, utilitarian
B6. Construction History: *Refer to Continuation Sheet.*
B7. Moved? ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location**: N/A

B8. Related Features: Two vernacular pumping station keeper residences (one built ca. 1930 and the other by 1966). No information about the planning/installation of staffing was revealed. The East levee, RD 1500 canal (historically referred to as Main Drainage Canal or Central Canal), Sacramento Slough (east of the East Levee and in its natural course), and East Canal (confluence with Sacramento Slough east of the levee), and Sutter By-Pass (bounded by levee).

B9a. Architect: N/A **b. Builder**: N/A

B10. Significance: **Theme**: The Architecture of Agriculture and Flood Control Development **Area**: Sutter Basin

Period of Significance: 1914-1952 **Property Type**: pumping station **Applicable Criteria** A

Research has yielded no information to suggest that the Karnak Drainage Facility is directly associated with the lives of persons significant to the nation's past (Criterion B/2). The architecture and design of the facility, which employs Neo-Classical and utilitarian elements, are typical of water control facilities. Research has yielded no information to suggest that the facility represents a significant departure from established reclamation design or practices contemporary to period in which it was built. Further the architect and builder for the facility were not identified, however it is unlikely that the facility represents the work of a master (Criterion C/3). It is unlikely that the facility has the potential for additional data that could yield information important to the prehistory or history of the nation (Criterion D/4). However, Karnak Drainage Facility (RD1500-JN-03) is associated with events that have made a significant contribution to the broad patterns of the history and cultural heritage of the United States (Criterion A/1). As a result, the Karnak Drainage Facility (RD1500-JN-03) is recommended as eligible for inclusion in the NRHP at a local level and CRHR under Criteria A/1.

The Karnak Drainage Facility are recommended eligible for listing in the NRHP and CRHR at a local level of significance under Criterion A/1 for their important contributions to the development of flood control and agriculture in the Sacramento Valley. The facility has a period of significance between 1914 and 1952 when the pump houses were initially constructed. The pumping facility play a critical role in flood control allowing for the Sutter Basin and RD 1500 to be drained, thus allowing for residential and agricultural development within the district. The boundaries for the Karnak Drainage Facility include PH1-3, the pumphouses' associated conduits and gates, three small sheds, and a drainage ditch. The sheds, weather station, and ditch appear to have been constructed outside the period of significance. The Karnak Drainage Facility retains historic integrity of original design and material, along with its original location and setting, the Facility clearly convey its historical importance in flood control and agricultural development.

B11. Additional Resource Attributes: HP9, HP20, HP11

B12. References: *Refer to Continuation Sheet.*

B13. Remarks: None.

B14. Evaluator: J. Castells. Kleinfelder, 435 Lincoln Way, Auburn, CA 9560

Date of Evaluation: 17-Feb-21

(This space reserved for official comments.)

L1. Historic and/or Common Name: Ditch

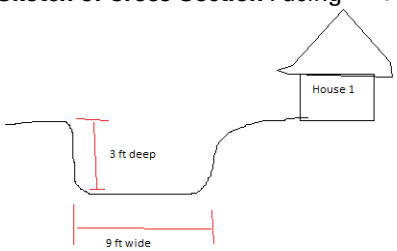
L2a. Portion Described: ☐Entire Resource ☒Segment ☐Point Observation **Designation:**
Location of point or segment: Northwest portion of Karna Drainage Facility.

L3. Description: This is a 640-ft segment of a ditch at the Karnak Drainage Facility of RD 1500. The ditch is located in the northwest section of the Karnak Drainage Facility, starting east of the northmost a residential structure, wraps around the residential structure (Temp#RD1500-JN-07), then turns south and west of a second residential structure and a weather station. An access route crosses the ditch where its located west of both residential structures; the ditch goes under the route through an 8-inch diameter corrugated culvert. The ditch measures 3 ft wide by 1 ft deep in the southwest end within the survey area and 9 ft wide by 3 ft deep near the culvert. The ditch is fed by a white polyvinyl chloride pipe that appear to be overflow from a tank in Shed 2. Only the segment of the ditch that fell within the Project survey area (Dunham, et al 2021) was recorded; it was noted that the ditch continues southwest, through a black corrugated pipe under another access route, and lets out into the RD 1500 Canal.

L4. Dimensions:

a. **Top Width**: 3 ft on the southwest end and 9 ft toward the east end.
b. **Bottom Width**:
c. **Height or Depth**: 1 ft deep on the southwest end and 3 ft deep toward the east end.
d. **Length of Segment**: 640 ft

L4e. Sketch of Cross-Section Facing: North. Not to scale



L5. Associated Resources:
Unnamed Concrete Slab Bridge (Temp# RD1500-JN-01)
East Levee (Temp# RD1500-JN-02)
Karnak Drainage Facility (Temp# RD1500-JN-03)
Reclamation District 1500 Canal (Temp# RD1500-JN-04)
East Canal (Temp# RD1500-JN-05)
Residential Structure (Temp# RD1500-JN-06)
Residential Structure (Temp# RD1500-JN-07)

L6. Setting: The ditch is located in rural Sutter County. Vegetation consists of manicured lawn and riparian vegetation. The segment of ditch is encompassed by the Karnak Drainage Facility. It begins at Shed 2 where a white polyvinyl chloride pipe leading from an overflow from a tank in the shed lets out in the ditch. The ditch wraps around a residential structure (Temp# RD1500-JN-07), then turns south and west of the residential structure, a second residential structure (Temp# RD1500-JN-06), and a weather station, before continuing southwest outside of the survey area. The ditch continues southwest, through a black corrugated pipe under an access route, and lets out into the RD 1500 Canal. *See Continuation Sheet for additional information and historic context.*



L7. Integrity Considerations: The ditch is in generally good condition and its form and does not appear to have undergone significant function changes since construction. The ditch appears to have been constructed outside the period of significance.

L8B. Description of Photo, Map, or Drawing: Overview of Ditch and House 1, facing east.

L9. Remarks: None

L10. Form Prepared by: J. Neal, S. Dunham, and K. Willis

L11. Date: January 21, 2021

B6. Construction History: *Continued from Building, Structure, and Object Record for Karnak Pump House 1*

PH1 was constructed in 1914 as part of the greater effort to reclaim the Sutter Basin, an area between Sutter Butte and the confluence of the Sacramento and Feather rivers. At the time of construction, it was reported to be one of the, if not the, largest pumping stations in the world, capable of pumping 1,200 cfs from the RD 1500 Canal that bisected RD 1500 lengthwise south from the Tisdale Bypass.

PH1 is 107 ft, 5 inches long and 34 ft, 5 inches deep (1914 plans) with its length orientated on and parallel to the north bank of the RD 1500 canal. It is constructed of cast concrete in the Neo-Classical style. Water is pumped from the canal and discharged through levee in Sutter Bypass. The building is supported by six concrete trapezoidal footings extending from the beneath the canal bed, through the levee bank, and then incorporated on the facade as minimally projecting pilasters to the tops of windows (ASAE 1922; BR 1983).

A 5-foot-thick reinforced concrete floor is built on top of the piles. The walls are made of reinforced concrete, are 4.5 ft thick at floor level, taper to 2.5 ft thick at the 100-year event flood plain elevation (42 ft), and taper from there to 1.25 ft thick at the roof line. The lower portion of the building doesn't have openings; the windows and doors are above the 43-foot elevation (United States Engineering Department datum). Interestingly, the building features two elevated water tables. Six conduits rise out of the canal before entering the building at the first table, which at 6 ft, is only slightly taller than the conduit diameter. Elevated water tables are expected in Neo-Classical design, but the use of the second is a visual reminder of how the RD 1500 engineers planned for flood events that may overpower the pump capacity. The second water table is 12 ft high and roughly one half of the elevation height. Here, the pilasters change from trapezoidal to rectangular at the top of the second water table. PH1 is designed so that the building and equipment's total weight would not float during high water levels. All of the building's windows are placed above the water table, a design. The district engineers also minimized the possibility of the electric pumps shorting out due to inundation from flooding by placing the windows in the upper half of the elevation. Photos of the 1915 flood show the plan worked - flood waters crested only just below the windowsills. Each window set is framed by a slightly projecting Tuscan surround. The frieze band and cornice of the surround's entablature are extension of those wrapped around the entire building. The words "RECLAMATION" "DISTRICT" "NUMBER 1500" are centered in each entablature, respectively. The window sets are comprised of three 4x8 multi-paned bays with a 2x6 inset casement ventilator topped by a 4x4 multi-pane ventilator with an inset 2x2 casement ventilator. All are separated by concrete mullions and dentils. A metal gooseneck light is centered in the width of each pilaster next to the small bay. The building is surmounted by a flat roof (ASAE 1922; BR 1983).

The reinforced concrete platform built along the east wall of PH1 supports electrical bus equipment, is at the floodplain elevation, and was originally used to support the electrical transformers. PH1 consists of six 50-inch Platt Centrifugal pumps direct connected to 800 hp GE squirrel-cage induction motors, operating at 248 rotations per minute (rpm) through flexible leather link couplings. Each pump produced approximately 197 cfs (88,000 gallons per minute) at a 20-foot pumping head. Two electric-motor-driven vacuum pumps had suctions connected to the top portion of the casings of all the pumps and were used for priming. During pump priming, the gate valve in the discharge line is closed. After priming, the pump is started; once the pump reaches full speed, the electric motor operated gate valve is opened. The suction pipes are about 70 ft long, extend directly from the pumps out through the south wall of the building (a distance of about 30 ft), angle downward into the sump, and increase from 50 inches to 96 inches in diameter at the lower end. These 3/8-inch wall-thickness steel pipes are supported by a steel structure. Portions of the PH1's equipment have been repaired or replaced since it was constructed. Changes since initial construction of PH1 include the transformers being moved from easterly bays from about 1939 to 1952. Two bays are added to the east end of the former transfer bay in 1950. The connection is visible in between the second and third bay on the south elevation. The installation of 6x3 glass brick windows in the top half of the south and north transformer bay elevations.

After 1970, the easternmost lower window bay is partially replaced with a pedestrian door. One row of panes remains as a transom light. The door is accessed by an exterior set of stairs with a landing at the same elevation as the transformer bay roof. Modern operating equipment is installed on the roof and is accessed by the stairs. An exterior walkway is installed slightly above the conduit height along the south elevation. The original ball and pipe railing was replaced at the exterior staircase attached to the west elevation. Overhead cables now extend over the canal and enter the building through exterior mounted conduit or directly through the concrete at the upper southeast corner. Electric metering boxes are attached at the northeast corner of the north elevation and covered by a rudimentary wood or metal flat overhanging roof (ASAE 1922; BR 1983).

B6. Construction History: *Continued from Building, Structure, and Object Record for Karnak Pump House 2*

PH2 was built in 1929, fifteen years after the construction of PH1, to provide more efficient drainage service to RD 1500 during low operating head conditions. However, PH2 has never functioned properly. PH2 is smaller than PH1, measuring 41 ft long by 18 ft wide, and is also constructed in the Neo-Classical style. While smaller in massing compared to the PH1, it shares the same style with less refined details. The building is largely intact with little changes since the end of construction. The equipment was manufactured by Westinghouse Electric & Manufacturing. This pumping station sits over the RD 1500 Canal and the intake conduits are vertically positioned under the building. The conduits then extend through the foundation wall and easterly through the levee to discharge into the East Canal and Sacramento Slough. A steel I-beam extends easterly from the roof and through a modern interpretation of a balustrade in a position typically seen in Federal or Neo-Classical architecture. The beam connects to the peak of two connected beams extending diagonally into the ground to form triangular space approximately 30 feet of the entrance. The structure supports a small communications unit (satellite or antenna) thought to have been installed in the last 15 years. After the construction of Shasta Dam, the operating water levels exceeded the had capability of the pumps, resulting in PH2 being inoperable. The conduits were plugged with concrete after the construction of the 1950-1952 Karnak PH3. Portions of the electrical equipment were removed, and the electrical motors were left in nonoperating condition. PH2 is no longer used by RD 1500 (ASAE 1922; BR 1983).

B6. Construction History: *Continued from Building, Structure, and Object Record for Karnak Pump House 3.*

PH3 was constructed in 1952, 23 years after the construction of PH2, as a means to also improve the drainage of RD 1500. This pump house is larger than PH2 and smaller than PH 1. Despite the difference in massing, PH3 is of the same style and exhibits similar levels of refinement in details as PH2. The building is largely intact with little changes since the end of construction. PH3 sits over the RD 1500 Canal and the intake conduits are vertically positioned under the building. The conduits then extend through the foundation wall and easterly through the East Levee to discharge into the Sacramento Slough. The fenestration arrangement is near identical to PH2; however, the window sets flanking the door each hold two casement ventilation panels that open outwardly. The front door was planned as solid oak with four rectangular panels, symmetrically placed in the width and height. The door has since been replaced with a steel door with three panes of fixed glass stacked vertically in the top half. The most notable change at the pumping station is the installation of a large steel bunker spanning the width of the roof and running two thirds of the building's length from the north. The structure houses the battery backup for the pump and is accessed from the interior. Electrical conduit has been added to the southeast elevation leading to the bunker. Three chain pulls are attached to the east elevation, used to lift and access the below-grade pumps. Two modern lights are installed at the top corners of the window/entrance bay (ASAE 1922; BR 1983).

Associated Structures and Features

In addition to the three pump houses and the ditch, the site contains three sheds, a weather station, and a ditch. The sheds and weather station appear to have been constructed outside the period of significance.

Shed 1 is a single pen front gable side shed. It is sheathed in corrugated metal and asphalt shingled. It was on-site after 1967.

Shed 2 is a square single pen building which houses a water pump and discharges into the ditch. It is surmounted by a hipped roof. The entrance faces west. A wing has been added at the north. The shed was on site after 1967; however, the addition was added after 1992.

Shed 3 is a rectangular single pen shed with a sliding door on the south elevation. It is sheathed in corrugated metal. It was on-site circa 1967.

The weather station is elevated on four wood piles set in a square concrete base. Instruments are housed in by four louvered panels, including one hinged access panel. It is surmounted by a gabled roof sheathed in asphalt. Historic aerial photos indicate it was likely on-site by 1966.

Karnak Drainage Facility

Before construction of the Karnak Drainage Facility, the Sutter Basin was flooded the spring and swampy in the summer; most of the development was by farmers who relied on flooding for their crops. The pumping stations were part of the RD 1500 project. RD 1500 was officially developed by the State of California; however, the district was intertwined with the SBC which was mostly owned by Ogden Armour and William Gerber. RD 1500 was intended to drain and develop 45,000 acres of land in the Sutter Basin between Tisdale Bypass and the Karnak Drainage Facility. RD 1500 was thought to have the largest capacity of any other in the world, requiring two clamshell dredgers at an estimated cost of $100,000 each and at least seven dredgers operated 24 hours a day. Ogden was able to influence a decision by state officials to move the proposed Sutter Bypass east from the middle of his lands (in the general location of the Sacramento Slough) to its current location, thereby allowing Ogden to increase potential profits from reassessment and bonding or leasing of the tracts within the 45,000 acres after reclamation. The SBC sold its last parcel in 1946. Overall, RD 1500 changed the Central Valley in immeasurable ways in regard to both agriculture and flood protection, with the Karnak Drainage Facility being a key component to the operation of the district. It is acknowledged that while some of the absolute language published describing the project could be hyperbole, it reflects the extraordinary event, decades in the making, that was experienced by many (ASAE 1922; BR 1983).

The Karnak Drainage Facility includes three pump houses (PH1, PH2, and PH3), their associated components and equipment, and several houses. The facility was established with the erection of PH1 in 1914; it was reported to be one of the biggest in the world and cost an estimated to $220,000 to construct. PH1 was constructed under direction of George Randle, who was noted as the "Chief Engineer Armour people in the Sutter Basin" (MED 1914). PH1 is constructed in the Neo-Classical style and is parallel to the RD 1500 Canal. It is designed so that the building and equipment's total weight wouldn't float during high water levels. It disposes of daily run-off water 5/8 inches deep from the RD 1500 net area and 2 ½ cfs per mile of levee seepage water. PH1 had six 50-inch Platt centrifugal pumps (each driven by an 800 horsepower [hp] General Electric [GE] meter), a capacity of 1,200 sec ft, and used every accessible water source to drain all the water off 60,000 ac. within the basin so the area could be cleared of tules to make space for commercial crops. In order to increase irrigation each year, PH1 pumped out surplus rainwater, seepage, irrigation water, and accumulative ground water. It was also designed to withstand future floods by placing windows high above a reasonably anticipated flood elevation. Images from the February 1915 flood show that the design stood, and the pumps could remain functional in times of high water. The words "RECLAMATION" "DISTRICT" "NUMBER 1500" are centered in each entablature, respectively. Parts of PH1 have been upgraded or replaced since the building's original construction. PH2 was built in 1929 to provide more efficient drainage service during low operating head conditions; it is smaller than PH1 and also constructed in the Neo-Classical style. After the construction of Shasta Dam, the operating water levels exceeded the head capability of the pumps, resulting in PH2 being inoperable. Portions of the electrical equipment were removed, and the electrical motors were left in nonoperating condition. PH3 was built in 1952 to improved drainage service to RD 1500; it increased the transformer requirements, resulting in Pacific Gas and Electric Company (PG&E) installing larger transformers at a ground-level substation located along the northern side of the structure. The pumps were designed to discharge 184 cfs (83,000 gallons per minute) at an approximate 17-ft pumping head. Portions of PH3's equipment was repaired or replaced since the buildings initial construction (ASAE 1922; BR 1983).

General Historic Context

The Sutter Basin is a low elevation triangular land mass between the Sacramento River to the west and the Feather River to the east. Its wide northern boundary is generally marked by the Sutter Buttes and its southern point is the confluence of the Sacramento and Feather rivers. Historically, these rivers overflowed their banks during annual freshets, resulting in the Sutter Basin being covered by water during the spring, then becoming swampy and tule covered in the summer. At the time, the main development in the Sutter Basin was by farmers who cultivated rice on private lands bordering the river banks as the wet and low-lying areas were ideal for rice cultivation. Flooding spread sediment across the Sacramento Valley with the greatest amount deposited closer to the rivers. The sediment build-up influenced the orientation of these rivers in relation to each other and their slopes, creating a natural basin ideal for irrigation and drainage if natural flooding could be eliminated. The Sacramento Slough was a natural outlet of flood waters in the south end of the Sutter Basin. Prior to the development of RD 1500, the slough ran a natural course from approximately 3.5 miles northeast of Knights Landing to its confluence with the Sacrament River approximately 2,700 ft west of its confluence with the Feather River. RD 1500 would be the fruition of decades long discussions and efforts regarding reclaiming the basin's tule areas and controlling the frequent, devasting floods of the Sacramento and Feather rivers (American Society of Agricultural Engineers [ASAE] 1922; Bureau of Reclamation [BR] 1983; Guise 1965).

One of the first documented plans to reclaim Sutter Basin land was proposed in 1856 by United States (US) Surveyor General John A. Brewster. He proposed to construct internal navigation canals, aqueducts for drainage of tule marshes, and prevention of overflows (Hagwood 1981). Before any meaningful change had occurred, hydraulic mining methods for the extraction of gold exploded in the Sierra Nevada and Northern California. As a result, untold amounts of earth were deposited downstream, carried by high-velocity water flow in mountain tributaries before slowing in the Sacramento River and Feather River valleys. This pattern, along with farming in the basin, re-channelized and raised riverbeds, contributing to consistent, destructive flooding and navigation issues as far away as San Francisco. In the absence of a basin-wide plan, property owners could reclaim their land within the basin as they saw fit. This eventually resulted in an "every man for himself" condition in which landowners only protected lands against inundation flowing from immediate neighbors. The levees of the basin gradually elevated until there was no capacity to bypass flood waters; if all the individual levees were to crest at the same time, 600,000 second ft (sec ft) (the common measurement for flow of irrigation water moving by gravity from streams and reservoirs) of water would detrimentally discharge to the tidewater in the bay, contributing to the hazardous flooding problems (ASAE 1922; Guise 1965; BR 1983).

State Engineer William Hammond Hall suggested the actual bypass concept as a means to control flooding in the Sutter Basin in 1880. In 1894, Engineer Carl E. Grunsky of the State Engineer's staff recommended a similar plan, but no action came of either plan. The California Debris Commission (the Commission), established by the federal government in 1893, addressed the detrimental conditions on the Sacramento and Feather rivers. The Commission established Central Valley reclamation districts specifically to address the flood exacerbation and navigation challenges caused by hydraulic mining's damaging practice. The Commission wanted an economic plan with a definite schedule to control the Sacramento River and improve navigation (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983)

The Commission established a plan to dredge the Yuba River and deposit the dredge materials on the riverbanks as barriers to the flood waters, which would effectively become levees. It included enlargement of existing channels, overflow of surplus water at specific channel points, bypass channels, and means to quickly get water into Suisun Bay. The Commission's consultants created the Jackson Plan which identified 10 means to accomplish the goal, including reconstructing the Tisdale Weir and connecting it to the Sutter-Butte Bypass to have a capacity of 35,000 cubic ft per second or sufficient to carry the excess water that reaches that point. The Commission's plan was estimated to cost $33 million. Congress accepted the plan but only funded a small part of it. Joseph J. Hagwood noted in his history of the Commission that "the report became the very foundation of all work on the Sacramento River (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983).

One of the California companies that based their work on the report was the Sutter Basin Company (SBC), established by J. Ogden Armour. Armour was a nationally known Chicago meatpacking magnate. His impact on US industry was significant. He grew his father's business from $182 million to $1 billion and was believed to be the second wealthiest man in American after John D. Rockefeller. A brief article about his death noted that he went on to develop similar stock yard and meatpacking subsidiaries in South America. As with many magnates of the time, Armour had a reputation of dubious business practices, some of which were documented by author Upton Sinclair, who worked in Armour plants while researching for his seminal work, The Jungle. Sinclair also published articles regarding the conditions observed. In 1903, the Sacramento Bee noted that Armour was subpoenaed to testify in a case regarding shorting, or rebates, surrounding the Fruit Growers Express Company. In 1904, Armour was deeded a large 6,000-acre (ac.) parcel of land west of Sacramento to secure his cash payment to the previous deed holder, however, the Natoma Water Company had bonded the land. The Sacramento Star mentioned that Armour was "heavily interested in gold dredging" in the area. He reconveyed the property five years later, presumably after the cash advance was repaid (Sacramento Star 1904, 1909).

Armour led a group that founded the SBC in 1911 with the intent to drain and develop 45,000 ac. of land in the Sutter Basin. During this time, Armour and other meatpackers were subject to overturned rulings under anti-trust, food safety, and labor relation legislation in the Midwest that were at work since 1903. This resulted in significant revenue drops for the companies. When Armour entered the California market, he sought to expand his influence on commodities. From 1917 to 1921, he made his company publicly traded through $60 million in bonds (SBC was also bonded during this time), his company lost $125 million in two years, and was $144 million in debt. He lost most of his personal fortune and he even lost $1 million a day for a month straight. He was ousted from the company in 1923. The financial ruin trailed him in death too. His widow elected not to pursue financial recovery from SBC bonds, but absorbed the debt owed to her from lessors, who then assumed ownership of the land upon the bond debt relief (Britton 2018; Intelligencer 1911; Lake Forest College 2020; Lead Daily Call 1927; Sacramento Bee 1903).

In 1915, the Commission vested authority in the California Reclamation Board as part of its plan to control flood waters of Sacramento and San Joaquin valleys. The US deeded all swamp and overflow land to the State of California under the condition that it reclaim the land with the goal of controlling the flood waters. The California Reclamation Board created the Sacramento and San Joaquin District as a means to complete levee assessments for the project, which encompassed RD 1500. Armour and a group of businessmen in Sacramento lobbied the state and federal governments to create RD 1500 as a means for paying for the development. In 1915, RD 1500 was officially created under California Law with a special act of the State Legislate. The SBC and subsidiaries were incorporated, and the project started with the majority of the costs being funded by the SBC. RD 1500 was bounded on the west by the Sacramento River, on the north by Tisdale Bypass, and on the east by the west levee of the Sutter Bypass (California State Library [CSL] 1916). RD 1500 was 19 miles long and 18 miles wide at its max. It would bring 66,000 ac. into cultivation, 45,000 of which were owned by SBC. The project promoters acquired the land by purchasing it or obtaining options. The land owned the system; each ac. represented one share of stock in Sutter Mutual Water Company and individuals privately owned most of the high lands along the Sacramento River. SBC was moderately successful – Armour and company were able to establish reclamation and a massive agricultural enterprise; however, failed bonding attempts and other factors disallowed for the profit initially assumed. It is documented that Armour lost up to $17 million. SBC paid $600,000 for Sutter Basin land that would eventually fall within RD 1500 (ASAE 1922; Marysville Evening Democrat [MED]1915; McKinney 2016; BR 1983).

RD 1500 operations fell under two classes: 1) concerns with operation and maintenance of drains and pumping plants for RD 1500 de-watering; and 2) concerns with operation and maintenance of the levees. Levee maintenance and operation projects were performed under the supervision of Public Works in accordance with rules and regulations prescribed by the Secretary of War as provided by Federal and State laws. Before work began, a full topographic survey and plan table survey with a contour interval of 6 inches were completed. The surveys established accurate benchmarks over RD 1500 and the resulting maps made it possible to plan out an irrigation system. Two of the major RD 1500 projects were the construction of the Tisdale Bypass and the Sutter Bypass. The Tisdale Bypass would eventually become the northernmost property boundary for the SBC, while Sutter Bypass was a more complex project (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983; Sutter County Farmer [SCF] 1912).

Reclamation District 1500 Litigations, Injunctions, and Land Assessments

From 1913 to 1915, the levee, drainage canals, pumping plant, and other reclamation components progressed in construction as court injunction and litigations held up other work components. The Sutter County Board of Supervisors (BOS) brought a suit against RD 1500 with the intent of preventing construction of the East Levee. Although an injunction was obtained from the lower court, RD 1500 appealed to the State Supreme Court and the case was set aside with a writ of prohibition. Not long after, a second suit was brought against RD 1500 by Samuel Gray and a number of Sutter County landowners with the same goals as the first. No injunction was issued, and the lower court ruled in favor of RD 1500, but then the appeal was taken to the State Supreme Court where the decision of the lower court was unanimously reversed. As a result, the Tarke Bill was introduced to State Legislature, with the intent of preventing levee construction, but didn't pass (ASAE 1922; BR 1983).

As controversy surrounded RD 1500 and SBC's influence on it, Armour remained resolute in his vision. In 1913, SBC issued $2.75 million in bonds with 6% interest for 40,000 ac. within Sutter Basin through Louis Sloss & Company in Chicago and the Continental and Commercial Trust and Savings Bank, secured with $6 million of SBC. The land was valued at $11 million (MED 2013). However, Armour owned 75% of the land within the Sutter Basin so it was clear he would benefit the most. The SCF reported Armour's visit to the area in April 1914, "with regard to the reclamation work in which I am interested, I can only say that extensive colonization plans have been laid, and that we are looking for the co-operation [sic] of the entire valley. We are not engaged in a philanthropic enterprise. Our plans are strictly commercial but the benefits resulting therefrom will reach every citizen and every resident in the vicinity…we are doing all we can" (SCF 1914a).

RD 1500 was so large that families visited the dredging settlement at Sutter Basin (SCF 1914b). The size and scope of the work was so expansive that RD 1500 was issued stock warrants to continue paying for the large costs of construction. In January 1914, Board of Trustees (BOT) petitioned the Sutter County BOS to appoint commissioners to assess the RD 1500 so calls could be made to provide funds to pay the stock warrants. Three assessments occurred from 1919 through 1930 (ASAE 1922; BR 1983).

In August 1919, the first assessment valued land at $5,000,000; it was approved by the Sutter County BOS and became a lien on RD 1500 lands. Some landowners paid cash in the accumulated amount of $447,013.22, but after 30 days, the remaining $4,952,986.78 became subject to an interest rate of 7% per year. In January 1920, the BOT issued 6% bonds to mature in annual installments over the course of 11 years with the first maturity occurring in January 1930. The entirety of the bonds sold at face value to SBC. Although the bonds were paid without default through 1923, the BOT anticipated that adverse trends in agriculture would make it difficult for landowners to pay the first maturity in addition to interest. The BOT pushed to amend a reclamation law so RD 1500 could refund bonds, provide for long term amelioration of bonds, and left the fixing of maturities in the discretion the BOT, provided that they be paid within 50 years of issuance. In 1929, the Bondholders Protective Committee was formed at the request of the BOT and funded by RD 1500 with the purpose of soliciting deposit of outstanding original bonds to be exchanged for refund bonds. The program was a success and bonds were refunded in the amount of $4,778,986.77, and maturity periods changed to 22 years. In February 1930, a second assessment of RD 1500 was approved with the intention of providing funds to pay the stock warrants issued after the first assessment and RD 1500 construction costs. The assessment had a net worth of $736,946 after paying the costs of debt assessments for reclamation work and stock warrant costs. In July 1930, the third assessment had the intention of completing maintenance valuation for each parcel of land in RD 1500 and was not a lien on the land. Though the BOT occasionally made calls on the third valuation as funds became necessary for operation, maintenance, and incidental expenses of RD 1500, at which point the calls became liens (ASAE 1922; BR 1983).

When RD 1500 landowners failed to meet calls on valuation, their lands were sold for delinquency to the County Treasurer, who was the RD 1500 Trustee and Trust of the RD 1500 bond fund. Landowners had a year following the sale to make a redemption. If they didn't, the title of the land was passed to the County Treasurer. Delinquencies occurred from 1925-1928 and the County Treasurer acquired approximately 4,900 ac. of land. Delinquencies under the first assessment could be sold for the total delinquency amount plus a 20% penalty and 7% annually compounded interest. Delinquencies under the second and third assessments cost the full delinquency amount plus a 10% penalty and 7% annually compounded interest. Statutes prior to 1931 didn't allow crop production on delinquent lands. These factors made it nearly impossible for anyone to buy back their property and resulted in much of the land going to waste (ASAE 1922; BR 1983).

In 1931, the State Legislature passed an amendment to the reclamation law so that after the lapse of one year following the redemption period of any land sold to the County Treasurer as trustee, the land could sell at fair market value as ascertained by the highest cash bidder, subject to any district assessments. The amendment gave the BOT possession of the delinquent lands after a one-year redemption period and allowed it to spend funds to retire liens on lands superior to the title of the County Treasurer as trustee to manage, control, and lease to tenants for a reasonable rent. Money collected was applied to incidental expenses of hold and leasing lands; maintenance assessments against such lands; and other incidental expenses, legal charges against RD 1500, or bonds and interest coupon purchases of RD 1500 for retirement. The majority of leased lands had no water rights and were leased on a dry farming basis with tenants paying to furnish water for irrigated crops. Some tenants made irrigation arrangements with people who owned land on the Sacramento River while others pumped water from RD 1500 drains, resulting in many being excluded from renting land lest they could afford to irrigate it (ASAE 1922; BR 1983).

Reclamation District 1500 Irrigation and Drainage System

Reclamation plans included levee construction with levee and bank erosion prevention in order to protect against overflow from flood waters. Levee heights were determined from the maximum high-water plan based off the 1907 flood. The flood runoffs were as follows: 54,000 sec ft in the Sacramento River below Tisdale; 189,000 sec ft in the flooded area above the Feather River; and, 385,000 sec ft in the flooded area below the Feather River. Then 50% was added to the flood's high-water marks to establish the high-water plan, with an additional 5-ft increase to establish the levee heights. The levees had 20-ft-wide crowns with slopes that had a ratio of five to one on the water side and two to one on the land side. The West Levee is 20 to 25 ft tall above ground elevation and the river levees average about 20 ft tall. The ground was cleared of all perishable materials and plowed where the levee base locations were planned. Most levee work was completed with the use of large floating clam shell dredgers with a bucket capacity of 5 cubic yards (CY). During construction, there could be as many as 15 dredgers working on the levees at a time. One dredge, the "Armour", was built at the Stockton Iron Works. Its hull was 160 ft long by 61 ft tall with a 205-ft-long boom. The boom weighed 24,000 pounds and was capable of moving 5 CY. The Armour operated 24 hours a day utilizing three crews. Dredging occurred from 1913 to 1915 before being held up for two years as a result of the aforementioned court injunction and litigations. Dredging resumed in 1917 and the final closure of the levees occurred in December 1918. The Sacramento River Levee is 54.6 miles long, the East Levee is 20.7 miles long, and the North Levee is 4.5 miles long. Timber sheet pilings, brush mattresses, and trees were planted to protect wave action and natural currents that may erode the levees and cause slides in exposed places. In 1928, erosion was also abated in one location by placing trees and using Bignell piles to anchor brush. Shortly after the completion of levee work, RD 1500 focused on drainage (ASAE 1922; BR 1983; SCF 1914b).

A system was designed to provide ample drainage, dispose of seepage and rain waters, and work with irrigation. A pumping plant (later called Karnak Drainage Facility) was planned near the south end of RD 1500 where a levee was built across and used the natural drainage of Sacramento Slough. The overall system included several pumping plants (Tisdale, Portuguese, State Ranch Bend, and Karnak). Tisdale Pumping Plant is the northernmost plant with the capacity to serve 80% of the land. Portuguese Pumping Plant is the southernmost plant and an independent unit built because it couldn't be reached by the East and West canals. RD 1500 Canal (historically referred to as the Main Drainage Canal and Central Canal) began at Tisdale. Three primary canals branched from Tisdale Pumping Plant: West Canal on the west side of RD 1500, East Canal on the east side of RD 1500, and the RD 1500 Canal down the center of the eastern half of Sutter Basin. Construction of the entire irrigation system finished in 1919, shortly after the levees were finished, and cost $1 million to build (ASAE 1922; BR 1983; Sacramento Bee 1915).

Sutter Bypass was originally planned as a trough covering the natural course of the Sacramento Slough through the center of RD 1500 and SBC. However, the California Reclamation Board moved the location of the Sutter Bypass to its current location, further east and closer to the Feather River. Instead, Sacramento Slough was developed into RD 1500 Canal, traversing the entire length of RD 1500 north to south, ending where it met with Karnak Drainage Facility. RD 1500 Canal declined 10 ft in elevation from the north end to Karnak Draining Facility, had an average depth of 9 ft, and measured 125 ft wide at the south end. The first ½ mile of the RD 1500 Canal had a velocity of 2.5 ft per second before flattening out to 1 cfs. Sediment pumped into RD 1500 Canal tended to deposit at this gradient change but could easily be removed. The canal had a 690 sec ft capacity and measured 36 ft wide at the bottom for the first 1 mile, but broadened out to 60 ft in more level ground. It was dredged to be used in conjunction with Power House (PH) 1 during early stages of reclamation (ASAE 1922; Hagwood 1981; BR 1983; SCF 1912).

The drainage system included laterals and sublaterals, generally located on section and section subdivisional lines, resulting in approximately 50 miles of lateral drains and over 250 miles of sublaterals. They were placed to drain every ¼ section of land and conveyed water to the RD 1500 Canal and PH1. Large portions of lateral drains were excavated by Austin trenching machines due to the land being relatively level. The drains were designed to keep the water table at least 5 ft below the surface and excavated by tracklaying dragline excavators. SBC built several miles of subsidiary drains in certain locations where seepage conditions were worse. SBC's subsidiary drains were shallower than RD 1500 drains, serving for quick run-off of the winter rains and seepage and emptied into the RD 1500 drains, extending the drainage system. SBC trenched two small experimental fields with tile-drains with use of a Funk power ditcher. These were placed at varying depths and distances (3 ½-5 ½ ft deep and 50-100 ft apart). Tiles ranged in size from 4-6 inches in diameter. Gravel replaced tile in some locations to compare functionality. Drainage actions were observed from manholes. In 1922, a gravity outlet works was constructed through the East Levee at the lower end of the RD 1500 Canal; when the Sacramento River subsided, it automatically carried off drain water and ensured good drainage. PH1 shut down in July until the river rose in late fall or winter during the irrigation season, decreasing operating costs despite the April 1 to October 31 irrigation season (ASAE 1922; BR 1983).

The irrigation system was designed to carry peak demand of water and deliver water on each 40-ac. tract of land at an elevation at least 1 ft higher than the highest land in the tract. Canal capacities were based on a duty of 1 sec ft for 80 ac. with a minimum head of 6 sec ft for any 40-ac. tract. The top width of the canal banks varied from 3 to 6 ft, many of the canals had a slope of 3 inches to the mile, and the bottom width of the canals varied from 5 to 60 ft. Most canal velocities were low with less than 1 cfs in most cases, with the exception of the RD 1500, West, and East canals. The West and the East canals each had a 500 sec ft capacity. During construction, dirt excavated from the canal sections was used to make embankments. Fresno scrapers built most of the canal system, but portions of the RD 1500 Canal were excavated by a dragline machine and a land dredge. Road blades hauled by tractors were used to build header ditches and field ditch roads. Martin ditchers (subsoil plows with V wings attached) and Hottell ditching machines were used to build smaller ditches. A Type 204 Pawling and Harnischfeger Dragline excavator was used to build all lateral irrigation canals, seepage ditches, and drains. A funk power ditcher was used to build 10-18-inch-wide ditches for subirrigation (ASAE 1922; BR 1983).

Besides the three main pumping plants, about 750 individual structures and 2,500 smaller structures were in the main system. Most of the main structures were built of reinforced concrete. The larger structures were equipped with screw stem gates and the majority of the other structures had wooden flash boards. Timber structures for individual field ditches were made of redwood, standardized, and made in quantities to reduce costs subirrigation. Bridges were necessary for road crossings and culverts for drain crossings; siphons and flumes were important too. A hundred miles of graded roads, 156 miles of graveled roads, and 4 miles of concrete paved roads were built in RD 1500. SBC used the Southern Pacific Railroad and the Sacramento River for transportation. Warehouses along the levees and three large and corrugated iron warehouses along the railroad were used for storage. Wells were scattered over Sutter Basin for domestic supply. A complete telephone system traversed the Sutter Basin. SBC had seven large permanent camps used as headquarters for extensive agricultural operations. In July 1949, landowners called on the BOT to offer delinquent lands in existing conditions without irrigation facilities and for sale prior to 1949. After a very rainy winter in 1950, the East Levee experienced damage. As a result, livestock and vehicle transportation on the levees was limited as to reduce damage to levees. Special permits were issued by USACE's State Engineer for transportation on levees (ASAE 1922; BR 1983; SCF 1920).

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Pump House 1, facing northeast



Pump House 1, facing north



Interior of Pump House 1



Pump Houses 1 and 2, facing southwest



Pump house 2, facing northwest



Interior of Pump House 2



Pump house 3, facing northwest



Interior of Pump House 3



Pump house 1 outlets into the East Canal/ Sacramento Slough, facing west



Pump house 2 and 3 outlets into the East Canal/ Sacramento Slough, facing northwest



Shed 2, facing northeast



Shed 1, facing northeast



Shed 3, facing northeast



Shed 1, Shed 2, and Shed 3, facing northwest.



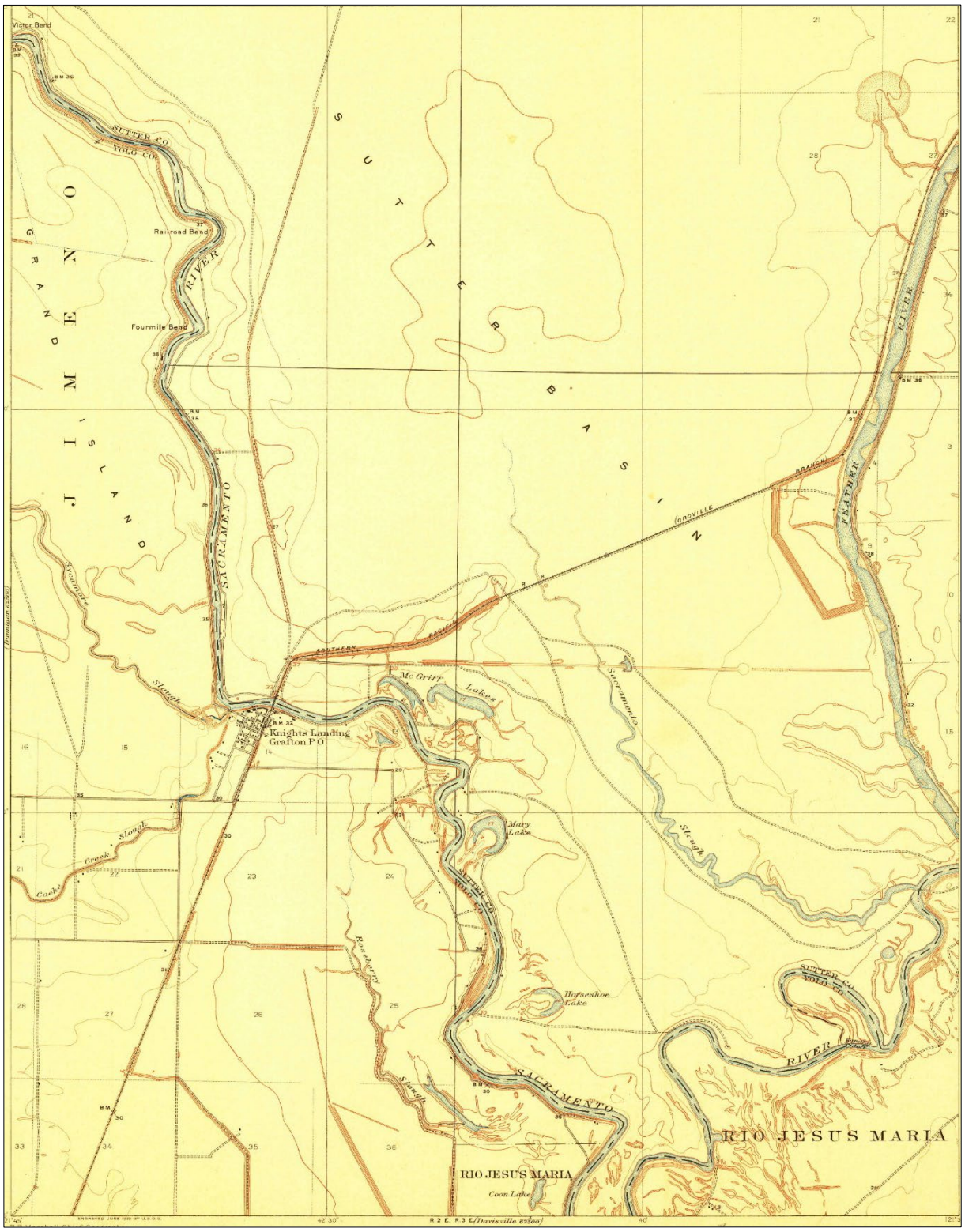
Weather Station, facing west.



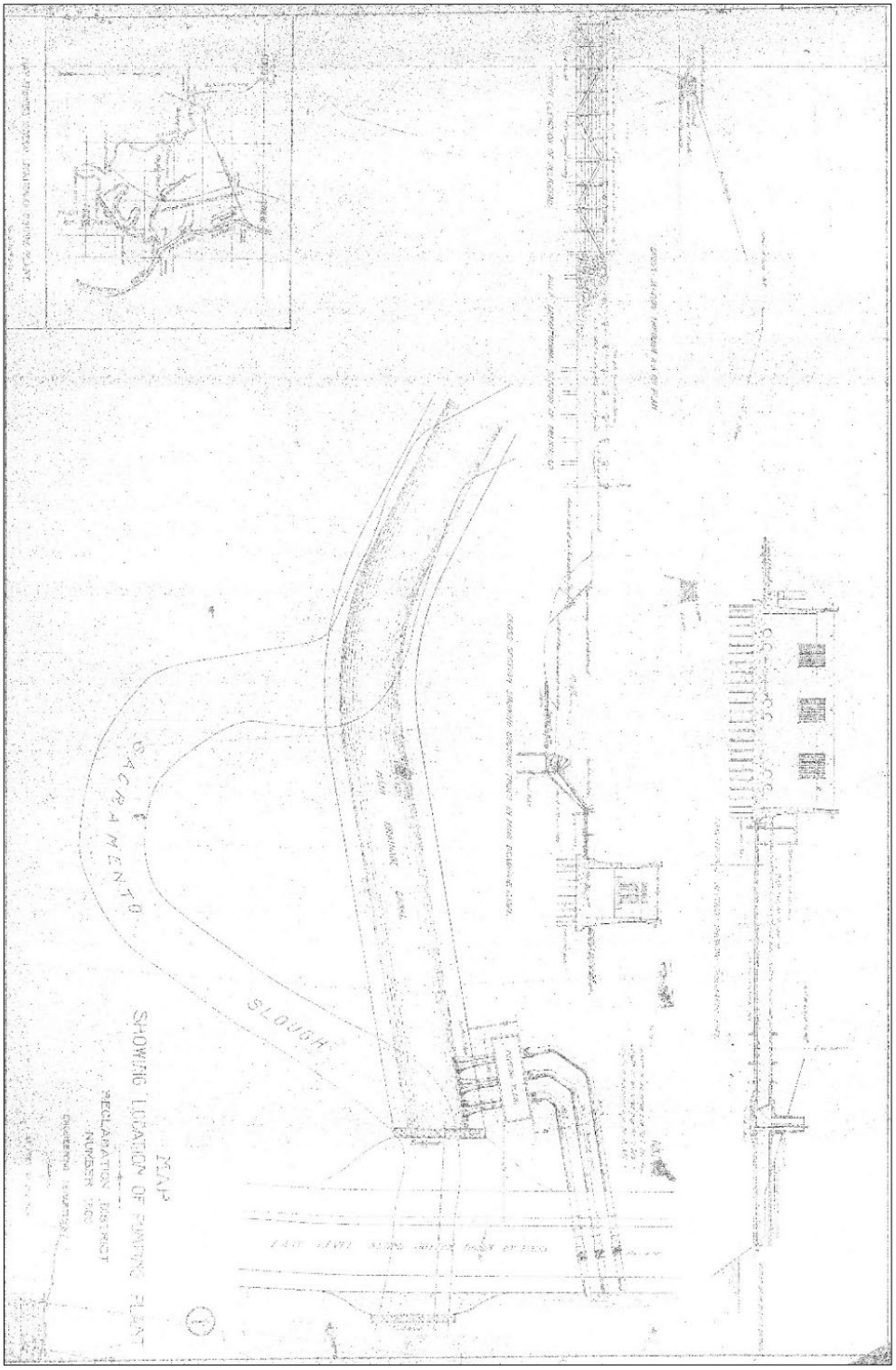
Overview of the ditch, facing northeast.



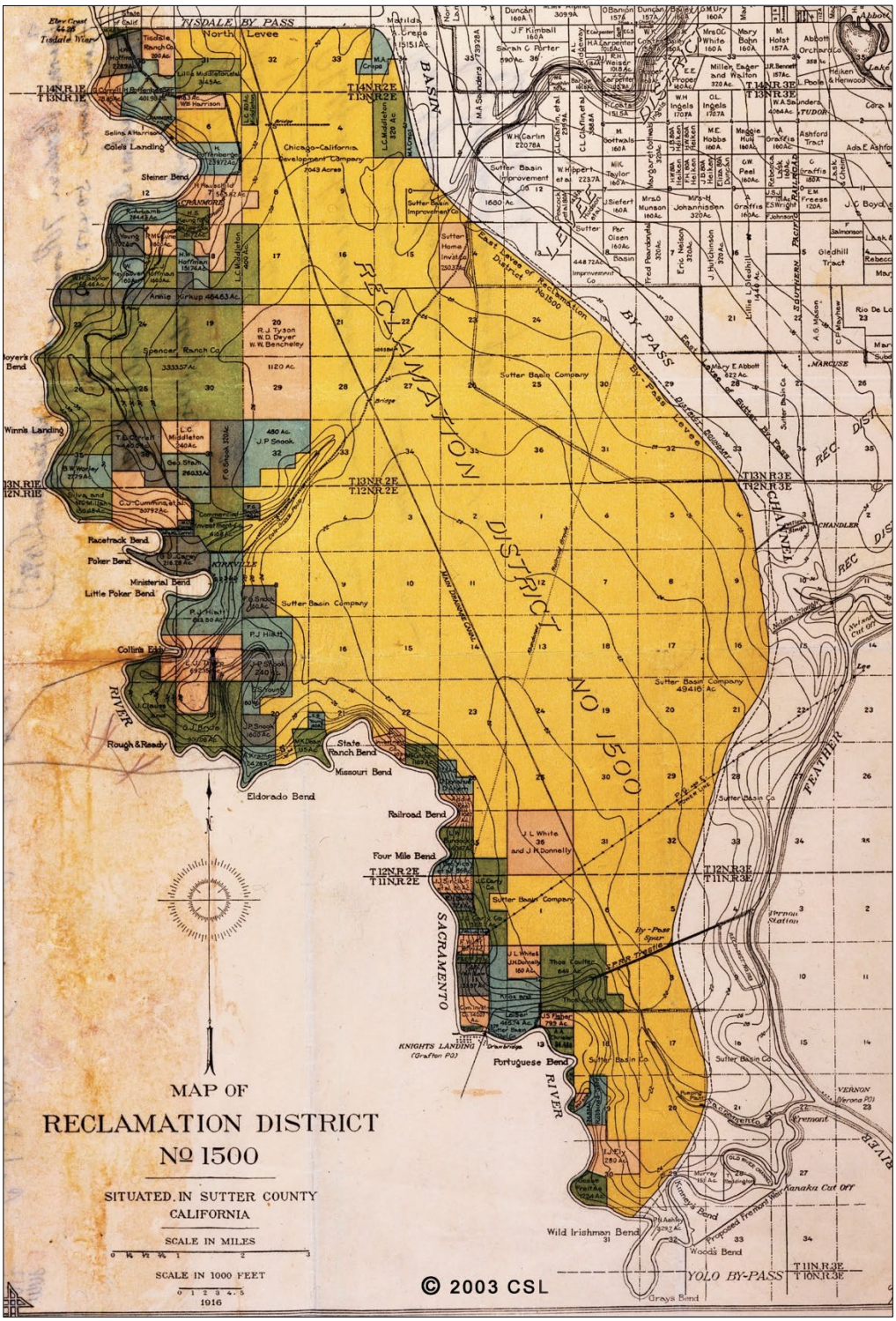
Township 11 North, Range 3 East, Mount Diablo Meridian (GLO Plat 1870). The original location of Sacramento Slough is depicted.



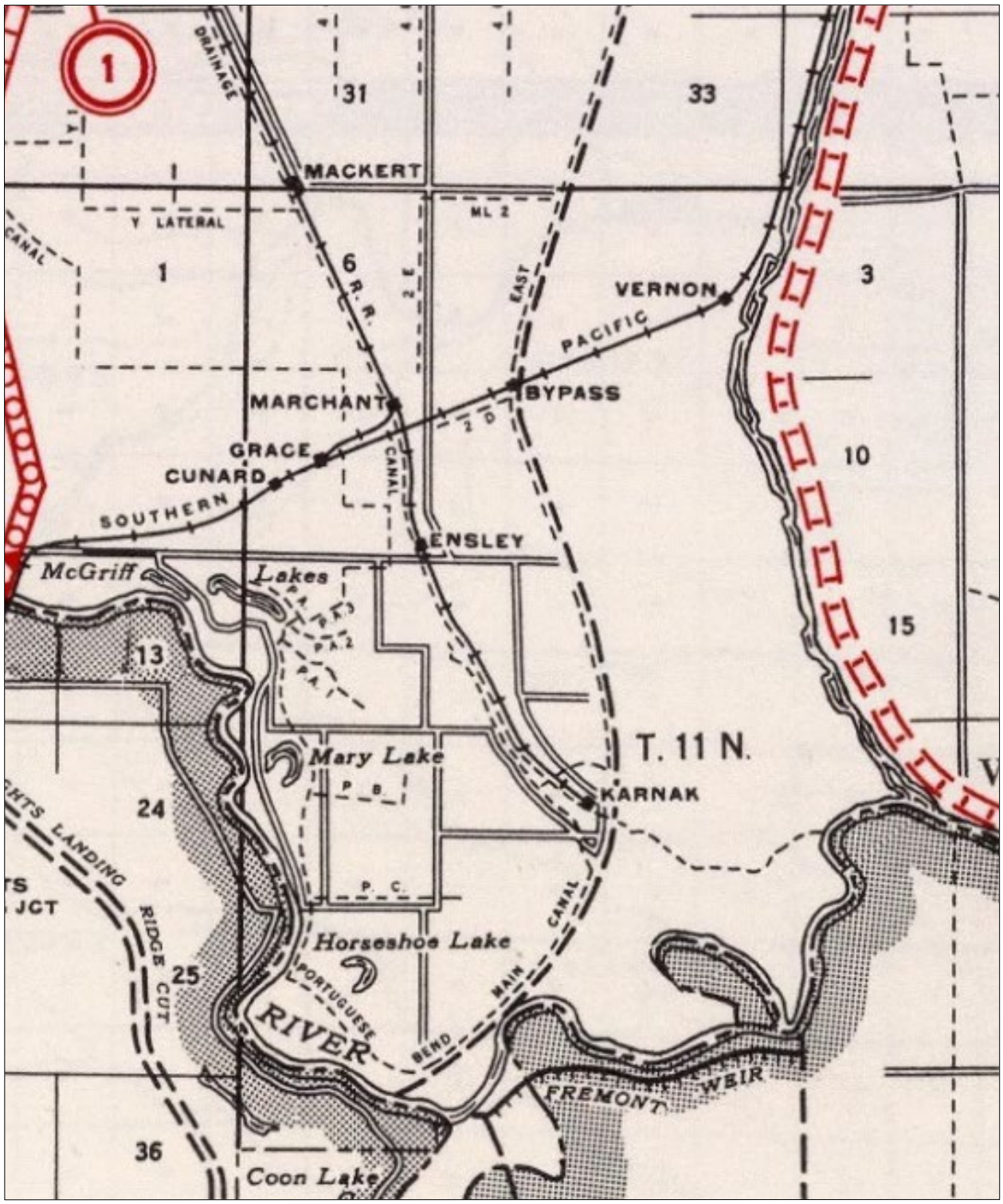
Knights Landing, Calif. 1:31,680 (USGS 1910). The original location of Sacramento Slough is depicted.



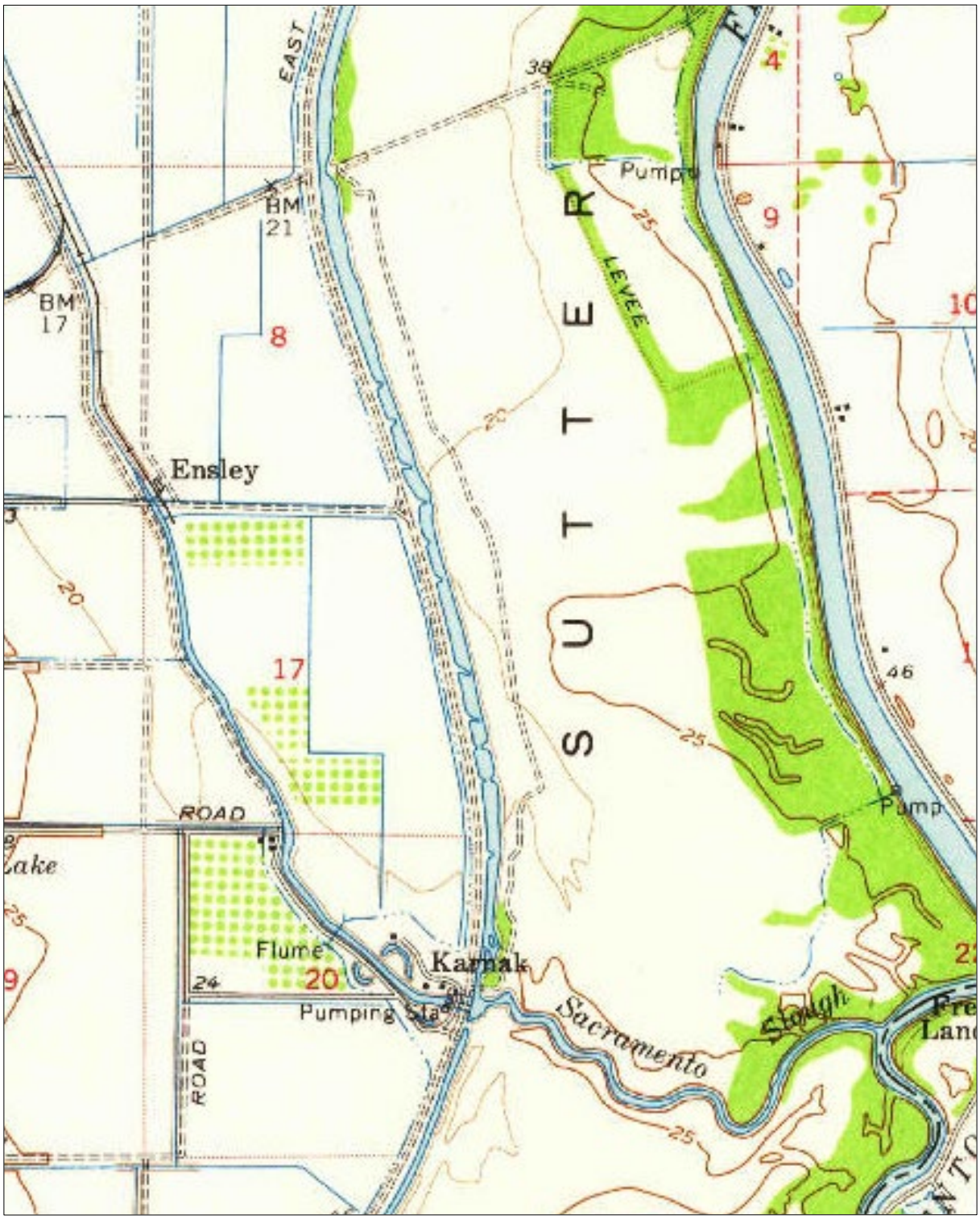
"Map Showing Location of Pumping Plant" (RD 1500 Engineering Department 1914). Karnak Drainage Facility is depicted in its current location.



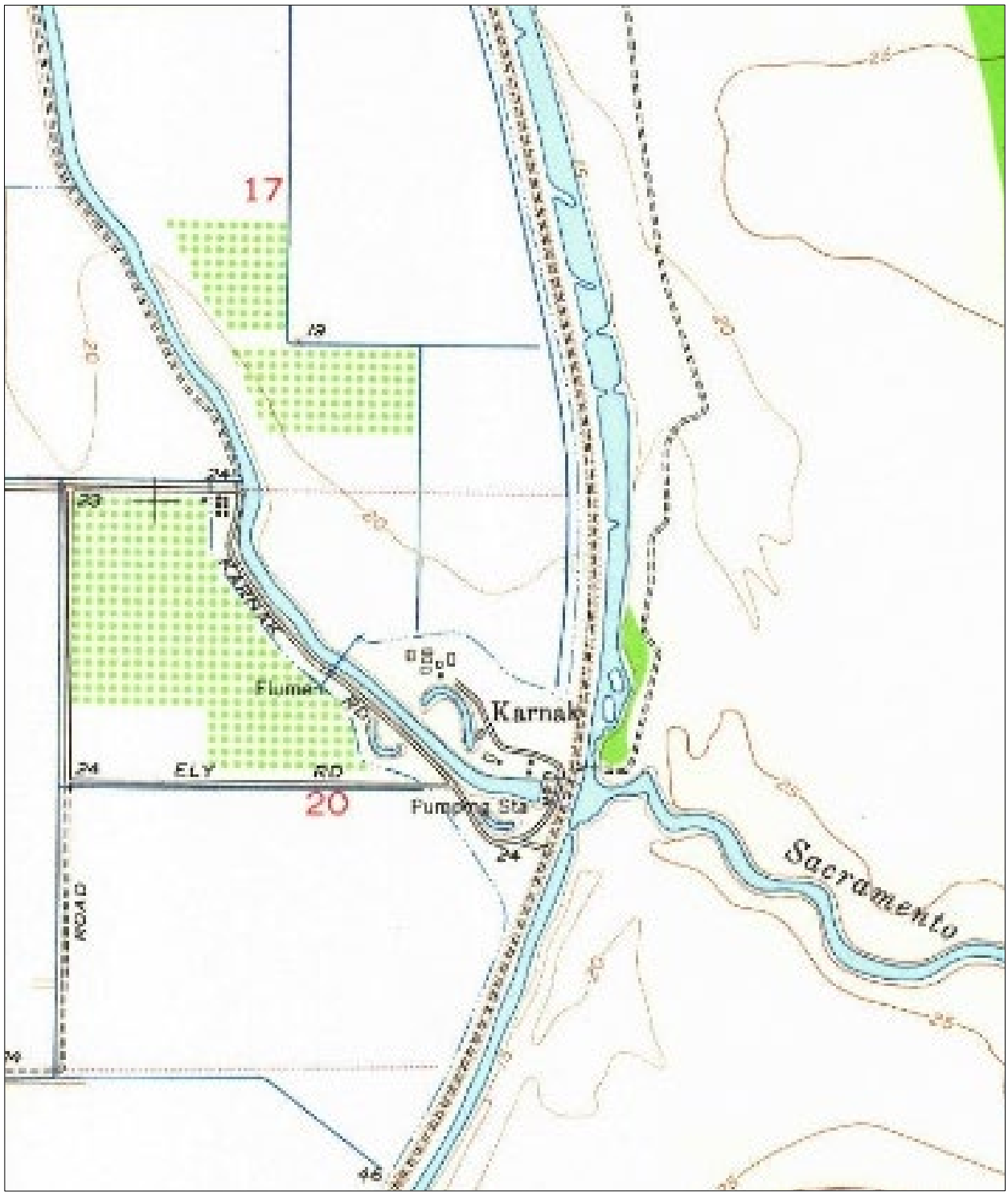
"Map of Reclamation District No. 1500, Situated in Sutter County, California" (California State Library 1916). Karnak Drainage Facility is depicted in its current location, labeled as "Pumping Plant".



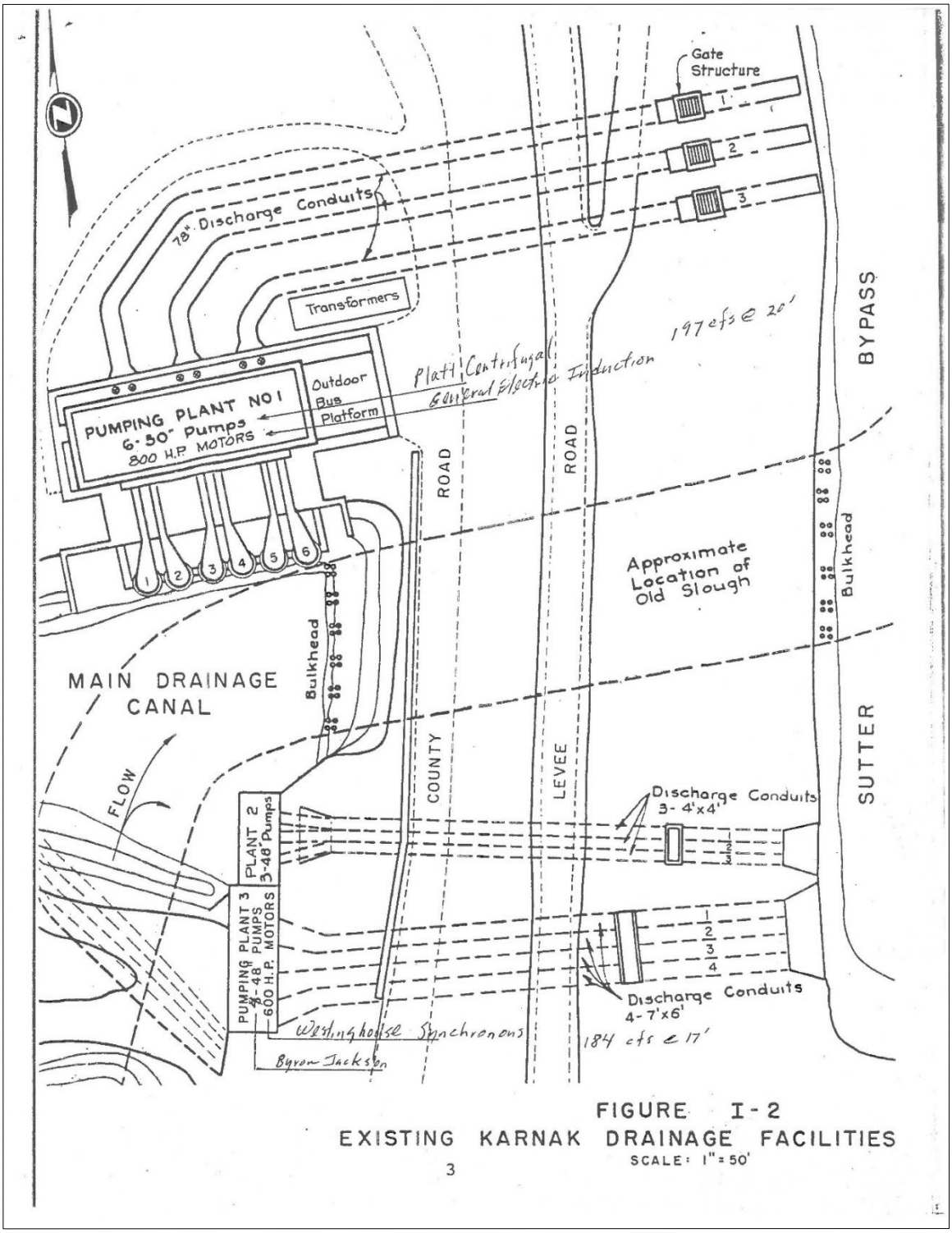
Sutter County (California Division of Highways 1935). Karnak Drainage Facility is depicted in its current location.



Knights Landing, Calif. 1:62,500 (USGS 1952 [ed. 1959]). Karnak Drainage Facility is depicted in its current location.



Knights Landing, Calif 1:24,000 (USGS 1952 [ed. 1964]). Karnak Drainage Facility is depicted in its current alignment.



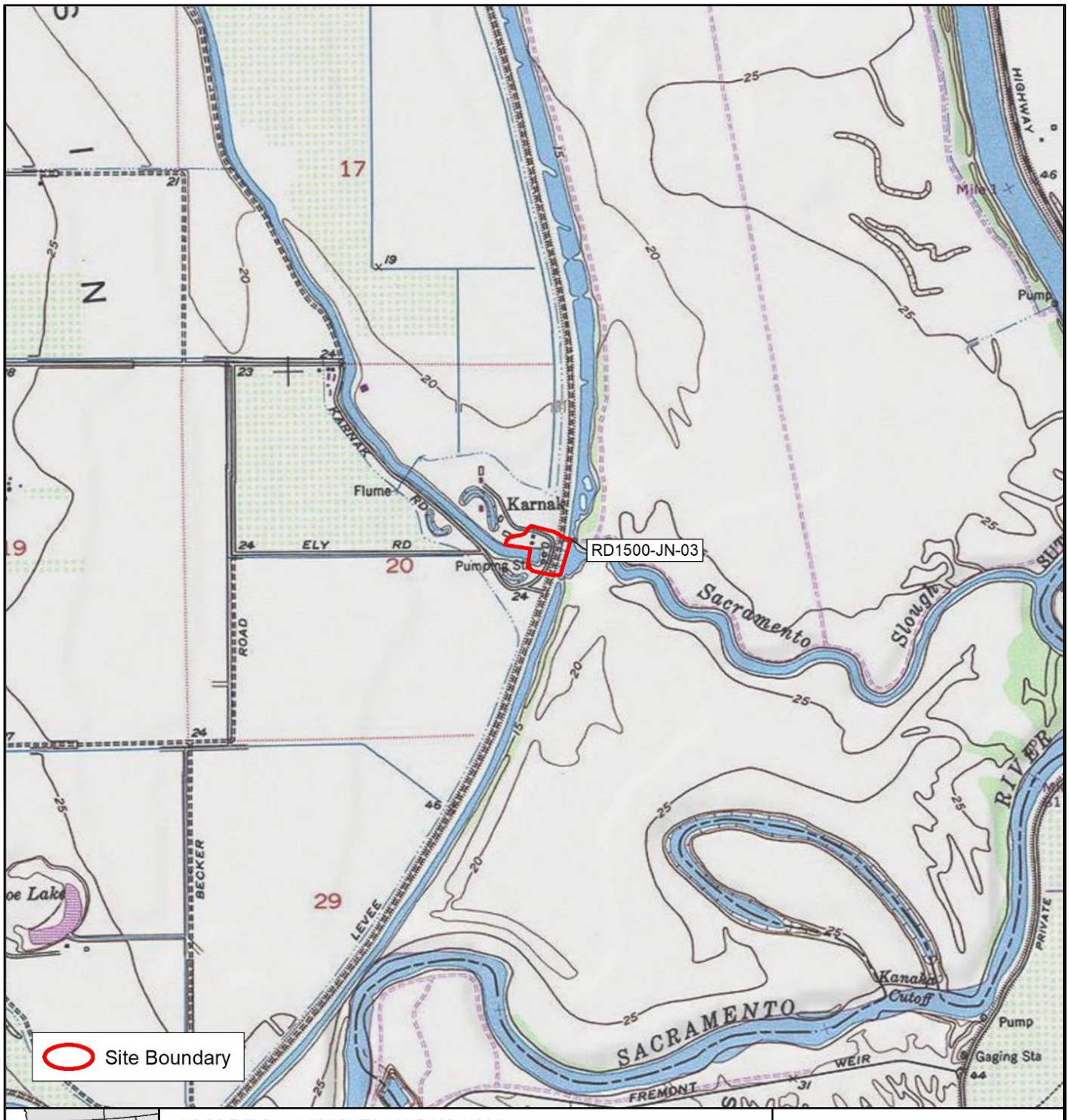
"Existing Karnak Drainage Facility" (BR 1983). The map shows Karnak Drainage Facility in its current location.

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Resource Name or #: RD1500-JN-03
Map Name: Knights Landing, CA
Scale: 1:24,000
Date of map: 1981



Resource Location
RD-1500-JN-03
Sutter County, California

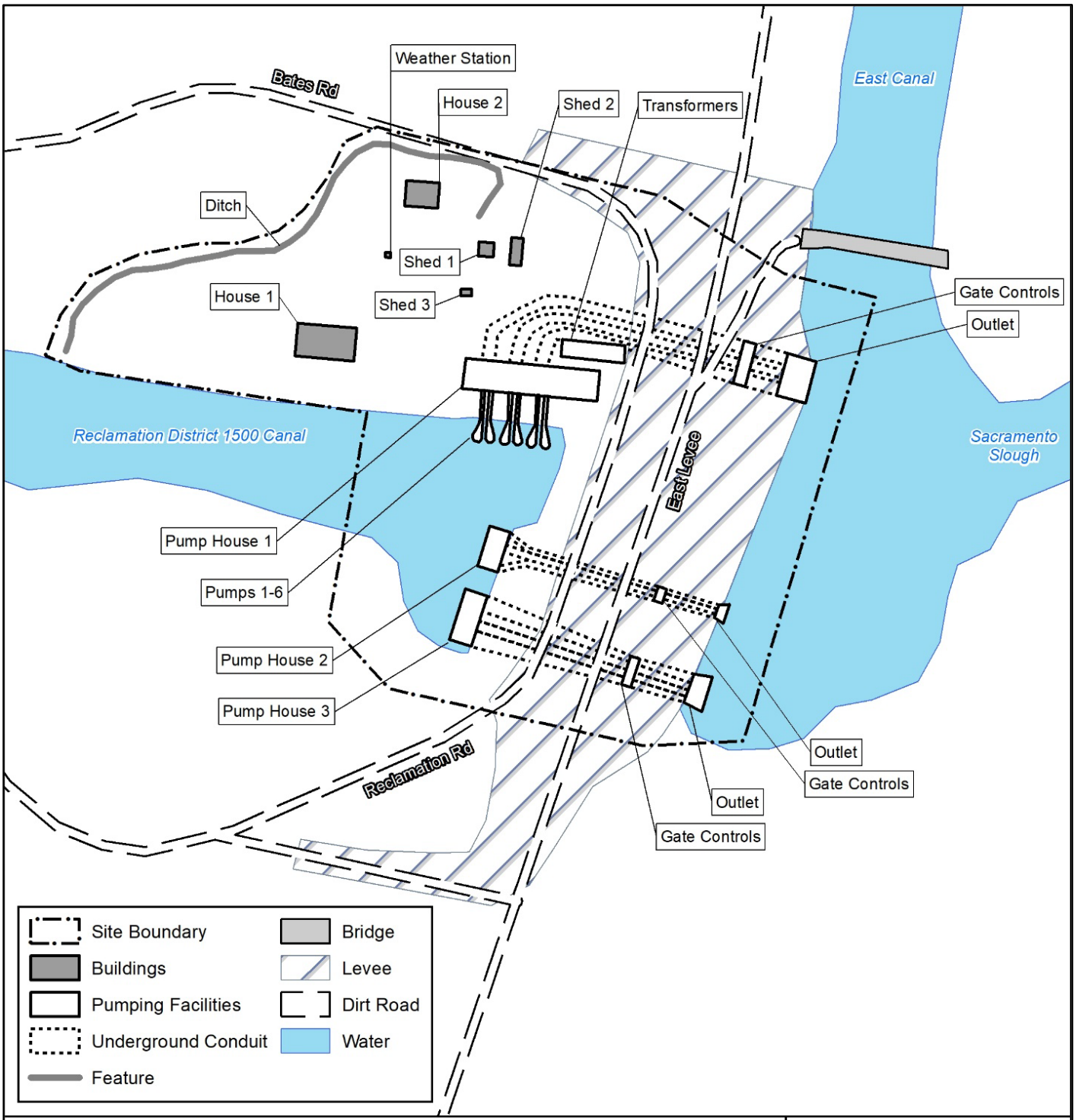
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-03
Date of map: January 21, 2021



NAD 1983 UTM Zone 10N

0 70 140 Feet
0 20 40 Meters

N

Scale 1:1,920
1 inch = 160 feet

Sketch Map
RD1500-JN-03
Sutter County, California

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial NRHP Status Code Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-04

P1. Reclamation District 1500 Canal

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616737mE/ 4293714mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road and continue for approximately 70 ft.

P3a. Description: This resource consists of a 600 ft segment of the Reclamation District (RD) 1500 Canal (historically referred to as the Main Drainage Canal or Central Canal) at its terminus. The RD 1500 Canal generally follows the original pathway of Sacramento Slough, a natural outlet of flood waters at the southern end of the Sutter Basin. The segment of canal is approximately 125 ft wide and widens to 250 ft at the levee to accommodate the Karnak Drainage Facilities pump houses. Portions of the canal segment are lined with sheet pile walls.

The Sacramento Slough was channelized in the early 20th century as a part of the Sutter Basin reclamation efforts. Sacramento Slough was severed in half with the western section of the slough channelized to convey water more efficiently (now referred to as the RD 1500 Canal). The RD 1500 Canal terminates at the East Levee where the Karnak Drainage Facilities pump overflow water through the levee into the remaining natural course of the Sacramento Slough with eventual discharge into the Sacramento River. The canal is in good condition and generally maintains its original form and function. Construction work in 2019 through 2020 installed sheet pile wall along the south bank of the canal and nine new 10-ft wide automatic conveyor belt-style debris removal screens to replace the existing debris catchment system.



P3b. Resource Attributes: HP20. Canal/aqueduct

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

P5b. Description of Photo: Overview of canal, facing west.

P6. Date Constructed/Age and Source: ☒Historic ☐Prehistoric ☐Both

P7. Owner and Address: RD 1500**,** 15094 Cranmore Rd, Robbins, CA 95676

P8. Recorded by: Kleinfelder
Jessica Neal, Samantha Dunam, and Kate Willis
435 Lincoln Way, Auburn, CA 9560

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

L1. Historic and/or Common Name: Reclamation District 1500 Canal

L2a. Portion Described: ☐Entire Resource ☒Segment ☐Point Observation **Designation:**
Location of point or segment: Terminus of RD 1500 Canal at the Karnak Drainage Facilities.

L3. Description: Sacramento Slough traversed the entire length of RD 1500 north to south and ended where it met with Karnak Draining Facilities; during the Sutter Basin reclamation project, the slough was developed into RD 1500 Canal (historically referred to as the Main Drainage Canal or Central Canal). The RD 1500 Canal originates at the Tisdale Bypass and terminates at the Karnak Drainage Facilities where water is pumped through the East Levee into the natural course of the Sacramento Slough. It is approximately 18 miles long. Between the canal's north end and Karnak Drainage Facilities, it reportedly declined 10 ft in elevation. It had a 690 second-ft capacity and measured 36 ft wide at the bottom for its first 1 mile and broadened out to 60 ft in more level ground. The average depth was 9 ft and 125 ft wide at the south end. The first 0.5 miles of the RD 1500 Canal had a velocity of 2.5 ft per second before flattening out to 1 ft per second. Sediment pumped into RD 1500 Canal tended to be deposited at this gradient change but could easily be removed. The canal was dredged so it could be used in conjunction with the Karnak Drainage Facilities Pump House 1 during early stages of reclamation. It provides critical flood protection to prevent damage from floodwater to homes and other properties, the community of Robbins and surrounding rural residential properties, State Route 113 and other local roadways, and of over 65,000 acres of rural farmland.

This is a segment of the RD 1500 Canal at its terminus. The segment widens from approximately 110 ft to 250 ft to accommodate the Karnak Drainage Facilities' three pump houses and pumps that carry water through the East Levee. The eastern end of the canal is lined with deteriorated concrete and wood piles from the original bulkhead.

L4. Dimensions:
- **a. Top Width**: 125-250 ft
- **b. Bottom Width**: Unknown
- **c. Height or Depth**: Unknown
- **d. Length of Segment**: 600 ft
- **e. Sketch of Cross-Section**: N/A.

L5. Associated Resources:
East Levee (Temp # RD1500-JN-02)
Karnak Drainage Facilities (Temp # RD1500-JN-03)
East Canal (Temp# RD 1500-JN-05)

L6. Setting: The RD 1500 Canal is located northwest of Sacramento between the Sacramento River (to the west) and Feather River (to the east) in low-lying land protected by levees, commonly known as the Sutter Basin. RD 1500 is one of the largest reclamation districts in California. It provides drainage and flood control to approximately 67,850 acres within RD 1500's service area and protects the community of Robbins from flood damage. The area was reclaimed for farming as part of the Sutter Basin reclamation project in the early part of the 20th century.



L7. Integrity Considerations: The segment of the RD 1500 Canal is in good condition, generally retaining its original form and function. Construction work in 2019 installed sheet pile wall along the south bank of the canal and nine new 10-ft wide automatic conveyor belt-style debris removal screens to replace the existing debris catchment system. The canal was assumed eligible only for the purposes that project and resulted in a finding of no effect.

L8b. Description of Photo, Map, or Drawing: RD 1500 Canal and East Levee, facing east-southeast.

L9. Remarks: None

L10. Form Prepared by: J. Neal and Samantha Dunham

L11. Date: 21-Jan-21

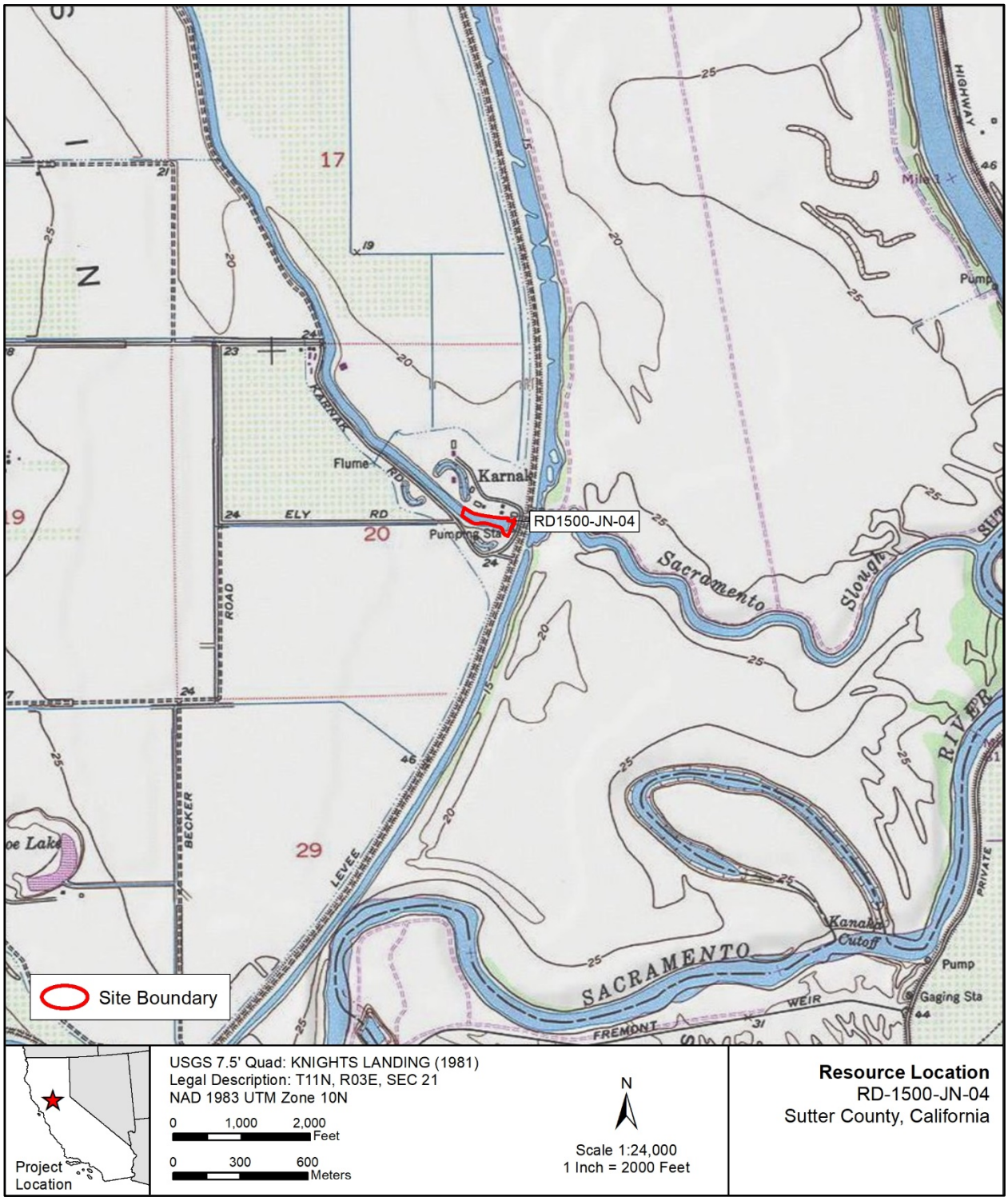
State of California - The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI#**

LOCATION MAP

Trinomial

Resource Name or #: RD1500-JN-04

Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



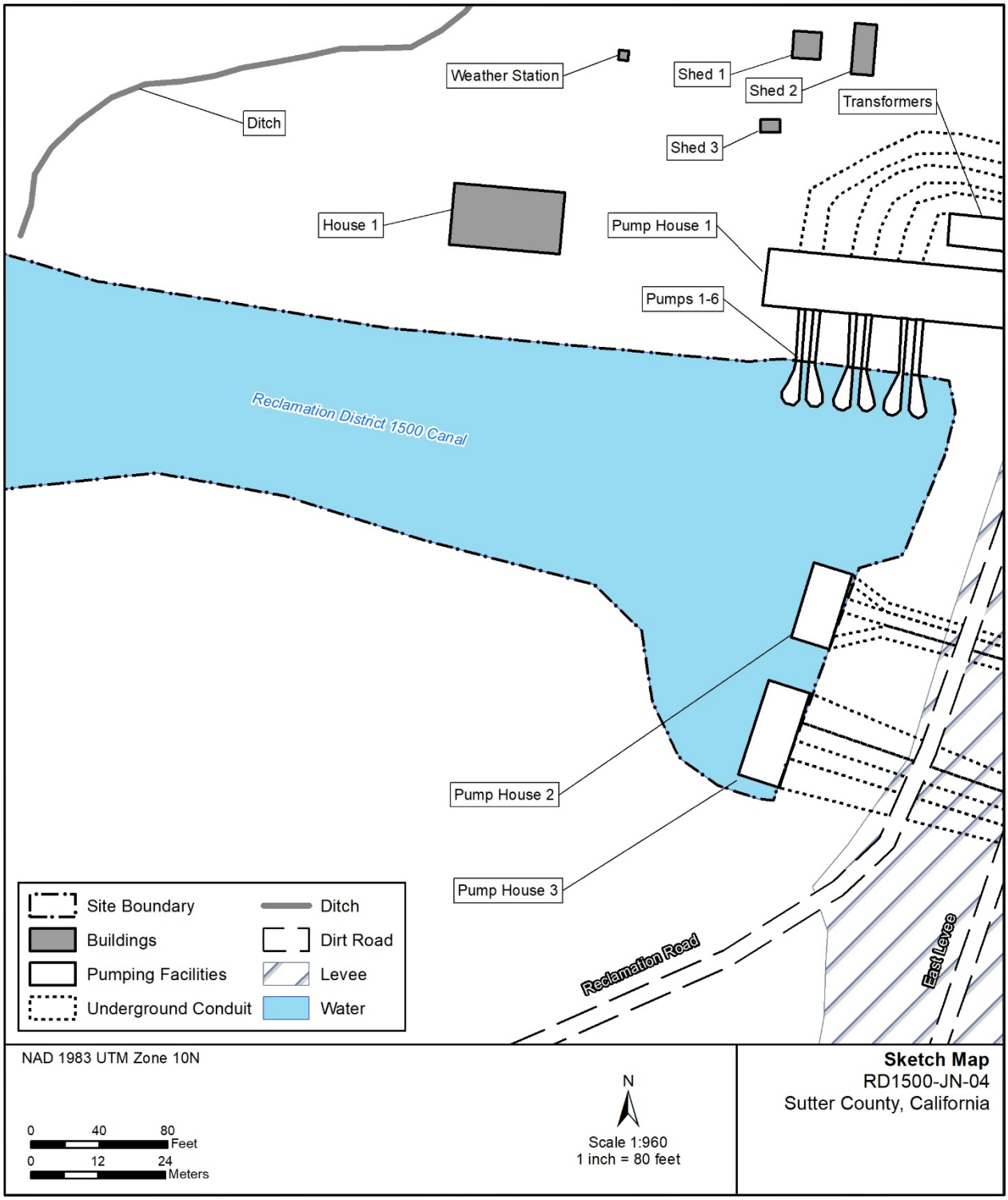
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

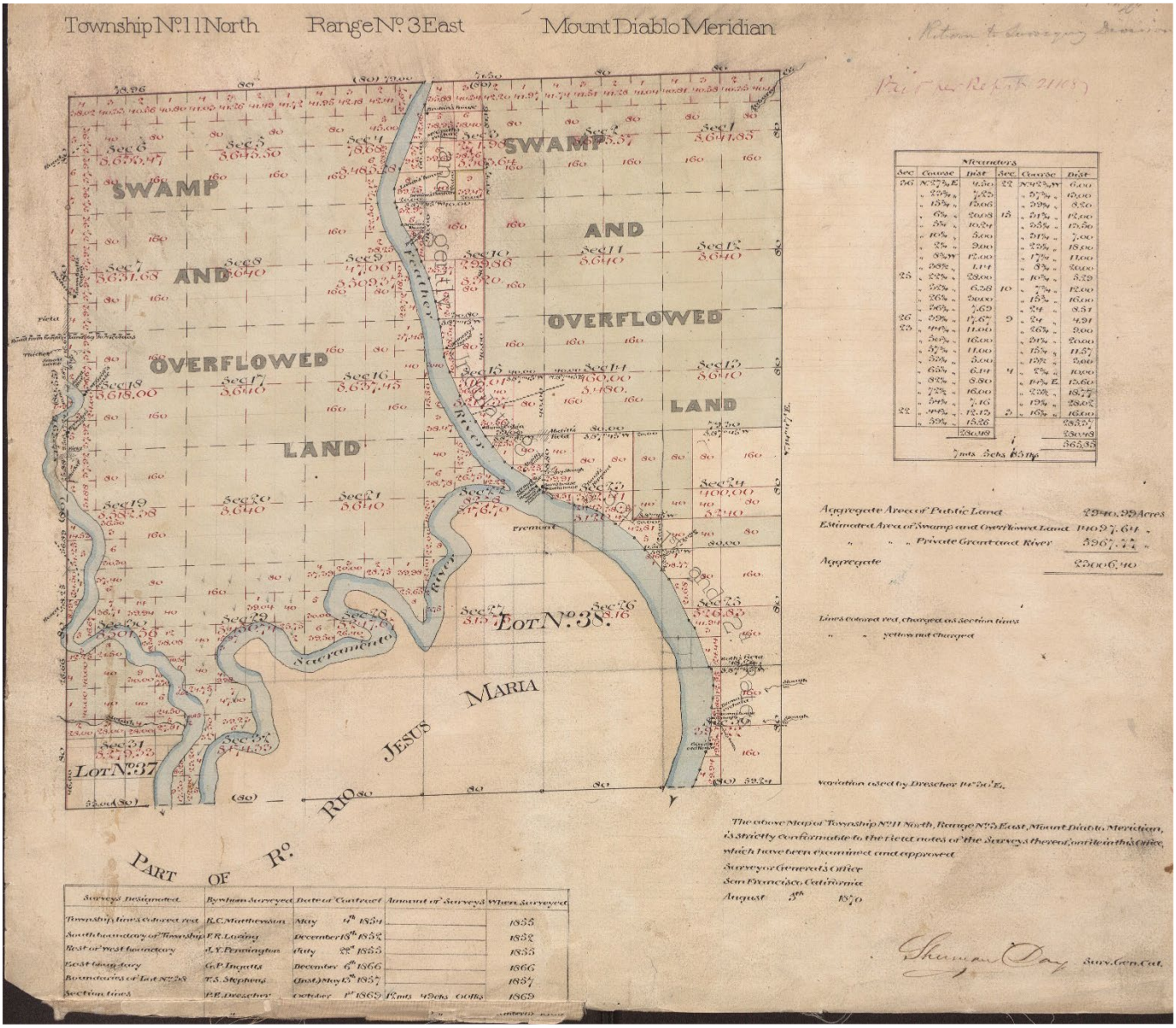
SKETCH MAP

Primary #
HRI#
Trinomial

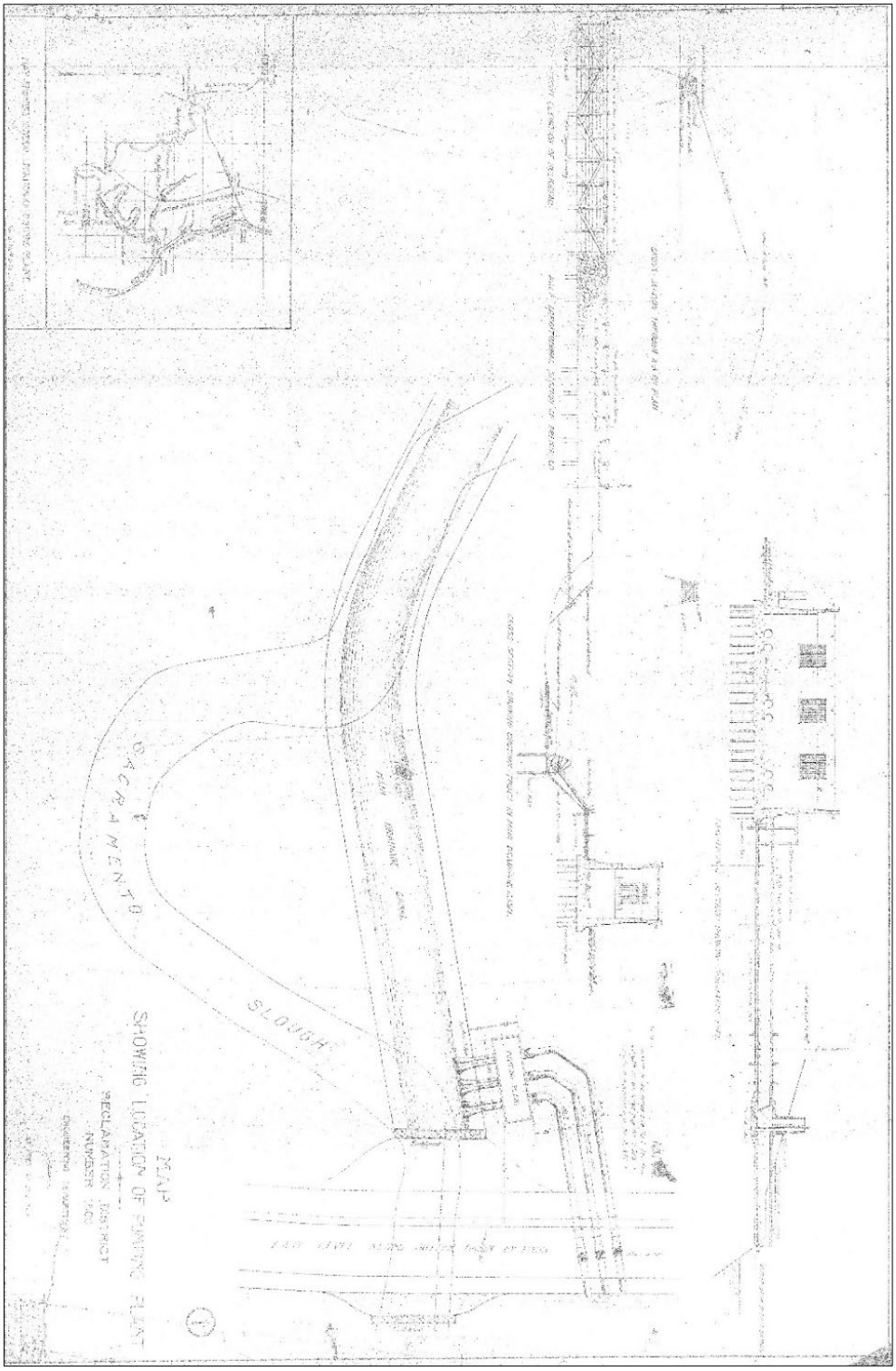
Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-04
Date of map: January 21, 2021

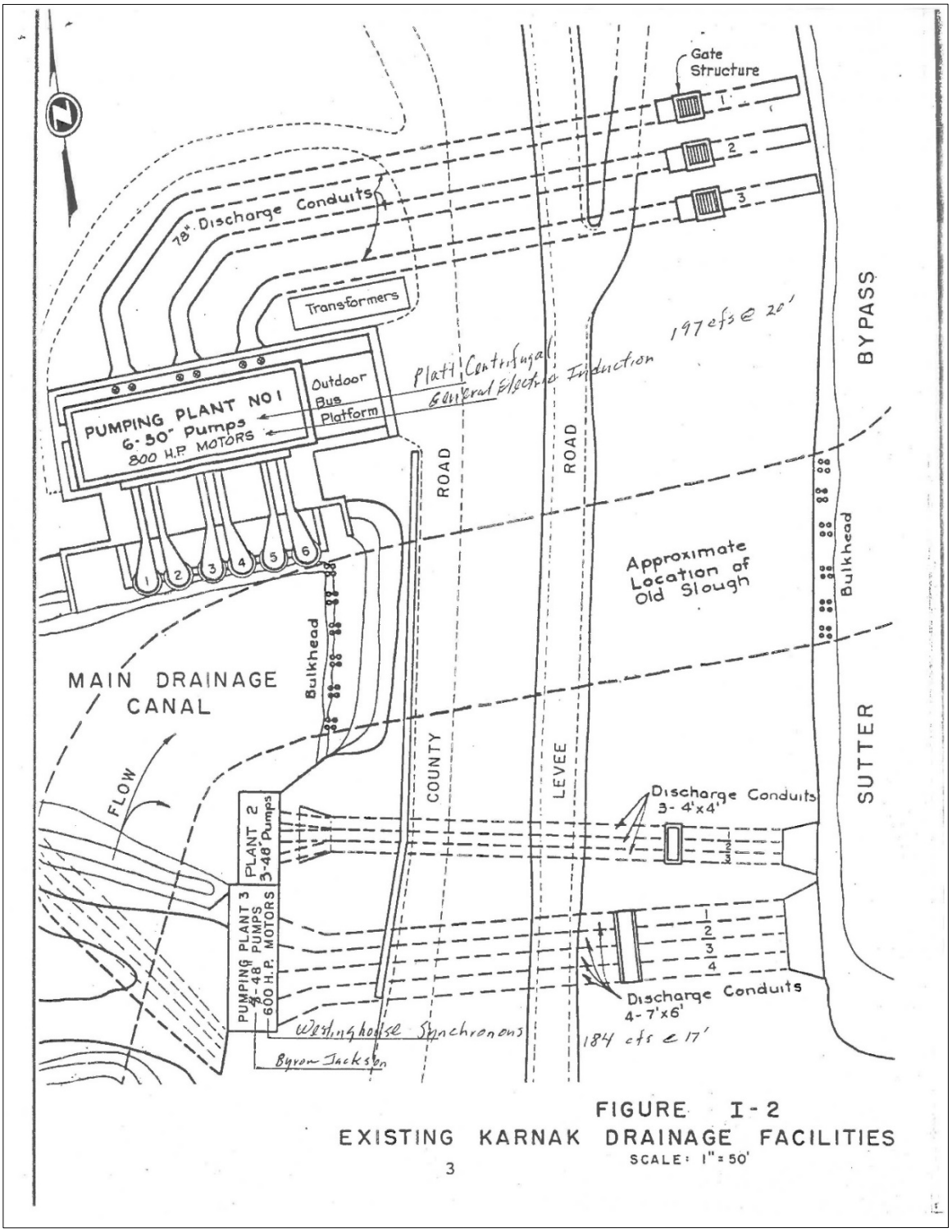




Township 11 North, Range 3 East, Mount Diablo Meridian (GLO Plat 1870). The original location of Sacramento Slough is depicted.



"Map Showing Location of Pumping Plant" (RD 1500 Engineering Department 1914). The RD 1500 Canal (depicted as Main Drainage Canal) is depicted in its current alignment.



"Existing Karnak Drainage Facilities" (BR 1983). The map shows the RD 1500 Canal (depicted as the Main Drainage Canal) in its current alignment.

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-05

P1. East Canal

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10, 616897mE/ 4293719mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road for approximately 70 feet (ft).

P3a. Description: This resource is the southernmost segment of the East Canal at its confluence with the RD 1500 Canal, where they merge into the Sacramento Slough, west of the Sacramento River and East of Karnak Drainage Facilities. The recorded segments is approximately 600 ft long and runs generally north to south.

The canal is located in the Sutter Bypass and is bordered to the west by the East Levee. The East Canal was constructed in the early 20th century as a part of the Sutter Bypass reclamation project. It flows along the southwestern edge of the Sutter Bypass from Tisdale to Verona. The East Canal terminates and flows into Sacramento Slough, a natural waterway, and then into the Sacramento River.

P3b. Resource Attributes: HP20. Canal/aqueduct

P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of East Canal, facing northeast.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by:
Kleinfelder
Jessica Neal and Samantha Dunham
435 Lincoln Way
Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Neal, Jessica, Dunham, Samantha, and Kate Willis. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

L1. Historic and/or Common Name: East Canal

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

Location of point or segment: Confluence of East Canal and RD 1500 Canal where they merge into the Sacramento Slough, west of the Sacramento River and east of the Karnak Drainage Facilities.

L3. Description: The southernmost segment of the East Canal at its confluence with RD 1500 Canal where they merge into the Sacramento Slough, west of the Sacramento River and east of the Karnak Drainage Facilities. The East Levee runs west of and parallel to the East Canal. The East Canal begins at the Tisdale Pumping Plant and runs south-southeast and parallel to the Sutter Bypass for the northern half of its length then parallel to the Feather River for the southern half of its length before merging with the RD 1500 Canal into and flowing into the Sacramento Slough (east of the Karnak Drainage Facilities), then letting out into the Sacramento River. The East Canal has a velocity of 500 second-ft capacity. During canal construction, dirt borrowed to make embankments was excavated from the canal section. The old Karnak Drainage Facilities layout depicts bulkheads on the west side of the East Canal at its confluence with the RD 1500 Canal, on the east side of the East Levee.

The East Canal is approximately 25 miles long. This segment of the East Canal is 600 ft long and widens from approximately 100 ft in the north to approximately 200 ft at its confluence with the RD 1500 Canal before feeding into the Sacramento Slough. The west side of the East Canal at the confluence is riprapped with imported rock and some modern and historic refuse and the Karnak Drainage Facilities pump house outlets. An unnamed concrete bridge that leads to agricultural land within the Sutter Bypass crosses the East Canal just north of its confluence with the RD 1500 Canal. No evidence of the bulkhead remains on the eastern side of the East Levee and within the East Canal.

L4. Dimensions:

a. **Top Width**: Unknown
b. **Bottom Width**: Unknown
c. **Height or Depth**: Unknown
d. **Length of Segment**: 600 ft long
e. **Sketch of Cross-Section:** N/A

L5. Associated Resources:
Unnamed Bridge (Temp # RD1500-JN-01)
East Levee (Temp # RD1500-JN-02)
Karnak Pump Station (Temp # RD1500-JN-03)

L6. Setting: The East Canal is in rural Sutter County. Vegetation includes riparian vegetation. This segment of canal at its confluence with RD 1500 Canal where it flows into the Sacramento Slough, west of the Sacramento River and east of the Karnak Drainage Facilities. The East Levee runs west of and parallel to the East Canal. An unnamed concrete bridge that leads to agricultural land within the Sutter Bypass crosses the East Canal just north of its confluence with the RD 1500 Canal.



L7. Integrity Considerations: The segment of the East Canal is in good condition, generally retaining its original form and function. Its form and function have no significant changes since construction.

L8b. Description of Photo, Map, or Drawing:
Where the unnamed concrete bridge crosses the East Canal, facing southeast.

L9. Remarks: None

L10. Form Prepared by: J. Neal and S. Dunham

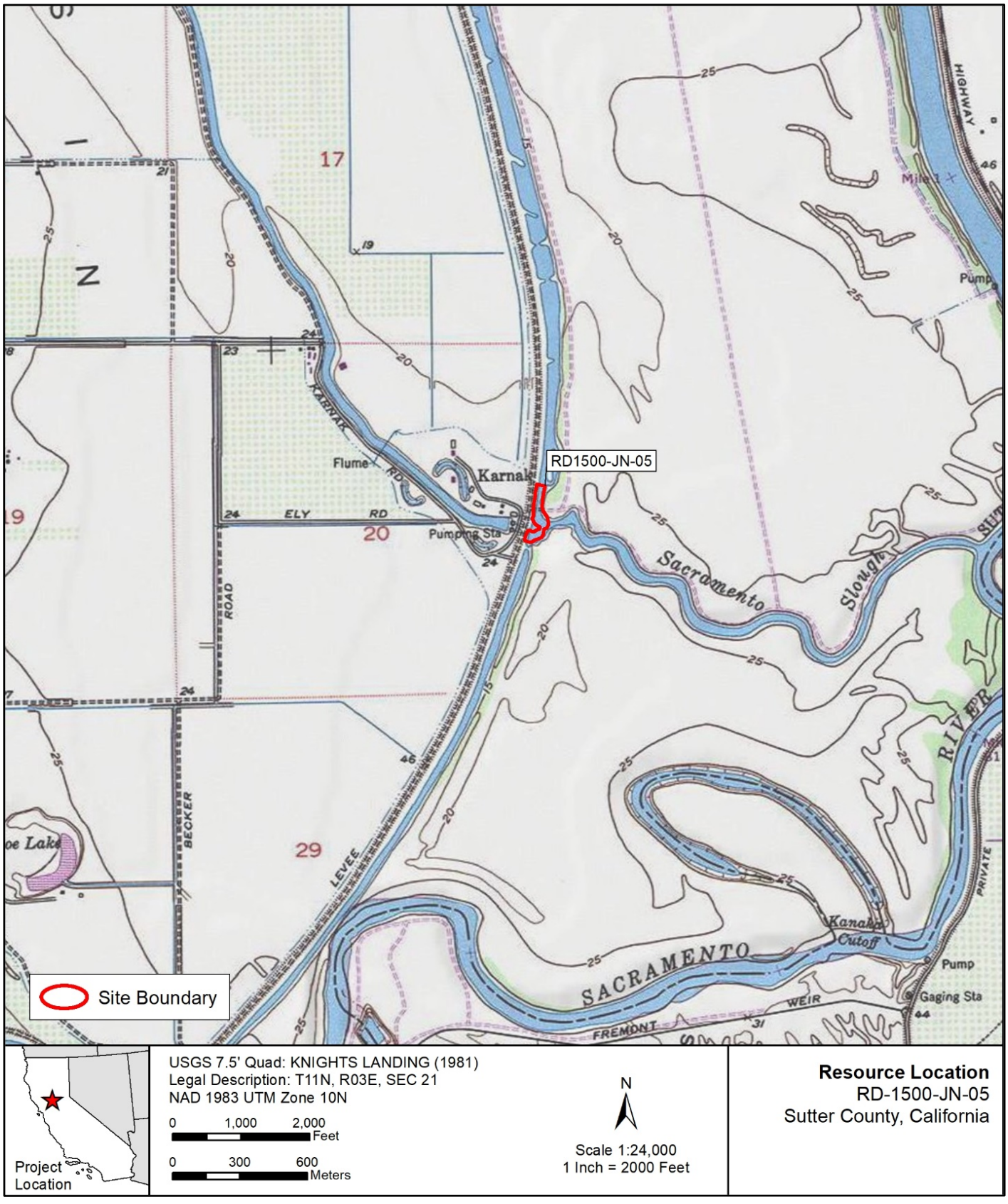
L11. Date: 21-Jan-21

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Resource Name or #: RD1500-JN-05
Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



Resource Location
RD-1500-JN-05
Sutter County, California

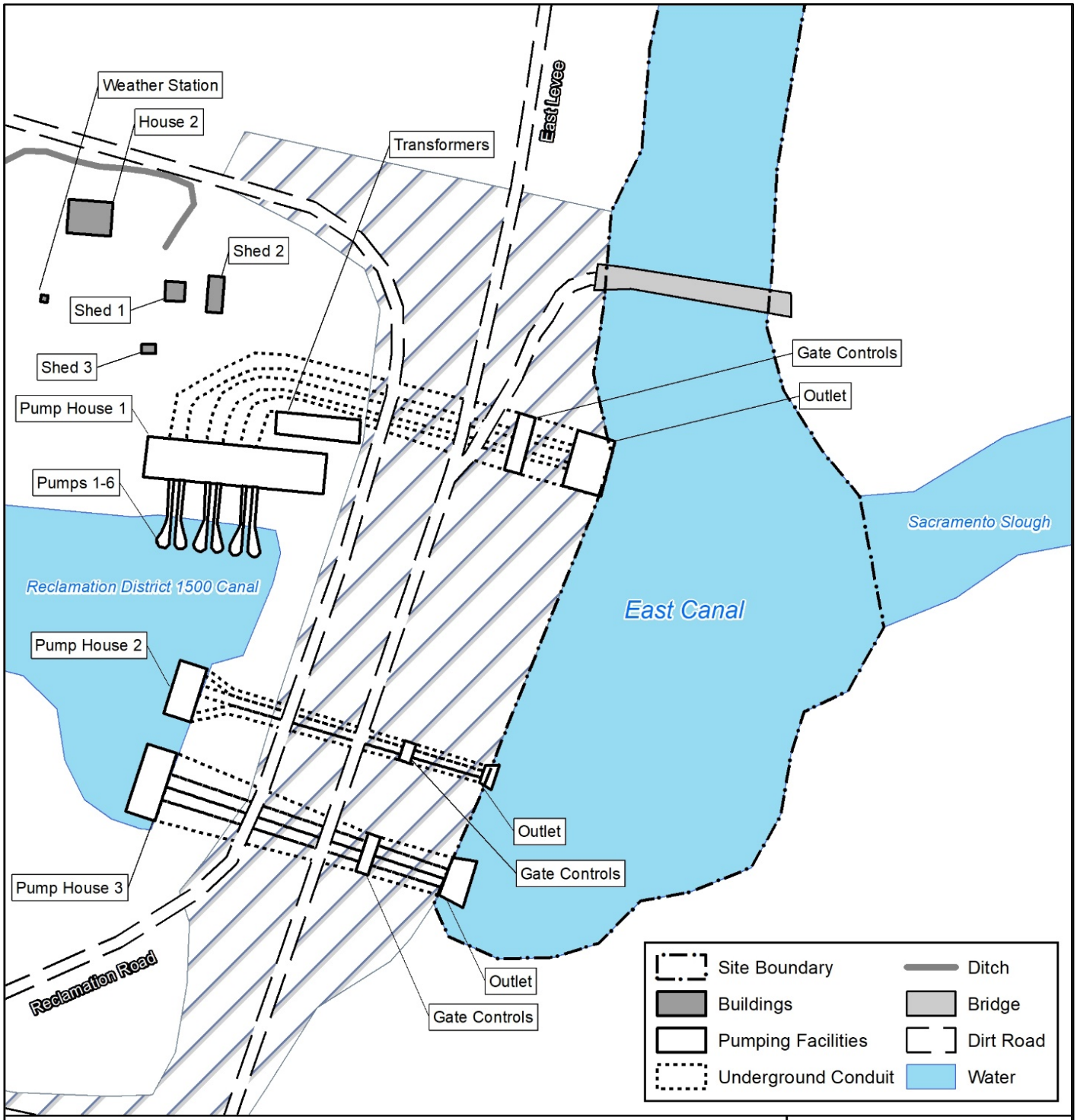
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-05
Date of map: January 21, 2021



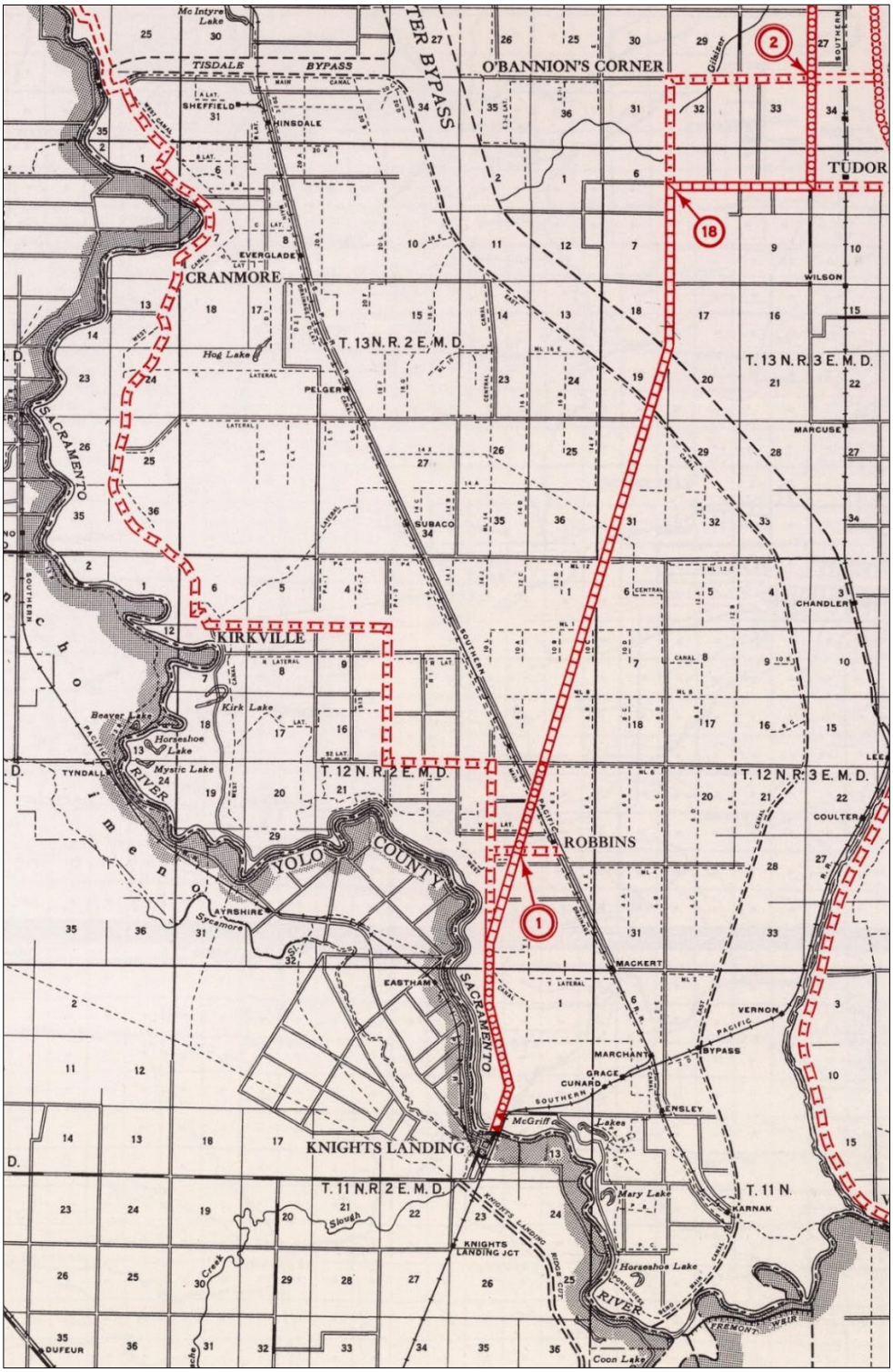
NAD 1983 UTM Zone 10N

0 60 120 Feet
0 20 40 Meters

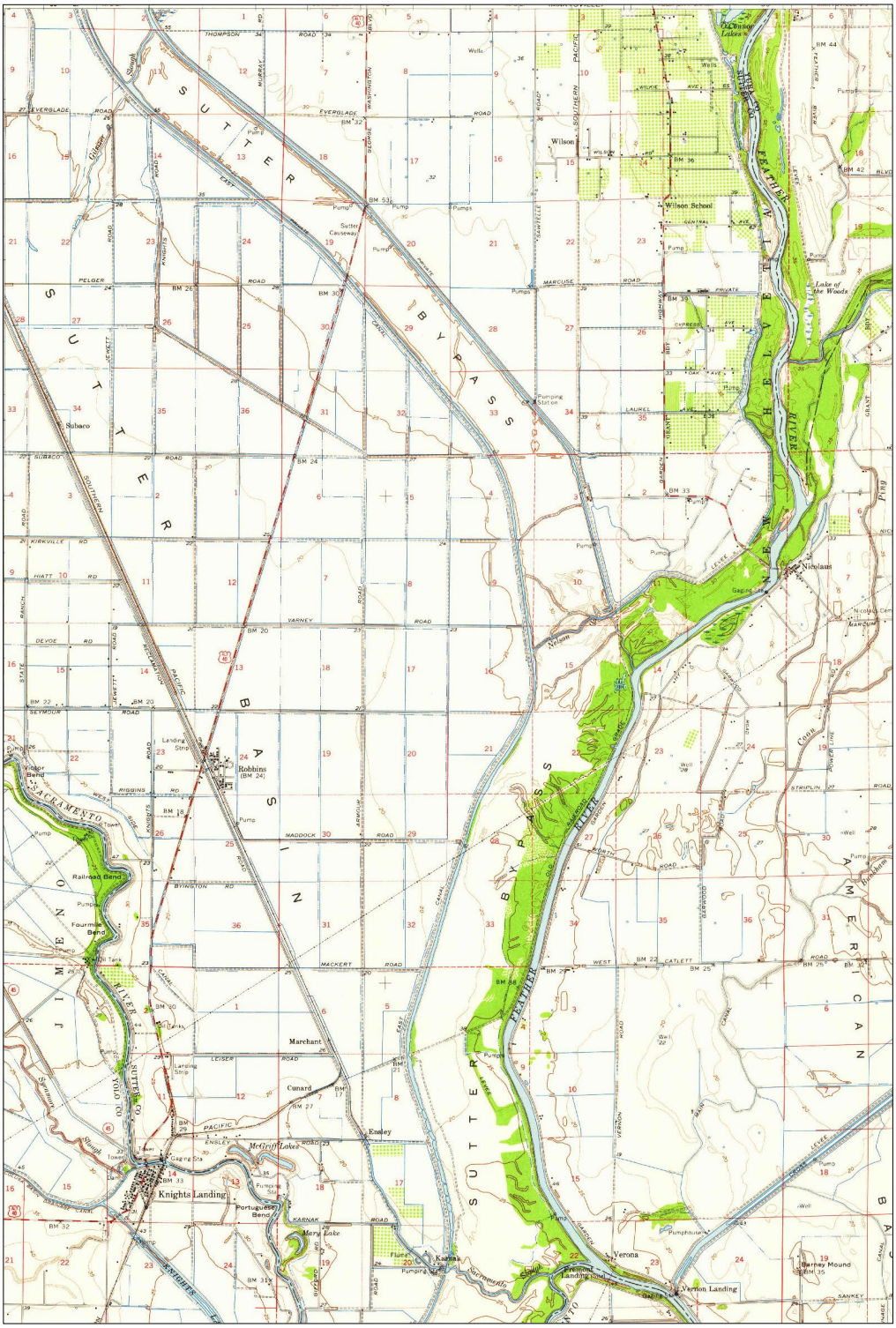
N

Scale 1:1,440
1 inch = 120 feet

Sketch Map
RD1500-JN-05
Sutter County, California



Sutter County (California Division of Highways 1935). The East Canal is depicted in its current alignment.



Knights Landing, Calif. 1:62,500 (USGS 1952 [ed. 1959]). The East Canal is depicted in its current alignment.

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # HRI #
PRIMARY RECORD	**Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-06

P1. House 1

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616714 mE/ 4293760 mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road for approximately 70 feet to the residence.

P3a. Description: This resource consists of a single-story residence of the Minimal Traditional style. The house is constructed of brick and sits on an elevated foundation enclosing a vented crawl space. It is surmounted by a hipped roof. The front elevation features three stepped bays. The side elevations also feature slightly projecting bays. All windows have been replaced. A small, hipped vent extends through the roof above the picture window of the front elevation. The house appears to have been constructed in approximately 1930.

The residential structure serves as housing for employees operating the Reclamation District (RD) 1500 Karnak Drainage Facilities, which consists of three pump houses carrying water from the RD 1500 Canal through the East Levee into the confluence of the East Canal and the RD 1500 Canal and where the two canals merge into the Sacramento Slough. The drainage facilities require staff to be present 24 hours a day. The house is in good condition and appears to have recently renovated with new windows and paint. The house is located on a slight hill north of the RD 1500 Canal and west of one of the pump houses.

P3b. Resource Attributes: HP2. Single family property

P4. Resources Present: ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of house, facing northwest.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by: Kleinfelder
J. Neal, S. Dunham, and K. Willis
435 Lincoln Way
Auburn, CA 9560

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

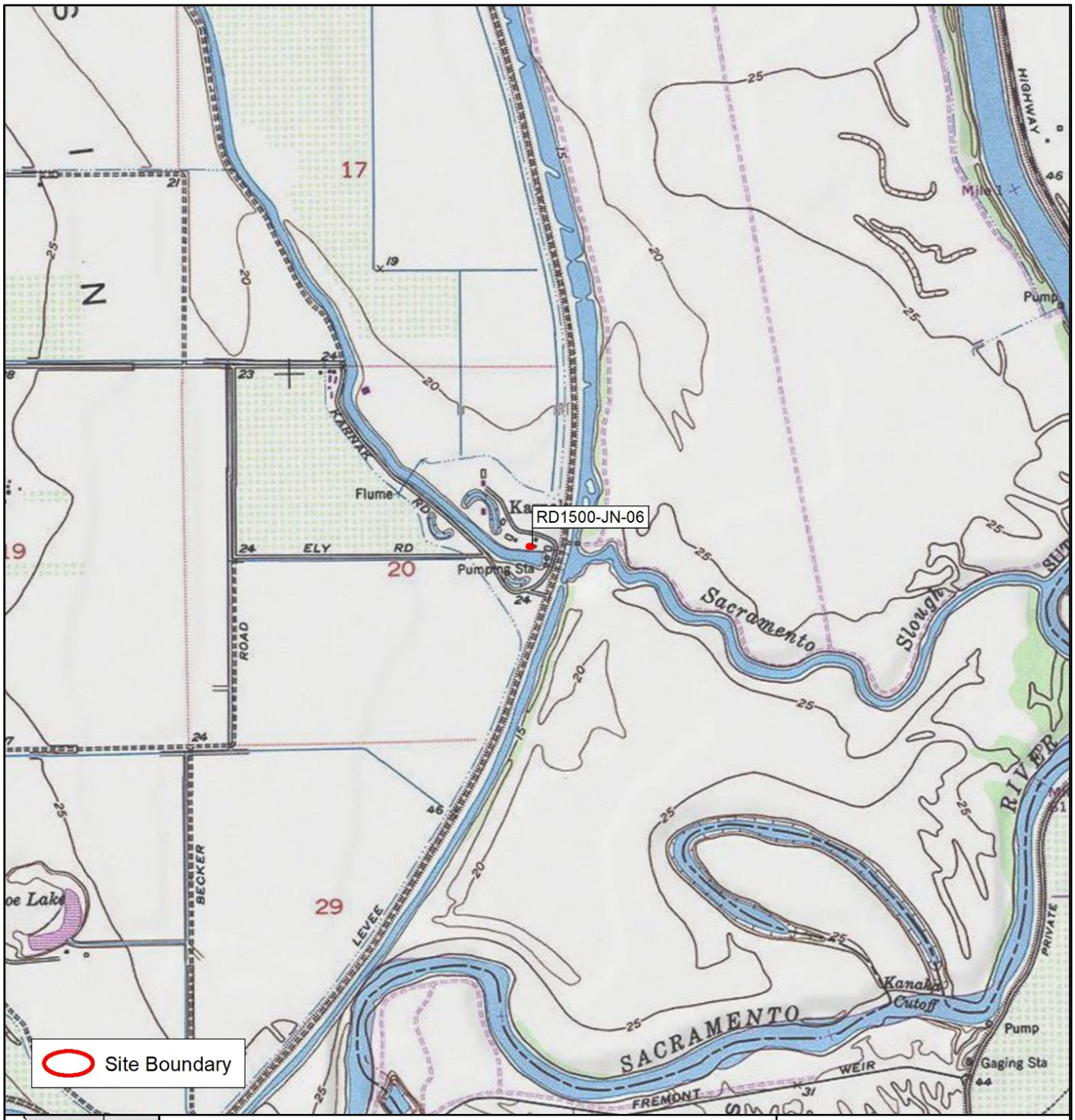
State of California - The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI#**

LOCATION MAP

Trinomial

Resource Name or #: RD1500-JN-06

Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
RD-1500-JN-06
Sutter County, California

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # HRI #
PRIMARY RECORD	**Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-07

P1. House 2

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616746mE/ 4293809 mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road for approximately 70 feet to the residence.

P3a. Description: This resource is a residential structure constructed in approximately 1966. It is a single story, vernacular side gable house. The house is three bays wide by two bays deep with centered entrances on each gable side elevation. The windows are modern, and the house is sheathed in T1-11. It sits on a concrete slab and the roofing materials is asphalt shingle. The gable ends are vented.

The residential structure serves as housing for employees operating the Reclamation District (RD) 1500 Karnak Drainage Facilities, which consists of three pump houses constructed between 1914-1952. The drainage facilities require staff to be present 24 hours a day, and therefore requires staff housing on site. The house is in good condition and appears to have new windows and doors. It is located approximately 170 ft northwest of the largest and oldest pump house.

P3b. Resource Attributes: HP2. Single family property

P4. Resources Present: ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of house, facing northwest.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by:
Kleinfelder
J. Neal, S. Dunham, and K. Willis
435 Lincoln Way
Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

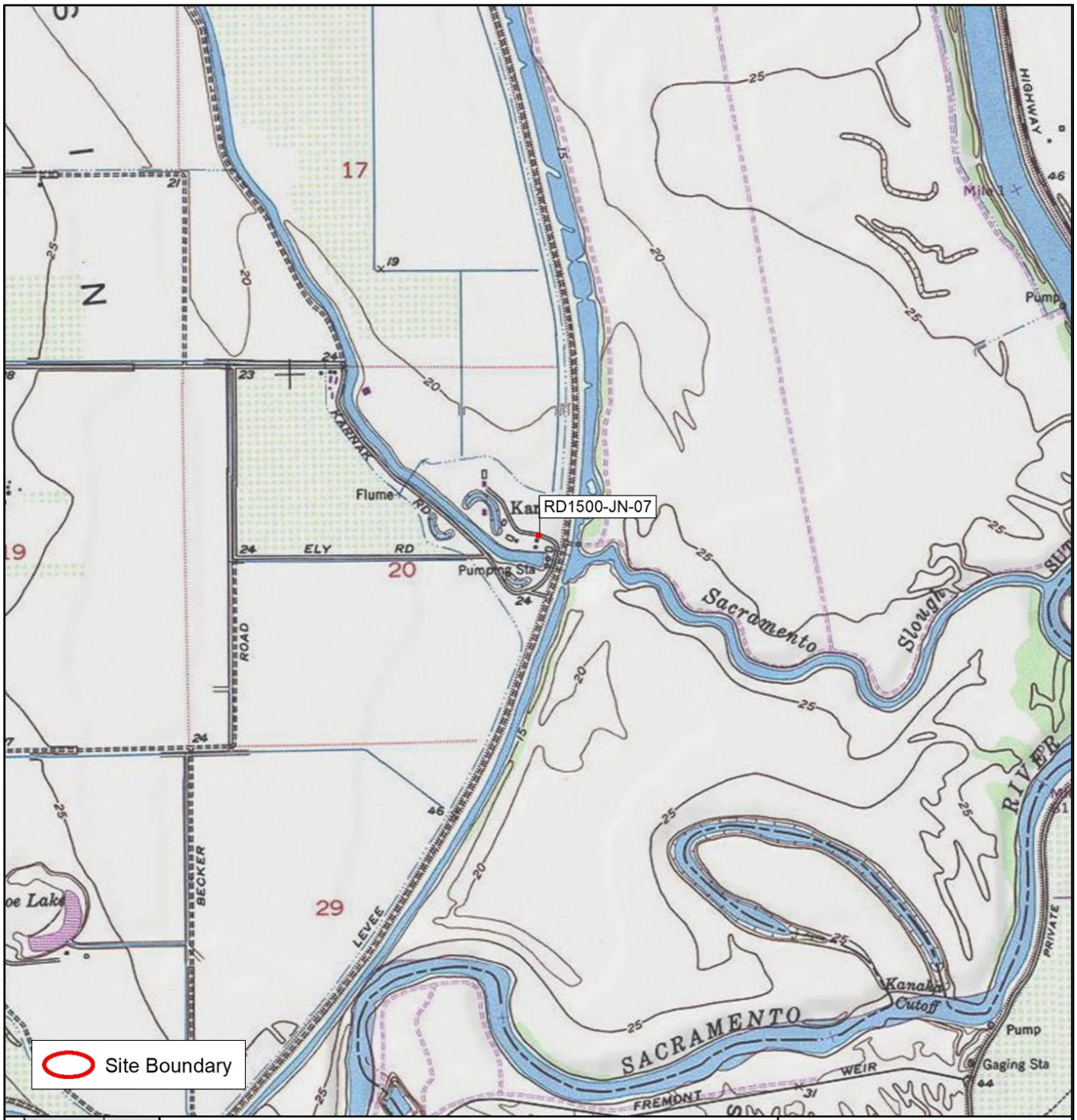
Attachments: ☐ NONE ☒Location Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐Other

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Resource Name or #: RD1500-JN-07
Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



Resource Location
RD-1500-JN-07
Sutter County, California

Appendix G

KARNAK DRAINAGE FACILITY DESIGN PLANS

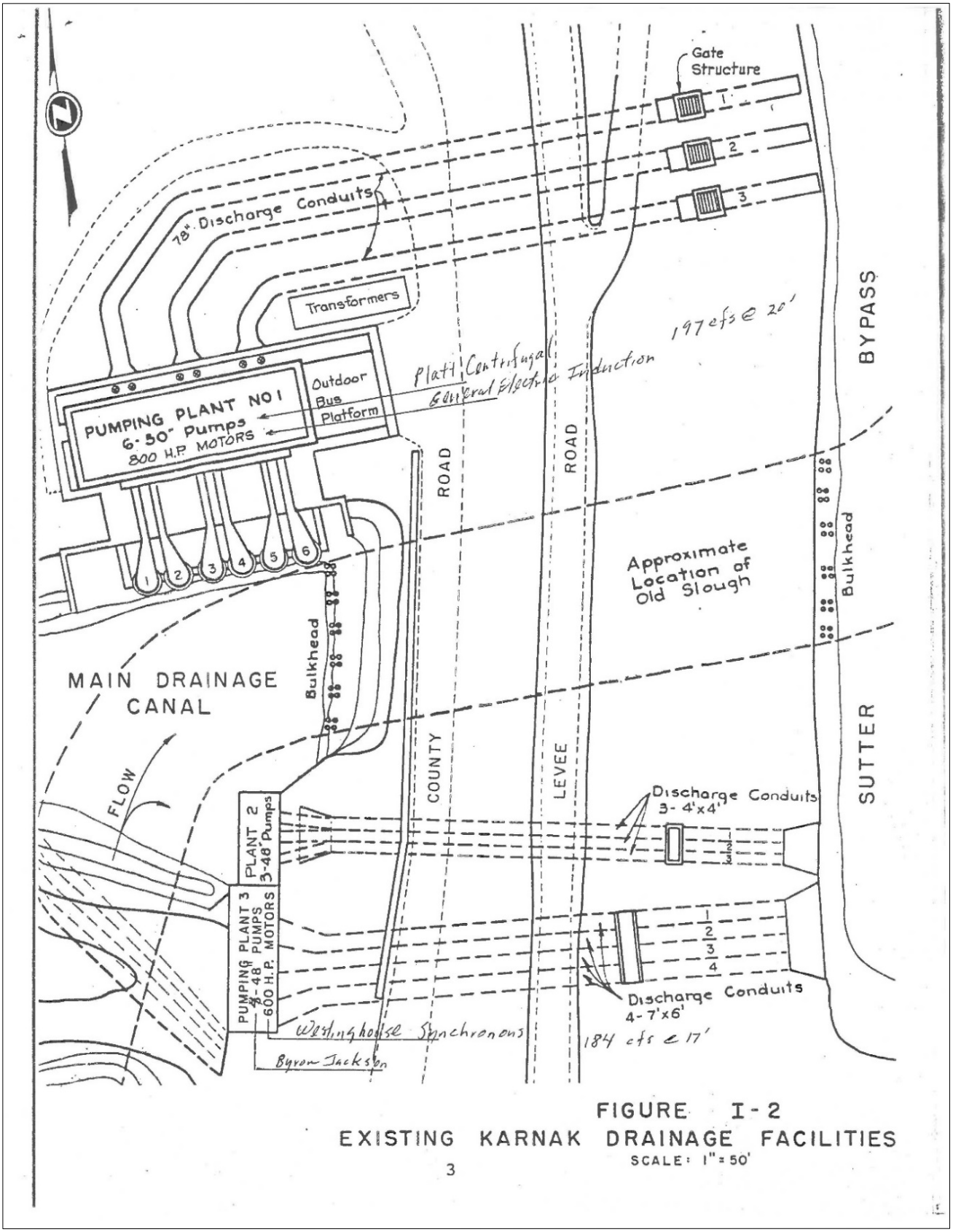
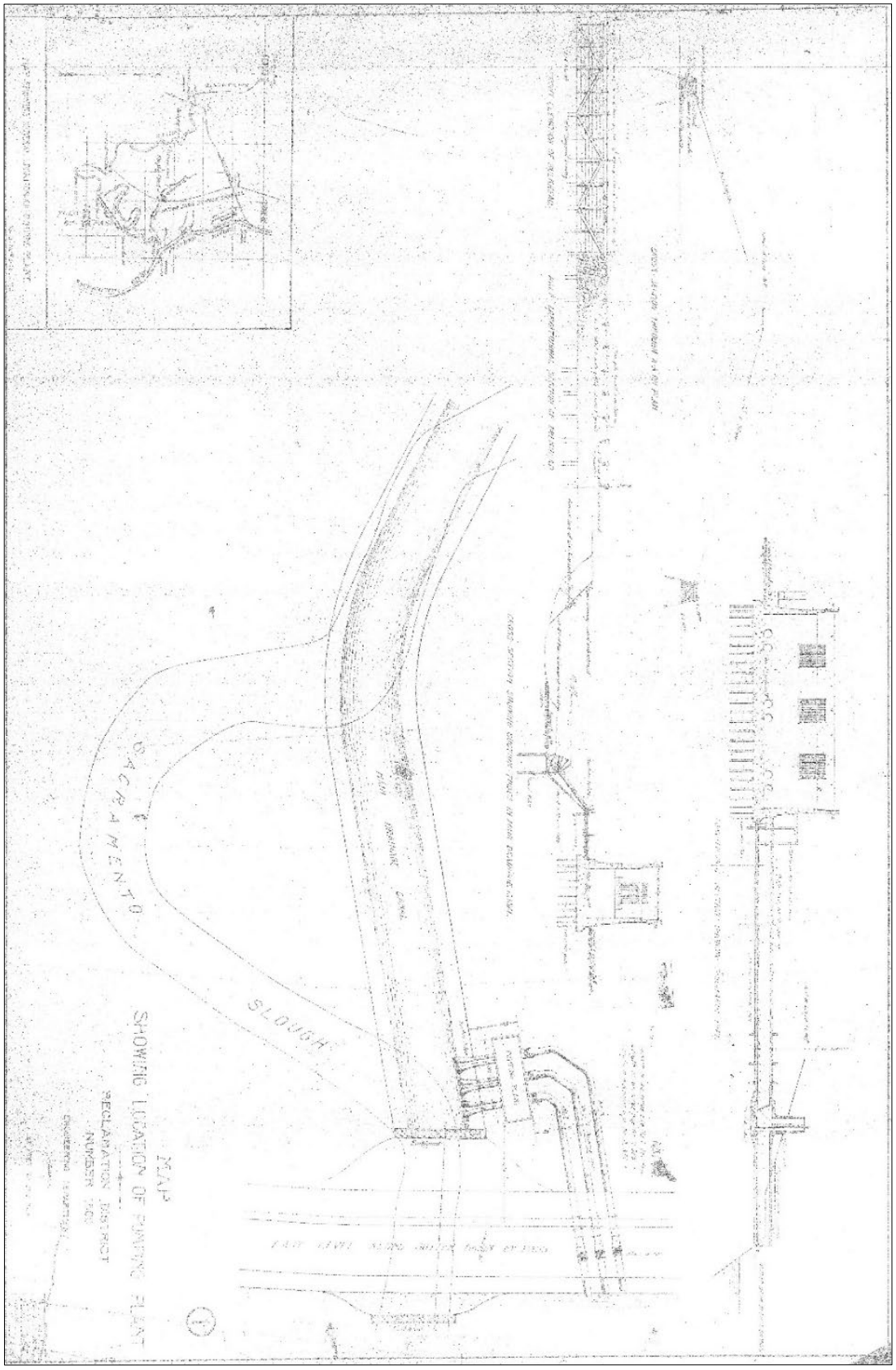


FIGURE I-2
EXISTING KARNAK DRAINAGE FACILITIES
SCALE: 1" = 50'

"Existing Karnak Drainage Facilities" (BR 1983).



"Map Showing Location of Pumping Plant" (RD 1500 Engineering Department 1914).

Cultural Resources Identification Report

Cultural Resources Identification Report for the McGriff Lakes – Sutter Basin Watershed Flood Control & Safety Project in Karnak, Sutter County, California

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KLEINFELDER
Bright People. Right Solutions.

March 2023

Acronyms and Abbreviations

AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
AD	anno domini
AF	acre-feet
amsl	above mean sea level
APE	area of potential effect(s)
ASAE	American Society of Agricultural Engineers
B.A.	Bachelor of Arts
BCE	before common era
BR	Bureau of Reclamation
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHRIS	California Historical Resources Information System
Commission	California Debris Commission
CRHR	California Register of Historical Resources
CY	cubic yards
District	Reclamation District 1500
DPR	Department of Parks and Recreation
EIR	Environmental Impact Report
hp	horsepower
GANDA	Garcia and Associates
GE	General Electric
GIS	geographic information system
GLO	Bureau of Land Management General Land Office
HUC	Hydrologic Unit Code
M.A.	Master of Arts
MND	Mitigated Negative Declaration
NAHC	Native American Heritage Commission
NCHS	Napa County Historical Society
NEIC	Northeast Information Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
No.	number
NOP	Notification of Preparation
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PG&E	Pacific Gas and Electric Company
PH	pumphouse
PRC	Public Resources Code
Project	McGriff Lakes – Sutter Basin Watershed Flood Control & Flood Safety Project
RD	Reclamation District
RPA	Register of Professional Archaeologists
rpm	rotations per minute
SBC	Sutter Basin Company
SHPO	California State Historic Preservation Officer
SLF	Sacred Lands File
SR	State Route
TCR	tribal cultural resource(s)
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Management Summary

Provost & Pritchard Consulting Group proposes the McGriff Lakes – Sutter Basin Watershed Flood Control & Flood Safety Project (Project) in the unincorporated locality of Karnak in Sutter County, California. The Project will involve modernizing the existing Karnak Drainage Facility or installing a suitable alternative that provides the same level of protection in order to provide drainage for the RD 1500 service area.

The Project will be funded by a United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) federal grant and may affect waters of the United States (US) and federal flood control structures. As a result, the Project proponent must meet requirements of Sections 401 and 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act as well as Section 106 of the National Historic Preservation Act (NHPA), which requires that federal agencies "take into account" the effect of its undertakings on historic properties. The US Army Corps of Engineers (USACE) is a federal agency and since the Project is an "undertaking" as defined at 36 Code of Federal Regulations (CFR) §800.16(y), and the undertaking has the potential to cause effects on historic properties (36 CFR §800.3[a]), it is necessary to identify cultural resources within the Area of Potential Effects (APE). This Cultural Resources Identification Report has been prepared in accordance with the USACE Section 106 Standards. In addition to meeting federal regulations as it pertains to the California Environmental Quality Act (CEQA).

This report provides a summary of the efforts and results of the California Historical Resources Information System (CHRIS) records search with the Northeast Information Center (NEIC) at California State University, Chico; a review of the Sutter County Museum historic properties records database; a historical map and archival research; and Native American Heritage Commission Sacred Lands File (NAHC SLF)search; as well as, the methods, results, resource eligibility, and management recommendations.

The Sutter County Museum historic properties database search identified one previously documented cultural resource within the APE (the Karnak Drainage Facility). One previous cultural resources study has been completed within the APE and four previous cultural resources studies have been conducted within the 0.5-mile radius. The NAHC SLF records search resulted in negative findings within the search area. The NAHC did provide a list of Native American contacts to be contacted for additional outreach regarding the Project area. This list has been included in the appendices for use by the lead agency for background information in completing their Section 106 Native American consultation.

An intensive pedestrian survey was conducted in January 2021, by Kleinfelder archaeologists, Jessica Neal, M.A., RPA, and Samantha Dunham, B.A. Six new cultural resources were identified (the East Levee, RD 1500 Canal, East Canal, a historical bridge, and two houses) and one previously recorded resource was updated (Karnak Drainage Facility) within the APE. All seven resources were recorded on Department of Parks and Recreation (DPR) 523-series forms.

The Karnak Drainage Facility consists of three pump houses constructed between 1914 and 1952, associated structures, infrastructure, and equipment. The Karnak Drainage Facility has been evaluated and are recommended eligible for inclusion in the National Register of Historic Properties (NRHP) and the California Register of Historical Resources (CRHR) under Criteria A/1.

The bridge, canals, levee, and houses have not been individually evaluated at this time, as the project design is undetermined and may result in avoidance of these resources. However, the East Levee, Karnak Drainage Facility, RD 1500 Canal, the East Canal, and House 1 are recommended as contributor to the Reclamation District 1500 proposed historic district. Kleinfelder recommends that once a final Project design and potential impacts to these resources are known that these resources be individually evaluated for eligibility for inclusion on the NRHP and CRHR. The lead federal agency will complete consultation with the State Historic Preservation Office (SHPO) for effects to Historic Properties and to determine mitigation measures for adverse effects that cannot be avoided.

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1.0 Introduction

The following provides an overview of the McGriff Lakes – Sutter Basin Watershed Flood Control & Flood Safety Project (Project) description, background and objectives, location, and Area of Potential Effect (APE).

1.1 Description

The following description details the watershed planning area, the setting, and current infrastructure.

1.1.1 Project Setting

The Project is located northwest of Sacramento in an area of low-lying land protected by levees between the Sacramento and Feather rivers, commonly known as the Sutter Basin. RD 1500 is one of the largest reclamation districts in California and provides drainage and flood control to an area of approximately 67,850 acres within its service area, including protecting the community of Robbins from flood damage. The area was reclaimed for farming as part of the Sutter Basin Reclamation Project in the early part of the 20th century and is located between the Sacramento River on the west and south and the Sutter Bypass and Feather River on the east. The entire District boundary is leveed to prevent flooding from the nearby river systems; however, during large rainfall events, the area acts as a bathtub filling up from precipitation that falls within its boundaries. The Sutter Basin is a closed basin with no natural outlet because of the extensive levee system, so drainage and flood control must be provided.

1.1.2 Current Infrastructure

The Karnak Drainage Facility is located in the southeast corner of the Sutter Basin. The existing Karnak Drainage Facility consist of three separate pumphouses which discharge drainage water to the Sacramento Slough (State Waterbody ID: CAR519220001998081411320 8) for ultimate discharge to the Sacramento River. More specifically the current infrastructure includes:

- Pump House (PH) 1, constructed in 1914 during the development of the Sutter Basin Reclamation Project and consists of six large centrifugal pumps capable of pumping approximately 1,200 cubic feet per second (cfs) out of the Sutter Basin.
- Pumphouse 2 (PH 2) consists of three vertical pumps and was constructed in 1929 but was poorly designed and was never operational.
- Pumphouse 3 (PH 3) consists of four vertical pumps capable of pumping approximately 700 cfs and was constructed in 1952 to expand the capacity of Karnak Drainage Facility and provide the possibility of gravity drainage.

All three pumphouses have existing discharge pipes that are installed through the East Levee for discharge to the Sacramento Slough. Antiquated equipment and lack of available parts has caused frequent and potentially extended outages which greatly impairs the existing Karnak Drainage Facility from providing its intended purpose of drainage control and flood management in the Sutter Basin.

1.2 Project Purpose and Need

The purpose of the Project is to prevent damage from floodwater to homes and other property by providing flood protection to the community of Robbins and surrounding rural residential

property, State Route (SR) 113 and other local roadways, and over 65,000 acres of rural farmland; to manage erosion and sediment issues; and, to prevent displacement of fish and wildlife by rehabilitating the existing Karnak Drainage Facility or installing a suitable alternative that provides the same level of protection. The purposes of this Project include flood prevention and flood damage reduction caused by above average precipitation within the Sutter Basin through facility improvements to control and direct impounded surface water out of the basin and reduce runoff frequency, depth, and velocity of flood waters.

Floods can be catastrophic to an area while burdening a large recovery cost. Additionally, California has more flood years and more drought years on average than any other part of the country and this variability would most likely increase with anticipated climate change (Lund 2019). Flood control maintenance must be reliable and consistent. Replacement of current infrastructure at the Karnak Drainage Facility would provide reliability and safety to the watershed by reducing the risk of catastrophic flooding and associated damage, now and in the future.

1.3 Area of Potential Effects

The APE measures approximately 9.37 acres and includes the Project footprint and the Project's maximum extent of ground disturbance. The APE is located at the Karnak Drainage Facility, Sutter County, approximately 3.5 miles east-southeast of Knights Landing, in the Sutter Basin, approximately 0.7-mile northwest of the Yuba County and Sutter County boundary. The APE is located on multiple Accessor Parcel Numbers (34-170-030, -031, -022, -028, -024, and -033), within Township 11 North, Range 3 East, Section 20 on the Knights Landing, California, 7.5-minute United States Geological Survey (USGS) quadrangle (USGS 1981). Refer to Appendix A, Figures 1, 2, and 3.

The elevation at the APE is approximately 20 feet above mean sea level (amsl). Adjacent land is used primarily for agriculture. The northwest-to-southeast-trending RD 1500 Canal bisects the APE. The north-to-south-trending East Canal and the east-to-west-trending Sacramento Slough make up the eastern boundary of the APE. The north-to-south-trending East Levee intersects the eastern half of the APE. Reclamation Road, Bates Road, and the Karnak Drainage Facility are located within the APE.

1.4 Background and Objectives

The purpose of this assessment is to inventory the APE for potential cultural resources that may be present and identify measures to avoid or mitigate potential impacts to such resources. Cultural resources include archaeological, architectural history, and Native American (tribal) cultural resources.

Kleinfelder conducted a cultural resources literature search through the California Historical Resources Information System (CHRIS) records search with the Northeast Information Center (NEIC) at California State University, Chico to assess potential presence of cultural resources within the APE and a 0.5-mile radius around the APE. The records review and literature search included reviews of the Sutter County Museum historic properties records database, historical maps, previous survey reports, and registers of historical resources. This was followed by a review of the Sutter County Museum historic properties records database and a Sacred Lands File (SLF) search with the Native American Heritage Commission (NAHC). Once background research had been completed, Kleinfelder completed an intensive pedestrian survey of the APE in order to

identify and/or update cultural resources within the APE. The Project has been conducted in accordance with Section 106 of the National Historic Preservation Act (NHPA) and California Environmental Quality Act (CEQA).

2.0 Regulatory Context

The following section provides the federal, State of California (State), and local laws, regulations, and ordinances that are applicable to cultural resources compliance on the Project.

2.1 Section 106 of the National Historic Preservation Act

Section 106 of the NHPA (36 CFR §800) requires that projects undertaken by federal agencies (and/or federally funded projects or projects requiring federal approval) consider the effects of their actions on properties that may be eligible for listing or are listed in the National Register of Historic Places (NRHP). To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological and architectural properties) must be inventoried and evaluated for listing in the NRHP. Although compliance with Section 106 is the responsibility of the lead federal agency, consultants in support of the agency or project proponent may be delegated all or portions of the Section 106 process. The RD 1500 Project is subject to Section 106 because it will require a United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) federal grant to fund this Project as well as a U.S. Army Corps Section 404 permit. The Section 106 process includes four primary steps, listed below.

1. Initiation of consultation with consulting parties (36 CFR §800.3).
2. Identification and evaluation of historic properties within the APE (36 CFR §800.4).
3. Assessment of adverse effects on historic properties within the APE (36 CFR §800.5). If there are historic properties that will be affected, consult with the California State Historic Preservation Officer (SHPO) regarding adverse effects, both direct and indirect, on historic properties. If there are no historic properties that will be affected, implementation of the project in accordance with the findings of no adverse effect shall proceed (36 CFR 36 §800.5[d][1]).
4. Resolve adverse effects on historic properties within the APE (36 CFR 800.6). Continue consultation among the federal agency and consulting parties to avoid and mitigate adverse effects. The Advisory Council on Historic Preservation (ACHP) provides comments to head of the federal agency, and the ACHP comments must be considered when final agency decision on the undertaking is made (move forward with the project, stop pursuant to mitigation, step back through Section 106 process) (36 CFR 800.7).

2.2 California Environmental Quality Act of 1970, as Amended

CEQA requires State and local agencies to identify and reduce, if feasible, the significant, negative environmental impacts of land use decisions.

CEQA Guidelines: Title 14 California Code of Regulations (CCR) Section 1427

This section of CEQA recognizes that California's archaeological resources are endangered by urban development; the legislature finds that these resources need preserving; it is a misdemeanor to alter any archaeological evidence found in any cave, or to remove any such materials from a cave.

CEQA Guidelines: Title 14 CCR Section 15064.4 subsection (b)

This section of CEQA defines "historical resource," addresses reburial options for Native American remains, and presents the preferred mitigation of historical resources.

CEQA Guidelines: Title 14 CCR Section 15064.5

This section of CEQA identifies which resources are considered cultural resources, as stated below.

- Resource(s) listed or eligible for listing on the California Register of Historic Places (CRHR) (Title 14 CCR Section 15064.5(a)(1).
- Resource(s) either listed in the NRHP or in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant," (Title 14 CCR Section 15064.5(a)(2)).
- Resources identified as significant in a historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code (PRC) [Title 14 CCR Section 15065.5(a)(2)].

In addition, Subdivision (g) provides the guidelines referenced below regarding historical surveys.

A resource identified as significant in a historical survey may be listed in the CRHR if the survey meets all the following criteria:

- The survey has been or will be included in the State Historic Resources Inventory,
- The survey and the survey documents were prepared in accordance with procedures and requirements of the California Office of Historic Preservation (OHP),
- The resource is evaluated and determined by OHP to have a significance rating of Category 1 to 5 on the Department of Parks and Recreation (DPR) Historic Resources Inventory Form,
- If the survey is five years or older at the time of its nomination for inclusion in the CRHR, the survey is updated to identify historic resources that have become eligible or ineligible due to changed circumstances or further documentation and those which have been demolished or altered in a manner that substantially diminished the significance of the resource, and
- Resources identified during such surveys are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates otherwise.
- A final category of "historical resources" may be determined at the discretion of the lead agency when: Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, education, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record [Title 14 CCR Section 15064.5(a)(3)].

When an Initial Study identifies the existence of, or the probable likelihood of, Native American human remains within a project, the lead agency shall work with the appropriate Native Americans as identified by NAHC. An applicant may develop an agreement for treating or disposing of, with appropriate dignity; the human remains and any items associated with Native American burials with the appropriate Native Americans as identified by NAHC (Title 14 CCR Section 15064.5(d)).

CEQA Guidelines: Title 14 CCR Section 15064.5(b)

Section 15124(b) addresses mitigation, and states that the preferred mitigation for historical resources is treatment in a manner consistent with Secretary's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings. The preferred mitigation for archaeological sites is preservation in place.

CEQA Guidelines: Title 14 CCR Section 15064.7 "Thresholds of Significance"

This section encourages agencies to develop thresholds of significance to be used in determining potential impacts and defines the term "cumulatively significant".

CEQA Guidelines: Title 14 CCR Section 15126.4 "Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects", sub-section (b) "Mitigation Measures Related to Impacts on Historical Resources"

Subsection (b) discusses:

- Impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource,
- Documentation as a mitigation measure, and
- Mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible; data recovery must be conducted in accordance with an adopted data recovery plan.

CEQA Appendix G Section V

This appendix is a checklist that identifies potential impacts to historical and archaeological resources, and/or human remains. The checklist includes the following questions, which are used to determine if a potential project would:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5,
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5,
- Disturb any human remains, including those interred outsides of formal cemeteries.

Questions on the checklist are answered to assess whether impacts associated with a project would be potentially significant, less than significant with mitigation, less than significant, or have no impact. The final determination of project-related impacts is made by the lead agency on a project.

CEQA Assembly Bill 52 –Tribal Consultation and Tribal Cultural Resources

Assembly Bill (AB) 52 amended CEQA to address California Native American tribal concerns regarding how cultural resources of importance to tribes are treated under CEQA. CEQA now specifies that a project that may cause a substantial adverse change in the significance of a "tribal cultural resource" [as defined in PRC 21074(a)] is a project that may have a significant effect on the environment. According to AB 52, tribes may have expertise in tribal history and "tribal

knowledge about land and tribal cultural resources (TCR) at issue should be included in environmental assessments for projects that may have a significant impact on those resources."

The AB 52 process entails the following:

- The CEQA lead agency must begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project if the tribe has requested such notification to the lead agency, in writing. The notification request requires that the lead agency inform these tribes of proposed projects in the geographic area provided by the representative tribe; and within set timeframes. Specifically, the lead state agency is required to notify tribe(s) that have requested project notification under AB 52 within 15 days of determining there is a project; the tribe(s) then have 30 days to respond to this notification and request consultation: upon receipt of a request for consultation the lead agency must then initiate consultation with the tribe(s) within 30 days.
- AB 52 applies to the following CEQA documents: Negative Declaration (ND), Mitigated Negative Declaration (MND), or Notification of Preparation (NOP) of an Environmental Impact Report (EIR). Such documents cannot be released for public review before tribal consultation has concluded and shall not contact any confidential information that the Tribe has requested be omitted from public review.

AB 52 further defines the following legislative terms:

Public Resource Code (PRC) 21074 (TCR): The statute identifies TCR as separate and distinct category of resource, separate from a historical resource. New PRC Section 21074 further defines a TCR as any of the following under its subsections (a) through (c):

a) Sites, features, places, and objects with cultural value to descendant communities or cultural landscapes that are any of the following:
    - Listed on the CRHR.
    - Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.
    - Deemed to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1.

b) Sacred places, including, but not limited to, Native American sanctified cemeteries, places of worship, religious or ceremonial sites, or sacred shrines that meet either of the following criteria:
    - Listed on the California NAHC's SLF pursuant to Section 5097.94 or 5097.96 and a California Native American tribe has submitted sufficient evidence to the lead agency demonstrating that significance to the California Native American tribe or contain known graves and cemeteries of California Native Americans.
    - Listed or determined pursuant to criteria set forth in subdivision (g) of Section 5024.1 to be eligible for listing in the CRHR.

c) A cultural landscape is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

d) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "non-unique archaeological resource" as defined in subdivision (h) of Section 21083.2 also may be a TCR if it conforms with the criteria of subdivision (a).

2.2.2 Public Resources Codes

The following provides a summary of California PRC that apply to cultural resources.

PRC Section 5020.1

This section defines several terms, including those provided below.

> "Historical resource" includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California.
>
> "Substantial adverse change" means demolition, destruction, relocation, or alteration such that the significance of a historical resource would be impaired.

PRC Section 5024.1

This section establishes the CRHR. A resource may be listed as a historical resource in the CRHR if it meets the NRHP criteria or the following state criteria:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage,
- is associated with the lives of persons important in our past,
- 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, or
- has yielded, or may be likely to yield, information important in prehistory or history.

PRC Section 5097.5

This section states that any unauthorized removal or destruction of archaeological or paleontological resources on sites located on public land is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the State, or any city, county, district, authority or public corporation, or any agency thereof.

PRC Section 5097.98

This section discusses the procedures that need to be followed upon the discovery of Native American human remains. NAHC, upon notification of the discovery of human remains by the County coroner, is required to notify those persons it believes to be most likely descended from the deceased Native American. It enables the descendant to inspect the site of the discovery of the Native American human remains and to recommend to the landowner (or person responsible for the excavation) means of treating, with dignity, the human remains and any associated grave goods.

PRC Sections 5097.99, 5097.991

These sections establish that it is a felony to obtain or possess Native American artifacts or human remains taken from a grave or cairn and sets penalties for these actions. The sections also mandate that it is the policy of the State to repatriate Native American remains and associated grave goods.

PRC Section 21083.2

This section states that under CEQA, the lead agency is responsible for determining whether a project may have a significant effect on historical and archaeological resources. Section 21083.2 states that if the lead agency determines that the project may have a significant effect on "unique" archaeological resources, an EIR shall be prepared to address these resources. A unique archaeological resource is an artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that the resource meets one of the following criteria:

- contains information needed to answer important research questions and that a demonstrable public interest exists in that information,
- has a special and particular quality, such as being the oldest or best example of its type, and/or
- is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require that reasonable efforts be taken to preserve these resources in place or provide conditions or mitigation measures.

PRC Section 21084.1

This section sets forth that a project that may cause a significant adverse change in a significant historical resource is a project that may be considered to have adverse effects on the environment. Historical resources not listed on the CRHR or other local lists may still be considered historical resources at the discretion of the lead agency on the project.

Senate Concurrent Resolution Number 43

This resolution requires state agencies to cooperate with archaeological survey and excavation programs, and to preserve known archaeological resources whenever reasonable.

Senate Bill 18 (Burton 2004)

This bill required protection and preservation of Native American traditional cultural places during city and county general plan development.

Health and Safety Code Section 7050.5

This code establishes that any person who knowingly mutilates, disinters, wantonly disturbs, or willfully removes any human remains in or from any location without authority of the law is guilty of a misdemeanor. It further defines procedures for the discovery and treatment of Native American remains.

Health and Safety Code Sections 8010-8011

This code is intended to provide consistent state policy to ensure that all California Native American human remains, and cultural materials are treated with dignity and respect. The code extends policy coverage to non-federally recognized tribes, as well as federally recognized groups.

California Penal Code Section 622.5
This code states that anyone who willfully damages an object or thing of archaeological or historic interest can be found guilty of a misdemeanor.

2.3 Sutter County General Plan

The Sutter County General Plan was adopted in 2011 and is intended to provide a framework for planning and the future of Sutter County. California law requires every city and county in the state to prepare and adopt a general plan "for the physical development of the county or city and any land outside its boundaries which bears relation to its planning" (California Government Code, Section 65300). The Sutter County General Plan expresses the community's goals, visions, and policies for future land uses. The general plan provides adequate background information about the kinds, locations, and intensities of land uses as well as applicable resource protection and development policies. According to California law, a general plan must contain at least seven elements: land use, open space, conservation, housing, circulation, noise, safety, and other elements that a county wishes to adopt. The Sutter County General Plan also includes the optional elements of economic development, infrastructure, and community services. Cultural resources are taken into consideration under the cultural resources section (Chapter 6.7) of the Sutter County General Plan (PBS&J 2010); cultural resources are defined as buildings, sites, districts, structures, or objects having historical, architectural, archaeological, or cultural significance. The applicable goals, policies, standards, and implementation measures are included below.

Environmental Resources Element (ER): Cultural Resources.

The goal of ER 8 is to identify, protect, and enhance Sutter County's important cultural resources to increase awareness of the County's heritage. The applicable policies and implementation programs of ER 8 are detailed below:

Policies

ER 8.1 **Identification.** Identify cultural resources, which include prehistoric, historic, and archeological resources, throughout the County to provide adequate protection of these resources.

ER 8.2 **Preservation.** Ensure the preservation of significant cultural resources, including those recognized at the national, state, and local levels.

ER 8.4 **Inclusion on Historic Registers and District.** Promote the registration of historic resources under the National and State registers and within the County's Historic Preservation Combining District.

ER 8.5 **Consultation.** Consult with the appropriate organizations and individuals early in the development process (e.g., Information Centers of the California Historical Resources Information System, Native American Heritage Commission, and Native American groups and individuals) to minimize potential impacts to cultural resources.

ER 8.6 **Compatible New Development.** Review proposed new development, rehabilitation efforts, and remodels for compatibility with the surrounding historic context.

ER 8.7 **Adaptive Reuse.** Encourage the adaptive reuse of historic resources when the original use of the resource is no longer feasible.

ER 8.8 **Financial Incentives.** Consider providing financial incentives to private owners and development in order to maintain, rehabilitate, and preserve cultural resources.

ER 8.9 **Public Awareness.** Educate the public on the County's important cultural resources to increase awareness for protection.

Implementation Programs

ER 8-A For projects subject to discretionary approval involving the demolition, relocation, or alteration of a building or structure over 45 years old or that would result in a change to the building or structure's immediate setting, the County shall require an assessment by a professional historic resource consultant to determine if the action would cause a substantial adverse change in the significance of an historical resource pursuant to CEQA Guidelines section 15064.5.

ER 8-B If the historical resource assessment determines that the proposed action would cause a substantial adverse change in the significance of an historical resource, the County shall require as a condition of project approval the implementation of appropriate and feasible measures to reduce the potential impact, including the appropriate level of written and photographic documentation of significant historical resources that would be demolished.

ER 8-C For projects subject to discretionary approval, which involve grading, excavation, or construction, require the applicant to hire a professional that meets the Secretary of Interior's professional qualifications standards for archaeology to conduct an archaeological resource investigation. As determined necessary by the archaeologist and the County, the investigation may include, but not be limited to, an updated records search, pre-construction field surveys, research, and testing, and/or other methods that identify whether a substantial adverse impact on significant archaeological resource would occur. If cultural resources are discovered, the resource shall be examined by a qualified archaeologist to determine its significance and develop appropriate protection and preservation measures.

ER 8-D Require that when any subsurface cultural resources, paleontological resources, or human remains are encountered, all work within 100 ft of the discovery be stopped and the area protected from further disturbance until the discovery is evaluated. The appropriate County personnel shall be notified immediately. The resources shall be examined by qualified personnel to determine their significance and develop appropriate protection and preservation measures. If

human remains are discovered, they shall be treated in compliance with applicable State and federal laws, including notifying the County Coroner and consulting with the California Native American Heritage Commission, as appropriate.

ER 8-E Update Zoning Code to allow for adaptive reuse of historic resources.

ER 8-F Maintain, rehabilitate, and preserve cultural resources by implementing the County's Historic Preservation Combining District.

ER 8-G Pursue local, State, and federal funding opportunities to rehabilitate, support, or provide incentives to maintain cultural resources.

3.0 Natural and Cultural Context

This section presents background information pertaining to the natural and cultural context of the APE, as well as an overview of regional prehistory, ethnography, and history.

3.1 Natural Context

The Project is located in Sutter County, in the central portion of the Sacramento Valley. Sutter County is comprised of approximately 607 square miles of land (378,875 acres) and its boundaries are defined by Yolo and Colusa counties to the west, with the Sacramento River and Butte Sink forming the western boundary; Butte County to the north; Yuba and Placer counties to the east with the Feather and Bear rivers forming a portion of the eastern boundary; and Sacramento County to the south, with the southern boundary south of Riego Road. Sutter County's topography is primarily flat, with the exception of the Sutter Buttes (often referred to as the world's smallest mountain range) in the northern part of the county. It is divided into two geographic areas: the Sutter Buttes and the valley area. The valley area covers the majority of Sutter County and is flat with open row or field crop style agriculture use and extremely low population density. Approximately 98 percent of the county is designated for agriculture and open space uses. Sutter County's climate has hot, dry summers with relatively moderate wet winters. The average temperature ranges from 39.2 degrees Fahrenheit in the winter to 97 degrees Fahrenheit in the summer; the average annual rainfall is 22 inches (Sutter County 2021; PBS&J 2010).

The APE is plotted within the McGriff Lakes-Sutter Basin subwatershed, where the Sutter Bypass and Sutter Basin converge and in land zoned for agricultural and open space use. The Sutter Bypass is a major flood control canal and runs north-to-south through the center of Sutter County and is connected to the Sacramento River by the Tisdale Bypass. The Sutter Bypass is a major manmade flood control area that acts as an overflow collector of flood flows in the Sacramento River after passing through the Butte Slough and the Butte Sink; it is a closed basin with no natural outlet because of the extensive levee system, so drainage and flood control must be provided. The Sutter Bypass and the drainage canals generally run south from the Butte Sink and through the center of the county until they meet with the Sacramento River west of its convergence with the Feather River. The Sutter Basin is bounded by the Feather River to the east and the Sacramento River to the west. It consists of a combination of natural topography and constructed levees that aid in the collection and discharge of water from the Basin in natural waterways managed by RD 1500, an approximate 67,850-acre area and one of the largest reclamation districts in California. The soil in the Sutter Basin is alluvial deposit known as river bottom land with Columbine silt loam covering Sacramento clay loam in varying amounts, which proved ideal for farming (Isbell 2009; NRCS 2014; PBS&J 2010).

Historically, the natural habitats in Sutter County included perennial grasslands, riparian woodlands, oak woodlands, and a variety of wetlands including vernal pools, seasonal wetlands, freshwater marshes, ponds, streams, and rivers. However, most of the environments have been disturbed by development for agriculture, irrigation, flood control, and urbanization. Numerous streams and channels have also been channelized, riparian and oak woodlands cleared, and marshes have been drained and converted to agricultural or urban lands. Many invasive annual grass species have replaced native perennial species. The Sutter Buttes are relatively undisturbed and undeveloped parcels along the Sacramento River, Feather River, Bear River, and Sutter Bypass

retain habitats similar to historical ones. Regional vegetation includes black willow, Fremont cottonwood, button willow, blue elderberry, white alder, round stem bulrush, California blackberry, California wild grape, and western raspberry. Regional animal species include deer, American badgers, skunk, beaver, fox, rabbit, bats, burrowing owls, western pond turtles, giant garter snakes, salmon, catfish, longfin smelt, bullheads, largemouth bass, bluegill, sunfish, and black crappie (California Department of Fish and Wildlife 2021; PBS&J 2010)

The soils within the APE consist of Capay silty clay (0 to 2 percent slopes) (California Soil Resource Lab 2021). The elevation at the APE is approximately 20 feet amsl. The APE is bisected by the northwest-to-southeast-trending RD 1500 Canal. An unnamed intermittent stream is approximately 536 feet north of the APE, an unnamed intermittent stream is located approximately 395 feet southwest of the APE, respectively, the Sacramento River is approximately 0.72 mile southeast of the APE, and the East Canal runs perpendicular on east side of the APE. Most of the APE has been developed for use as Karnak Drainage Facility (see Appendix A, Figure 2).

3.2 Prehistoric Context

The Central Valley is characterized by multiple cultural-historical frameworks with some cultural chronologies being highly detailed in certain locations and being poorly defined in other areas. Most local sequences are built on a few radiocarbon dates, relying on cross-dating stylistically distinct artifact types and cultural patterns. The applicable archaeological chronology is based on a system developed by Fredrickson's (1973, 1974) California adaptation of the Willey and Phillips (1958) period and stage integrative scheme with radiocarbon determinations (Groza 2002, LaJeunesse and Pyor 1996, Meyer and Rosenthal 1997) adjusting Frederickson's proposed periods with modern calibration curves. The following chronological framework is relevant to the APE: Paleo-Indian (11,550 to 8,550 cal before common era [BCE]), Lower Archaic (8,550 to cal 5,550 BCE), Middle Archaic (5,550 to 550 cal BCE), Upper Archaic (550 cal BCE to cal anno domini [AD] 1,100), and Emergent Period (cal AD 1,100 to historic) (Jones and Klar 2007; Rosenthal et al. 2007).

3.2.1 Paleoindian Period (11,550–8,550 cal BCE)

Paleoindian Period occupation is poorly represented in the archaeological record with most artifacts encountered as isolated finds. The few Paleoindian sites in California mainly occur on remnant Pleistocene landforms. This period is typically marked by an abundance of small, leaf-shaped and lanceolate projectile points, casual flake tools, ochre, and hammerstones. Some of the earliest evidence of human occupation in the Central Valley consists of concave base projectile points, basally thinned projectile points, and fluted projectile points which are well dated elsewhere in North America to an interval between 11,550 and 9,550 BCE. Assemblages range from a single projectile point to hundreds of projectile points and human remains (Jones and Klar 2007; Rosenthal. et al. 2007).

3.2.2 Lower Archaic Period (8,550–cal 5,550 BCE)

The Lower Archaic Period in the Central Valley is primarily defined by isolated finds. Stemmed points, chipped stone crescents, distinctive flaked stone artifacts, and early concave base points have been identified along Tulare Lake's ancient shore. Representation of milling tools, subsidiary processing tools, and other direct evidence of plant food is generally lacking in the Central Valley. Sites in adjacent regions have abundant milling equipment and other indications of reliance on plant food (e.g., handstones, millingslabs, various cobble cores, acorn and pine nut remains). The

woodlands in these regions were expanding at the time, thus similar behaviors and exploitations likely expanded into the Central Valley. There are no marine shell beads or obsidian in the Central Valley dated to the Lower Archaic Period, but during this period, marine shell beads have been identified in the western and central Great Basin and obsidian from the eastern Sierra Nevada has been identified on both sides of the Central Valley (Jones and Klar 2007; Rosenthal et al. 2007).

3.2.3 Middle Archaic Period (5,550–550 cal BCE)

During the Middle Archaic Period, the climate became warmer and drier, with large lakes reducing in size and desiccating. The Sacramento-San Joaquin Delta developed as a result of the rising sea level pushing inland into the Central Valley. Local populations in the foothills and valley floor began to adapt and differentiate from each other (Jones and Klar 2007; Rosenthal et al. 2007).

Foothill sites have abundant expedient cobble-based pounding, chopping, scraping, and mulling tools; flaked and ground stone tools used in food procurement and processing; minimal but widespread amounts of bone or shell artifacts, beads, or ornaments; small amounts of tabular pendants, incised slate and perforated stone plummets; notched, stemmed, and thick-leaf projectile points; narrow concave base darts with local and regional morphological variability; rock filled hearths and ovens; and, several graves capped by cairns of unmodified rock and milling equipment. Most tool materials are locally sourced with a small amount of obsidian procured from quarries in the North Coast Ranges, Cascades, and eastern Sierra Nevada. Acorns and pine nuts show up in botanical remains. Similar assemblages have been identified as far north as the Sacramento River Canyon and as far south as the Kings River in southern San Joaquin Valley (Jones and Klar 2007; Rosenthal et al. 2007).

Valley sites are rare in the Central Valley due to the geomorphic changes that occurred; four sites in the Central Valley date to the early Middle Archaic and about nine sites are represented in the later Middle Archaic in the Sacramento Valley. Central Valley sites reflect distinct adaptive patterns, organized subsistence practices, and increased residential stability along river corridors of the Sacramento and San Joaquin valleys. They are characterized by refined and specialized tool assemblages and features; a wide range of nonutilitarian artifacts (personal adornments); abundant trade objects (obsidian, shell beads and ornaments, and other perishable items); mortars and pestles found in marsh and riparian settings in northern San Joaquin and southern Sacramento valleys and North Diablo Range; fishing technologies (gorge hooks, composite bone hooks, spears); baked clay impressions of fine twisted cordage and twined basketry, basketry awls, simple pottery and other baked clay objects; finely made stone plummets and perforated “pencils”; bird bone tubes; shell beads; and, plant and animal remains indicative of year-round occupation). Acorn and pine nut remains are in most archaeobotanical assemblages. Faunal assemblages show a heavy reliance on marshes, riparian forests, and grasslands and include evidence of tule elk, mule deer, pronghorn, large and small fish, rabbits, hares, water birds, other terrestrial carnivores, raptors, and rodents. Obsidian was quarried from the eastern Sierra Nevada, North Coast Ranges, and southern Cascades (Jones and Klar 2007; Rosenthal et al. 2007).

The Windmiller Pattern is archetypical of the Central Valley during the Middle Archaic. Windmiller Pattern sites are widespread in the San Joaquin Valley and have been identified on old levee ridges adjacent to freshwater marshes and well-watered riparian settings near the confluence of the Mokelumne and Consumnes rivers in the Delta region. With the exception of one early component site, Windmiller Pattern sites date from 1,850 to 750 cal BCE. They are westerly

oriented, have ventrally and dorsally extended burials, and have sophisticated material culture found primarily as grave offerings. Windmiller Pattern sites reflect a seasonal adaptation with valley sites occupied in the winter and foothill sites occupied in the summer (Jones and Klar 2007; Rosenthal et al. 2007).

3.2.4 Upper Archaic Period (550 cal BCE–cal AD 1,100)

During the Upper Archaic Period, the Central Valley environment stabilized and evolved to be cooler and wetter with greater freshwater flows into the Delta watershed. Cultural developments are represented through the improvement and proliferation of many specialized technologies and manufactured goods (e.g., bone implements, polished stone plummets, saucer and saddle-shaped Olivella beads, Haliotis ornaments, obsidian bifacial rough-outs, and ceremonial blades). Economies varied regionally and focused on seasonally structured resources that could be harvested and processed in bulk like acorns, salmon, shellfish, rabbits, and deer. The Upper Archaic Period is characterized by mortars and pestles and handstones and millingslabs on the margins of the valleys; large mounded villages related to the Berkeley Pattern developed in the Delta region of the lower Sacramento Valley. Berkeley Pattern sites contain extensive accumulations of habitation debris and features (fire-cracked rock heaps, shallow hearths, rock-lined ovens, house floors, and flexed burials). Windmiller Pattern descendants continued to occupy the San Joaquin Valley, but groups from the valley and coast may have periodically colonized the western margins of the San Joaquin Valley. Sites in the San Joaquin Valley may have included year-round villages with house floors and extensive accumulations of aquatic- and terrestrial-based dietary debris; people in this area continued to use obsidian from the eastern Sierra Nevada. Sites in the far northern Sacramento Valley appear to be related to the Whiskeytown Pattern which is technologically conservative with mobile adaptation in the adjoining foothills, a lack of developed middens and residential features, and rare/absent fishbone and other riverine resources. Sites in the northeast Sacramento Valley included more substantial village settlements with domestic and processing features, human graves, bone implements, shell beads and ornaments, and faunal assemblages that represent occupation through winter. Sites in the southern Sacramento Valley had obsidian primarily procured from quarries in the North Coast Ranges. Sites in the northern and eastern Sacramento Valley had obsidian primarily obtained from the southern Cascade ranges (Jones and Klar 2007; Rosenthal et al. 2007).

3.2.5 Emergent Period (cal AD 1,100–historic)

During the Emergent Period, the climate was relatively stable with a few localized flood and drought events. Assemblages during this time are substantial, comprehensive, and diverse. Patterns that occur during this Period are the Augustine Pattern in the lower Sacramento Valley/Delta region, the Sweetwater and Shasta complexes in the northern Sacramento Valley, and the Pacheco Complex along the western edge of the Central Valley. The Emergent Period is characterized by the replacement of the dart and atlatl by the bow and arrow between cal AD 1,000 and 13,000; more complex social forms indicated by increased variation in burial type and furnishings; grave offerings (e.g., shell beads, ornaments, pestles and mortars); twined and coiled basketry; house floors and structural remains; localization of shell bead industries including clam shell disk beads; Stockton serrated, desert side notched, and Gunther-barbed points; and, increased importance in fishing and plant harvesting. Most sites from this period contain large quantities of fish bone and a diverse assortment of mammal and bird remains. Raw obsidian cobbles and flake blanks were primarily procured from the Napa Valley. Sites in the Sacramento

Valley included large populous towns with fish weirs along the river; mound villages and smaller hamlets established in the Delta region and along major tributaries; elaborate and diverse fishing equipment (e.g., harpoons, bone fish hooks, netting, and gorge hooks); human and animal effigies of baked clay; and, acorns, pine nuts, manzanita, and small seed remains in middens. Sites in the San Joaquin Valley included villages and smaller residential communities along streams of the foothills and along the river channels and sloughs of the valley bottom. The Emergent Occupation Period is also divided into the Lower and Upper Emergent phases. The Lower Emergent is marked by banjo type Haliotis ornaments in the southern Sacramento Valley/Delta region; elaborately incised bird bone whistles and tubes; flanged soapstone pipes; rectangular Olivella sequin beads; and, crematory burial practices reserved for high-status individuals. The Upper Emergent is marked by small corner-notched and desert serries arrow points; Olivella lipped and clam disk beads; bead drills; magnesite cylinders; hopper mortars; village sites with house pits; and, crematory burial practices that were generally wide-spread (Jones and Klar 2007; Rosenthal et al. 2007).

3.3 Ethnographic Context

The APE is situated within the ethnographic group territory of the Nisenan and is located approximately one mile east of the ethnographic group territory of the Patwin.

3.3.1 Nisenan

Ethnographically, the APE was part of the territory of the Nisenan (Kroeber 1925; Wilson and Towne 1978). Nisenan is part of the California Penutian linguistic family, which is further divided into four subfamilies: Wintuan, Maiduan, Yokutsan, and Utian. Nisenan belongs to the Maiduan subfamily along with Maidu and Konkow (Shipley 1978). The territory of the Nisenan, which included the drainage of the American River, extended from the crest of the Sierra Nevada in the east to the Sacramento River in the west, as far south as the Cosumnes River, and north to the divide of the North Fork of the Yuba River and Middle Fork of the Feather River (Wilson and Towne 1978).

Nisenan is divided into the Hill and Valley socio-political groups, which were further divided into "tribelets" that exerted political control over particular geographical areas. Valley Nisenan usually located their settlements on low, natural rises, knolls along streams and rivers, or on gentle slopes with southern exposures. Nisenan lived in semi-permanent settlements, consisting of one village, or a number of smaller villages clustered around one large village. Family groups often lived away from the main village and had seasonal camps for resource procurement (Wilson and Towne 1978:388-389). Nisenan lived in houses that were conical-shaped with coverings of bark, skins, and brush. Brush shelters were used in the summer and during gathering excursions. Most villages had bedrock mortar resources and acorn granaries. Olo, Yokol, Wollok, and Leuchi are the closest villages, all east of the APE (Wilson and Towne 1978:387-389).

Nisenan relied heavily on acorns, local game, and fish for subsistence. Acorns were gathered communally or individually. Deer, bear, salmon, birds, and rabbits were important in the Nisenan diet, along with insects, such as grasshoppers, crickets, and locusts. Freshwater mussels were also eaten, along with a variety of berries, wild plums, and grapes; manzanita cider was a preferred beverage (Kroeber 1925:409-411; Wilson and Towne 1978:388).

Stone tools used by the Nisenan included knives, projectile points, arrow straighteners, scrapers, pestles, mortars, and pipes (Wilson and Towne 1978:391). Wooden digging sticks were used for procuring roots and other food resources, and wooden mortars were used for food preparation (Kroeber 1925:413-414). Tule was used for mats, netting, fish nets, and canoes. Willow and redbud were preferred materials for weaving baskets. Baskets were used for food storage, cooking, cradles, seed beaters, and cages (Wilson and Towne 1978:391).

Nisenan first came into contact with Europeans upon the arrival of the Spanish in the late 1700s. Contact was limited to the southern edge of this territory and the effect was minimal (Wilson and Towne 1978:396). It was not until 1833, when a malaria epidemic swept through the Sacramento Valley, that the Nisenan began to feel the effects of encroaching Europeans. The epidemic was estimated to have killed 75 percent of the Valley Nisenan population, eliminating entire villages (Wilson and Towne 1978:396). Nisenan suffered further during the years following the Gold Rush when non-native peoples competed for land and resources, killing and persecuting the Nisenan, and driving survivors into the hills (Wilson and Towne 1978:396).

3.3.2 Patwin

The Patwin ethnographic tribal group lies east of the APE. The Patwin were to the east in the Suisun, Berryessa, and Green valleys, extending into the Sacramento Valley around present-day Vacaville. The name Patwin is derived from the Wintuan word for 'people' and was ascribed first to the broader Wintuan speakers until subsequent ethnographic data further distinguished the Patwin, or Southern Wintuan, from Central (Nomlaki) and Northern (Wintu) Wintuan speakers (Johnson 1978). Wintuan languages belong to the broader Penutian Language family which includes the Miwok to the west and south, Maidu to the east, Costanoan (Ohlone) to the south, and Yokuts to the southeast, among others (Powers 1976 McKern 1922; Kroeber 1925; Kroeber 1932; Johnson 1978; Milliken 1978).

The arrival of Spanish missionaries and subsequent settlement of Patwin ancestral territories resulted in a steep decline in native population. The proliferation of Mexican and Euro-American settlement, first felt in Sacramento and Suisun valleys, reached the hills surrounding the APE by the 1850s despite many Patwin who survived or evaded the mission system having fruitful relationships with newcomers, including Chief Solano who was lieutenant and friend to General Mariano Vallejo (Johnson 1978). Kroeber (1925) and Heizer (1953) estimated the Patwin population to be at less than 200 in the early twentieth century. Estimates of Patwin populations at the time of European contact varies widely. Kroeber (1925) placed an overall estimate on the greater Wintuan language group at around 12,000 at the time of contact, with subsequent estimates relating directly to the Patwin placed around 6,000 (Cook 1976). Based on the distribution of recorded ethnographic and archaeological village sites in the valleys to the east, it is likely that populations were less concentrated in the rugged hills. Yo-doi is the nearest Patwin village, located northwest of the APE (Johnson 1978; Kroeber 1932)

Patwin villages consisted of semi-subterranean and earth-covered homes, with a dance house and separate sweat house of the same construction at the edge of the village, and a menstrual hut placed furthest away (Johnson 1978). Shelters consisted of grass thatch over a framework of bent poles. These structures typically provided shelter for between one to six households, but houses documented in the Geyserville area averaged about nine people each and ranged from four to 21 persons. A chief would be selected to direct many community decisions within a single village,

though the overall political structure was largely democratic. McKern (1922) noted that social distinctions were generally patrilineal, with the household centered around the man and his paternal family and married sisters (Driver 1936).

Patwin settlement patterns were typical of their neighbors throughout the San Francisco Bay Area (Driver 1936; Sawyer 1978; Johnson 1978). Communities were centered in larger permanent villages, typically housing 100 to 200 people, with large towns populated by as many as 400 people. Villages were not laid out in particular schemes. However, seasonal (typically summer) camps were usually used throughout the territory for hunting and foraging expeditions (Driver 1936).

Patwin subsistence was based on food gathering and harvesting activities with the greatest emphasis placed on vegetable foods. Most plants and animals had multiple uses including subsistence, religious, and material necessities. Acorns from various oak species were the primary source of nutmeats and were heavily relied on as a dietary staple. Deer was the primary game animal, though various animals were hunted and trapped. Hunting was typically conducted by the men, while woman gathered and prepared the vegetable foods. There was, however, little occupational specialization, members of each family ate meals together and both sexes commonly shared in the gathering of acorns, water, and firewood (Heizer 1953).

The Patwin manufactured an array of primary and secondary implements for hunting and processing resources. Tools were constructed for the most part of stone, wood, and shell. A type of universal currency existed in the form of clamshell disk beads and magnesite cylinders (each with different values) that were worn decoratively and ceremoniously. Glass Mountain in northern Napa Valley was the primary source of obsidian for the manufacture of projectile points and cutting tools, though there has been obsidian sourced from as far as the eastern Sierra Nevada. Patwin were also known for their sophisticated basketry, which was both artistic and utilitarian (Kroeber 1925; Johnson 1978). Twining and coiling techniques were used for creating transportation, milling, and storage baskets and numerous other apparatuses.

3.4 Historic Context

Northern California saw significant changes to the region starting in the 1700s with European conquest occurring in the 1800s and resulting in the majority of native populations being displaced or killed by the 1850s. The California Gold Rush quickly followed with high immigration and landscape development. Logging and ranching continued this trend of expansion through the 1900s. The following historical framework is relevant to the Project area: The Contact Period (1500-1769), Mission Period (1769-1822), Rancho Period (1822-1850), and American Period (1850 to present).

3.4.1 Contact Period (1500–1769)

In 1542, Juan Sebastian Cabrillo was the first of the exploring Europeans to sail along the California coast. During the next 125 years, the Native Americans of California had sporadic contact with European explorers. The Portolá expedition left San Diego on July 14, 1769, becoming the first Europeans to explore by land what is now California (Browning 1992).

3.4.2 Mission Period (1769–1822)

The arrival of the Spanish and establishment of the missions marked the start of the rapid decline of Native American tribal life across California. Many factors impacted native culture, including the significant decimation of the population from introduced European diseases and the replacement of the traditional social, subsistence, and settlement patterns by newly introduced mission systems. The introduction of European plants and animals also resulted in the alteration of the landscape. The mission system was partly initiated as a way for Spain to manage indigenous populations of Alta California and to convert the native people of California into Catholic citizens of Spain (known as neophytes). In the charter of the Alta California Missions, a stipulation stated that 10 years after the establishment of a mission, the land and holdings would be transferred to the Native Americans for their benefit; this never came to pass (Lightfoot 2005). The northernmost missions in California were established as follows: Mission Dolores (San Francisco de Asís) in San Francisco in 1776, Mission San Rafael Arcángel in San Rafael in 1817, and Mission San Francisco Solano in Sonoma in 1823. A mission planned in Santa Rosa was abandoned in 1827. All three of the existing missions are located 50 miles or more from the APE. In 1808, while looking for locations for mission sites, Gabriel Moraga was the first recorded European to see the Sutter Buttes. Although there was no direct association between the missions and the Maidu tribes, native peoples fleeing the missions and soldiers did spread disease, which likely eventually affected native populations throughout California (Lightfoot 2005; Milliken 1995; PBS&J 2010; Silliman 2000).

3.4.3 Rancho Period (1822-1850)

In 1821, the same year Mexico declared independence from Spain, Governor Sola sent an exploration party under the command of Captain Luis Arguello to parts of northern California. The expedition was known as “Arguello’s Expedition to the Columbia.” Arguello traveled north across the Carquinez Straight, up the Central Valley along the east bank of the Sacramento River, into the Sierra Nevada, then west and returning via a southern route (Lewis Publishing Company 1891).

Although California was Spanish territory, the Spanish did not have a significant presence in northern California. The Sacramento River Valley was briefly occupied by fur trappers, from as early as 1820 (Lewis Publishing Company 1891). These early explorations made inroads into the region that were later followed by settlers and gold seekers, resulting in the introduction of foreign diseases to the native populations. A devastating epidemic that occurred between 1831 and 1833 reduced the native population by approximately 75 percent. When the Mexican and American people immigrated into the area, native populations were already significantly weakened (Cook 1960).

California became a Mexican territory in 1822 and secularization of the mission occurred in 1834. Following this, Mexican government representatives distributed large land grants to selected individuals. The closest land grant to the APE is Rancho Rio de Jesus Maria, about 1 mile south of the APE in Yolo County. The Rio de Jesus Maria area, settled in the 1840s, was one of the earliest places to be settled in the Sacramento Valley. the Rancho was a six square league land grant named after Rio de Jesus Maria (currently known as Cache Creek), which ran through its middle. The Rancho was north of Woodland and extended along Cache Creek from Rancho Quesesoni on the east to the Sacramento River. Rancho Rio de Jesus Maria was given to Thomas M. Hardy by Governor Manuel Micheltoreno in 1843. Hardy was a native to England who arrived in Veracruz,

Mexico in 1825, served in the Battle of San Jacinto in Mexico in 1836, and was naturalized as a citizen of Mexico for his service. Hardy arrived in California as early as 1843, when he was granted Rancho Rio de Jesus Maria. He was also a known carpenter but made few improvements to his land and lived in a reed hut. Hardy was reportedly very antisocial. He drowned mysteriously while on a sailing trip on the Sacramento River in 1848 and his estate was sold by a public administrator to James M. Harbin, George Tyler, and John Parish (EIP Associates et al. 1995; Surhone et al. 2010).

The land use pattern of Alta California during this period expanded to include cattle ranches, which were used for the hide and tallow trade. Native Americans and immigrant artisans worked in adobe workshops and engaged in manufacturing items like leather, soap, saddles, harnesses, blankets, shoes, and wagons (Marschner 2002:154). California was officially annexed to the United States (US) in 1848 and officially became a state in 1850 (Cornford 1999:86-87; Kyle et al. 2002).

3.4.4 American Period (1850 to Present)

About 90,000 people arrived in California in 1849 and 300,000 people arrived by 1850 from the US, Mexico, South America, China, United Kingdom, Hawaii, and other locations. The influx of non-native people further disrupted the indigenous populations' cultures and significantly impacted the natural environment. The discovery of gold in the Sierra Nevada by Euro-Americans ignited a major population increase in the northern half of California, specifically throughout the Sacramento River Valley. Native Americans made up roughly half of the mining labor force but were driven out of the mines as early as 1849 and eventually relegated to the margins as competition for mining rights grew (Cornford 1999:86-87). Gold mining camps and settlements sprang up overnight, drastically altering freshwater systems and creating a shortage of ranch workers who rushed off to participate in the Gold Rush. Although there were few mines in Sutter County, the sudden loss of the ranch workforce and significant increase in Euro-American squatters on the ranch lands ultimately contributed to the disintegration of the Mexican land grant system as well as the division and sale of land grant properties (Robinson 1979). Throughout the American Period, the APE and Project vicinity underwent large modifications through land reclamation and water control.

Sutter County

Sutter County was one of California's original 27 counties, created in 1850. It was named after General Augustus John Sutter, a Swiss native, who had obtained a land grant from the Mexican government and called his first settlement New Helvetia (currently known as Sacramento). In 1850 and 1851, portions of Sutter County were used to create Placer County and Butte County, although parts were returned in 1852, 1854, and 1866. Territory from Sutter County was also used to form Colusa County. Early newspapers occasionally referred to the general Sutter County area as Marysville (California State Association of Counties 2014; Genealogy Trails 2021; Ryan 1971).

Reclamation District 1500 Establishment

The Sutter Basin is a low elevation triangular land mass between the Sacramento River to the west and the Feather River to the east. Its wide northern boundary is generally marked by the Sutter Buttes and its southern point is the confluence of the Sacramento and Feather rivers. Historically, these rivers overflowed their banks during annual freshets, resulting in the Sutter Basin being covered by water during the spring, then becoming swampy and tule covered in the summer. During this time, the main development in the Sutter Basin was by farmers who cultivated rice on

private lands bordering the riverbanks; these locations were ideal for rice cultivation due to being wet and low-lying areas. Flooding spread sediment across the Sacramento Valley with the greatest amount deposited closer to the rivers. The sediment build-up influenced the orientation of these rivers in relation to each other and their slopes, creating a natural basin ideal for irrigation and drainage if natural flooding could be eliminated.

The Sacramento Slough was a natural outlet of flood waters in the south end of the Sutter Basin. Prior to the development of RD 1500, the slough ran a natural course from approximately 3.5 miles northeast of Knights Landing to its confluence with the Sacrament River approximately 2,700 feet west of its confluence with the Feather River. RD 1500 would be the fruition of decades long discussions and efforts regarding reclaiming the basin's tule areas and controlling the frequent, devasting floods of the Sacramento and Feather rivers (American Society of Agricultural Engineers [ASAE] 1922; Bureau of Reclamation [BR] 1983; Guise 1965).

One of the first documented plans to reclaim land within the Sutter Basin was proposed in 1856 by US Surveyor General John A. Brewster. His plan proposed to construct internal navigation canals, aqueducts for drainage of tule marshes and prevention of overflows (Hagwood 1981). However, before any meaningful change had occurred, hydraulic mining methods for the extraction of gold exploded in the Sierra Nevada and Northern California. As a result, untold amounts of earth were deposited downstream, carried by high-velocity water flow in mountain tributaries before slowing in the Sacramento River and Feather River valleys. This pattern, along with farming in the basin, re-channelized and raised riverbeds, contributing to consistent, destructive flooding and navigation issues as far away as San Francisco. In the absence of a basin-wide plan, property owners could reclaim their land within the basin as they saw fit. This eventually resulted in an "every man for himself" condition in which landowners only protected lands against inundation flowing from immediate neighbors. The levees of the basin gradually elevated until there was no capacity to bypass flood waters; if all the individual levees were to crest at the same time, 600,000 second feet (the common measurement for flow of irrigation water moving by gravity from streams and reservoirs) of water would detrimentally discharge to the tidewater in the bay, further contributing to the hazardous flooding problems (ASAE 1922; Guise 1965; BR 1983).

State Engineer William Hammond Hall first suggested the actual concept of the bypass as a means to control flooding in the Sutter Basin in 1880. In 1894, Engineer Carl E. Grunsky of the State Engineer's staff recommended a similar plan. However, no action came of either Hall or Grunsky's plans. Nonetheless, the California Debris Commission (the Commission), established by the federal government the year before in 1893, addressed the detrimental conditions on the Sacramento and Feather rivers. Reclamation districts of the Central Valley were established by the Commission specifically to address the flood exacerbation and navigation challenges caused by the damaging practice of hydraulic mining. The Commission wanted an economic plan with a definite schedule to control the Sacramento River and improve navigation (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983).

The Commission established a plan to dredge the Yuba River and deposit the dredge materials on the riverbanks as barriers to the flood waters, which would effectively become levees. The plan included enlargement of existing channels, overflow of surplus water at specific channel points, bypass channels, and means to get water into Suisun Bay quickly. The Commission's consultants

created the Jackson Plan which identified 10 means to accomplish the goal, including "reconstructing the Tisdale Weir…and connecting it by means of the Sutter-Butte Bypass, the weir and bypass to have a capacity of about 35,000 cubic [ft] per second or sufficient to carry the excess water that reaches that point." The Commission's entire plan was estimated to cost $33 million. While Congress funded only a small part of the plan, it did accept the whole plan, thus California did as well. Joseph J. Hagwood noted in his history of the Commission that "from that point on, the report became the very foundation of all work on the Sacramento River" (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983).

One of the California companies that based their work on the report was the Sutter Basin Company (SBC), established by J. Ogden Armour. Armour was a nationally known Chicago meatpacking magnate. His impact among US industry was significant, having grown his father's business from $182 million to $1 billion and he was believed to be the second wealthiest man in American after John D. Rockefeller. A brief article regarding his death notes that he went on to develop similar stock yard and meatpacking subsidiaries in South America. As with many magnates of the time, Ogden had a reputation of dubious business practices, some of which were documented by author Upton Sinclair, who worked in Armour plants while researching for his seminal work, The Jungle. Sinclair also published articles regarding the conditions observed. In 1903, the Sacramento Bee noted that Armour been subpoenaed to testify in a case regarding shorting, or rebates, surrounding the Fruit Growers Express Company. In 1904, Armour was deeded a large 6,000-acre parcel of land west of Sacramento to secure his cash payment to the previous deed holder, however, the Natoma Water Company had bonded the land. The Sacramento Star also noted that Armour was "heavily interested in gold dredging" in the area. He reconveyed the property five years later, presumably after the cash advance was repaid (Sacramento Star 1904, 1909).

Armour led a group that founded the SBC in 1911; they had the intent of draining and developing 45,000 acres of land in the Sutter Basin. As Armour turned his sights on to the Sutter Basin, he and other meatpackers were subject to overturned rulings under anti-trust, food safety, and labor relations legislation in the Midwest that had been in the works since 1903. This likely resulted in significant revenue drops for the companies. When Armour entered the California market, he was seeking to expand his influence on commodities. From 1917 to 1921, Armour made his company publicly traded through $60 million in bonds (SBC was also bonded during this time), his company lost $125 million in two years, and was $144 million in debt. He lost most of his personal fortune and at one point he lost $1 million a day for a month straight. He was ousted from the company in 1923. The financial ruin trailed him in death as well. His widow elected not to pursue financial recovery from SBC bonds, rather absorbed the debt owed to her from lessors, who then assumed ownership of the land upon the bond debt relief (Britton 2018; Intelligencer 1911; Lake Forest College 2020; Lead Daily Call 1927; Sacramento Bee 1903).

Later in 1915, the Commission vested authority in the California Reclamation Board as part of its plan to control flood waters of Sacramento and San Joaquin valleys. The US deeded all swamp and overflow land to the State of California under the condition that it reclaim the land with the goal of controlling the flood waters. The California Reclamation Board created the Sacramento and San Joaquin District as a means to complete levee assessments for the project, which encompassed RD 1500. Armour and a group of businessmen in Sacramento lobbied the state and federal governments to create RD 1500 as a means for paying for the development. In 1915, RD

1500 was officially created under California Law with a special act of the State Legislate. The SBC and subsidiaries were incorporated, and the project started with the majority of the costs being funded by the SBC. RD 1500 was bounded on the west by the Sacramento River, on the north by Tisdale Bypass, and on the east by the west levee of the Sutter Bypass (refer to Appendix A Figure 5 for a 1916 map depicting RD 1500) (California State Library 1916). RD 1500 was 19 miles long and 18 miles wide at its max. It would bring 66,000 acres into cultivation, 45,000 of which were owned by SBC. The project promoters acquired the land by either purchasing it or obtaining options. The land owned the system with each acre representing one share of stock in Sutter Mutual Water Company and most of the high lands along the Sacramento River being in private ownership. SBC was moderately successful – Armour and company were able to establish reclamation and a massive agricultural enterprise; however, failed bonding attempts and other factors disallowed for the profit initially assumed. In fact, it is documented that Armour lost upwards of $17 million. SBC paid $600,000 for Sutter Basin land that would eventually fall within RD 1500 (ASAE 1922; Marysville Evening Democrat 1915; McKinney 2016; BR 1983).

RD 1500 operations fell under two classes: 1) concerns with operation and maintenance of drains and pumping plants for the de-watering of RD 1500; and 2) concerns with operation and maintenance of the levees. Levee maintenance and operation projects were performed under the supervision of Public Works in accordance with rules and regulations prescribed by the Secretary of War as provided by the Federal and State laws. Before work began, a full topographic survey and plan table survey with a contour interval of 6 inches were completed. The surveys established accurate benchmarks over the entirety of RD 1500 and the resulting maps made it possible to plan out an irrigation system. Two of the major RD 1500 projects were the construction of the Tisdale Bypass and the Sutter Bypass. The Tisdale Bypass would eventually become the northernmost property boundary for the SBC, while Sutter Bypass was a more complex project (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983; Sutter County Farmer 1912).

Reclamation District 1500 Litigations, Injunctions, and Land Assessments

From 1913 to 1915, the levee, drainage canals, pumping plant, and other reclamation components were progressing in their construction as ongoing court injunction and litigations held up other components of work. The Sutter County Board of Supervisors brought a suit against RD 1500 with the intent of preventing construction of the East Levee. Although an injunction was obtained from the lower court, RD 1500 appealed to the State Supreme Court and the case was set aside with a writ of prohibition. Not long after, a second suit was brought against RD 1500 by Samuel Gray and a number of Sutter County landowners with the same goals as the first suit. No injunction was issued, and the lower court ruled in favor of RD 1500, but then the appeal was taken to the State Supreme Court where the decision of the lower court was unanimously reversed. As a result, the Tarke Bill was introduced to State Legislature, with the intent of preventing levee construction, but did not pass (ASAE 1922; BR 1983).

As controversy surrounded RD 1500, and therefore regarding SBC's influence on it, Armour remained resolute in his vision. In 1913, SBC issued $2.75 million in bonds with six percent interest for 40,000 acres within Sutter Basin through Louis Sloss & Company in Chicago and the Continental and Commercial Trust and Savings Bank, secured with $6 million of SBC. The land was valued at $11 million (Marysville Evening Democrat 2013). However, with Armour as the majority owner of 75 percent of the land within the Basin that would be developed, it was clear that

Armour would benefit the most. The Sutter County Farmer reported Armour's visit to the area in April 1914.

> "With regard to the reclamation work in which I am interested, I can only say that extensive colonization plans have been laid, and that we are looking for the co-operation [sic] of the entire valley. We are not engaged in a philanthropic enterprise. Our plans are strictly commercial but the benefits resulting therefrom will reach every citizen and every resident in the vicinity…we are doing all we can." (Sutter County Farmer 1914a).

The reclamation project was of such scale and enamor that families would come "sightseeing among the dredging settlement at Sutter Basin." (Sutter County Farmer 1914b). The size and scope of the work also proved so expansive that RD 1500 had to be issued stock warrants to continue paying for the large costs of construction. In January 1914, Board of Trustees petitioned the Sutter County Board of Supervisors to appoint commissioners to assess the RD 1500 lands so calls could be made to provide funds to pay the stock warrants. Three assessments of RD 1500 took place from 1919 through 1930 (ASAE 1922; BR 1983).

In August 1919, the assessment commissioners completed the first assessment, valuing the land at $5,000,000; it was approved by the Sutter County Board of Supervisors and became a lien on RD 1500 lands. Some landowners paid cash in the accumulated amount of $447,013.22, but after 30 days, the remaining $4,952,986.78 became subject to an interest rate of seven percent per year. In January 1920, the Board of Trustees issued six percent bonds to mature in annual installments over the course of 11 years with the first maturity occurring in January 1930. The entirety of the bonds sold at face value to SBC. Although the bonds had been paid without default through 1923, the Board of Trustees anticipated that adverse trends in agriculture would make it difficult for landowners to pay the first maturity in addition to interest. The Board of Trustees pushed to amend a reclamation law so RD 1500 could refund bonds, provide for long term amelioration of bonds, and left the fixing of maturities in the discretion the Board of Trustees, provided that they be paid within 50 years of issuance. In 1929, the Bondholders Protective Committee was formed at the request of the Board of Trustees with the purpose of soliciting deposit of outstanding original bonds to be exchanged for refund bonds and was funded by RD 1500. The refunding program was a success, the bonds were refunded in the amount of $4,778,986.77, and maturity periods were changed to 22 years. In February 1930, a second assessment of RD 1500 lands was approved with the intention of providing funds to pay the stock warrants issued after the first assessment and RD 1500 construction costs. The assessment had a net worth of $736,946 after paying the costs of debt assessments for reclamation work and stock warrant costs. In July 1930, the third assessment had the intention of completing maintenance valuation for each parcel of land in RD 1500 and was not a lien on the land. Though the Board of Trustees occasionally made calls on the third valuation as funds became necessary for operation, maintenance, and incidental expenses of RD 1500, at which point the calls became liens (ASAE 1922; BR 1983).

When landowners in RD 1500 failed to meet the calls on valuation, their lands were sold for delinquency to the County Treasurer, who was the RD 1500 Trustee and Trust of the RD 1500 bond fund. The landowners had a year following the sale to make a redemption. If they did not, the title of the land was passed to the County Treasurer. These delinquencies occurred from 1925 to 1928 and the County Treasurer acquired approximately 4,900 acres of land. Delinquencies

under the first assessment could be sold for the total delinquency amount plus a 20 percent penalty and seven percent annually compounded interest. Delinquencies under the second and third assessments cost the full delinquency amount plus a 10 percent penalty and seven percent annually compounded interest. Statutes prior to 1931 did not allow crop production on delinquent lands. These factors made it nearly impossible for anyone to buy back their property and resulted in much of the land going to waste (ASAE 1922; BR 1983).

In 1931, the State Legislature passed an amendment to the reclamation law making it so that after the lapse of one year after the redemption period of any land sold to the County Treasurer as trustee, the land could be sold at fair market value as ascertained by the highest cash bidder, subject to any district assessments. The amendment also gave the Board of Trustees possession of the delinquent lands after the one-year redemption period. The Board of Trustees could spend funds to retire liens on lands superior to the title of the County Treasurer as trustee to manage, control, and lease to tenants for a reasonable rent. The money collected from this was applied to incidental expenses of hold and leasing lands; maintenance assessments against such lands; and other incidental expenses, legal charges against RD 1500, or bonds and interest coupon purchases of RD 1500 for retirement. The majority of leased lands had no water rights and were leased on a dry farming basis with tenants paying to furnish water for irrigated crops. Some tenants made irrigation arrangements with people who owned land on the Sacramento River while others pumped water from RD 1500 drains, resulting in many being excluded from renting land lest they could afford to irrigate it (ASAE 1922; BR 1983).

Reclamation District 1500 Irrigation and Drainage System

Reclamation plans included levee construction with levee and bank erosion prevention in order to protect against overflow from flood waters. Levee heights were determined from the maximum high-water plan based off the 1907 flood. The flood runoffs were as follows: 54,000 second-feet in the Sacramento River below Tisdale; 189,000 second-feet in the flooded area above the Feather River; and 385,000 second-feet in the flooded area below the Feather River. Fifty percent was added to the flood's high-water marks to establish the high-water plan, with an additional 5-foot increase to establish the levee heights. The levees had 20-foot-wide crowns with slopes that had a ratio of five to one on the water side and two to one on the land side. The West Levee is 20 to 25 feet tall above ground elevation and the river levees average about 20 feet tall. The ground was cleared of all perishable materials and plowed where the levee base locations were planned. Most levee work was completed with the use of large floating clam shell dredgers with a bucket capacity of 5 cubic yards (CY). During construction, there could be as many as 15 dredgers working on the levees at a time. One dredge, the "Armour", was built at the Stockton Iron Works. Its hull was 160 feet long by 61 feet tall with a 205-foot-long boom. The boom weighed 24,000 pounds and was capable of moving 5 CY. The Armour operated 24 hours a day utilizing three crews. Dredging occurred from 1913 to 1915 before being held up for two years as a result of the aforementioned court injunction and litigations. Dredging resumed in 1917 and the final closure of the levees occurred in December 1918. The Sacramento River Levee is 54.6 miles long, the East Levee is 20.7 miles long, and the North Levee is 4.5 miles long. Timber sheet pilings, brush mattresses, and trees were planted to protect wave action and natural currents that may erode the levees and cause slides in exposed places. In 1928, erosion was also abated in one location by placing trees and using Bignell piles to anchor brush. Shortly after the completion of levee work, RD 1500 focused on drainage (ASAE 1922; BR 1983; Sutter County Farmer 1914b).

A drainage system was designed to provide ample drainage, dispose of seepage and rain waters, and work with an irrigation system. A pumping plant (later called the Karnak Drainage FacilityFacility) was planned near the south end of RD 1500 where a levee was built across Sacramento Slough, utilizing the natural drainage. The overall drainage system included several pumping plants (Tisdale, Portuguese, State Ranch Bend, and Karnak). Tisdale Pumping Plant has the capacity to serve 80 percent of the land and is the northernmost plant. Portuguese Pumping Plant is the southernmost plant and an independent unit built because it could not be reached by the East and West canals. RD 1500 Canal (also historically referred to as the Main Drainage Canal and Central Canal) began at Tisdale, and three primary canals branched from Tisdale Pumping Plant: West Canal on the west side of RD 1500, East Canal on the east side of RD 1500, and the RD 1500 Canal down the center of the eastern half of Sutter Basin. Construction of the entire irrigation system was complete in 1919, shortly after the levees were finished, and cost $1 million to build (ASAE 1922; BR 1983; Sacramento Bee 1915).

Sutter Bypass was originally planned as a trough that would encompass the natural course of the Sacramento Slough through the center of RD 1500 and SBC. However, the California Reclamation Board moved the location of the Sutter Bypass to its current location, further east and closer to the Feather River. Instead, Sacramento Slough was developed into RD 1500 Canal, traversing the entire length of RD 1500 north to south, ending where it met with the Karnak Drainage Facility. RD 1500 Canal declined 10 feet in elevation from the north end to the Karnak Draining Facility, had an average depth of 9 feet, and measured 125 feet wide at the south end. The first ½ mile of the RD 1500 Canal had a velocity of 2.5 feet per second before flattening out to 1 cfs. Sediment pumped into RD 1500 Canal tended to be deposited at this gradient change but could easily be removed. The canal had a 690-second-feet capacity and measured 36 feet wide at the bottom for the first 1 mile but broadened out to 60 feet in more level ground. The canal was dredged so it could be used in conjunction with PH1 during early stages of reclamation (ASAE 1922; Hagwood 1981; BR 1983; Sutter County Farmer 1912).

The drainage system also consisted of laterals and sublaterals, generally located on section and section subdivisional lines, resulting in approximately 50 miles of lateral drains and over 250 miles of sublaterals. They were placed to drain every one-quarter section of land and convey water to the RD 1500 Canal and PH1. A large portion of the lateral drains had to be excavated by Austin trenching machines due to the land being relatively level. The drains were designed to keep the water table at least 5 feet below the surface and were excavated by tracklaying dragline excavators. SBC also built several miles of subsidiary drains in certain locations where seepage conditions were the worst. SBC's subsidiary drains were not as deep as the RD 1500 drains but served for quick run-off of the winter rains and seepage and emptied into the RD 1500 drains, further extending the drainage system. SBC established two small fields to experiment with tile-drains; trenching of these was completed by a Funk power ditcher. These drains were placed at varying depths and distances (3 ½ to 5 ½ feet deep and 50 to 100 feet apart). Tiles ranged in size from 4 to 6 inches in diameter. Gravel replaced tile in some locations to compare how the two functioned. Drainage actions were observed from manholes. In 1922, a gravity outlet works was constructed through the East Levee at the lower end of the RD 1500 Canal. When the Sacramento River subsided to a lower elevation, it would automatically carry off drain water and ensure good drainage. Due to this, PH1 shut down in July until the river rose in late fall or winter during the irrigation season, decreasing the operating costs despite the irrigation season occurring from April 1 to October 31 (210 days) (ASAE 1922; BR 1983).

The irrigation system was designed to carry peak demand of water and deliver water on each 40-acre tract of land at an elevation at least 1 foot higher than the highest land in the tract. Canal capacities were based on a duty of 1 second-feet for 80 acres with a minimum head of 6 second-feet for any 40-acre tract. The top width of the canal banks varied from 3 to 6 feet, many of the canals had a slope of 3 inches to 1 mile, and the bottom width of the canals varied from 5 to 60 feet. Most canal velocities were low with less than 1 cfs in most cases, with the exception of the RD 1500, West, and East canals. The West and the East canals each had a 500 second-feet capacity (ASAE 1922; BR 1983).

During canal construction, dirt borrowed to make embankments was excavated from the canal section. Most of the canal system was built by Fresno scrapers, but a portion of the RD 1500 Canal was excavated by a dragline machine and another portion was constructed by a land dredge. Header ditches and field ditch roads were built with the use of road blades hauled by tractors. Smaller ditches were built with the use of martin ditchers, subsoil plows with V wings attached, and Hottell ditching machines. All lateral irrigation canals, seepage ditches, and drains were built using a Type 204 Pawling and Harnischfeger Dragline excavator. Ditches 10 inches wide and 18 inches deep were dug by a funk power ditcher to be used for subirrigation (ASAE 1922; BR 1983).

Apart from the three main pumping plants, there were about 750 individual structures and 2,500 smaller structures in the main system. Most of the main structures were built of reinforced concrete with the intent of them being permanent. The larger structures were equipped with screw stem gates and the majority of the other structures had wooden flash boards. Timber structures for individual field ditches were made of redwood, standardized, and made in quantities to reduce costs subirrigation. Bridges were necessary for road crossings and culverts for drain crossings; siphons and flumes were important too. Additionally, 100 miles of graded roads, 156 miles of graveled roads, and 4 miles of concrete paved roads were built in RD 1500. SBC used the Southern Pacific Railroad and the Sacramento River for transportation; warehouses were located along the levees and three large, corrugated iron warehouses were located along the railroad. Wells were scattered over the entire Sutter Basin for domestic supply and a complete telephone system traversed the entire basin. SBC also had seven large permanent camps used as headquarters for extensive agricultural operations (ASAE 1922; BR 1983).

In July 1949, landowners called on the Board of Trustees to offer delinquent lands in their existing conditions that were without irrigation Facility and for sale prior to 1949. After an especially rainy winter in 1950, the East Levee experienced considerable damage. As a result, the transporting of livestock and vehicles on the levees was limited in order to reduce damage to the levees. Special permits had to be issued by USACE's State Engineer in order to use the levees for transportation (ASAE 1922; BR 1983; Sutter County Farmer 1920).

Karnak Drainage Facility

The Karnak Drainage Facility includes three pump houses (PH1, PH2, and PH3), their associated components and equipment, and several houses. The facility was established with the erection of PH1 in 1914; it was reported to be one of the biggest in the world and cost an estimated to $220,000 to construct. PH1 was constructed under direction of George Randle, who was noted as the "Chief Engineer Armour people in the Sutter Basin" (Marysville Evening Democrat 1914). PH1 is constructed in the Neo-Classical style and is parallel to the RD 1500 Canal. It is designed so that the building and equipment's total weight would not float during high water levels. It disposes of

daily run-off water 5/8 inches deep from the RD 1500 net area and 2 ½ cfs per mile of levee seepage water. PH1 had six 50-inch Platt centrifugal pumps (each driven by an 800 horsepower [hp] General Electric [GE] meter), a capacity of 1,200 second feet, and used every accessible water source to drain all the water off 60,000 acres within the basin so the area could be cleared of tules to make space for commercial crops. In order to increase irrigation each year, PH1 pumped out surplus rainwater, seepage, irrigation water, and accumulative ground water. It was also designed to withstand future floods by placing windows high above a reasonably anticipated flood elevation. Images from the February 1915 flood show that the design stood, and the pumps could remain functional in times of high water. The words "RECLAMATION" "DISTRICT" "NUMBER 1500" are centered in each entablature, respectively. Parts of PH1 have been upgraded or replaced since the building's original construction. PH2 was built in 1929 to provide more efficient drainage service during low operating head conditions; it is smaller than PH1 and also constructed in the Neo-Classical style. After the construction of Shasta Dam, the operating water levels exceeded the head capability of the pumps, resulting in PH2 being inoperable. Portions of the electrical equipment were removed, and the electrical motors were left in nonoperating condition. PH3 was built in 1952 to improved drainage service to RD 1500; it increased the transformer requirements, resulting in Pacific Gas and Electric Company (PG&E) installing larger transformers at a ground-level substation located along the northern side of the structure. The pumps were designed to discharge 184 cfs (83,000 gallons per minute) at an approximate 17-foot pumping head. Portions of PH3's equipment has been repaired or replaced since the buildings initial construction (ASAE 1922; BR 1983).

Sutter Basin Branch Line

Prior to establishment of the railroads, one of the primary methods of traversing across Sutter County was via river traffic, although the varying water levels created complications. Development of railways to navigate across California began in 1852 with the proposed Sacramento Valley Rail Road Co. which led from Sacramento, across the American River, to the foothills, and then to Marysville. The Central Pacific Railroad Company built the Cal-P branch railway track from Oakland to Sacramento in 1868 and the Marysville Branch from Woodland to Marysville in 1870, the latter of which came within miles of Karnak Drainage Facility (Rifkin 2015; Ryan 1977). The Marysville Branch extended 18 miles and included 11 sidings with a railroad depot at Robin, in the center of the railroad line. SBC owned three large corrugated iron warehouses along the Marysville Branch. The Sutter Basin Branch Line was constructed in 1920 by Southern Pacific Railroad and led from Karnak Drainage Facility to Josephine where it connected to the Marysville Branch. However, the Sutter Basin Branch Line was completely abandoned by 1952 (Joslyn 1928; ASAE 1922; BR 1983; Ryan 1977; Yuba County Archives 2012).

Agriculture

The soil in the Sutter Basin is alluvial deposit known as river bottom land with Columbine silt loam covering Sacramento clay loam in varying amounts. This soil is ideal for farming as it is well suited for most crops grown in the climate. Early agriculture in the area consisted primarily of dry farm grain crops and stock raising. The commercial production of wheat in Sutter County began in 1843 by General Sutter. The early developments of agriculture were often confined in relatively close proximity to the large rivers because steamers in the waterways were the sole method of shipping produce and receiving supplies. The outlying areas were devoted to cattle until the construction of the transcontinental railroad provided an alternative transportation method. Farmers made some diversions for water from the rivers in the late 1800s for irrigation and could access wells

scattered over the entire Sutter Basin that provided enough water for domestic supply, but more rapid irrigation development didn't occur until after 1910 (ASAE 1922; Bryan 1923; BR 1983; Gowans and Lindt 1965).

After PH1 was built in 1914, the structure started to drain most of the water in the region in order to prepare the area for growing commercial crops by removing tules. By 1919, farmers had already began switching over to banner crops. SBC also became directly involved in corporate farming after leasing out farmland for several years. The net receipt for the sale of vegetables in 1919 nearly paid for the construction of the entire irrigation system. SBC encouraged farming due to the profit and return of labor it produced. According to the 1920 records, the major crops produced in the Sutter Basin included wheat, barely, potatoes, onions, green peas, melons, rice, and other vegetables. Crops grown less extensively included sugar beets, oats, celery, asparagus, alfalfa, and tomatoes. Additionally, orchards, vineyards, and miscellaneous crops were planted by landowners who had purchased property from SBC (ASAE 1922; Bryan 1923; BR 1983; Gowans and Lindt 1965)

Farming units of 2,500 to 5,000 acres were set up with camps for each unit. Each camp had a tract foreman and general superintendent hired to supervise farming. By the spring of 1920, there were hundreds of acres of potatoes, onions, lettuce, cantaloupes, beans, asparagus, wheat, barley, rice, and gyp corn. However, that same year, the bottom dropped out of nearly all crops before harvest and the rain came early, resulting in the crops not being harvested. As a result, SBC started to further subdivide their lands and branch out into implementing sheep and turkey grazing. SBC was hired to plants orchards and crops for some of the buyers that lived further away (e.g., Chicago); the company planted orchards (plums, peaches, pears, and prunes) on 40-acre lots as well as vineyards. However, some of the clients believed SBC was charging too much and filed several failed lawsuits (ASAE 1922; Plank 2010).

By the mid-1920s, sugar beet became a promising crop until curly top virus destroyed massive numbers of the crop in 1925. As the Depression continued in 1929, other crops were attempted to be grown including cucumbers for pickles, peas, and cotton. Today, Sutter County is known for its rice, walnut, peach, tomato, and prune production. Additionally, the seedless grape was developed in Sutter County which helped revolutionize the raisin industry (Plank 2010; Sutter County n.d.).

4.0 Background Research and Sources Consulted

The methods and results of the records search, historical map review, and NAHC consultation are described in detail below.

4.1 Records Search Results

A records search of the APE and a 0.5-mile buffer was conducted by the NEIC on January 14, 2021 (I.C. File #D21-11). No previously cultural resources on file with the NEIC were identified within a half mile of the APE. Four previous cultural resources studies have been conducted within the 0.5-mile radius of the APE (Table 2).

A search of the Sutter County Museum historic properties records database was completed on January 20, 2021. The museum records search results found one cultural resource within the APE and none within the 0.5-mile radius (Table 1). One previous cultural resources study conducted by the Sutter County Historic Society intersects the APE (Table 2).

Table 1. Cultural Resources in the APE

Primary No.	Trinomial	Type	Description
None	None	Built environment	Karnak Pumping Station: Pump House 1

The Karnak Pumping Station Pump House 1 was recorded by Carol Bordeaux, a volunteer with Galvin Preservation Associates, Inc, in April 2006 as part of the Sutter County Historic Survey that took place from 2005 to 2007. A draft DPR523 form was created, however, the resource was never formally recorded and was not filed with the NEIC.

Table 2. Studies Conducted within the APE and 0.5 Mile of the APE

Report No.	Date	Author	Title	Relation to the APE
NEIC-001091	1990	Glover, Leslie C. and Paul D. Bouey	Sacramento River Flood Control System Evaluation, Mid-Valley Area Cultural Resources Survey, Colusa, Sacramento, Sutter, Yolo, and Yuba Counties, California.	Within 0.5 mile of the APE.
NEIC-001137	1974	Johnson, Jerald Jay and Patti Johnson	Cultural Resources Along the Sacramento River from Keswick Dam to Sacramento.	Within 0.5 mile of the APE.
NEIC-010792	2009	Piccola, Francis C.	Archaeological Survey of Approximately 97 Acres of Former Agricultural Land on the Sacramento River at River Mile (RM) 83 in Sutter County, California for the Furlan Mitigation Project (FMP).	Within 0.5 mile of the APE.
NEIC-014242	2018	Heffner, Sarah	Historic Property Survey Report for the Tisdale Bridge (18C-0057) Replacement Project, Sutter County, California.	Within 0.5 mile of the APE.
N/A	2006	Galvin Preservation Associates, Inc.	Sutter County Historic Survey	Intersects APE

4.2 Historical Map Review

Kleinfelder reviewed historical maps depicting features such as towns, roads, buildings, and creeks to provide additional information regarding the potential for the presence of historic-era cultural resources within the APE. Historic maps are available at several online repositories, in

particular the USGS repository, the David Rumsey Map Collection, and the U.S. Department of the Interior Bureau of Land Management General Land Office (GLO) Records. Refer to Appendix A, Figure 5 to see where the APE plotted on the historical maps. The following sources were consulted during the historical map review:

- Sutter County (California Division of Highways 1935)
- Historical Aerial of Karnak, California (Historic Aerials 1966, 1968)
- Knights Landing, Calif. 1:31,680 (USGS 1910)
- Knights Landing, Calif. 1:62,500 (USGS 1952 [ed. 1959])
- Knights Landing, Calif 1:24,000 (USGS 1952 [ed. 1964])
- Map of Reclamation District No. 1500, Situated in Sutter County, California (California State Library 1916)
- Township 11 North, Range 3 East, Mount Diablo Meridian (GLO Plat 1870)

4.2.1 Historical Map Review Results

The following summarizes the results of the historic map review of the APE.

An 1870 GLO Plat plots the APE in "Swamp and Overflowed Land" with no features shown in the APE (GLO 1870).

A 1910 map depicts the APE within the Sutter Basin. Sacramento Slough is shown in its natural alignment, bisecting the APE. A northwest-to-southeast-trending unnamed unimproved road runs parallel to and south of Sacramento Slough and adjacent and south of the APE, occasionally overlapping with Reclamation Road's current locations. A second unnamed unimproved road runs parallel to and north of Sacramento Slough, approximately 0.38 mile north of the APE (USGS 1910).

A 1916 map shows the full extent of RD 1500 with a "Pumping Plant" in Karnak Drainage Facility location on land owned by Sutter basin Co. The Sacramento Slough is now shown in its current, channelized alignment in the northern part of the APE. No roads are depicted on the map (California State Library 1916).

A 1935 map depicts the "Main Drainage Canal" in Sacramento Slough's current location. At Karnak, the Main Drainage Canal branches off into the "Bend Main Canal" which trends south, the "East Canal" which trends north, and the "Main Drainage Canal" which continues east. A northwest-to-southeast-trending branch of the Southern Pacific Railroad begins at Marchant and terminates just at Karnak. An unnamed road is in Bates Road's current location (California Division of Highways 1935).

A 1952 map plots the APE where the Sutter Bypass and Sutter Basin converge; Sacramento Slough is labeled east of the East Canal, between Karnak and the Feather River. The community of Karnak is shown in more detail, including a pumping station, five structures, and an unnamed light duty road in Bates Road's current location. A bridge is depicted crossing the East Canal east of Karnak with an unnamed unimproved road leading north from it. The West Levee is shown as "Levee" with an unnamed unimproved road on it; an unnamed intermittent stream runs parallel and west

of this road but diverts in a loop north of Karnak before feeding into the canal that bisects Karnak. Two holding ponds are located west of the APE on opposite sides of this canal; the one on the north side is approximately 356 feet west of the APE and the one on the south side is approximately 772 feet west of the APE. The unnamed road in Bates Road's current location terminates at the northwest end of the northernmost holding pond; one of the previously mentioned structures is located here, approximately 803 feet west of the APE. Karnak Road is depicted in its current location. Approximately 0.36 mile west of the APE, a flume crosses the canal that bisects Karnak. Ely Road is shown but not labeled and orchard land is located southwest of Karnak Road. The "Main Drainage Canal" and "Bend Main Canal" are not labeled; the branch off of the Southern Pacific Railroad is no longer shown (USGS 1952 [ed. 1959]).

Another 1952 map shows similar information with a few key differences. This map labels Ely Road; shows a spur road branching off Bates Road directly southeast of Karnak onto the levee; and plots seven structures north of the northernmost holding pond, as well as three structures directly east of the same pond (USGS 1952 [ed. 1964]).

A 1966 aerial shows, but doesn't label, the canal that bisects Karnak, the East Canal, the West Levee and its associated access route, the Sacramento Slough, Bates Road, Karnak Road, PH1, PH2, PH 3 and its associated flood gate on the levee, the bridge that crosses the East Canal, at least eight structures of varying size northwest of PH 1, and a possible ditch that starts in the north part of Karnak and trends northeast to southwest through the area before feeding into the canal that bisects Karnak (Historic Aerials 1966).

A 1968 aerial reveals that several structures in the northwest part of Karnak are no longer present, including at least two structures located directly north of the canal that bisects Karnak and a structure located directly northwest of PH1 (Historic Aerials 1968).

4.3 Native American Heritage Commission Consultation

On January 12, 2021, Kleinfelder requested from the California Native American Heritage Commission (NAHC) a search of their Sacred Land Files (SLF). The NAHC responded on February 2, 2021, with a list of Native American contacts affiliated with the region to contact for additional information, but that their SLF files resulted negative findings within the vicinity of the APE. Kleinfelder completed no further Native American outreach, as it is the responsibility of the lead federal to conduct Section 106 Native American consultation; and lead state agency to complete CEQA Assembly Bill 52 (AB 52) tribal consultation. The NAHC Native American contacts list is provided in Appendix D.

5.0 Field Methods and Results

On January 21 and 25, 2021, Kleinfelder/GANDA archaeologists, Jessica Neal, M.A., RPA, and Samantha Dunham, B.A., completed an intensive pedestrian survey of the APE. The survey was completed using 10- to 15-meter-spaced transects. Close inspection was given to all exposed ground soils and cut banks for the presence of archaeological materials. The APE was photographed using a high-resolution digital camera (see Appendix B, Survey Photographs) and field observations were captured in written notes. Locational data were collected with Environmental Systems Research Institute Arc Collector application on Android. The APE was accessible by foot and 100 percent of the APE was surveyed. Ground visibility was 75 percent. Soils were a medium silty clay with angular gravel inclusions. Vegetation consisted of grasses and wetlands with occasional oak trees; there were also cedar trees and nonnative landscaping (orange trees, roses, etc.) within the residential area. There is a thin veneer of non-diagnostic broken glass of various colors and metal debris across the entire Project area that seems to be a mix of historical and modern material.

5.1 Observed Resources

Kleinfelder/GANDA identified seven cultural resources including a historic bridge (RD1500-JN-01); a segment of the East Levee (RD1500-JN-02); the Karnak Drainage Facility (RD1500-JN-03); a segment of the RD 1500 Canal (RD1500-JN-04); a segment of the East Canal (RD1500-JN-05); and two houses associated with Karnak Drainage Facility (RD1500-JN-06 and RD1500-JN-07). The resources are summarized in Table 3 below.

Table 3. Cultural Resources Recorded in the APE

Resource Number	Name	Description
RD1500-JN-01	Unnamed Bridge	Concrete slab bridge spanning the East Canal
RD1500-JN-02	East Levee	East Levee of the Reclamation District No. 1500
RD1500-JN-03	Karnak Drainage Facility	Facility including three pump houses constructed between 1914-1952, 3 sheds, a weather station, and a ditch
RD1500-JN-04	Reclamation District 1500 Canal	Channelized portion of Sacramento Slough terminating at the East Levee
RD1500-JN-05	East Canal	Manmade canal paralleling the East Levee in the Sutter Bypass
RD1500-JN-06	House 1	Single-family home associated with the Karnak Drainage Facility, constructed in approximately 1930
RD1500-JN-07	House 2	Single-family home associated with the Karnak Drainage Facility, constructed in approximately 1966

RD1500-JN-01: Bridge

RD1500-JN-01 is an unnamed concrete slab bridge that spans the East Canal. The bridge is approximately 162 feet long and is comprised of a cast-in-place concrete deck carried by concrete beams. The beams extend approximately 6 to 8 inches past the deck, resulting in a minimal curb. The bridge is supported by fifteen 1-foot square concrete piles approximately 30 feet high (over the East Canal bed). The piles are arranged in five rows of three wide. Two steel piles, lateral support, and diagonal bracing have been added at both the second and third (from west) pile locations. The bridge was constructed circa 1935 with the steel supports added within the last 20 years. The bridge accesses agricultural fields within the Sutter Bypass and is located approximately 275 feet northwest of PH1.

RD1500-JN-02: The East Levee

RD1500-JN-02 is an approximately 360-foot segment of an earthen levee known as the East Levee of RD 1500 (commonly referred to as the East Levee). It was constructed as a part of the Sutter Bypass project, beginning in approximately 1913. The levee severed the Sacramento Slough in half; the western half of the slough was channelized into the RD 1500 Canal and PH1-3 were constructed between 1914 and 1952 to pump water through the levee into the eastern unchanneled portion of the slough. A bulkhead was constructed on both the eastern and western walls of the levee where the canal terminates. The bulkhead served as additional support against the water pressure from the canal. During the field survey, wooden piles and deteriorating concrete were visible in the RD 1500 Canal at the toe of the levee. No evidence of the bulkhead was on the eastern side of the levee. Debris has built up in the general area of the bulkhead and it is possibly buried.

The earthen levee is approximately 20 feet high. The crown is between 25 and 60 feet wide; a gravel road runs the length of the segment along the crown. The landside berm of is approximately 22 feet wide with a gravel road running along it.

The recorded segment is located at approximately Levee Mile 2, where the RD 1500 Canal and East Canal converge at the levee and flow into the Sacramento Slough. A gravel road along the crown of the levee spans the length of the segment and two earthen ramps with a gravel road are located at both the northern and southern ends of the segment, allowing vehicular access to farmland in the Sutter Bypass. The waterside of the levee is riprapped with imported rock and some modern and historic refuse. Stairs for pedestrian access to the levee and two utility poles are located on the landside slope. An unnamed concrete bridge connects the levee to agricultural land within the Sutter Bypass. Conduits, flood gates, and discharge outlets from the Karnak Drainage Facility are present on and within the levee. The levee is in good condition, with grassy sides to the east and riprap, pump gates and infrastructure, and outlets on the eastern, waterside of the levee.

The full extent of the levee is approximately 20.72 miles long. Two levee systems, Unit 1 and Unit 2, encircle RD 1500. Unit 1 is approximately 33.15 miles long running from the southernmost point of the RD to the northwestern edge of the Tisdale Bypass, generally following the course of the Sacramento River. Unit 2 is approximately 20.72 miles long and originates at the southernmost point of the RD. It generally follows along the edge of the Sutter Bypass until it terminates at the southeastern edge of the Tisdale Bypass. This segment of the East Levee is part of Levee Unit 2.

RD1500-JN-03: The Karnak Drainage Facility

RD1500-JN-03 consists of the Karnak Drainage Facility which includes three pump houses (PH1, PH2, and PH3), their associated components and equipment, three sheds, a weather station, and a drainage ditch. The facility was established with the erection of PH1 in 1914 with the most recent pump house (PH3) being constructed in 1952.

Pump House 1

PH1 was constructed in 1914 as part of the greater effort to reclaim the Sutter Basin, an area between Sutter Butte and the confluence of the Sacramento and Feather rivers. At the time of construction, it was reported to be one of the, if not the, largest pumping stations in the world,

capable of pumping 1,200 cfs from the RD 1500 Canal that bisected RD 1500 lengthwise south from the Tisdale Bypass.

PH1 is 107 feet, 5 inches long and 34 feet, 5 inches deep (1914 plans) with its length orientated on and parallel to the north bank of the RD 1500 canal. It is constructed of cast concrete in the Neo-Classical style. Water is pumped from the canal and discharged through levee in Sutter Bypass. The building is supported by six concrete trapezoidal footings extending from the beneath the canal bed, through the levee bank, and then incorporated on the facade as minimally projecting pilasters to the tops of windows (ASAE 1922; BR 1983).

A 5-foot-thick reinforced concrete floor is built on top of the piles. The walls are made of reinforced concrete, are 4.5 feet thick at floor level, taper to 2.5 feet thick at the 100-year event flood plain elevation (42 feet), and taper from there to 1.25 feet thick at the roof line. The lower portion of the building doesn't have openings; the windows and doors are above the 43-foot elevation (United States Engineering Department datum). Interestingly, the building features two elevated water tables. Six conduits rise out of the canal before entering the building at the first table, which at 6 feet, is only slightly taller than the conduit diameter. Elevated water tables are expected in Neo-Classical design, but the use of the second is a visual reminder of how the RD 1500 engineers planned for flood events that may overpower the pump capacity. The second water table is 12 feet high and roughly one half of the elevation height. Here, the pilasters change from trapezoidal to rectangular at the top of the second water table. PH1 is designed so that the building and equipment's total weight would not float during high water levels. All of the building's windows are placed above the water table, a design. The district engineers also minimized the possibility of the electric pumps shorting out due to inundation from flooding by placing the windows in the upper half of the elevation. Photos of the 1915 flood show the plan worked - flood waters crested only just below the windowsills. Each window set is framed by a slightly projecting Tuscan surround. The frieze band and cornice of the surround's entablature are extension of those wrapped around the entire building. The words "RECLAMATION" "DISTRICT" "NUMBER 1500" are centered in each entablature, respectively. The window sets are comprised of three 4x8 multi-paned bays with a 2x6 inset casement ventilator topped by a 4x4 multi-pane ventilator with an inset 2x2 casement ventilator. All are separated by concrete mullions and dentils. A metal gooseneck light is centered in the width of each pilaster next to the small bay. The building is surmounted by a flat roof (ASAE 1922; BR 1983).

The reinforced concrete platform built along the east wall of PH1 supports electrical bus equipment, is at the floodplain elevation, and was originally used to support the electrical transformers. PH1 consists of six 50-inch Platt Centrifugal pumps direct connected to 800 hp GE squirrel-cage induction motors, operating at 248 rotations per minute (rpm) through flexible leather link couplings. Each pump produced approximately 197 cfs (88,000 gallons per minute) at a 20-foot pumping head. Two electric-motor-driven vacuum pumps had suctions connected to the top portion of the casings of all the pumps and were used for priming. During pump priming, the gate valve in the discharge line is closed. After priming, the pump is started; once the pump reaches full speed, the electric motor operated gate valve is opened. The suction pipes are about 70 feet long, extend directly from the pumps out through the south wall of the building (a distance of about 30 feet), angle downward into the sump, and increase from 50 inches to 96 inches in diameter at the lower end. These 3/8-inch wall-thickness steel pipes are supported by a steel structure. Portions of the PH1's equipment have been repaired or replaced since it was

constructed. Changes since initial construction of PH1 include the transformers being moved from easterly bays from about 1939 to 1952. Two bays are added to the east end of the former transfer bay in 1950. The connection is visible in between the second and third bay on the south elevation. The installation of 6x3 glass brick windows in the top half of the south and north transformer bay elevations. After 1970, the easternmost lower window bay is partially replaced with a pedestrian door. One row of panes remains as a transom light. The door is accessed by an exterior set of stairs with a landing at the same elevation as the transformer bay roof. Modern operating equipment is installed on the roof and is accessed by the stairs. An exterior walkway is installed slightly above the conduit height along the south elevation. The original ball and pipe railing was replaced at the exterior staircase attached to the west elevation. Overhead cables now extend over the canal and enter the building through exterior mounted conduit or directly through the concrete at the upper southeast corner. Electric metering boxes are attached at the northeast corner of the north elevation and covered by a rudimentary wood or metal flat overhanging roof (ASAE 1922; BR 1983).

Pump House 2

PH2 was built in 1929, fifteen years after the construction of PH1, to provide more efficient drainage service to RD 1500 during low operating head conditions. However, PH2 has never functioned properly. PH2 is smaller than PH1, measuring 41 ft long by 18 ft wide, and is also constructed in the Neo-Classical style. While smaller in massing compared to the PH1, it shares the same style with less refined details. The building is largely intact with little changes since the end of construction. The equipment was manufactured by Westinghouse Electric & Manufacturing. This pumping station sits over the RD 1500 Canal and the intake conduits are vertically positioned under the building. The conduits then extend through the foundation wall and easterly through the levee to discharge into the East Canal and Sacramento Slough. A steel I-beam extends easterly from the roof and through a modern interpretation of a balustrade in a position typically seen in Federal or Neo-Classical architecture. The beam connects to the peak of two connected beams extending diagonally into the ground to form triangular space approximately 30 feet of the entrance. The structure supports a small communications unit (satellite or antenna) thought to have been installed in the last 15 years. After the construction of Shasta Dam, the operating water levels exceeded the had capability of the pumps, resulting in PH2 being inoperable. The conduits were plugged with concrete after the construction of the 1950-1952 Karnak PH3. Portions of the electrical equipment were removed, and the electrical motors were left in nonoperating condition. PH2 is no longer used by RD 1500 (ASAE 1922; BR 1983).

Pump House 3

PH3 was constructed in 1952, 23 years after the construction of PH2, as a means to also improve the drainage of RD 1500. This pump house is larger than PH2 and smaller than PH 1. Despite the difference in massing, PH3 is of the same style and exhibits similar levels of refinement in details as PH2. The building is largely intact with little changes since the end of construction. PH3 sits over the RD 1500 Canal and the intake conduits are vertically positioned under the building. The conduits then extend through the foundation wall and easterly through the East Levee to discharge into the Sacramento Slough. The fenestration arrangement is near identical to PH2; however, the window sets flanking the door each hold two casement ventilation panels that open outwardly. The front door was planned as solid oak with four rectangular panels, symmetrically placed in the width and height. The door has since been replaced with a steel door with three

panes of fixed glass stacked vertically in the top half. The most notable change at the pumping station is the installation of a large steel bunker spanning the width of the roof and running two thirds of the building's length from the north. The structure houses the battery backup for the pump and is accessed from the interior. Electrical conduit has been added to the southeast elevation leading to the bunker. Three chain pulls are attached to the east elevation, used to lift and access the below-grade pumps. Two modern lights are installed at the top corners of the window/entrance bay (ASAE 1922; BR 1983).

Associated Structures and Features

In addition to the three pump houses, the site contains three sheds, a weather station, and a ditch.

Shed 1 is a single pen front gable side shed. It is sheathed in corrugated metal and asphalt shingled. It was on-site after 1967.

Shed 2 is a square single pen building which houses a water pump and discharges into the ditch. It is surmounted by a hipped roof. The entrance faces west. A wing has been added at the north. The shed was on site after 1967; however, the addition was added after 1992.

Shed 3 is a rectangular single pen shed with a sliding door on the south elevation. It is sheathed in corrugated metal. It was on-site circa 1967.

The weather station is elevated on four wood piles set in a square concrete base. Instruments are housed in by four louvered panels, including one hinged access panel. It is surmounted by a gabled roof sheathed in asphalt. Historic aerial photos indicate it was likely on-site by 1966.

This ditch is a 640-foot-long segment located in the northwest section of the Karnak Drainage Facility, starting east of the northernmost residential structure, wrapping around the residential structure, then turning south and west of a second residential structure and a weather station. An access route crosses the ditch where its located west of both residential structures; the ditch goes under the route through an 8-inch diameter corrugated culvert. The ditch measures 3 feet wide by 1 foot deep in the southwest end within the survey area and 9 feet wide by 3 feet deep near the culvert. The ditch is fed by a white polyvinyl chloride pipe that appears to be overflow from a tank in Shed 2. Only the segment of the ditch that fell within the Project survey area was recorded; it was noted that the ditch continues southwest, through a black corrugated pipe under another access route, and lets out into the RD 1500 Canal.

RD1500-JN-04: Reclamation District 1500 Canal

RD1500-JN-04 consists of a 600-foot segment of the RD 1500 Canal (historically referred to as the Main Drainage Canal or Central Canal) at its terminus. The RD 1500 Canal generally follows the original pathway of Sacramento Slough, which followed the entire length of RD 1500 north to south and provided a natural outlet of flood waters at the southern end of the Sutter Basin where it met with Karnak Draining Facility. During the Sutter Basin reclamation project, the slough was developed into RD 1500 Canal. RD 1500 Canal is approximately 18 miles long. Between the canal's north end and the Karnak Drainage Facility, it reportedly declined 10 feet in elevation. It had a 690 second-ft capacity and measured 36 feet wide at the bottom for its first mile and then broadened out to 60 feet wide in more level ground. The average depth was 9 feet and average

width was 125 feet wide at the south end. The first 0.5 mile of the RD 1500 Canal had a velocity of 2.5 feet per second before flattening out to 1 foot per second. Sediment pumped into RD 1500 Canal tended to be deposited at this gradient change but could easily be removed. The canal was dredged so it could be used in conjunction with the Karnak Drainage Facility PH 1 during early stages of reclamation. It provides critical flood protection to prevent damage from floodwater to homes and other properties, the community of Robbins and surrounding rural residential properties, SR 113 and other local roadways, and of over 65,000 acres of rural farmland.

The segment of canal is approximately 125 feet wide and widens to 250 feet at the levee to accommodate the Karnak Drainage Facility pump houses. Portions of the canal segment are lined with sheet pile walls. The canal is in good condition and generally maintains its original form and function. Construction work in 2019 through 2020 installed sheet pile wall along the south bank of the canal and nine new 10-foot-wide automatic conveyor belt-style debris removal screens to replace the existing debris catchment system.

RD1500-JN-05: The East Canal

RD1500-JN-05 is the southernmost segment of the East Canal at its confluence with the RD 1500 Canal, where they merge into the Sacramento Slough, west of the Sacramento River and east of Karnak Drainage Facility. The recorded segment is approximately 600 feet long and runs generally north to south. The canal is located in the Sutter Bypass and is bordered to the west by the East Levee.

The East Canal was constructed in the early 20th century as a part of the Sutter Bypass reclamation project. It flows along the southwestern edge of the Sutter Bypass from Tisdale to Verona. The East Canal terminates and flows into Sacramento Slough, a natural waterway, and then into the Sacramento River. The East Canal is approximately 25 miles long. It begins at the Tisdale Pumping Plant and runs south-southeast and parallel to the Sutter Bypass for the northern half of its length, then parallel to the Feather River for the southern half of its length before merging with the RD 1500 Canal and flowing into the Sacramento Slough. The East Canal has a velocity of 500 second-ft capacity. During canal construction, dirt borrowed to make embankments was excavated from the canal section. The old Karnak Drainage Facility layout depicts bulkheads on the west side of the East Canal at its confluence with the RD 1500 Canal, on the east side of the East Levee.

This segment of the East Canal is approximately 100 feet wide in the north to approximately 200 feet wide at its confluence with the RD 1500 Canal. The west side of the East Canal at the confluence is riprapped with imported rock and some modern and historic refuse and the Karnak Drainage Facility pump house outlets. An unnamed concrete bridge that leads to agricultural land within the Sutter Bypass crosses the East Canal just north of its confluence with the RD 1500 Canal. No evidence of the bulkhead remains on the eastern side of the East Levee and within the East Canal. The segment of the East Canal is in good condition, generally retaining its original form and function. Its form and function have no significant changes since construction.

RD1500-JN-06: House 1

RD1500-JN-06 is a vernacular pumping station keeper residence associated with the Karnak Drainage Facility (RD1500-JN-03). This single-story residence is of the Minimal Traditional style (as defined by McAlester 2013). The house is constructed of brick and sits on an elevated foundation enclosing a vented crawl space. It is surmounted by a hipped roof. The front elevation features

three stepped bays. The side elevations also feature slightly projecting bays. All windows have been replaced. A small, hipped vent extends through the roof above the picture window of the front elevation. The house was likely constructed ca. 1930.

The residential structure serves as housing for employees operating the RD 1500 Karnak Drainage Facility, which consists of three pump houses carrying water from the RD 1500 Canal through a levee into Sacramento Slough. The pumping facility requires staff to be present 24 hours a day. Research for this effort did not reveal the circumstances in which it was constructed; however, it has always been owned by the District. The house is in good condition and appears to have been recently renovated with new windows and paint. The house is located on a slight hill north of the RD 1500 Canal and 150 feet north of PH1.

RD1500-JN-07: House 2

RD1500-JN-07 is a second vernacular pumping station keeper residence associated with the Karnak Drainage Facility (RD1500-JN-03). It was constructed ca. 1966. It is a single-story, vernacular side gable house. The house is three bays wide by two bays deep with centered entrances on each gable side elevation. The windows are modern and the house is sheathed in T1-11. It sits on a concrete slab and the roofing materials is asphalt shingle. The gable ends are vented.

The residential structure serves as housing for employees operating the RD 1500 Karnak Drainage Facility, which consist of three pump houses constructed between 1914-1952. The pumping facility requires staff to be present 24 hours a day, and therefore requires staff housing on-site. The house is in good condition and appears to have new windows. It is located approximately 170 feet northwest of PH1.

6.0 Evaluations and Recommendations

Although the Project design has not yet been finalized, it will likely result in unavoidable impacts to the Karnak Drainage Facility due to the Project's goal of modernizing and/or replacing the existing Facility in order to enhance flood protection. As such, the Karnak Drainage Facility was evaluated for inclusion in the NRHP/CRHR while the Project is still in the planning phase as a means of supporting the project with minimizing unavoidable effects to Historic Properties.

Six additional cultural resources occur within the current APE, but once the final design is complete these resources may be removed from the final design and APE. Once the final Project design has been selected it is recommended that a qualified Architectural Historian evaluate the remaining cultural resources that fall within the final APE to determine if these resources are eligible for inclusion on the NRHP/ CRHR. This stage will also require coordination with lead and/or state agencies to concur with recommendations and determine appropriate measures to minimize, resolve, or mitigate adverse effects to Historic Properties.

Also, RD 1500 is recommended eligible as historic reclamation district, but has not yet been formally recorded on the appropriate DPR 523-series forms. The four resources (the East Levee, RD 1500 Canal, East Canal, and the Karnak Drainage Facility) located within the current APE are presumed eligible contributors to this proposed district. It is recommended that future work would include formal recordation and evaluation of proposed RD 1500 District.

The following provide the evaluation recommendations for the Karnak Drainage Facility. The subsequent Section 6.2 provides an overview of associated resources and whether or not they are presumed contributors to the proposed RD 1500 District.

6.1 The Karnak Drainage Facility Evaluation

Before construction of the Karnak Drainage Facility, the Sutter Basin was flooded in the spring and swampy in the summer; most of the development in the area was by farmers who relied on the flooding for their crops. In 1915, RD 1500 was designed with the intent to drain and develop 45,000 acres of land in the Sutter Basin between Tisdale Bypass and the Karnak Drainage Facility. Various pumping stations were constructed as part of this project. RD 1500 was officially developed by the State of California; however, the district was intertwined with the SBC, which was mostly owned by Ogden Armour and William Gerber. RD 1500 was thought to have the largest capacity out of any other reclamation district in the world. Its construction required two clamshell dredgers at an estimated cost of $100,000 each and at least seven dredgers operated 24 hours a day. Ogden was able to influence a decision by state officials to move the proposed Sutter Bypass east from the middle of his lands (in the general location of the Sacramento Slough) to its current location, thereby allowing Ogden to increase potential profits from reassessment and bonding or leasing of the tracts within the 45,000 acres after reclamation. The SBC sold its last parcel in 1946. Overall, RD 1500 changed the Central Valley in immeasurable ways in regard to both agriculture and flood protection, with the Karnak Drainage Facility being a key component to the operation of the district. It is acknowledged that while some of the absolute language published describing the project could be hyperbole, it reflects the extraordinary event, decades in the making, that was experienced by many (ASAE 1922; BR 1983).

Karnak Drainage Facility (RD1500-JN-03) are not directly associated with the lives of persons significant to the nation's past (Criterion B/2). The architecture and design of the facility, which

employs Neo-Classical and utilitarian elements, are typical of water control Facility constructed during the early to mid-twentieth century. Research has yielded no information to suggest that the facility represents a significant departure from established reclamation design or practices contemporary to period in which it was built. Further the architect and builder for the facility were not identified, however it is unlikely that the facility represents the work of a master (Criterion C/3). It is unlikely that the facility has the potential for additional data that could yield information important to the prehistory or history of the nation (Criterion D/4). However, Karnak Drainage Facility (RD1500-JN-03) is associated with events that have made a significant contribution to the broad patterns of the history and cultural heritage of the United States (Criterion A/1). As a result, the Karnak Drainage Facility (RD1500-JN-03) are recommended as eligible for inclusion in the NRHP at a local level and CRHR under Criteria A/1.

Criterion A/1

The Karnak Drainage Facility (RD1500-JN-03) is recommended eligible for listing in the NRHP and CRHR at a local level of significance under Criterion A/1 for their important contributions to the development of flood control and agriculture in the Sacramento Valley. The facility has a period of significance between 1914 and 1952 when the pump houses were initially constructed. The pumping facility played a critical role in flood control allowing for the Sutter Basin and RD 1500 to be drained, thus resulting in residential and agricultural development within the district. The boundaries for the Karnak Drainage Facility include PH1-3, the pumphouses' associated conduits and gates, three small sheds, a weather station, and a drainage ditch. The sheds, weather station, and ditch appear to have been constructed outside the period of significance. The Karnak Drainage Facility retains historic integrity of original design and material, along with its original location and setting; the facility clearly conveys the cultural resource's historical importance in flood control and agricultural development.

Facility6.2 Reclamation District 1500 Historic District

Reclamation District 1500 represents the emergence of modern corporations as landowners and developers of reclamation districts and is representative of the use of large-scale land-moving and dredging machinery employed for the transformation of the landscape into productive agricultural land. As such, it meets criteria for listing on the NRHP/CRHR. The historic district's primary contributing features are elements of the district's drainage system, road systems, levees, pumping plants, and large-scale land patterns, some of which pass through the Project's APE.

More specifically, the following five resources: The East Levee, Karnak Drainage Facility, RD 1500 Canal, East Canal, and House 1 are recommended as contributor to the RD 1500 proposed district. Two additional resources within the current APE are not within the period of significance and/or do not contribute to the RD 1500 proposed district. These resources include the bridge and House 2. This represents preliminary assumptions on eligibility status, formal evaluation and concurrence with the lead federal and state agency will be required.

In sum, the six resources (in addition to Karnak Drainage Facility) are located within the current APE and five are recommended as contributors to the proposed RD 1500 historic district. Kleinfelder recommends once the final design is realized that the remaining six resources be formally evaluated and determined if they are contributors to the proposed district, and/or if these resource(s) is individually eligible for listing on the NRHP/CRHR.

Table 4. Summary of Recommended Site Eligibility

Resource Number	Name	Description	Induvial Eligibility Recommendation	RD 1500 District Recommendation
RD1500-JN-01	Unnamed Bridge	Concrete slab bridge spanning the East Canal	Unevaluated	Non-contributing
RD1500-JN-02	East Levee	East Levee of the Reclamation District No. 1500	Unevaluated	Contributing
RD1500-JN-03	Karnak Drainage Facility	Facility including three pump houses constructed between 1914-1952, 3 sheds, and a ditch	Recommended eligible	Contributing
RD1500-JN-04	Reclamation District 1500 Canal	Channelized portion of Sacramento Slough terminating at the East Levee	Unevaluated	Contributing
RD1500-JN-05	East Canal	Manmade canal paralleling the East Levee in the Sutter Bypass	Unevaluated	Contributing
RD1500-JN-06	House 1	Single-family home, constructed in approximately 1930	Unevaluated	Contributing
RD1500-JN-07	House 2	Single-family home, constructed in approximately 1966	Unevaluated	Non-contributing

6.3 Recommendations and Potential Mitigation

Kleinfelder recommends the Project be designed to avoid or minimize the undertaking's adverse effects on historic properties. An adverse effect as defined in CFR 800.5(a) (1–2) is any direct or indirect effect that may alter characteristics of a historic property that qualify the property for listing in the NRHP. Adverse effects diminish the integrity of a historic property's location, design, setting, materials, workmanship, feeling, or association.

Adverse effects that cannot be avoided will require additional documentation to address adverse effects to Historic Properties. Mitigation for adverse effects to the drainage Facility, levee, and canals could include recording the structures or other historic-period elements using documentation similar to the Historic American Buildings Survey (HABS)/ Historic American Engineering Record (HAER).

7.0 Conclusion

This section presents the results of cultural resources identification efforts within the APE. A records search at the NWIC and a search of the Sutter County Museum database revealed that one previously identified resource is located within the APE: the Karnak Drainage Facility. A pedestrian survey of the APE resulted in the identification of six new cultural resources (the East Levee, RD 1500 Canal, East Canal, a historical bridge, and two houses) and the update of one previously recorded cultural resource (Karnak Drainage Facility). The Karnak Drainage Facility consists of three pump houses constructed between 1914 and 1952, associated structures, infrastructure, and equipment. The Facility have been evaluated and is recommended eligible for inclusion in the NRHP and the CRHR under Criteria A/1. The bridge, canals, levee, and houses have not been individually evaluated for inclusion in the NRHP and CRHR, however the levee, canals, House 1, and the drainage Facility are recommended as contributors to a proposed historic district, Reclamation District 1500.

Kleinfelder recommends once the final design is realized that the remaining six resources be formally evaluated and determined if they are contributors to the proposed district, and/or if these resource(s) is individually eligible for listing on the NRHP/CRHR. Additionally, in accordance with Section 106 of NHPA a Finding of Effects (FOE) Report may be required to fully identify historic properties that are subject to direct or indirect affects, based on the final project design. The necessity of such a document will be determined in consultation with the lead federal and state agencies. It is anticipated that the lead agency would prepare the FOE with support from the Client's consultant. The final FOE and technical reports will be submitted by the lead federal agency to SHPO for concurrence on eligibility recommendations and proposed measures to avoid, resolve, or mitigate adverse effects to historic properties.

8.0 Preparers' Qualifications

Rachael Nixon has over 20 years of cultural resource management. She has served as principal investigator on projects under CEQA, NEPA, and Section 106 of the National Historic Preservation Act (NHPA). Rachael has directed projects that involved the identification and evaluation of thousands of resources including paleontological, archaeological, and architectural history. She has worked with various agencies on these projects, including but not limited to: Bureau of Land Management, Bureau of Indian Affairs, California Energy Commission, Native American Heritage Commission, State Historic Preservation Office, U.S Army Corp. of Engineers and the U.S. Forest Service. She has also worked closely with Native American Tribal representatives, most likely descendants, Tribal Historic Preservation Officers, and has served as liaison between contract personnel, clients, tribal representatives, technical leads, and agency leads throughout California. She meets the Secretary of Interior's Professional Qualification Standards in archaeology and history and is a Registered Professional Archaeologist (RPA).

Kleinfelder senior archaeologist Jessica Neal contributed to this report. She has a Bachelor of Science degree in anthropology from Loyola University Chicago and a Master of Arts degree in Maritime Archaeology from the University of Southern Denmark. She is a registered professional archaeologist (#17230) and a member of the Society for California Archaeology. She meets the Secretary of the Interior's Standards for prehistoric and historical archaeology. Ms. Neal has nine years of experience in cultural resources management, including project management, personnel management, field survey, excavation and data recovery, laboratory analysis, collections management, and geographic information system (GIS) applications in environmental planning. She has experience in preparation of archaeological research, built environment, and archaeological evaluations for inclusion in the NRHP and CRHR, and survey, testing, excavation, and monitoring reports pursuant to the requirements of CEQA, Section 106 of the NHPA, and National Environmental Policy Act (NEPA).

Kleinfelder senior architectural historian Justin Castells is an architectural historian who exceeds the Secretary of the Interior's Professional Qualification Standards in architectural history and history. Justin has a M.A. in History and over sixteen years of professional experience in historic preservation and cultural resources management. Justin has worked on assessments for properties based on local, CRHR, and NRHP criteria. He has prepared technical reports in compliance with NEPA, CEQA, and Section 106 and 110 of the NHPA. He has completed work for various federal, state, and local agencies.

Kate Willis is a Secretary of the Interior qualified Architectural Historian with a variety of experience in project management, environmental planning and permitting and working with historic resources. She has extensive experience in Section 106 of the National Historic Preservation Act and Section 4(f) of the US Department of Transportation Act compliance and integration into the National Environmental Policy Act. Ms. Willis also has considerable experience with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER). As a trained architectural historian, she has expertise in the history of national and local architectural styles of both industrial and residential developments. Her other responsibilities include working directly with SHPO, sub-consultant management, public and Section 106 consulting parties meeting participation, and consultation with municipalities.

Samantha Dunham is an archaeologist with five years of cultural resources management experience in California. Her training and background meet the California Department of Parks and Recreation qualifications as an Associate State Archaeologist for prehistoric and historic archaeology. Her experience includes archival research; ethnographic and historical research; Native American consultation; field survey; prehistoric and historical excavation; archaeological monitoring; and writing technical documents including permits, archaeological resource management reports, historic property management plans, and archaeological treatment plans, amongst others. She prepares cultural resources technical studies pursuant to the CEQA, Section 106 of the NHPA, and local policies.

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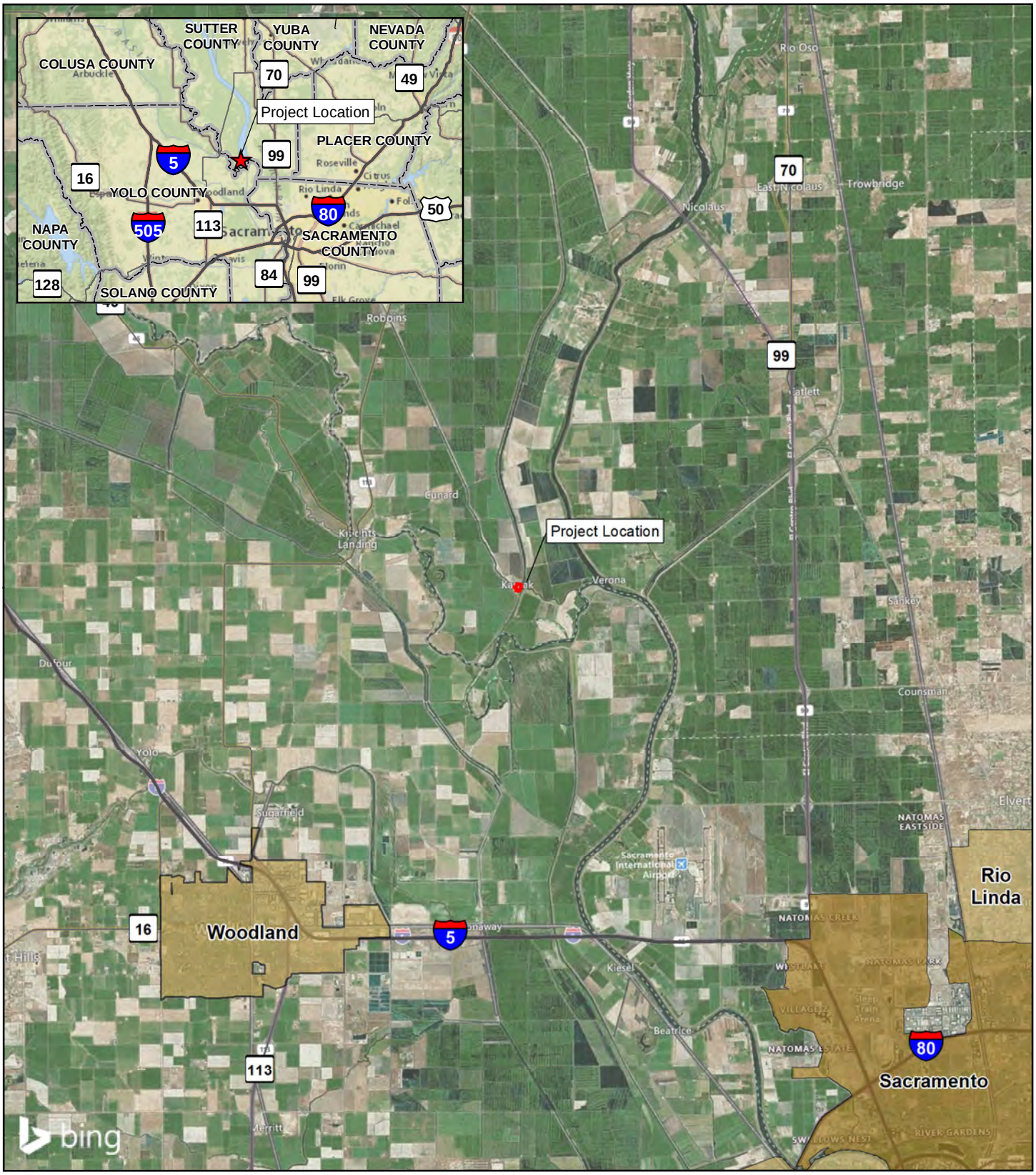
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Appendix A

FIGURES





Source: Bing Maps

0 1.5 3 Miles

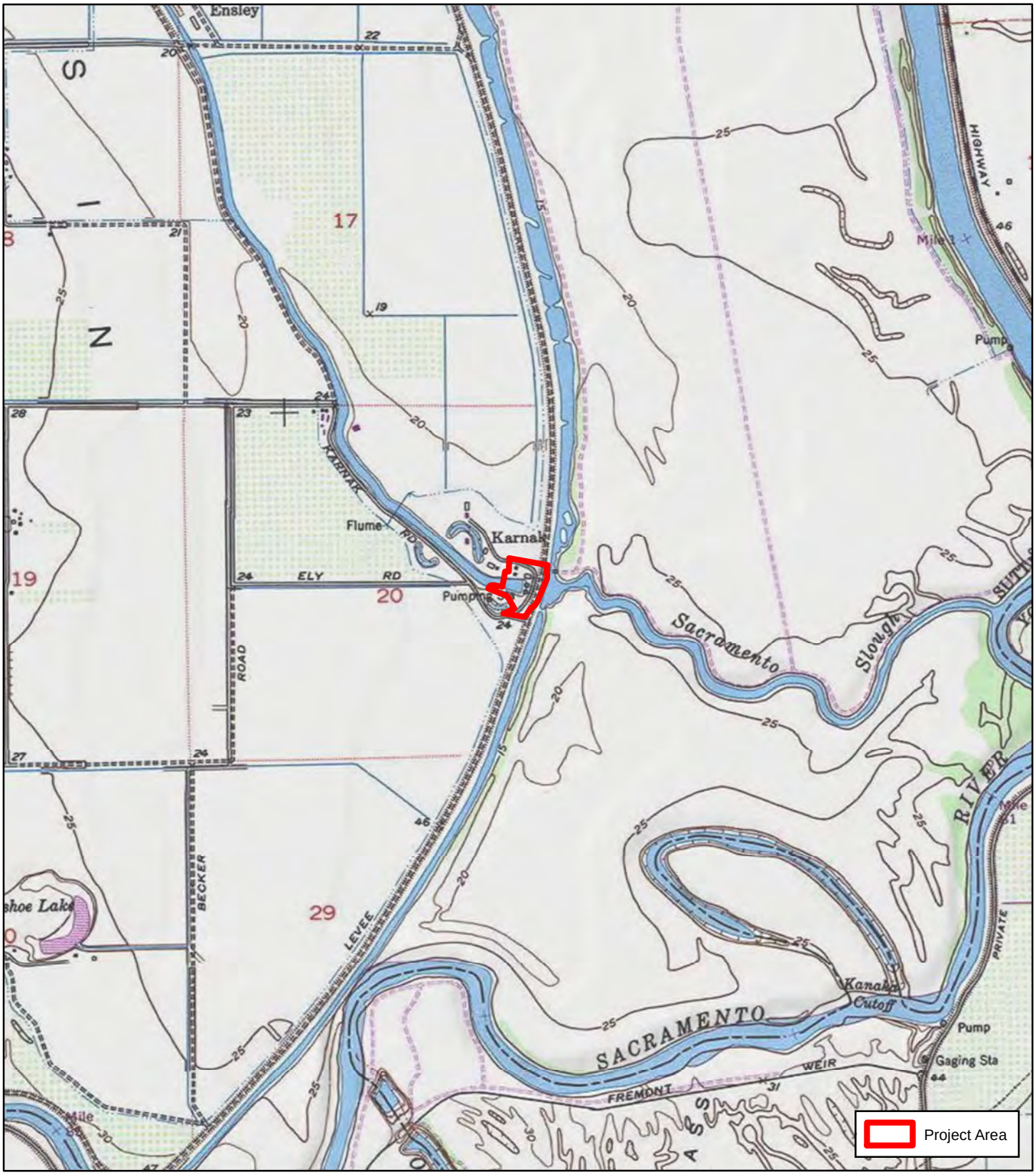
0 2.5 5 Kilometers

N

Scale 1:190,080
1 in = 3 miles

Figure 1. Regional Vicinity
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 20, 21

0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Figure 2. Project Location
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 200 400 Feet

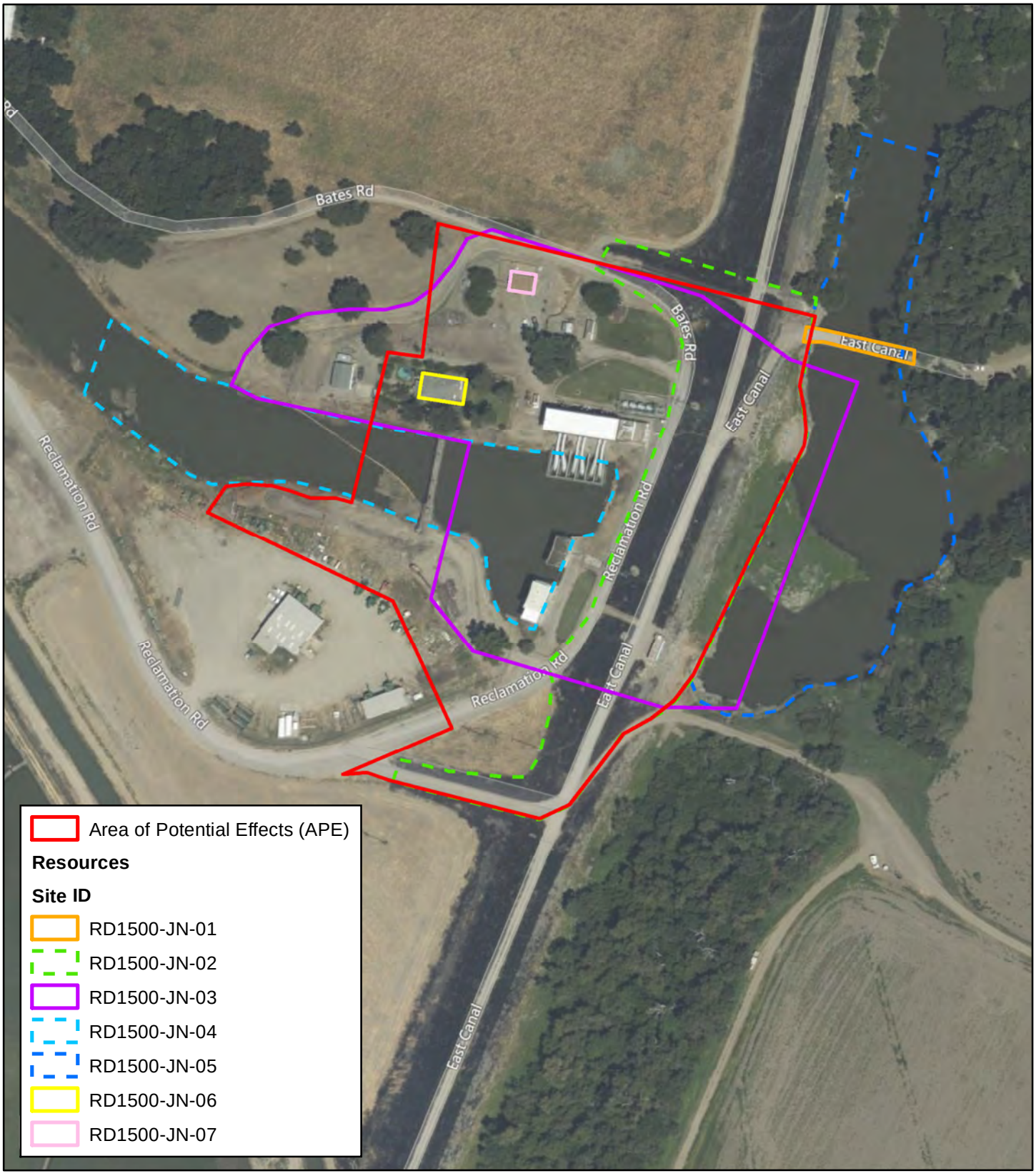
0 75 150 Meters

N

Scale 1:5,000

Figure 3. Area of Potential Effects (APE)
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 100 200 Feet

0 30 60 Meters

N

Scale 1:2,400

Figure 4. Resources Overview
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 1,000 2,000 Feet

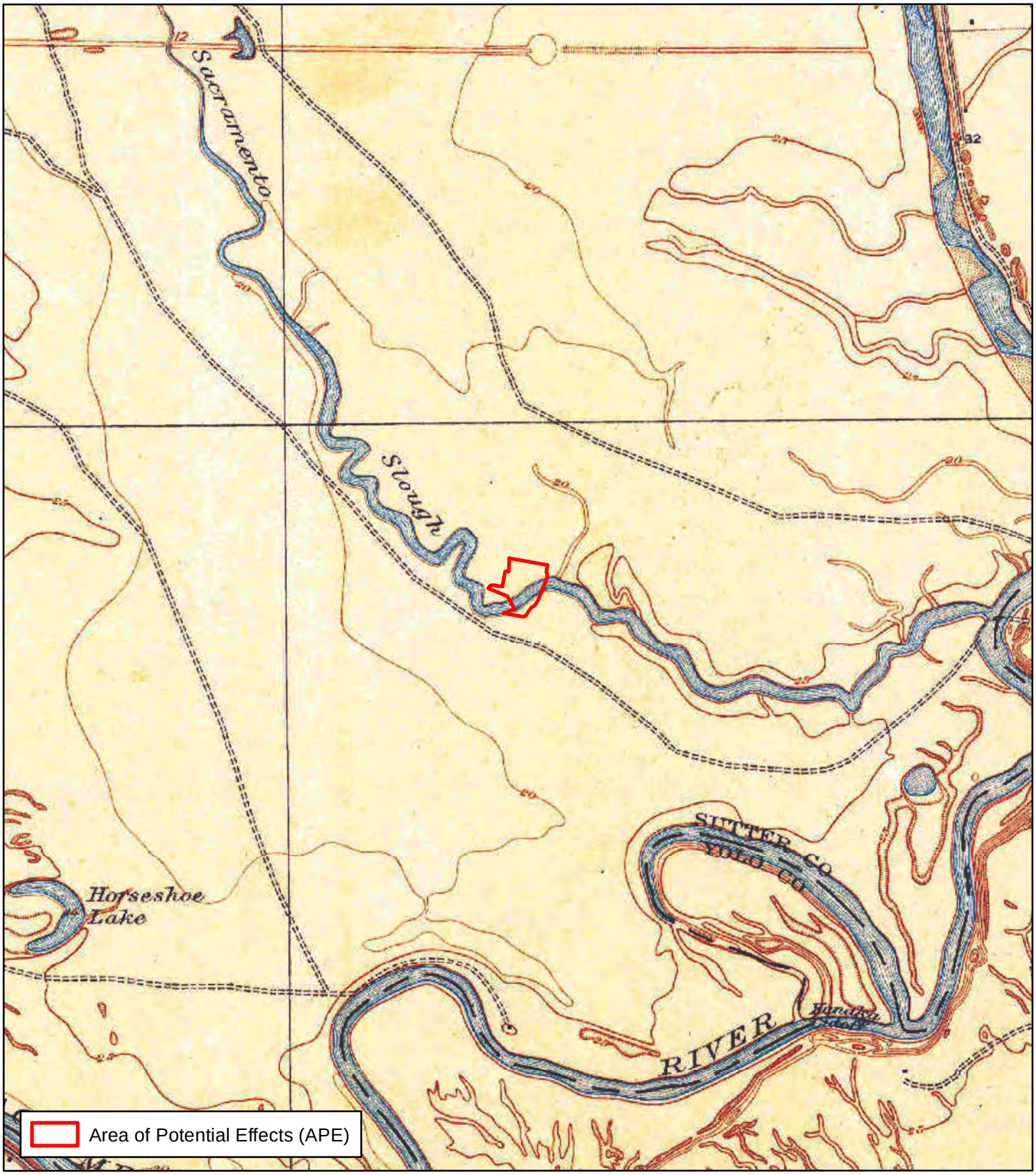
0 300 600 Meters

N

Scale 1:24,000

Figure 5a. T11N R3E, MDBM (GLO Plat 1870)
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

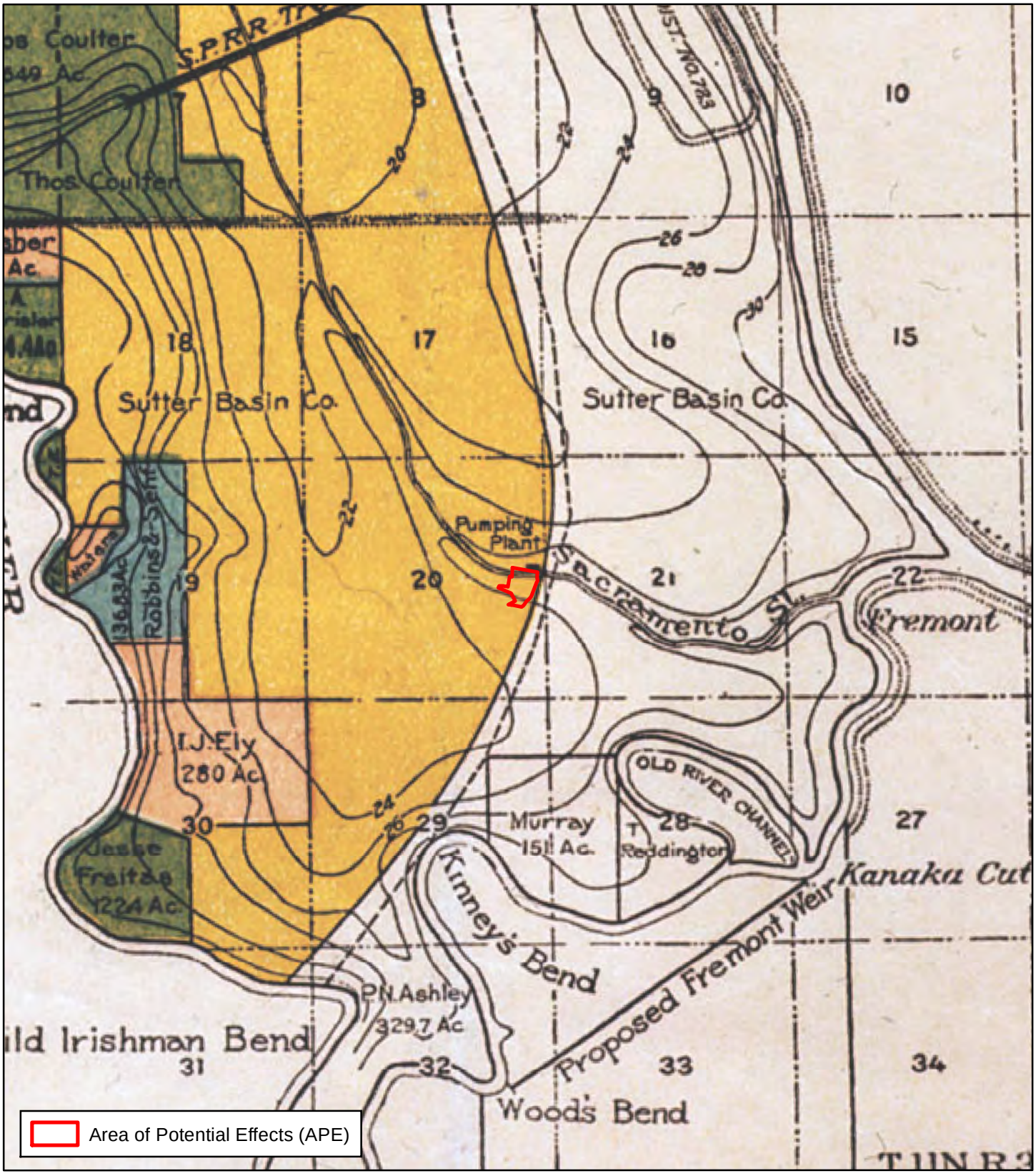
0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000

Figure 5b. Knights Landing (USGS 1910)
Reclamation District
Flood Control Project
Sutter County, California





Source: Bing Maps

0 1,500 3,000 Feet

0 500 1,000 Meters

N

Scale 1:36,000

Figure 5c. Map of Reclamation District No. 1500 (California State Library 1916)
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 2,000 4,000 Feet

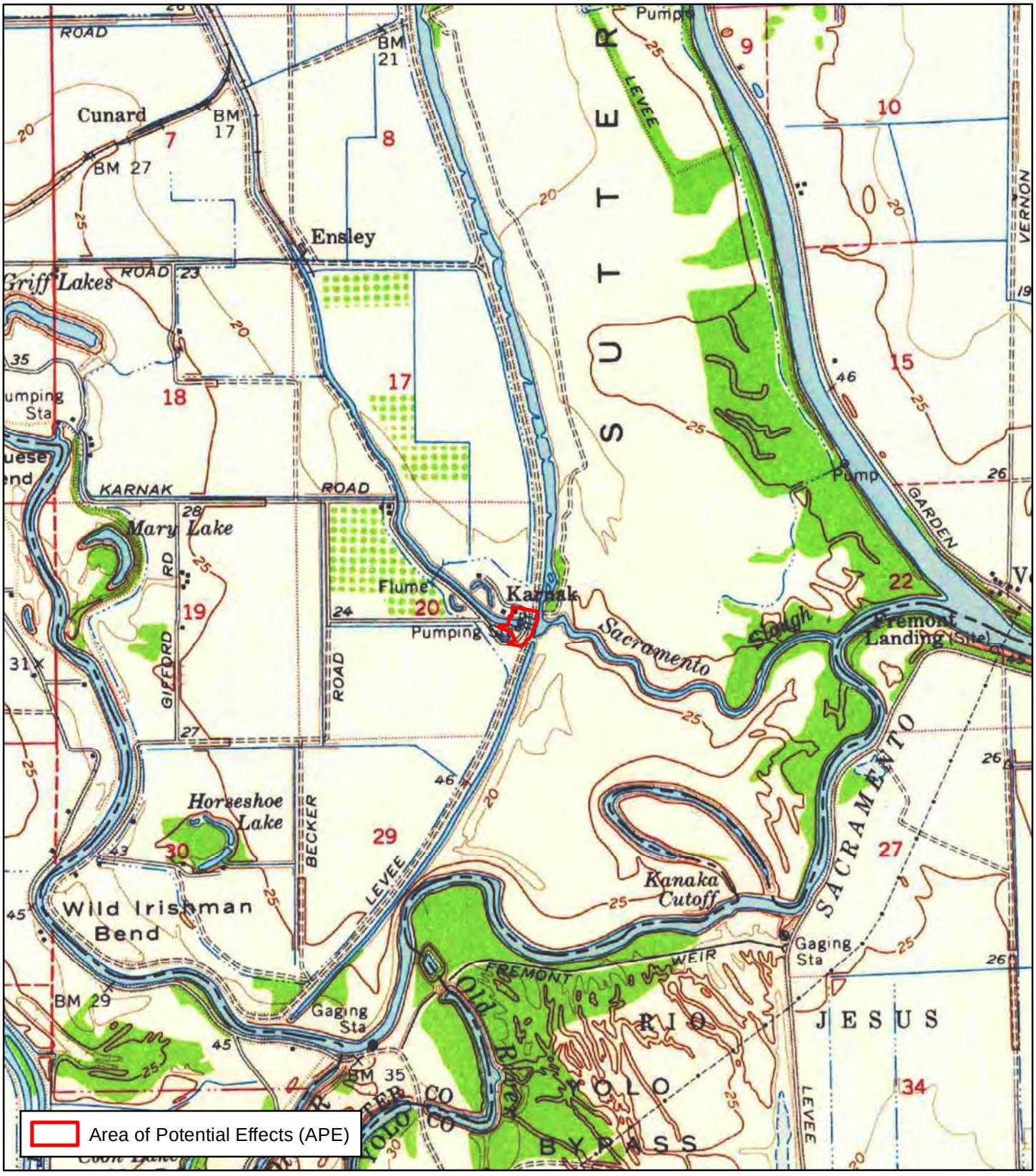
0 600 1,200 Meters

N

Scale 1:48,000

Figure 5d. Sutter County
(California Division of Highways 1935)
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 1,500 3,000 Feet

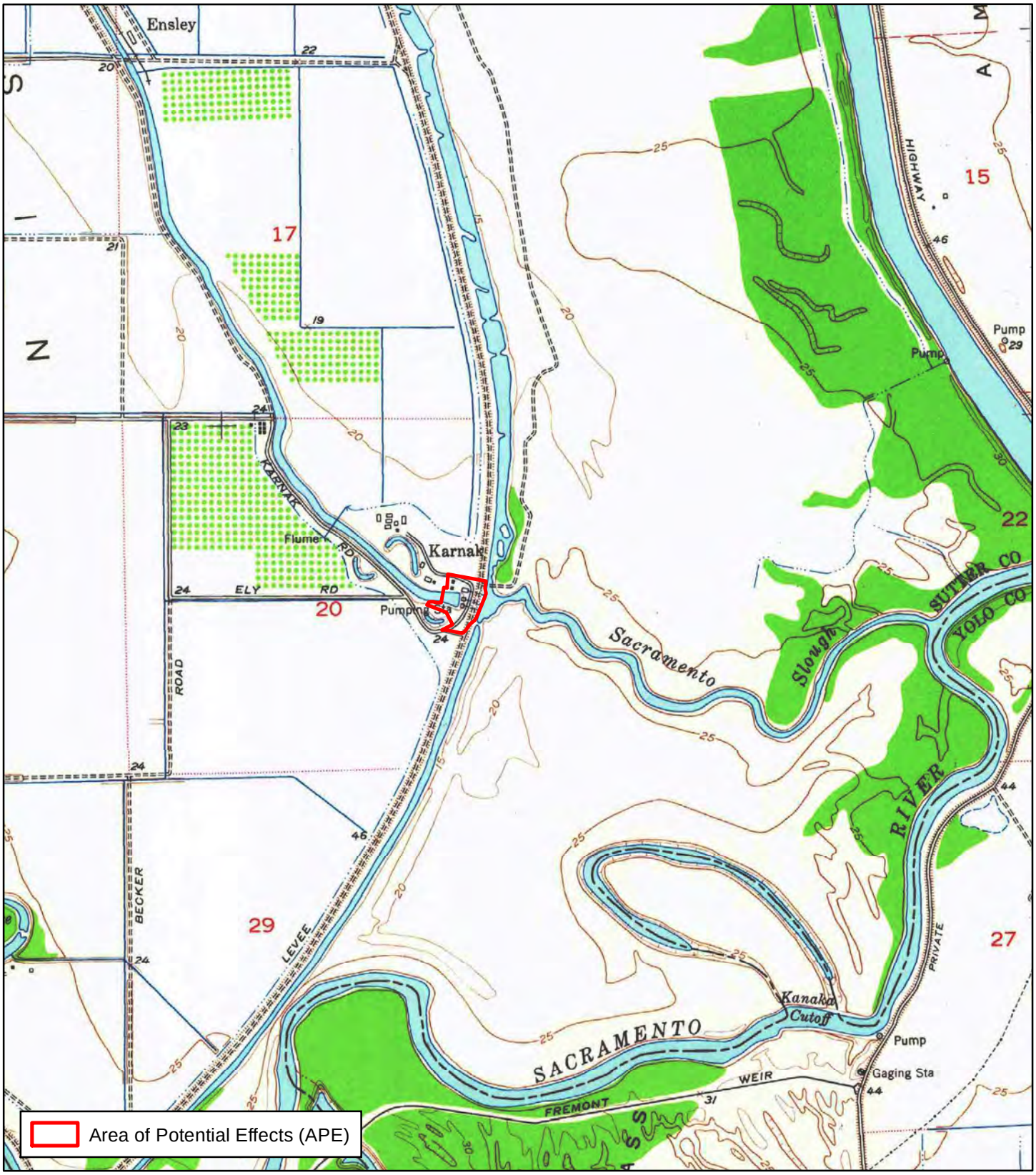
0 500 1,000 Meters

N

Scale 1:36,000

Figure 5e. Knights Landing, Calif. 1:62,500 (USGS 1952 [ed. 1959])
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA





Source: Bing Maps

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000

Figure 5e. Knights Landing, Calif. 1:24,000 (USGS 1952 [ed. 1964])
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA

Appendix B

SURVEY PHOTOGRAPHS



Pump House 1, facing northeast



Pump House 1, facing north



Interior of Pump House 1



Pump Houses 1 and 2, facing southwest



Pump house 2, facing northwest



Interior of Pump House 2



Pump house 3, facing northwest



Interior of Pump House 3



Pump house 1 outlets into the East Canal/Sacramento Slough, facing west



Pump house 2 and 3 outlets into the East Canal/Sacramento Slough, facing northwest



Shed 2, facing northeast



Shed 1, facing northeast



Shed 3, facing northeast



Shed 1, Shed 2, and Shed 3, facing northwest.



Weather Station, facing west.



Overview of the ditch, facing northeast.

Appendix C

LOCAL HISTORICAL SOCIETY CONSULTATION

State of California--- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI
Trinomial #
NRHP Status Code
Other Listings
Review Code Reviewer Date

***Resource Name or #** (Assigned by recorder) 23611 Reclamation Road, Knights Landing

P1. Other Identifier: Karnak Pumping Station

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Sutter

and (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** **Date** **T** **;R** ; **¼of** **¼ of Sec** ; **B.M.**

c. Address 23611 Reclamation Road City Knights Landing Zip 95645

d. UTM: (Give more than one for large and/or linear resources) Zone ; mE/ mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

APN: N/A

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The service building (pumping station) at 23611 Reclamation Road in Knights Landing was constructed in 1914 in a modest Neo-Classical Revival style. The building is located near the front of the parcel on the west side of Reclamation Road, facing east within a primarily agricultural area.

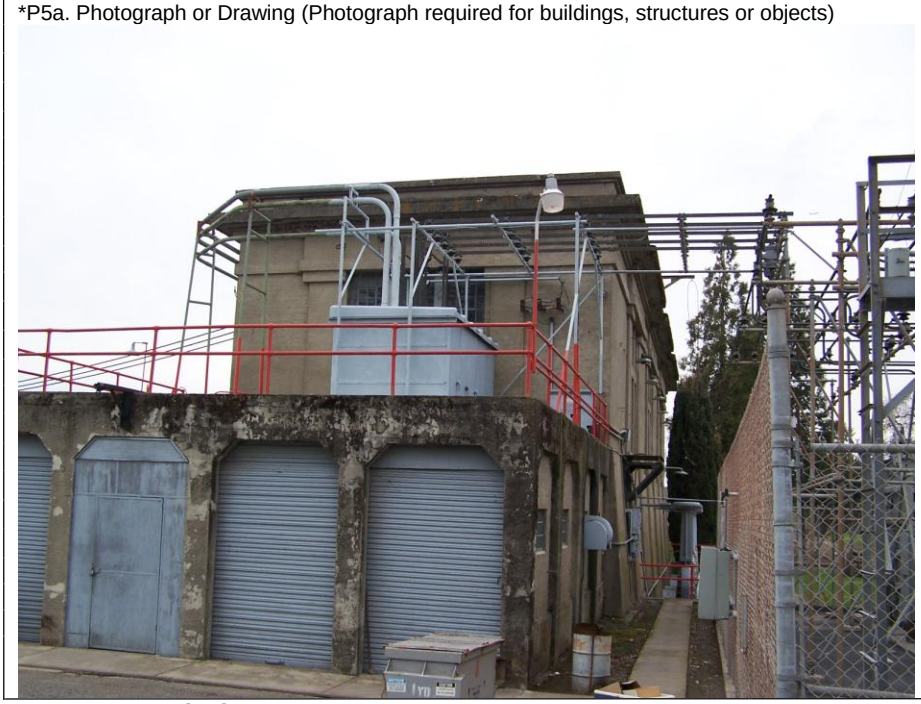
This two-story pumping station has an oversized rectangular floor plan. The façade is symmetrical and the building sits on a concrete foundation. The building has a concrete block structural system and an exterior clad in smooth stucco. The building is covered by a flat roof clad with industrial cool seal (not visible). The slightly-overhanging eaves are boxed.

(continued page 2)

***P3b. Resource Attributes:** (List attributes and codes) HP9. Public utility building

***P4. Resources Present:** ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.):

*P5a. Photograph or Drawing (Photograph required for buildings, structures or objects)



P5b. Description of Photo: (view, date, accession #) View looking west at the façade, July 18, 2006

***P6. Date Constructed/Age and Sources:** ☒Historic ☐Prehistoric ☐Both
1914

***P7. Owner and Address:**
N/A

***P8. Recorded by:** Name, affiliation, and address)
Carol Bordeaux, volunteer
Galvin Preservation Associates Inc.
1611 S. Pacific Coast Hwy. Suite 104
Redondo Beach CA, 90277

***P9. Date Recorded:** April, 2006

***P10. Survey Type:** (Describe)
☐ Intensive
☒ Reconnaissance

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Sutter County Historic Survey (Galvin Preservation Associates, 2005-2007)

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

*Resource Name or # (Assigned by recorder) 23611 Reclamation Road, Knights Landing

Recorded By: Carol Bordeaux Date: April, 2006 ☒ Continuation ☐ Update

(continued from page 1)

***P3a. Description:**

The primary entry is located at the east elevation. It consists of metal stairs with metal rails that lead to a concrete-floored deck and an entry at the second floor level. The entry is a single five-paneled wood door located within a bank of five windows. There are five windows on the east elevation. They are symmetrically spaced and consist of three steel sixteen-light casement windows over the entry door which is flanked by two steel 32-light casement windows. Other windows throughout the pumping station consist of three banks of six windows on each of the north and south elevations. Each bank of windows consists of three steel sixteen-light casement windows over three steel 32-light casement windows. On the west elevation there is an additional bank of similar casement windows. Other elements of this pumping station include a steel encaged ladder to the north of the entry door that leads to the roof and a concrete addition to the north elevation with apparent drive-through service doors. Decorative elements of this building include poured-in-place concrete pillasters flanking either side of the casement windows and a four-tired concrete cornice.

Landscaping elements include mature trees. Other features include concrete walkways, suspended metal walkways and metal hand rails as well as a secondary pumping station located to the north of the main pumping station facing east. That building was constructed in 1924 in the Neo-Classical Revival style. This one-story pumping station has a rectangular floor plan. The building has a symmetrical façade and sits on a concrete foundation. The pumping station has a similar construction to the primary building but sits on the edge of the levee with part of the building extending into the river. The primary entry is located at the façade. It consists of solid single entry door placed within a bank of windows. There are six windows on the façade. They are symmetrically spaced and consist of three twelve-light windows placed over two 28-light windows which flank an eight-light window over the entry door. All of the windows are steel casement windows. Other windows throughout the secondary pumping station consist of steel casement windows similar to those in the façade. Other elements of this pumping station include a large steel abutment structure located in the middle of the building and in front of the entry.

Alterations to the building include replacement stairs. The condition of the building is good to fair.

*Resource Name or # (Assigned by recorder) 23611 Reclamation Road, Knights Landing

Recorded By: Carol Bordeaux Date: April, 2006 ☒ Continuation ☐ Update



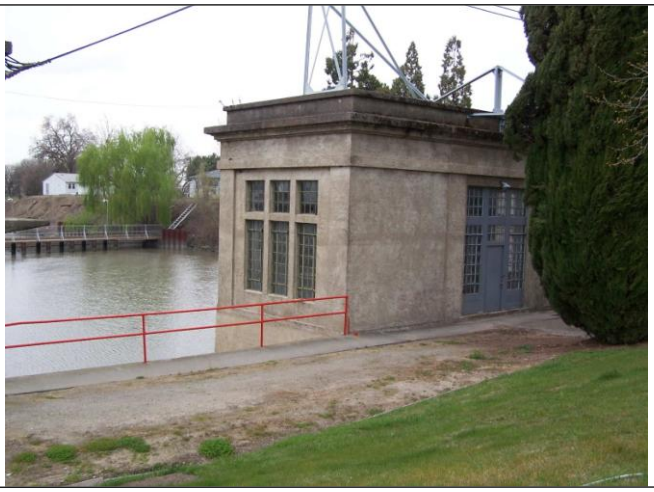
View looking west at the east elevation



View looking south at the north elevation



View looking at the south elevation of the 1924 pumphouse



View looking at the north elevation of the pumphouse



View looking at build date, shown on building

Appendix D

NATIVE AMERICAN HERITAGE COMMISSION CONSULTATION

From:	Samantha Dunham
To:	"nahc@nahc.ca.gov"
Subject:	Reclamation District Flood Control Project: SLF & Native American Contacts List Request
Date:	Tuesday, January 12, 2021 12:19:00 PM
Attachments:	Flood_Control_Location.pdf image001.jpg reclamation district flood control project SLF request.pdf

Hello,

I would like to please submit this SLF and contacts request for a location in Sutter County. Please see the attached request form and let me know if you have any questions.

Thanks,

As of August, 24, 2020, Kleinfelder has acquired Garcia and Associates. Please make note of my new email address and update your contact records accordingly.

Samantha Dunham
Archaeologist
435 Lincoln Way,
Auburn, CA 95603
o| (530) 823-3151
c| (530) 902-0735



This email may contain confidential information. If yoy have received this email, including any attachments, in error, please notify the sender promptly and delte the email and any attachments from all of your systems.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: 20212629.001A Reclamation District Flood Control Project

County: Sutter

USGS Quadrangle Name: KNIGHTS LANDING (1981)

Township: T11N Range: R03E Section(s): SEC 20

Company/Firm/Agency: Kleinfelder/GANDA

Contact Person: Samantha Dunham

Street Address: 435 Lincoln Way

City: Auburn Zip: 95603

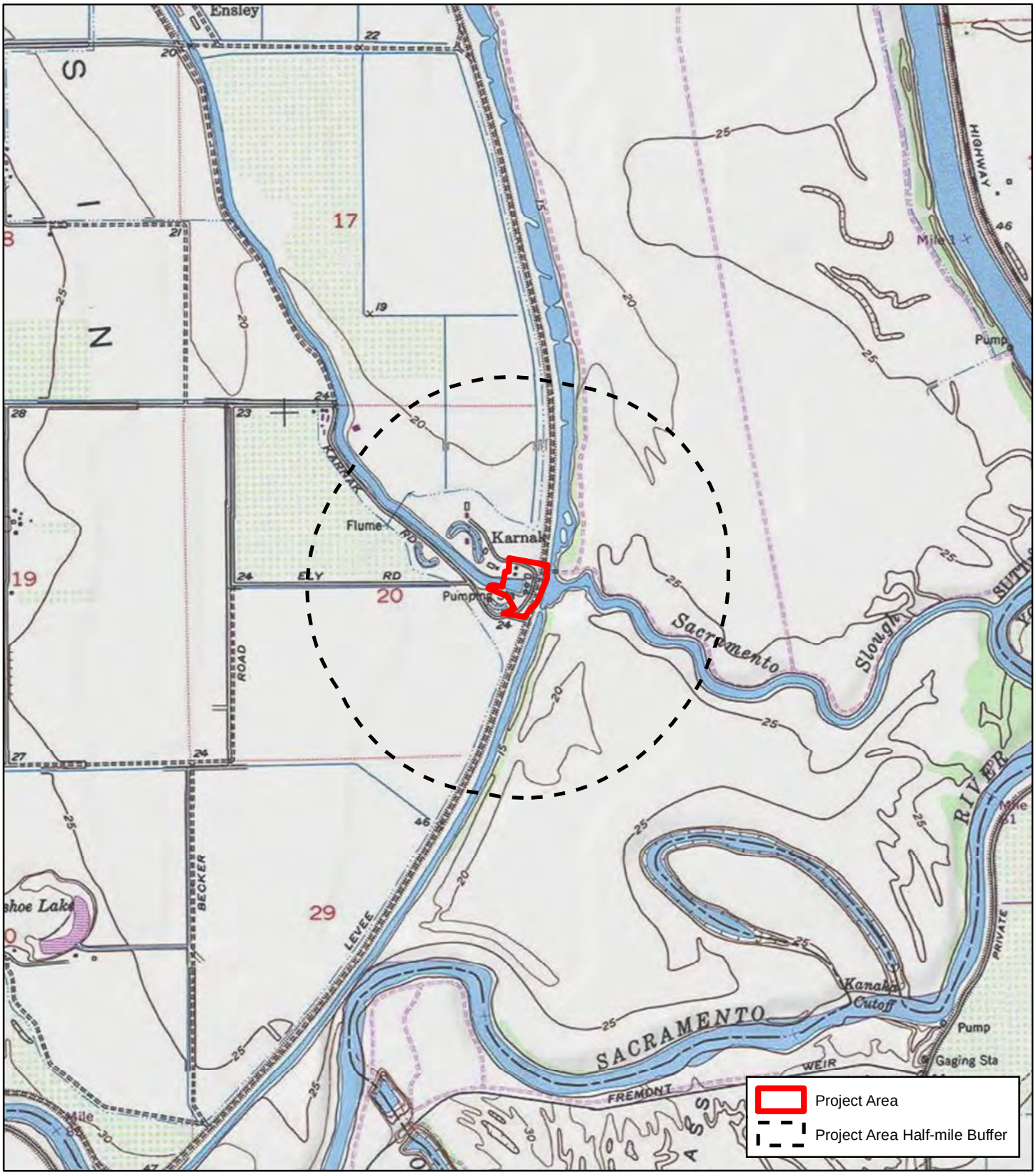
Phone: 530-902-0735 (work cell because not currently in office)

Fax:

Email: sdunham@kleinfelder.com

Project Description:

The Project proposes the rebuild of the existing pumps and replacement of pipelines that run through the levy to the East Canal.





USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 20

0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Record Search
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA

From: Gonzalez-Lopez, Nancy@NAHC
To: Samantha Dunham
Subject: 20212629.001A Reclamation District Flood Control Project, Sutter County
Date: Tuesday, February 2, 2021 2:09:10 PM
Attachments: SLF No 20212629.001A DunhamSutter 2-2-2021 Signed.pdf
20212629.001A DunhamSutter 2-2-2021.pdf

External Email

Regards,

Nancy Gonzalez-Lopez
Cultural Resources Analyst
Native American Heritage Commission
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 573-0168

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Merri Lopez-Keifer
Luiseño

PARLIAMENTARIAN
Russell Attebery
Karuk

COMMISSIONER
William Mungary
Paiute/White Mountain Apache

COMMISSIONER
Julie Tumamait-Stenslie
Chumash

COMMISSIONER
[**Vacant**]

COMMISSIONER
[**Vacant**]

COMMISSIONER
[**Vacant**]

EXECUTIVE SECRETARY
Christina Snider
Pomo

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

February 2, 2021

Samantha Dunham

Garcia & Associates

Via E-mail: sdunham@garciaandassociates.com

Re: 20212629.001A Reclamation District Flood Control Project, Sutter County

Dear Ms. Dunham:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez-Lopez
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Sutter County
2/2/2021

Shingle Springs Band of Miwok Indians
Regina Cuellar, Chairperson
P.O. Box 1340 Maidu
Shingle Springs, CA, 95682 Miwok
Phone: (530) 387 - 4970
Fax: (530) 387-8067
rcuellar@ssband.org

United Auburn Indian Community of the Auburn Rancheria
Gene Whitehouse, Chairperson
10720 Indian Hill Road Maidu
Auburn, CA, 95603 Miwok
Phone: (530) 883 - 2390
Fax: (530) 883-2380
bguth@auburnrancheria.com

Yocha Dehe Wintun Nation
Isaac Bojorquez, Director of Cultural Resources
PO Box 18 Brooks, CA 95606 Patwin
Phone: (530) 796 - 0103
ibojorquez@yochadehe-nsn.gov

Yocha Dehe Wintun Nation
Leland Kinter, THPO
P.O. Box 18 Patwin
Brooks, CA, 95606
Phone: (530) 796 - 3400
thpo@yochadehe-nsn.gov

Yocha Dehe Wintun Nation
Laverne Bill, Site Protection Manager
P.O. Box 18 Patwin
Brooks, CA, 95606
Phone: (530) 796 - 3400
lbill@yochadehe-nsn.gov

Yocha Dehe Wintun Nation
Anthony Roberts, Chairperson
P.O. Box 18 Patwin
Brooks, CA, 95606
Phone: (530) 796 - 3400
aroberts@yochadehe-nsn.gov

This list is current only as of the date of this document. 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 Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed 20212629.001A Reclamation District Flood Control Project, Sutter County.

Appendix E

RECORDS SEARCH RESULTS

CHRIS Data Request Form

ACCESS AND USE AGREEMENT NO.: 63 **IC FILE NO.:** _____

To: Northeast Information Center

Print Name: Samantha Dunham Date: 1/12/2021

Affiliation: Kleinfelder/GANDA

Address: 435 Lincoln Way

City: Auburn State: CA Zip: 95603

Phone: 530-902-0735 (wo Fax: _____ Email: sdunham@kleinfelder.com

Billing Address (if different than above): 1 Saunders Ave San Anselmo CA 94960

Billing Email: AccountsPayableUS@Kleinfelder.com. Billing Phone: _____

Project Name / Reference: Reclamation District Flood Control Project

Project Street Address: Community of Karnak

County or Counties: Sutter

Township/Range/UTMs: T11N, R03E, SEC 20

USGS 7.5' Quad(s): KNIGHTS LANDING (1981)

PRIORITY RESPONSE (Additional Fee): yes ■ / no ☐

TOTAL FEE NOT TO EXCEED: $ 650
(If blank, the Information Center will contact you if the fee is expected to exceed $1,000.00)

Special Instructions:

Information Center Use Only

Date of CHRIS Data Provided for this Request: _____

Confidential Data Included in Response: yes ☐ / no ☐

Notes: _____

_____

CHRIS Data Request Form

Mark the request form as needed. Attach a PDF of your project area (with the radius if applicable) mapped on a 7.5' USGS topographic quadrangle to scale 1:24000 ratio 1:1 neither enlarged nor reduced and include a shapefile of your project area, if available. Shapefiles are the current CHRIS standard for submitting digital spatial data for your project area or radius. **Check with the appropriate IC for current availability of digital data products.**

- Documents will be provided in PDF format. Paper copies will only be provided if PDFs are not available at the time of the request or under specially arranged circumstances.
- Location information will be provided as a digital map product (Custom Maps or GIS data) unless the area has not yet been digitized. In such circumstances, the IC may provide hand drawn maps.
- In addition to the $150/hr. staff time fee, client will be charged the Custom Map fee when GIS is required to complete the request [e.g., a map printout or map image/PDF is requested and no GIS Data is requested, or an electronic product is requested (derived from GIS data) but no mapping is requested].

For product fees, see the CHRIS IC Fee Structure on the OHP website.

1. Map Format Choice:

Select One: Custom GIS Maps ☐ GIS Data ☒ Custom GIS Maps **and** GIS Data ☐ No Maps ☐

Any selection below left unmarked will be considered a "no. "

Location Information:

	Within project area	Within 0.50 mi. radius
ARCHAEOLOGICAL Resource Locations[1]	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Locations	yes ☒ / no ☐	yes ☒ / no ☐
Report Locations[1]	yes ☒ / no ☐	yes ☒ / no ☐
"Other" Report Locations[2]	yes ☒ / no ☐	yes ☒ / no ☐

3. Database Information:
(contact the IC for product examples, or visit the SSJVIC website for examples)

	Within project area	Within 0.50 mi. radius
ARCHAEOLOGICAL Resource Database[1]		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☒ / no ☐
Excel Spreadsheet	yes ☐ / no ☒	yes ☐ / no ☒
NON-ARCHAEOLOGICAL Resource Database		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☒ / no ☐
Excel Spreadsheet	yes ☐ / no ☒	yes ☐ / no ☒
Report Database[1]		
List (PDF format)	yes ☐ / no ☒	yes ☐ / no ☒
Detail (PDF format)	yes ☐ / no ☒	yes ☒ / no ☐
Excel Spreadsheet	yes ☐ / no ☒	yes ☐ / no ☒
Include "Other" Reports [2]	yes ☐ / no ☒	yes ☐ / no ☒

4. Document PDFs (paper copy only upon request)**:**

	Within project area	Within 0.50 mi. radius
ARCHAEOLOGICAL Resource Records[1]	yes ☒ / no ☐	yes ☒ / no ☐
NON-ARCHAEOLOGICAL Resource Records	yes ☒ / no ☐	yes ☒ / no ☐
Reports[1]	yes ☒ / no ☐	yes ☐ / no ☒
"Other" Reports[2]	yes ☐ / no ☒	yes ☐ / no ☒

CHRIS Data Request Form

5. Eligibility Listings and Documentation:

	Within project area	Within 0.50 mi. radius
OHP Built Environment Resources Directory[3]:		
Directory listing only (Excel format)	yes ■ / no ☐	yes ■ / no ☐
Associated documentation[4]	yes ■ / no ☐	yes ■ / no ☐
OHP Archaeological Resources Directory[1,5]:		
Directory listing only (Excel format)	yes ■ / no ☐	yes ■ / no ☐
Associated documentation[4]	yes ■ / no ☐	yes ■ / no ☐
***California Inventory of Historic Resources* (1976):**		
Directory listing only (PDF format)	yes ■ / no ☐	yes ■ / no ☐
Associated documentation[4]	yes ■ / no ☐	yes ■ / no ☐

6. Additional Information:

The following sources of information may be available through the Information Center. However, several of these sources are now available on the OHP website and can be accessed directly. The Office of Historic Preservation makes no guarantees about the availability, completeness, or accuracy of the information provided through these sources. Indicate below if the Information Center should review and provide documentation (if available) of any of the following sources as part of this request.

Caltrans Bridge Survey	yes ■ / no ☐
Ethnographic Information	yes ☐ / no ■
Historical Literature	yes ☐ / no ■
Historical Maps	yes ■ / no ☐
Local Inventories	yes ■ / no ☐
GLO and/or Rancho Plat Maps	yes ■ / no ☐
Shipwreck Inventory	yes ☐ / no ■
Soil Survey Maps	yes ☐ / no ■

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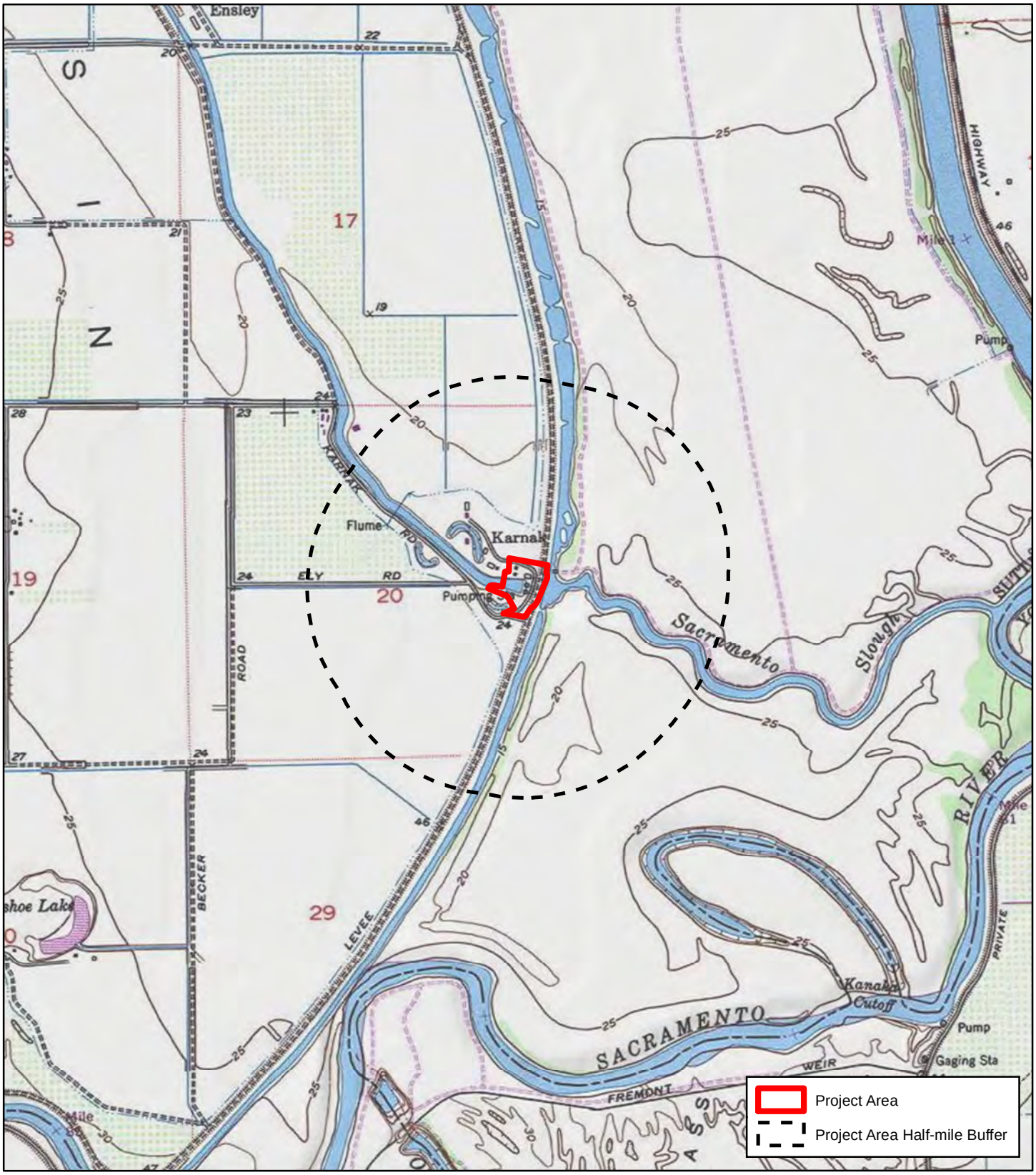
[1] In order to receive archaeological information, requestor must meet qualifications as specified in Section III of the current version of the California Historical Resources Information System Information Center Rules of Operation Manual and be identified as an Authorized User or Conditional User under an active CHRIS Access and Use Agreement.

[2] "Other" Reports GIS layer consists of report study areas for which the report content is almost entirely non-fieldwork related (e.g., local/regional history, or overview) and/or for which the presentation of the study area boundary may or may not add value to a record search.

[3] Provided as Excel spreadsheets with no cost for the rows; the only cost for this component is IC staff time. Includes, but not limited to, information regarding National Register of Historic Places, California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and historic building surveys. Previously known as the HRI and then as the HPD, it is now known as the Built Environment Resources Directory (BERD). The Office of Historic Preservation compiles this documentation and it is the source of the official status codes for evaluated resources.

[4] Associated documentation will vary by resource. Contact the IC for further details.

[5] Provided as Excel spreadsheets with no cost for the rows; the only cost for this component is IC staff time. Previously known as the Archaeological Determinations of Eligibility, now it is known as the Archaeological Resources Directory (ARD). The Office of Historic Preservation compiles this documentation and it is the source of the official status codes for evaluated resources.





USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 20

0 1,000 2,000 Feet
0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2,000 Feet

Record Search
Reclamation District
Flood Control Project
Sutter County, California

KLEINFELDER
GANDA

Northeast Center of the California Historical Resources Information System

BUTTE
GLENN
LASSEN
MODOC
PLUMAS
SHASTA
SIERRA
SISKIYOU
SUTTER
TEHAMA
TRINITY

123 West 6th Street, Suite 100
Chico CA 95928
Phone (530) 898-6256
neinfocntr@csuchico.edu

January 14, 2021

Kleinfelder/GANDA
435 Lincoln Way
Auburn, CA 95603
Attn: Samantha Dunham

I.C. File # D21-11
Standard Response

RE: Reclamation District Flood Control Project
T11N, R3E, Section 20 MDBM
USGS Knights Landing 7.5' (1981) & Knights Landing 15' (1952) quadrangle maps
9 acres (Sutter County)

Dear Ms. Dunham

In response to your request, a Standard Records Request for the project cited above was conducted by examining the official maps and records for archaeological sites and surveys in Sutter County.

RESULTS:

Prehistoric Resources: According to our records, no sites of this type have been recorded within or adjacent to the project area. In addition, no sites of this type have been recorded within the ½-mile vicinity. The project area is located in a boundary region utilized by Nisenan populations. Unrecorded prehistoric cultural resources may be located in the project area.

Historic Resources: According to our records, no sites of this type have been recorded within or adjacent to the project area. In addition, no sites of this type have been recorded within the ½-mile vicinity. Unrecorded historic resources may be located in the project area.

The USGS Knights Landing 7.5' (1981) & Knights Landing 15' (1952) quadrangle maps indicate archaeologically sensitive regions within the project area such as Sacramento Slough, a pumping station, structures, buildings, and a railroad. Karnak Road, Ely Road, the town of Karnak, structures, foundations, roads, a flume, and additional waterways are located in the general project vicinity.

Previous Archaeological Investigations: According to our records, portions within and adjacent to the project area have not been surveyed for cultural resources. However, portions of the ½-mile project radius have been previously surveyed for cultural resources. A Detail List of the reports is enclosed.

Literature Search: The official records and maps for archaeological sites and surveys in Sutter County were reviewed. Also reviewed: **National Register of Historic Places-Listed Properties and Determined Eligible Properties** (2012); **Built Environment Resource Directory** (2019); **California Register of Historical Resources** (2012); **California Points of Historical Interest** (2012); **California Inventory of Historic Resources** (1976); **California Historical Landmarks** (2012); **Gold Districts of California – Bulletin 193** (2005); **Handbook of North American Indians, Vol. 8, California** (1978); and **Historic Spots in California** (2002).

RECOMMENDATIONS:

We recommend that you contact the appropriate local Native American representatives for information regarding traditional cultural properties that may be located within project boundaries for which we have no records.

The charge for this records search is **$225.00** An invoice will follow from Chico State Enterprises for billing purposes. Thank you for your concern in preserving California's cultural heritage. Please feel free to contact us if you have any questions or need any further information

Thank you,

Ashlyn Weaver

Ashlyn Weaver, M.A.
Assistant Coordinator
Northeast Information Center

Appendix F

DEPARTMENT OF PARKS AND RECREATION 523 FORMS

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

Resource Name or #: RD1500-JN-01
P1. N/A

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10, 616897mE/ 4293791mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road and continue for approximately 70ft. The bridge is located on the east side of the levee.

P3a. Description: This resource is an unnamed concrete slab bridge that spans the East Canal. The bridge is approximately 162 feet (ft) long and is comprised of a cast in place concrete deck carried by concrete beams. The beams extend approximately 6 to 8 inches past the deck, resulting in a minimal curb. The bridge is supported by fifteen 1-ft square concrete piles approximately 30 ft high (over the canal bed). The piles are arranged in five rows of three wide. Two Steel piles, lateral support, and diagonal bracing have been added at both the second and third (from west) pile locations.

The bridge was constructed circa 1935 with the steel supports added within the last 20 years. The bridge is attached to the East Levee to the west and serves as access to agricultural fields within the Sutter Bypass to the east. It is located approximately 275 ft northwest of the Karnak Drainage Facilities Pump House No. 1.

P3b. Resource Attributes: HP19. Bridge

P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of bridge, facing northeast.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by: Kleinfelder
Jessica Neal, Samantha Dunam, and Kate Willis
435 Lincoln Way, Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

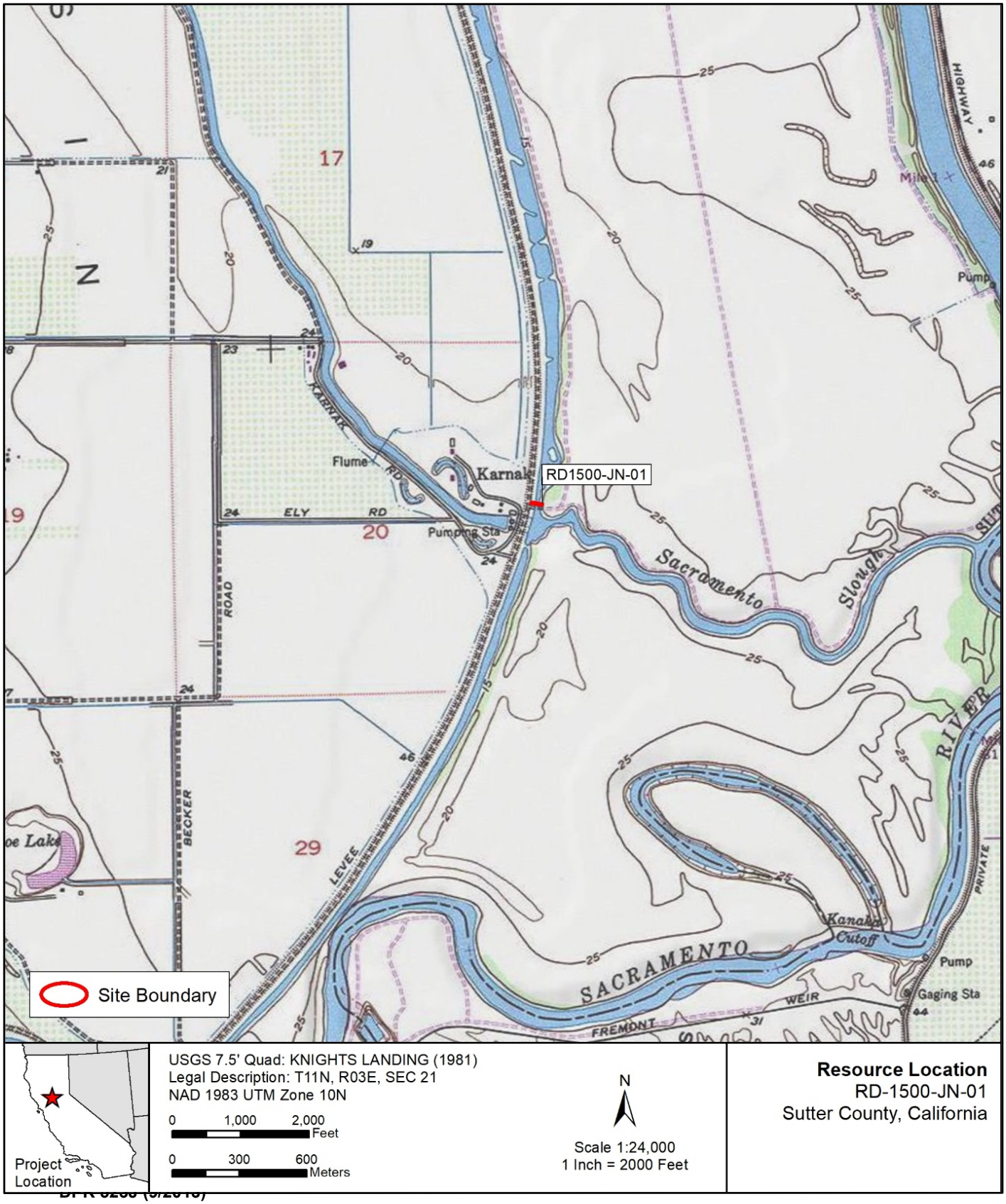
Attachments: ☐NONE ☒Location Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☒Other (List): Sketch Map

State of California - The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI#**

LOCATION MAP

Trinomial

Page 2 **of** 3 **Resource Name or #**: RD1500-JN-01
Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



Project Location

USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
RD-1500-JN-01
Sutter County, California

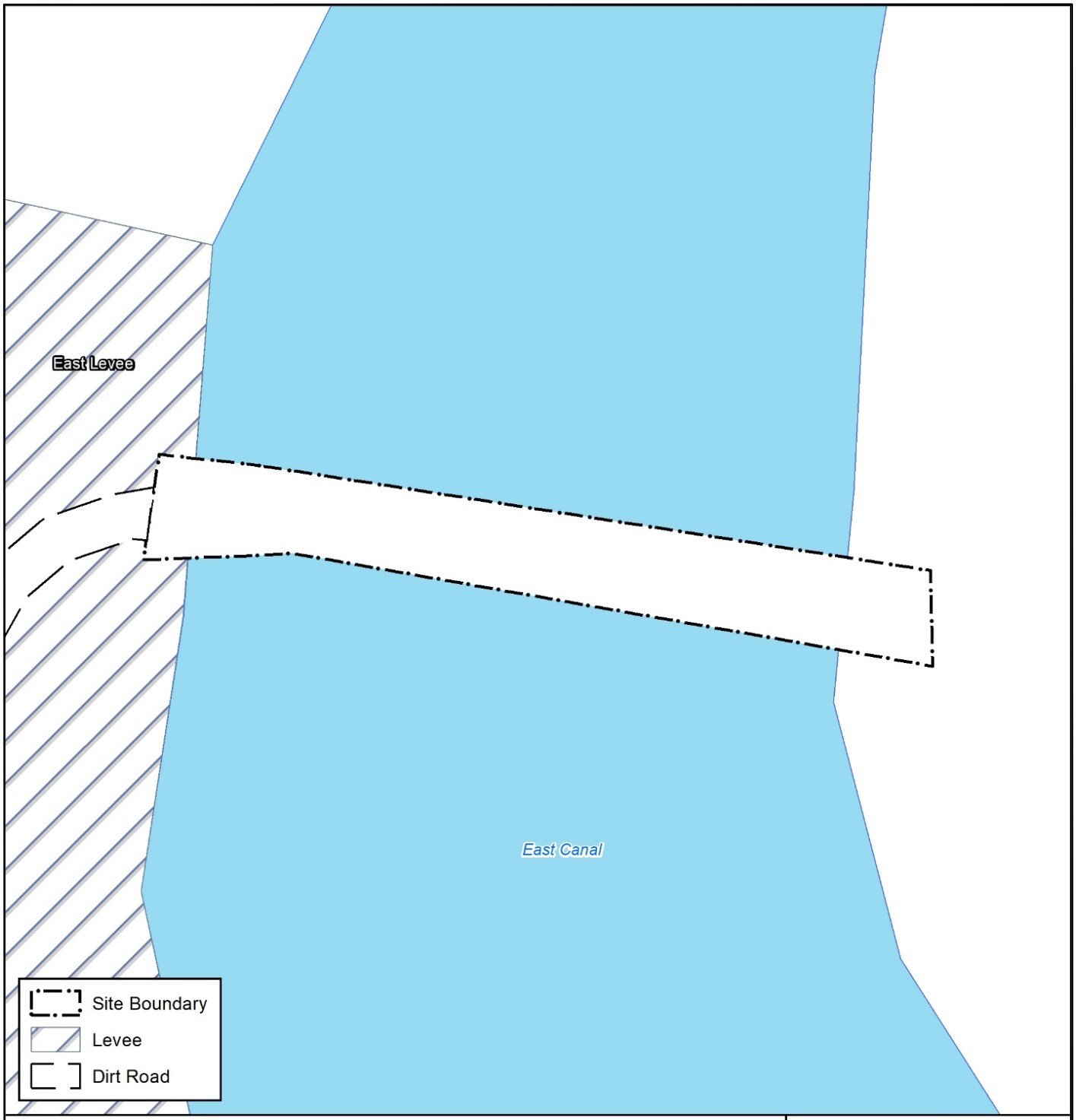
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-01
Date of map: January 21, 2021



Sketch Map
RD1500-JN-01
Sutter County, California

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-02

P1. East Levee of Reclamation District No. 1500

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616825 mE/ 4293698mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road and continue for approximately 70 ft.

P3a. Description: This resource consists of an approximately 360-ft segment of an earthen levee known as the East Levee of the Reclamation District No. 1500 (RD 1500) (commonly referred to as the East Levee). It was constructed as a part of the Sutter Bypass project, beginning in approximately 1913. The levee severed the Sacramento Slough in half; the western half of the slough was channelized (now called the RD 1500 Canal) and three pump houses were constructed between 1914 and 1952 to pump water through the levee into the eastern, unchanneled portion of the slough.

The recorded segment is located at approximately Levee Mile 2, where the RD 1500 Canal and East Canal converge at the levee and flow into the Sacramento Slough. A gravel road along the crown of the levee spans the length of the segment and two earthen ramps with a gravel road are located at both the northern and southern ends of the segment, allowing vehicular access to farmland in the Sutter Bypass. The levee is in good condition, with grassy sides to the east and riprap, pump gates and infrastructure, and outlets on the eastern, waterside of the levee.

P3b. Resource Attributes: HP39. Other

P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of levee, facing north.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by:
Kleinfelder
Jessica Neal and Samantha Dunam
435 Lincoln Way, Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

L1. Historic and/or Common Name: East Levee of Reclamation District No. 1500; East Levee

L2a. Portion Described: ☐Entire Resource ☒Segment ☐Point Observation **Designation:**
Location of point or segment: 360 ft at Levee Mile 2

L3. Description: This is a 360-ft segment of the East Levee of RD 1500. The East Levee makes up the eastern border of RD 1500 and serves as a divider between the RD 1500 Canal and Sutter Bypass. This segment of levee was constructed in 1913 and fits into larger reclamation projects happening in the early 20th century. This segment of the levee bisected a natural waterway, the Sacramento Slough. This portion of the slough was channelized and renamed the RD 1500 Canal at the same time the levee system was constructed. A bulkhead was constructed on both the eastern and western walls of the levee where the canal terminates.

The full extent of the levee is approximately 20.72 miles long. The earthen levee is approximately 20 ft high. The crown is between 25 and 60 ft wide; a gravel road runs the length of the segment along the crown. The landside berm of is approximately 22 ft wide with a gravel road running along it. Two earthen ramps on either side of the levee allow vehicular access to the levee and farmland within the Sutter Bypass. The waterside of the levee is riprapped with imported rock and some modern and historic refuse. Stairs for pedestrian access to the levee and two utility poles are located on the landside slope. An unnamed concrete bridge connects the levee to agricultural land within the Sutter Bypass. Between 1914 and 1952, three separate pump houses were constructed to convey water from the RD 1500 Canal through the levee into the East Canal and Sacramento Slough. Associated conduits, flood gates, discharge outlets are present on and within the levee.

The 1914 plans of the Karnak Drainage Facilities depicts a bulkhead on both the eastern and western slopes of the levee. The bulkhead served as additional support against the water pressure from the canal. During the field survey, wooden piles and deteriorating concrete were visible in the RD 1500 Canal at the toe of the levee. No evidence of the bulkhead was on the eastern side of the levee. Debris has built up in the general area of the bulkhead and is possibly buried. *See Continuation Sheet for additional information.*

L4. Dimensions:

a. **Top Width**: 40 ft
b. **Bottom Width**: 220 ft
c. **Height or Depth**: 25 high; top of levee approximately 48 ft at mean sea level
d. **Length of Segment**: 360 ft
e. **Sketch of Cross-Section:** N/A

L5. Associated Resources:
Unnamed Concrete Bridge (Temp# RD1500-JN-01)
Karnak Drainage Facilities (Temp # RD1500-JN-03)
East Canal (Temp# RD 1500-JN-05)

L6. Setting: The levee is in rural Sutter County. Vegetation includes manicured lawn and riparian vegetation. This segment of levee is encompassed by the Karnak Drainage Facilities. The East Canal parallels the levee to the east. The landside of the levee is made of agricultural land. The RD 1500 Canal abuts the landside of the levee.



L7. Integrity Considerations: The levee is in generally good condition. Its form and function have no significant changes since construction. The bulkhead is in currently in poor condition.

L8b. Description of Photo, Map, or Drawing: Waterside of the East Levee, facing southwest.

L9. Remarks: None

L10. Form Prepared by: J. Neal and S. Dunham

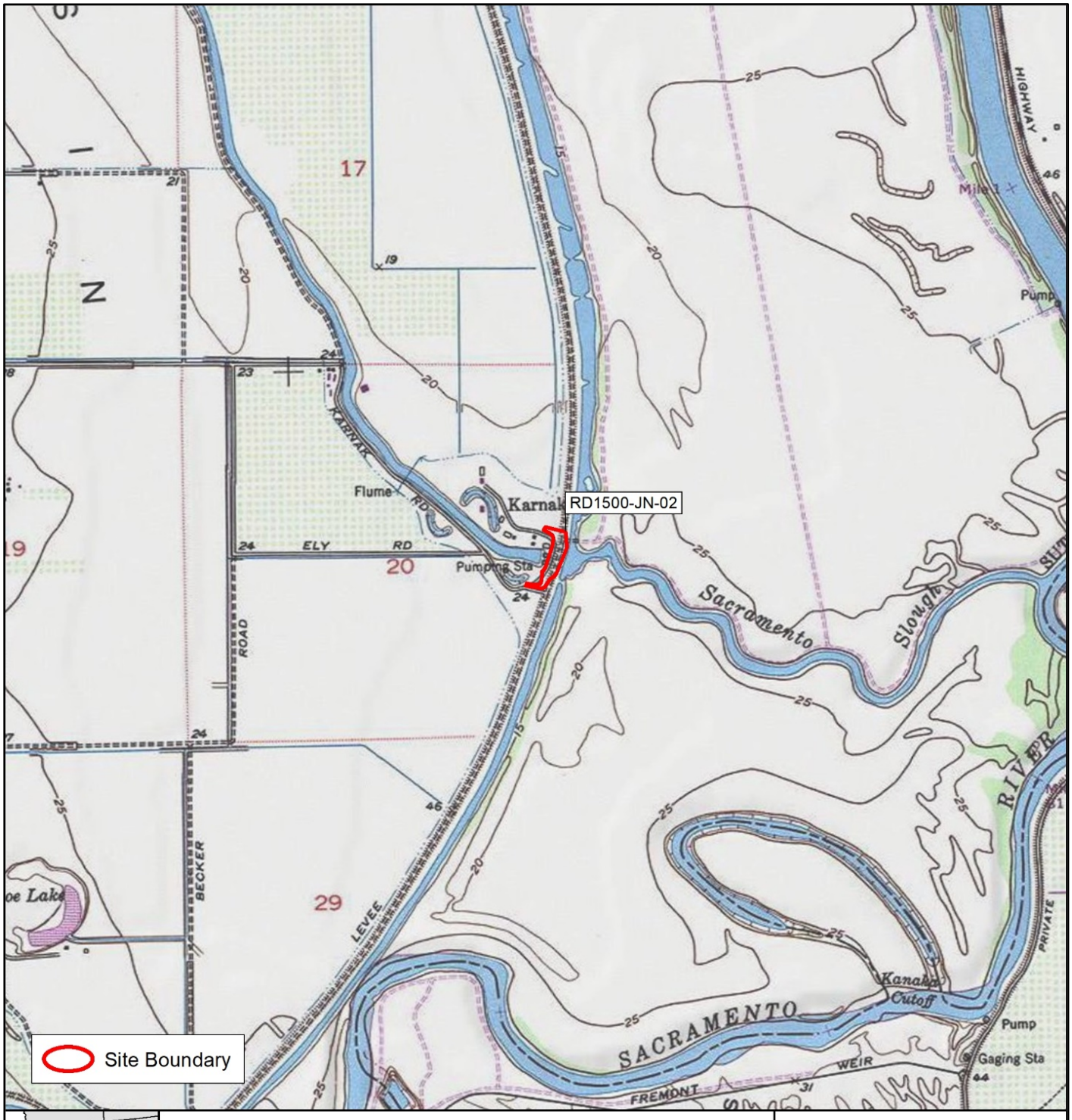
L11. Date: January 21, 2021

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Resource Name or #: RD1500-JN-02
Map Name: Knights Landing, CA
Scale: 1:24,000
Date of map: 1981



USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
RD-1500-JN-02
Sutter County, California

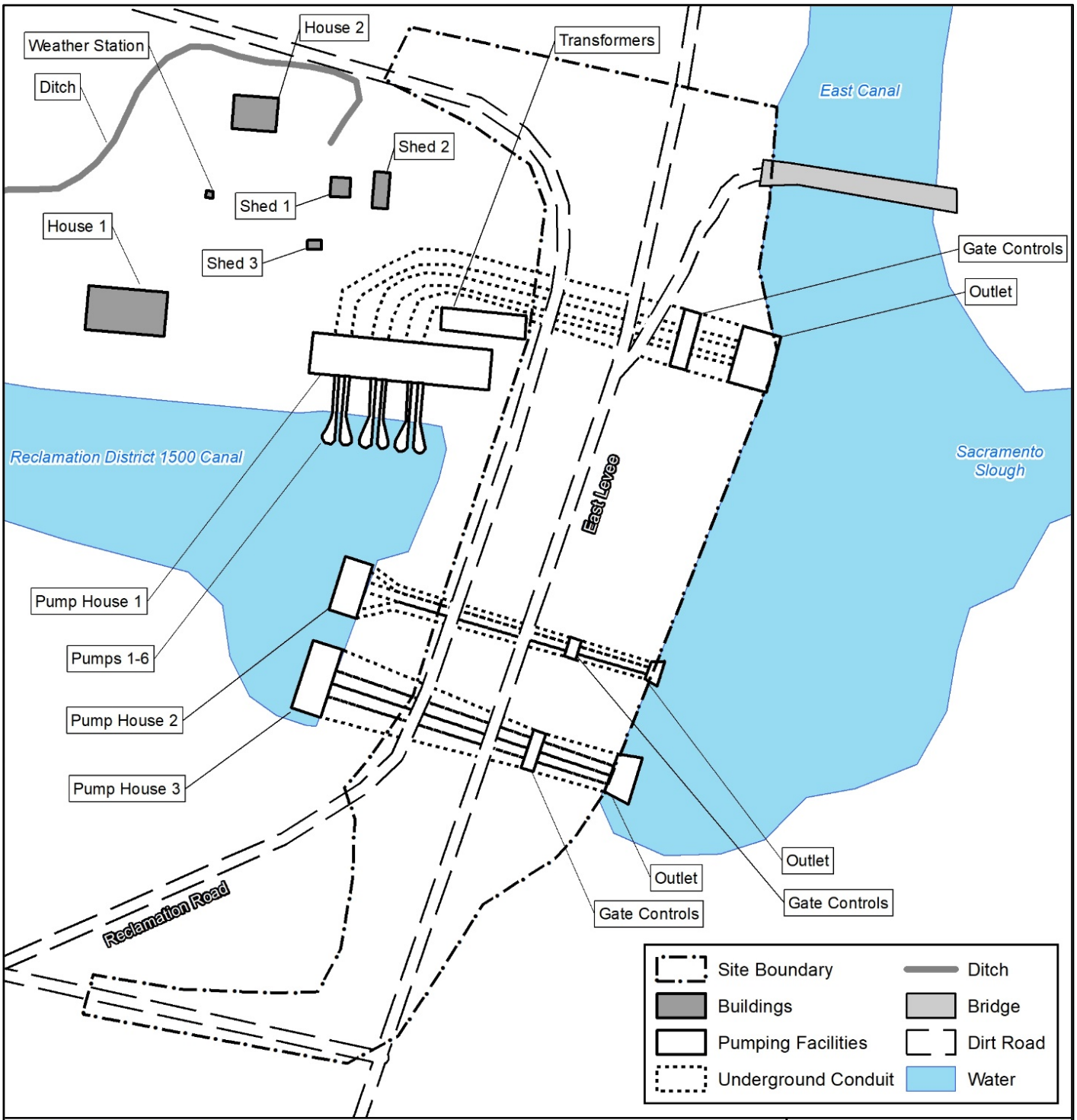
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-01
Date of map: January 21, 2021



NAD 1983 UTM Zone 10N

0 60 120 Feet
0 20 40 Meters

N

Scale 1:1,440
1 inch = 120 feet

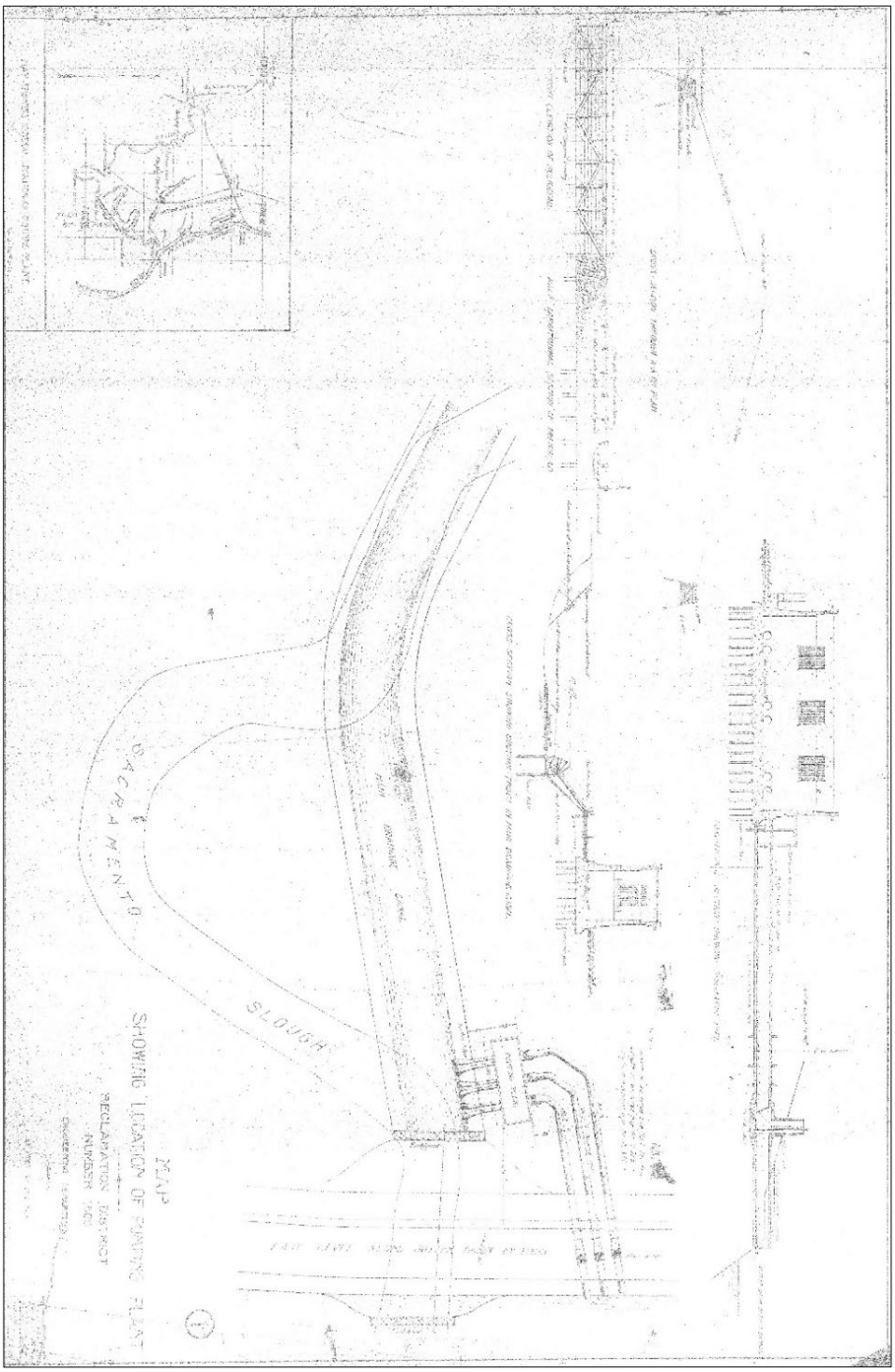
Sketch Map
RD1500-JN-02
Sutter County, California

Levee Context

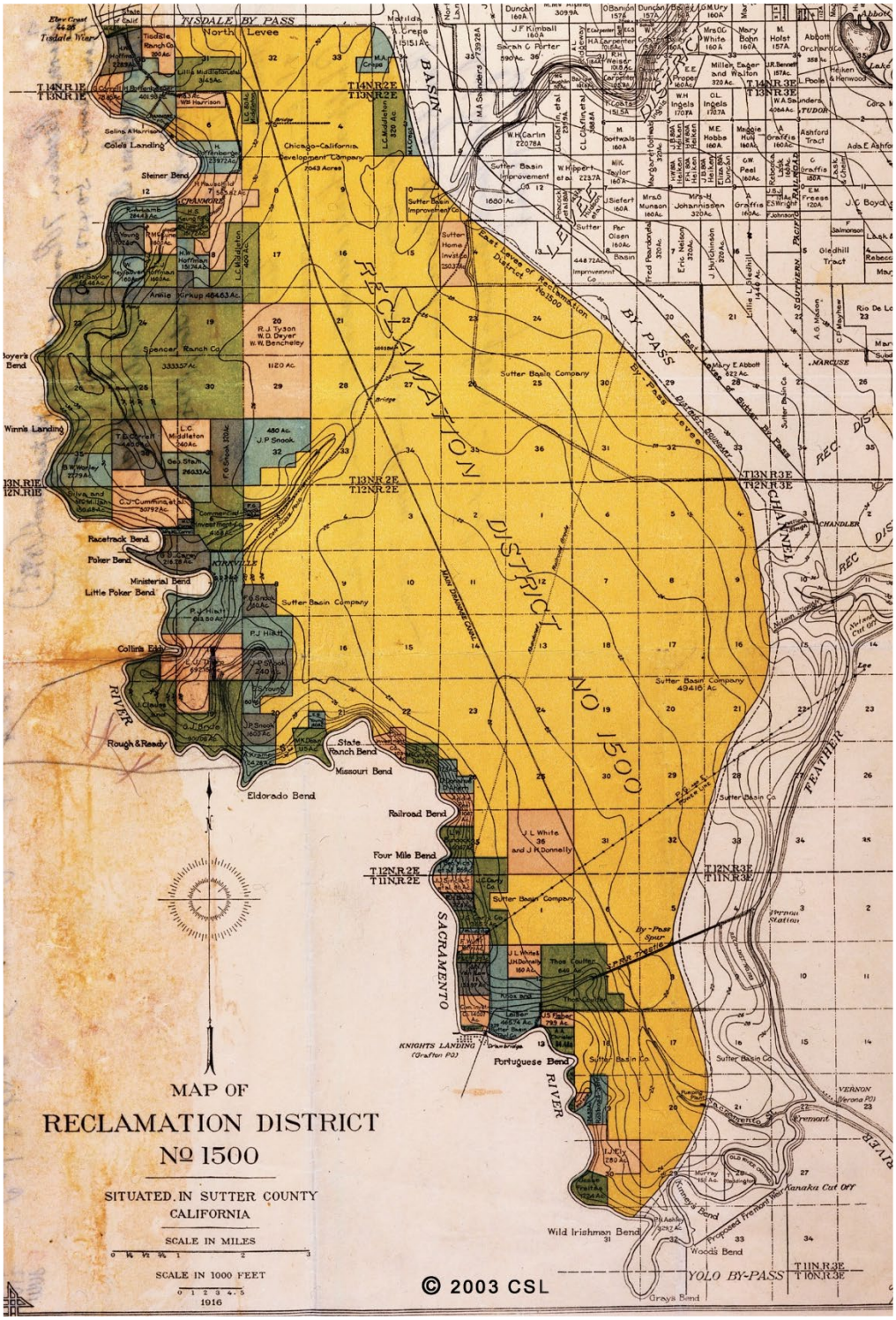
This segment of the East Levee is part of Levee Unit 2. Two levee systems, Unit 1 and Unit 2, encircle RD 1500. Unit 1 is approximately 33.15 miles long running from the southernmost point of the RD to the northwestern edge of the Tisdale Bypass, generally following the course of the Sacramento River. Unit 2 is approximately 20.72 miles long and originates at the southernmost point of RD 1500. It generally follows the along the edge of the Sutter Bypass until it terminates at the southeastern edge of the Tisdale Bypass.



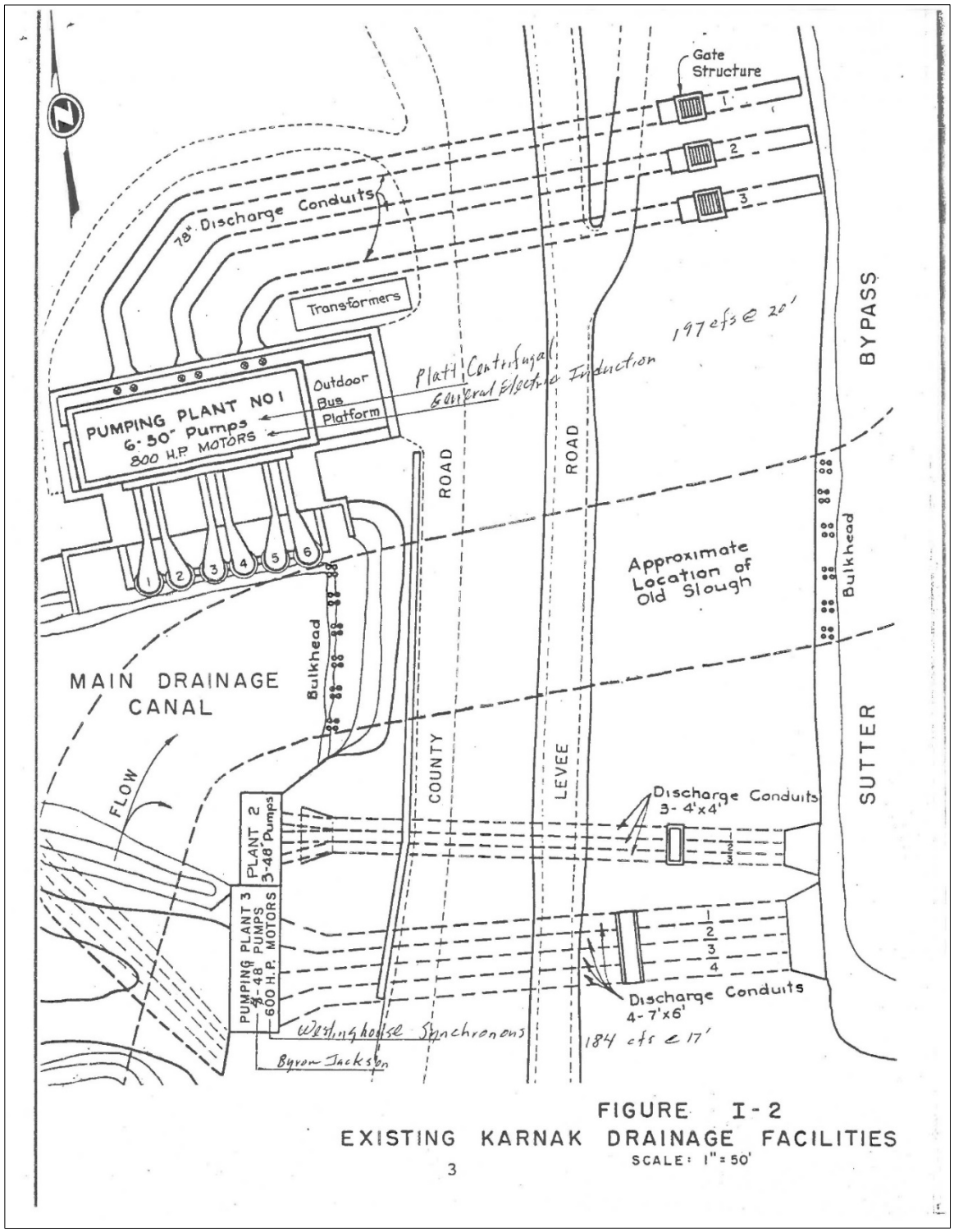
Overview of waterside of the East Levee facing northwest.



"Map Showing Location of Pumping Plant" (RD 1500 Engineering Department 1914). The East Levee is depicted in its current alignment.



"Map of Reclamation District No. 1500, Situated in Sutter County, California" (CSL 1916). The East Levee is depicted in its current location.



"Existing Karnak Drainage Facilities" (BR 1983). The map shows the East Levee in its current alignment.

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-03

P1. The Karnak Drainage Facility

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616779mE/ 4293 748mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road for approximately 70 feet to the Karnak Drainage Facility.

P3a. Description: The Karnak Drainage Facility includes three pump houses (PH1, PH2, and PH3), their associated components and equipment, three sheds, a weather station, and a drainage ditch. The Facility were established with the erection of PH1 in 1914 with the most recent pump house (PH3) being constructed in 1952. PH1 is 107 ft 5 inches long and 34 ft 5 inches deep (per 1914 plans) with its length orientated on the north bank of Reclamation District No. 1500 (RD 1500) Canal. It is constructed of cast concrete in the Neo-Classical style. PH2 was built in 1929 to provide more efficient drainage service during low operating head conditions. It is 41 ft long by 18 ft wide and, like PH1, it is constructed in the Neo-Classical style. After the construction of Shasta Dam, the operating water levels exceeded the capability of the pumps, resulting in PH2 being inoperable. PH3 was built in 1952 to improved drainage service to RD 1500; it increased the transformer requirements, resulting in PG&E installing larger transformers at a ground-level substation located along the northern side of the structure. PH3 is located south and alongside PH2. PH3 is a 57 ft long by 22 ft wide reinforced concrete pumphouse, similar to PH 2.

P3b. Resource Attributes: HP11. Engineering structure; HP9. Public utility building

P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☒Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of Karnak Drainage Facility showing all three pump houses, facing northeast.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by: Kleinfelder
J. Neal, S. Dunham, and K. Willis
435 Lincoln Way
Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

B1. Historic Name: Karnak Drainage Facilities of RD 1500
B2. Common Name: Karnak Drainage Facility of RD 1500
B3. Original Use: Reclamation District Pump Facility
B4. Present Use: Reclamation District Pump Facility
B5. Architectural Style: Neo-Classical, utilitarian
B6. Construction History: *Refer to Continuation Sheet.*
B7. Moved? ☒**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location**: N/A

B8. Related Features: Two vernacular pumping station keeper residences (one built ca. 1930 and the other by 1966). No information about the planning/installation of staffing was revealed. The East levee, RD 1500 canal (historically referred to as Main Drainage Canal or Central Canal), Sacramento Slough (east of the East Levee and in its natural course), and East Canal (confluence with Sacramento Slough east of the levee), and Sutter By-Pass (bounded by levee).

B9a. Architect: N/A **b. Builder**: N/A

B10. Significance: **Theme**: The Architecture of Agriculture and Flood Control Development **Area**: Sutter Basin

Period of Significance: 1914-1952 **Property Type**: pumping station **Applicable Criteria** A

Research has yielded no information to suggest that the Karnak Drainage Facility is directly associated with the lives of persons significant to the nation's past (Criterion B/2). The architecture and design of the facility, which employs Neo-Classical and utilitarian elements, are typical of water control facilities. Research has yielded no information to suggest that the facility represents a significant departure from established reclamation design or practices contemporary to period in which it was built. Further the architect and builder for the facility were not identified, however it is unlikely that the facility represents the work of a master (Criterion C/3). It is unlikely that the facility has the potential for additional data that could yield information important to the prehistory or history of the nation (Criterion D/4). However, Karnak Drainage Facility (RD1500-JN-03) is associated with events that have made a significant contribution to the broad patterns of the history and cultural heritage of the United States (Criterion A/1). As a result, the Karnak Drainage Facility (RD1500-JN-03) is recommended as eligible for inclusion in the NRHP at a local level and CRHR under Criteria A/1.

The Karnak Drainage Facility are recommended eligible for listing in the NRHP and CRHR at a local level of significance under Criterion A/1 for their important contributions to the development of flood control and agriculture in the Sacramento Valley. The facility has a period of significance between 1914 and 1952 when the pump houses were initially constructed. The pumping facility play a critical role in flood control allowing for the Sutter Basin and RD 1500 to be drained, thus allowing for residential and agricultural development within the district. The boundaries for the Karnak Drainage Facility include PH1-3, the pumphouses' associated conduits and gates, three small sheds, and a drainage ditch. The sheds, weather station, and ditch appear to have been constructed outside the period of significance. The Karnak Drainage Facility retains historic integrity of original design and material, along with its original location and setting, the Facility clearly convey its historical importance in flood control and agricultural development.

B11. Additional Resource Attributes: HP9, HP20, HP11

B12. References: *Refer to Continuation Sheet.*

B13. Remarks: None.

B14. Evaluator: J. Castells. Kleinfelder, 435 Lincoln Way, Auburn, CA 9560

Date of Evaluation: 17-Feb-21

(This space reserved for official comments.)

L1. Historic and/or Common Name: Ditch

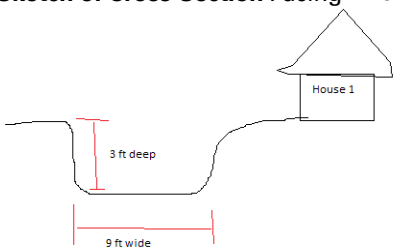
L2a. Portion Described: ☐Entire Resource ☒Segment ☐Point Observation **Designation:**
Location of point or segment: Northwest portion of Karna Drainage Facility.

L3. Description: This is a 640-ft segment of a ditch at the Karnak Drainage Facility of RD 1500. The ditch is located in the northwest section of the Karnak Drainage Facility, starting east of the northmost a residential structure, wraps around the residential structure (Temp#RD1500-JN-07), then turns south and west of a second residential structure and a weather station. An access route crosses the ditch where its located west of both residential structures; the ditch goes under the route through an 8-inch diameter corrugated culvert. The ditch measures 3 ft wide by 1 ft deep in the southwest end within the survey area and 9 ft wide by 3 ft deep near the culvert. The ditch is fed by a white polyvinyl chloride pipe that appear to be overflow from a tank in Shed 2. Only the segment of the ditch that fell within the Project survey area (Dunham, et al 2021) was recorded; it was noted that the ditch continues southwest, through a black corrugated pipe under another access route, and lets out into the RD 1500 Canal.

L4. Dimensions:

a. **Top Width**: 3 ft on the southwest end and 9 ft toward the east end.
b. **Bottom Width**:
c. **Height or Depth**: 1 ft deep on the southwest end and 3 ft deep toward the east end.
d. **Length of Segment**: 640 ft

L4e. Sketch of Cross-Section Facing: North. Not to scale



L5. Associated Resources:
Unnamed Concrete Slab Bridge (Temp# RD1500-JN-01)
East Levee (Temp# RD1500-JN-02)
Karnak Drainage Facility (Temp# RD1500-JN-03)
Reclamation District 1500 Canal (Temp# RD1500-JN-04)
East Canal (Temp# RD1500-JN-05)
Residential Structure (Temp# RD1500-JN-06)
Residential Structure (Temp# RD1500-JN-07)

L6. Setting: The ditch is located in rural Sutter County. Vegetation consists of manicured lawn and riparian vegetation. The segment of ditch is encompassed by the Karnak Drainage Facility. It begins at Shed 2 where a white polyvinyl chloride pipe leading from an overflow from a tank in the shed lets out in the ditch. The ditch wraps around a residential structure (Temp# RD1500-JN-07), then turns south and west of the residential structure, a second residential structure (Temp# RD1500-JN-06), and a weather station, before continuing southwest outside of the survey area. The ditch continues southwest, through a black corrugated pipe under an access route, and lets out into the RD 1500 Canal. *See Continuation Sheet for additional information and historic context.*



L7. Integrity Considerations: The ditch is in generally good condition and its form and does not appear to have undergone significant function changes since construction. The ditch appears to have been constructed outside the period of significance.

L8B. Description of Photo, Map, or Drawing: Overview of Ditch and House 1, facing east.

L9. Remarks: None

L10. Form Prepared by: J. Neal, S. Dunham, and K. Willis

L11. Date: January 21, 2021

B6. Construction History: *Continued from Building, Structure, and Object Record for Karnak Pump House 1*

PH1 was constructed in 1914 as part of the greater effort to reclaim the Sutter Basin, an area between Sutter Butte and the confluence of the Sacramento and Feather rivers. At the time of construction, it was reported to be one of the, if not the, largest pumping stations in the world, capable of pumping 1,200 cfs from the RD 1500 Canal that bisected RD 1500 lengthwise south from the Tisdale Bypass.

PH1 is 107 ft, 5 inches long and 34 ft, 5 inches deep (1914 plans) with its length orientated on and parallel to the north bank of the RD 1500 canal. It is constructed of cast concrete in the Neo-Classical style. Water is pumped from the canal and discharged through levee in Sutter Bypass. The building is supported by six concrete trapezoidal footings extending from the beneath the canal bed, through the levee bank, and then incorporated on the facade as minimally projecting pilasters to the tops of windows (ASAE 1922; BR 1983).

A 5-foot-thick reinforced concrete floor is built on top of the piles. The walls are made of reinforced concrete, are 4.5 ft thick at floor level, taper to 2.5 ft thick at the 100-year event flood plain elevation (42 ft), and taper from there to 1.25 ft thick at the roof line. The lower portion of the building doesn't have openings; the windows and doors are above the 43-foot elevation (United States Engineering Department datum). Interestingly, the building features two elevated water tables. Six conduits rise out of the canal before entering the building at the first table, which at 6 ft, is only slightly taller than the conduit diameter. Elevated water tables are expected in Neo-Classical design, but the use of the second is a visual reminder of how the RD 1500 engineers planned for flood events that may overpower the pump capacity. The second water table is 12 ft high and roughly one half of the elevation height. Here, the pilasters change from trapezoidal to rectangular at the top of the second water table. PH1 is designed so that the building and equipment's total weight would not float during high water levels. All of the building's windows are placed above the water table, a design. The district engineers also minimized the possibility of the electric pumps shorting out due to inundation from flooding by placing the windows in the upper half of the elevation. Photos of the 1915 flood show the plan worked - flood waters crested only just below the windowsills. Each window set is framed by a slightly projecting Tuscan surround. The frieze band and cornice of the surround's entablature are extension of those wrapped around the entire building. The words "RECLAMATION" "DISTRICT" "NUMBER 1500" are centered in each entablature, respectively. The window sets are comprised of three 4x8 multi-paned bays with a 2x6 inset casement ventilator topped by a 4x4 multi-pane ventilator with an inset 2x2 casement ventilator. All are separated by concrete mullions and dentils. A metal gooseneck light is centered in the width of each pilaster next to the small bay. The building is surmounted by a flat roof (ASAE 1922; BR 1983).

The reinforced concrete platform built along the east wall of PH1 supports electrical bus equipment, is at the floodplain elevation, and was originally used to support the electrical transformers. PH1 consists of six 50-inch Platt Centrifugal pumps direct connected to 800 hp GE squirrel-cage induction motors, operating at 248 rotations per minute (rpm) through flexible leather link couplings. Each pump produced approximately 197 cfs (88,000 gallons per minute) at a 20-foot pumping head. Two electric-motor-driven vacuum pumps had suctions connected to the top portion of the casings of all the pumps and were used for priming. During pump priming, the gate valve in the discharge line is closed. After priming, the pump is started; once the pump reaches full speed, the electric motor operated gate valve is opened. The suction pipes are about 70 ft long, extend directly from the pumps out through the south wall of the building (a distance of about 30 ft), angle downward into the sump, and increase from 50 inches to 96 inches in diameter at the lower end. These 3/8-inch wall-thickness steel pipes are supported by a steel structure. Portions of the PH1's equipment have been repaired or replaced since it was constructed. Changes since initial construction of PH1 include the transformers being moved from easterly bays from about 1939 to 1952. Two bays are added to the east end of the former transfer bay in 1950. The connection is visible in between the second and third bay on the south elevation. The installation of 6x3 glass brick windows in the top half of the south and north transformer bay elevations.

After 1970, the easternmost lower window bay is partially replaced with a pedestrian door. One row of panes remains as a transom light. The door is accessed by an exterior set of stairs with a landing at the same elevation as the transformer bay roof. Modern operating equipment is installed on the roof and is accessed by the stairs. An exterior walkway is installed slightly above the conduit height along the south elevation. The original ball and pipe railing was replaced at the exterior staircase attached to the west elevation. Overhead cables now extend over the canal and enter the building through exterior mounted conduit or directly through the concrete at the upper southeast corner. Electric metering boxes are attached at the northeast corner of the north elevation and covered by a rudimentary wood or metal flat overhanging roof (ASAE 1922; BR 1983).

B6. Construction History: *Continued from Building, Structure, and Object Record for Karnak Pump House 2*

PH2 was built in 1929, fifteen years after the construction of PH1, to provide more efficient drainage service to RD 1500 during low operating head conditions. However, PH2 has never functioned properly. PH2 is smaller than PH1, measuring 41 ft long by 18 ft wide, and is also constructed in the Neo-Classical style. While smaller in massing compared to the PH1, it shares the same style with less refined details. The building is largely intact with little changes since the end of construction. The equipment was manufactured by Westinghouse Electric & Manufacturing. This pumping station sits over the RD 1500 Canal and the intake conduits are vertically positioned under the building. The conduits then extend through the foundation wall and easterly through the levee to discharge into the East Canal and Sacramento Slough. A steel I-beam extends easterly from the roof and through a modern interpretation of a balustrade in a position typically seen in Federal or Neo-Classical architecture. The beam connects to the peak of two connected beams extending diagonally into the ground to form triangular space approximately 30 feet of the entrance. The structure supports a small communications unit (satellite or antenna) thought to have been installed in the last 15 years. After the construction of Shasta Dam, the operating water levels exceeded the had capability of the pumps, resulting in PH2 being inoperable. The conduits were plugged with concrete after the construction of the 1950-1952 Karnak PH3. Portions of the electrical equipment were removed, and the electrical motors were left in nonoperating condition. PH2 is no longer used by RD 1500 (ASAE 1922; BR 1983).

B6. Construction History: *Continued from Building, Structure, and Object Record for Karnak Pump House 3.*

PH3 was constructed in 1952, 23 years after the construction of PH2, as a means to also improve the drainage of RD 1500. This pump house is larger than PH2 and smaller than PH 1. Despite the difference in massing, PH3 is of the same style and exhibits similar levels of refinement in details as PH2. The building is largely intact with little changes since the end of construction. PH3 sits over the RD 1500 Canal and the intake conduits are vertically positioned under the building. The conduits then extend through the foundation wall and easterly through the East Levee to discharge into the Sacramento Slough. The fenestration arrangement is near identical to PH2; however, the window sets flanking the door each hold two casement ventilation panels that open outwardly. The front door was planned as solid oak with four rectangular panels, symmetrically placed in the width and height. The door has since been replaced with a steel door with three panes of fixed glass stacked vertically in the top half. The most notable change at the pumping station is the installation of a large steel bunker spanning the width of the roof and running two thirds of the building's length from the north. The structure houses the battery backup for the pump and is accessed from the interior. Electrical conduit has been added to the southeast elevation leading to the bunker. Three chain pulls are attached to the east elevation, used to lift and access the below-grade pumps. Two modern lights are installed at the top corners of the window/entrance bay (ASAE 1922; BR 1983).

Associated Structures and Features

In addition to the three pump houses and the ditch, the site contains three sheds, a weather station, and a ditch. The sheds and weather station appear to have been constructed outside the period of significance.

Shed 1 is a single pen front gable side shed. It is sheathed in corrugated metal and asphalt shingled. It was on-site after 1967.

Shed 2 is a square single pen building which houses a water pump and discharges into the ditch. It is surmounted by a hipped roof. The entrance faces west. A wing has been added at the north. The shed was on site after 1967; however, the addition was added after 1992.

Shed 3 is a rectangular single pen shed with a sliding door on the south elevation. It is sheathed in corrugated metal. It was on-site circa 1967.

The weather station is elevated on four wood piles set in a square concrete base. Instruments are housed in by four louvered panels, including one hinged access panel. It is surmounted by a gabled roof sheathed in asphalt. Historic aerial photos indicate it was likely on-site by 1966.

Karnak Drainage Facility

Before construction of the Karnak Drainage Facility, the Sutter Basin was flooded the spring and swampy in the summer; most of the development was by farmers who relied on flooding for their crops. The pumping stations were part of the RD 1500 project. RD 1500 was officially developed by the State of California; however, the district was intertwined with the SBC which was mostly owned by Ogden Armour and William Gerber. RD 1500 was intended to drain and develop 45,000 acres of land in the Sutter Basin between Tisdale Bypass and the Karnak Drainage Facility. RD 1500 was thought to have the largest capacity of any other in the world, requiring two clamshell dredgers at an estimated cost of $100,000 each and at least seven dredgers operated 24 hours a day. Ogden was able to influence a decision by state officials to move the proposed Sutter Bypass east from the middle of his lands (in the general location of the Sacramento Slough) to its current location, thereby allowing Ogden to increase potential profits from reassessment and bonding or leasing of the tracts within the 45,000 acres after reclamation. The SBC sold its last parcel in 1946. Overall, RD 1500 changed the Central Valley in immeasurable ways in regard to both agriculture and flood protection, with the Karnak Drainage Facility being a key component to the operation of the district. It is acknowledged that while some of the absolute language published describing the project could be hyperbole, it reflects the extraordinary event, decades in the making, that was experienced by many (ASAE 1922; BR 1983).

The Karnak Drainage Facility includes three pump houses (PH1, PH2, and PH3), their associated components and equipment, and several houses. The facility was established with the erection of PH1 in 1914; it was reported to be one of the biggest in the world and cost an estimated to $220,000 to construct. PH1 was constructed under direction of George Randle, who was noted as the "Chief Engineer Armour people in the Sutter Basin" (MED 1914). PH1 is constructed in the Neo-Classical style and is parallel to the RD 1500 Canal. It is designed so that the building and equipment's total weight wouldn't float during high water levels. It disposes of daily run-off water 5/8 inches deep from the RD 1500 net area and 2 ½ cfs per mile of levee seepage water. PH1 had six 50-inch Platt centrifugal pumps (each driven by an 800 horsepower [hp] General Electric [GE] meter), a capacity of 1,200 sec ft, and used every accessible water source to drain all the water off 60,000 ac. within the basin so the area could be cleared of tules to make space for commercial crops. In order to increase irrigation each year, PH1 pumped out surplus rainwater, seepage, irrigation water, and accumulative ground water. It was also designed to withstand future floods by placing windows high above a reasonably anticipated flood elevation. Images from the February 1915 flood show that the design stood, and the pumps could remain functional in times of high water. The words "RECLAMATION" "DISTRICT" "NUMBER 1500" are centered in each entablature, respectively. Parts of PH1 have been upgraded or replaced since the building's original construction. PH2 was built in 1929 to provide more efficient drainage service during low operating head conditions; it is smaller than PH1 and also constructed in the Neo-Classical style. After the construction of Shasta Dam, the operating water levels exceeded the head capability of the pumps, resulting in PH2 being inoperable. Portions of the electrical equipment were removed, and the electrical motors were left in nonoperating condition. PH3 was built in 1952 to improved drainage service to RD 1500; it increased the transformer requirements, resulting in Pacific Gas and Electric Company (PG&E) installing larger transformers at a ground-level substation located along the northern side of the structure. The pumps were designed to discharge 184 cfs (83,000 gallons per minute) at an approximate 17-ft pumping head. Portions of PH3's equipment was repaired or replaced since the buildings initial construction (ASAE 1922; BR 1983).

General Historic Context

The Sutter Basin is a low elevation triangular land mass between the Sacramento River to the west and the Feather River to the east. Its wide northern boundary is generally marked by the Sutter Buttes and its southern point is the confluence of the Sacramento and Feather rivers. Historically, these rivers overflowed their banks during annual freshets, resulting in the Sutter Basin being covered by water during the spring, then becoming swampy and tule covered in the summer. At the time, the main development in the Sutter Basin was by farmers who cultivated rice on private lands bordering the river banks as the wet and low-lying areas were ideal for rice cultivation. Flooding spread sediment across the Sacramento Valley with the greatest amount deposited closer to the rivers. The sediment build-up influenced the orientation of these rivers in relation to each other and their slopes, creating a natural basin ideal for irrigation and drainage if natural flooding could be eliminated. The Sacramento Slough was a natural outlet of flood waters in the south end of the Sutter Basin. Prior to the development of RD 1500, the slough ran a natural course from approximately 3.5 miles northeast of Knights Landing to its confluence with the Sacrament River approximately 2,700 ft west of its confluence with the Feather River. RD 1500 would be the fruition of decades long discussions and efforts regarding reclaiming the basin's tule areas and controlling the frequent, devasting floods of the Sacramento and Feather rivers (American Society of Agricultural Engineers [ASAE] 1922; Bureau of Reclamation [BR] 1983; Guise 1965).

One of the first documented plans to reclaim Sutter Basin land was proposed in 1856 by United States (US) Surveyor General John A. Brewster. He proposed to construct internal navigation canals, aqueducts for drainage of tule marshes, and prevention of overflows (Hagwood 1981). Before any meaningful change had occurred, hydraulic mining methods for the extraction of gold exploded in the Sierra Nevada and Northern California. As a result, untold amounts of earth were deposited downstream, carried by high-velocity water flow in mountain tributaries before slowing in the Sacramento River and Feather River valleys. This pattern, along with farming in the basin, re-channelized and raised riverbeds, contributing to consistent, destructive flooding and navigation issues as far away as San Francisco. In the absence of a basin-wide plan, property owners could reclaim their land within the basin as they saw fit. This eventually resulted in an "every man for himself" condition in which landowners only protected lands against inundation flowing from immediate neighbors. The levees of the basin gradually elevated until there was no capacity to bypass flood waters; if all the individual levees were to crest at the same time, 600,000 second ft (sec ft) (the common measurement for flow of irrigation water moving by gravity from streams and reservoirs) of water would detrimentally discharge to the tidewater in the bay, contributing to the hazardous flooding problems (ASAE 1922; Guise 1965; BR 1983).

State Engineer William Hammond Hall suggested the actual bypass concept as a means to control flooding in the Sutter Basin in 1880. In 1894, Engineer Carl E. Grunsky of the State Engineer's staff recommended a similar plan, but no action came of either plan. The California Debris Commission (the Commission), established by the federal government in 1893, addressed the detrimental conditions on the Sacramento and Feather rivers. The Commission established Central Valley reclamation districts specifically to address the flood exacerbation and navigation challenges caused by hydraulic mining's damaging practice. The Commission wanted an economic plan with a definite schedule to control the Sacramento River and improve navigation (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983)

The Commission established a plan to dredge the Yuba River and deposit the dredge materials on the riverbanks as barriers to the flood waters, which would effectively become levees. It included enlargement of existing channels, overflow of surplus water at specific channel points, bypass channels, and means to quickly get water into Suisun Bay. The Commission's consultants created the Jackson Plan which identified 10 means to accomplish the goal, including reconstructing the Tisdale Weir and connecting it to the Sutter-Butte Bypass to have a capacity of 35,000 cubic ft per second or sufficient to carry the excess water that reaches that point. The Commission's plan was estimated to cost $33 million. Congress accepted the plan but only funded a small part of it. Joseph J. Hagwood noted in his history of the Commission that "the report became the very foundation of all work on the Sacramento River (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983).

One of the California companies that based their work on the report was the Sutter Basin Company (SBC), established by J. Ogden Armour. Armour was a nationally known Chicago meatpacking magnate. His impact on US industry was significant. He grew his father's business from $182 million to $1 billion and was believed to be the second wealthiest man in American after John D. Rockefeller. A brief article about his death noted that he went on to develop similar stock yard and meatpacking subsidiaries in South America. As with many magnates of the time, Armour had a reputation of dubious business practices, some of which were documented by author Upton Sinclair, who worked in Armour plants while researching for his seminal work, The Jungle. Sinclair also published articles regarding the conditions observed. In 1903, the Sacramento Bee noted that Armour was subpoenaed to testify in a case regarding shorting, or rebates, surrounding the Fruit Growers Express Company. In 1904, Armour was deeded a large 6,000-acre (ac.) parcel of land west of Sacramento to secure his cash payment to the previous deed holder, however, the Natoma Water Company had bonded the land. The Sacramento Star mentioned that Armour was "heavily interested in gold dredging" in the area. He reconveyed the property five years later, presumably after the cash advance was repaid (Sacramento Star 1904, 1909).

Armour led a group that founded the SBC in 1911 with the intent to drain and develop 45,000 ac. of land in the Sutter Basin. During this time, Armour and other meatpackers were subject to overturned rulings under anti-trust, food safety, and labor relation legislation in the Midwest that were at work since 1903. This resulted in significant revenue drops for the companies. When Armour entered the California market, he sought to expand his influence on commodities. From 1917 to 1921, he made his company publicly traded through $60 million in bonds (SBC was also bonded during this time), his company lost $125 million in two years, and was $144 million in debt. He lost most of his personal fortune and he even lost $1 million a day for a month straight. He was ousted from the company in 1923. The financial ruin trailed him in death too. His widow elected not to pursue financial recovery from SBC bonds, but absorbed the debt owed to her from lessors, who then assumed ownership of the land upon the bond debt relief (Britton 2018; Intelligencer 1911; Lake Forest College 2020; Lead Daily Call 1927; Sacramento Bee 1903).

In 1915, the Commission vested authority in the California Reclamation Board as part of its plan to control flood waters of Sacramento and San Joaquin valleys. The US deeded all swamp and overflow land to the State of California under the condition that it reclaim the land with the goal of controlling the flood waters. The California Reclamation Board created the Sacramento and San Joaquin District as a means to complete levee assessments for the project, which encompassed RD 1500. Armour and a group of businessmen in Sacramento lobbied the state and federal governments to create RD 1500 as a means for paying for the development. In 1915, RD 1500 was officially created under California Law with a special act of the State Legislate. The SBC and subsidiaries were incorporated, and the project started with the majority of the costs being funded by the SBC. RD 1500 was bounded on the west by the Sacramento River, on the north by Tisdale Bypass, and on the east by the west levee of the Sutter Bypass (California State Library [CSL] 1916). RD 1500 was 19 miles long and 18 miles wide at its max. It would bring 66,000 ac. into cultivation, 45,000 of which were owned by SBC. The project promoters acquired the land by purchasing it or obtaining options. The land owned the system; each ac. represented one share of stock in Sutter Mutual Water Company and individuals privately owned most of the high lands along the Sacramento River. SBC was moderately successful – Armour and company were able to establish reclamation and a massive agricultural enterprise; however, failed bonding attempts and other factors disallowed for the profit initially assumed. It is documented that Armour lost up to $17 million. SBC paid $600,000 for Sutter Basin land that would eventually fall within RD 1500 (ASAE 1922; Marysville Evening Democrat [MED]1915; McKinney 2016; BR 1983).

RD 1500 operations fell under two classes: 1) concerns with operation and maintenance of drains and pumping plants for RD 1500 de-watering; and 2) concerns with operation and maintenance of the levees. Levee maintenance and operation projects were performed under the supervision of Public Works in accordance with rules and regulations prescribed by the Secretary of War as provided by Federal and State laws. Before work began, a full topographic survey and plan table survey with a contour interval of 6 inches were completed. The surveys established accurate benchmarks over RD 1500 and the resulting maps made it possible to plan out an irrigation system. Two of the major RD 1500 projects were the construction of the Tisdale Bypass and the Sutter Bypass. The Tisdale Bypass would eventually become the northernmost property boundary for the SBC, while Sutter Bypass was a more complex project (ASAE 1922; Guise 1965; Hagwood 1981; BR 1983; Sutter County Farmer [SCF] 1912).

Reclamation District 1500 Litigations, Injunctions, and Land Assessments

From 1913 to 1915, the levee, drainage canals, pumping plant, and other reclamation components progressed in construction as court injunction and litigations held up other work components. The Sutter County Board of Supervisors (BOS) brought a suit against RD 1500 with the intent of preventing construction of the East Levee. Although an injunction was obtained from the lower court, RD 1500 appealed to the State Supreme Court and the case was set aside with a writ of prohibition. Not long after, a second suit was brought against RD 1500 by Samuel Gray and a number of Sutter County landowners with the same goals as the first. No injunction was issued, and the lower court ruled in favor of RD 1500, but then the appeal was taken to the State Supreme Court where the decision of the lower court was unanimously reversed. As a result, the Tarke Bill was introduced to State Legislature, with the intent of preventing levee construction, but didn't pass (ASAE 1922; BR 1983).

As controversy surrounded RD 1500 and SBC's influence on it, Armour remained resolute in his vision. In 1913, SBC issued $2.75 million in bonds with 6% interest for 40,000 ac. within Sutter Basin through Louis Sloss & Company in Chicago and the Continental and Commercial Trust and Savings Bank, secured with $6 million of SBC. The land was valued at $11 million (MED 2013). However, Armour owned 75% of the land within the Sutter Basin so it was clear he would benefit the most. The SCF reported Armour's visit to the area in April 1914, "with regard to the reclamation work in which I am interested, I can only say that extensive colonization plans have been laid, and that we are looking for the co-operation [sic] of the entire valley. We are not engaged in a philanthropic enterprise. Our plans are strictly commercial but the benefits resulting therefrom will reach every citizen and every resident in the vicinity…we are doing all we can" (SCF 1914a).

RD 1500 was so large that families visited the dredging settlement at Sutter Basin (SCF 1914b). The size and scope of the work was so expansive that RD 1500 was issued stock warrants to continue paying for the large costs of construction. In January 1914, Board of Trustees (BOT) petitioned the Sutter County BOS to appoint commissioners to assess the RD 1500 so calls could be made to provide funds to pay the stock warrants. Three assessments occurred from 1919 through 1930 (ASAE 1922; BR 1983).

In August 1919, the first assessment valued land at $5,000,000; it was approved by the Sutter County BOS and became a lien on RD 1500 lands. Some landowners paid cash in the accumulated amount of $447,013.22, but after 30 days, the remaining $4,952,986.78 became subject to an interest rate of 7% per year. In January 1920, the BOT issued 6% bonds to mature in annual installments over the course of 11 years with the first maturity occurring in January 1930. The entirety of the bonds sold at face value to SBC. Although the bonds were paid without default through 1923, the BOT anticipated that adverse trends in agriculture would make it difficult for landowners to pay the first maturity in addition to interest. The BOT pushed to amend a reclamation law so RD 1500 could refund bonds, provide for long term amelioration of bonds, and left the fixing of maturities in the discretion the BOT, provided that they be paid within 50 years of issuance. In 1929, the Bondholders Protective Committee was formed at the request of the BOT and funded by RD 1500 with the purpose of soliciting deposit of outstanding original bonds to be exchanged for refund bonds. The program was a success and bonds were refunded in the amount of $4,778,986.77, and maturity periods changed to 22 years. In February 1930, a second assessment of RD 1500 was approved with the intention of providing funds to pay the stock warrants issued after the first assessment and RD 1500 construction costs. The assessment had a net worth of $736,946 after paying the costs of debt assessments for reclamation work and stock warrant costs. In July 1930, the third assessment had the intention of completing maintenance valuation for each parcel of land in RD 1500 and was not a lien on the land. Though the BOT occasionally made calls on the third valuation as funds became necessary for operation, maintenance, and incidental expenses of RD 1500, at which point the calls became liens (ASAE 1922; BR 1983).

When RD 1500 landowners failed to meet calls on valuation, their lands were sold for delinquency to the County Treasurer, who was the RD 1500 Trustee and Trust of the RD 1500 bond fund. Landowners had a year following the sale to make a redemption. If they didn't, the title of the land was passed to the County Treasurer. Delinquencies occurred from 1925-1928 and the County Treasurer acquired approximately 4,900 ac. of land. Delinquencies under the first assessment could be sold for the total delinquency amount plus a 20% penalty and 7% annually compounded interest. Delinquencies under the second and third assessments cost the full delinquency amount plus a 10% penalty and 7% annually compounded interest. Statutes prior to 1931 didn't allow crop production on delinquent lands. These factors made it nearly impossible for anyone to buy back their property and resulted in much of the land going to waste (ASAE 1922; BR 1983).

In 1931, the State Legislature passed an amendment to the reclamation law so that after the lapse of one year following the redemption period of any land sold to the County Treasurer as trustee, the land could sell at fair market value as ascertained by the highest cash bidder, subject to any district assessments. The amendment gave the BOT possession of the delinquent lands after a one-year redemption period and allowed it to spend funds to retire liens on lands superior to the title of the County Treasurer as trustee to manage, control, and lease to tenants for a reasonable rent. Money collected was applied to incidental expenses of hold and leasing lands; maintenance assessments against such lands; and other incidental expenses, legal charges against RD 1500, or bonds and interest coupon purchases of RD 1500 for retirement. The majority of leased lands had no water rights and were leased on a dry farming basis with tenants paying to furnish water for irrigated crops. Some tenants made irrigation arrangements with people who owned land on the Sacramento River while others pumped water from RD 1500 drains, resulting in many being excluded from renting land lest they could afford to irrigate it (ASAE 1922; BR 1983).

Reclamation District 1500 Irrigation and Drainage System

Reclamation plans included levee construction with levee and bank erosion prevention in order to protect against overflow from flood waters. Levee heights were determined from the maximum high-water plan based off the 1907 flood. The flood runoffs were as follows: 54,000 sec ft in the Sacramento River below Tisdale; 189,000 sec ft in the flooded area above the Feather River; and, 385,000 sec ft in the flooded area below the Feather River. Then 50% was added to the flood's high-water marks to establish the high-water plan, with an additional 5-ft increase to establish the levee heights. The levees had 20-ft-wide crowns with slopes that had a ratio of five to one on the water side and two to one on the land side. The West Levee is 20 to 25 ft tall above ground elevation and the river levees average about 20 ft tall. The ground was cleared of all perishable materials and plowed where the levee base locations were planned. Most levee work was completed with the use of large floating clam shell dredgers with a bucket capacity of 5 cubic yards (CY). During construction, there could be as many as 15 dredgers working on the levees at a time. One dredge, the "Armour", was built at the Stockton Iron Works. Its hull was 160 ft long by 61 ft tall with a 205-ft-long boom. The boom weighed 24,000 pounds and was capable of moving 5 CY. The Armour operated 24 hours a day utilizing three crews. Dredging occurred from 1913 to 1915 before being held up for two years as a result of the aforementioned court injunction and litigations. Dredging resumed in 1917 and the final closure of the levees occurred in December 1918. The Sacramento River Levee is 54.6 miles long, the East Levee is 20.7 miles long, and the North Levee is 4.5 miles long. Timber sheet pilings, brush mattresses, and trees were planted to protect wave action and natural currents that may erode the levees and cause slides in exposed places. In 1928, erosion was also abated in one location by placing trees and using Bignell piles to anchor brush. Shortly after the completion of levee work, RD 1500 focused on drainage (ASAE 1922; BR 1983; SCF 1914b).

A system was designed to provide ample drainage, dispose of seepage and rain waters, and work with irrigation. A pumping plant (later called Karnak Drainage Facility) was planned near the south end of RD 1500 where a levee was built across and used the natural drainage of Sacramento Slough. The overall system included several pumping plants (Tisdale, Portuguese, State Ranch Bend, and Karnak). Tisdale Pumping Plant is the northernmost plant with the capacity to serve 80% of the land. Portuguese Pumping Plant is the southernmost plant and an independent unit built because it couldn't be reached by the East and West canals. RD 1500 Canal (historically referred to as the Main Drainage Canal and Central Canal) began at Tisdale. Three primary canals branched from Tisdale Pumping Plant: West Canal on the west side of RD 1500, East Canal on the east side of RD 1500, and the RD 1500 Canal down the center of the eastern half of Sutter Basin. Construction of the entire irrigation system finished in 1919, shortly after the levees were finished, and cost $1 million to build (ASAE 1922; BR 1983; Sacramento Bee 1915).

Sutter Bypass was originally planned as a trough covering the natural course of the Sacramento Slough through the center of RD 1500 and SBC. However, the California Reclamation Board moved the location of the Sutter Bypass to its current location, further east and closer to the Feather River. Instead, Sacramento Slough was developed into RD 1500 Canal, traversing the entire length of RD 1500 north to south, ending where it met with Karnak Drainage Facility. RD 1500 Canal declined 10 ft in elevation from the north end to Karnak Draining Facility, had an average depth of 9 ft, and measured 125 ft wide at the south end. The first ½ mile of the RD 1500 Canal had a velocity of 2.5 ft per second before flattening out to 1 cfs. Sediment pumped into RD 1500 Canal tended to deposit at this gradient change but could easily be removed. The canal had a 690 sec ft capacity and measured 36 ft wide at the bottom for the first 1 mile, but broadened out to 60 ft in more level ground. It was dredged to be used in conjunction with Power House (PH) 1 during early stages of reclamation (ASAE 1922; Hagwood 1981; BR 1983; SCF 1912).

The drainage system included laterals and sublaterals, generally located on section and section subdivisional lines, resulting in approximately 50 miles of lateral drains and over 250 miles of sublaterals. They were placed to drain every ¼ section of land and conveyed water to the RD 1500 Canal and PH1. Large portions of lateral drains were excavated by Austin trenching machines due to the land being relatively level. The drains were designed to keep the water table at least 5 ft below the surface and excavated by tracklaying dragline excavators. SBC built several miles of subsidiary drains in certain locations where seepage conditions were worse. SBC's subsidiary drains were shallower than RD 1500 drains, serving for quick run-off of the winter rains and seepage and emptied into the RD 1500 drains, extending the drainage system. SBC trenched two small experimental fields with tile-drains with use of a Funk power ditcher. These were placed at varying depths and distances (3 ½-5 ½ ft deep and 50-100 ft apart). Tiles ranged in size from 4-6 inches in diameter. Gravel replaced tile in some locations to compare functionality. Drainage actions were observed from manholes. In 1922, a gravity outlet works was constructed through the East Levee at the lower end of the RD 1500 Canal; when the Sacramento River subsided, it automatically carried off drain water and ensured good drainage. PH1 shut down in July until the river rose in late fall or winter during the irrigation season, decreasing operating costs despite the April 1 to October 31 irrigation season (ASAE 1922; BR 1983).

The irrigation system was designed to carry peak demand of water and deliver water on each 40-ac. tract of land at an elevation at least 1 ft higher than the highest land in the tract. Canal capacities were based on a duty of 1 sec ft for 80 ac. with a minimum head of 6 sec ft for any 40-ac. tract. The top width of the canal banks varied from 3 to 6 ft, many of the canals had a slope of 3 inches to the mile, and the bottom width of the canals varied from 5 to 60 ft. Most canal velocities were low with less than 1 cfs in most cases, with the exception of the RD 1500, West, and East canals. The West and the East canals each had a 500 sec ft capacity. During construction, dirt excavated from the canal sections was used to make embankments. Fresno scrapers built most of the canal system, but portions of the RD 1500 Canal were excavated by a dragline machine and a land dredge. Road blades hauled by tractors were used to build header ditches and field ditch roads. Martin ditchers (subsoil plows with V wings attached) and Hottell ditching machines were used to build smaller ditches. A Type 204 Pawling and Harnischfeger Dragline excavator was used to build all lateral irrigation canals, seepage ditches, and drains. A funk power ditcher was used to build 10-18-inch-wide ditches for subirrigation (ASAE 1922; BR 1983).

Besides the three main pumping plants, about 750 individual structures and 2,500 smaller structures were in the main system. Most of the main structures were built of reinforced concrete. The larger structures were equipped with screw stem gates and the majority of the other structures had wooden flash boards. Timber structures for individual field ditches were made of redwood, standardized, and made in quantities to reduce costs subirrigation. Bridges were necessary for road crossings and culverts for drain crossings; siphons and flumes were important too. A hundred miles of graded roads, 156 miles of graveled roads, and 4 miles of concrete paved roads were built in RD 1500. SBC used the Southern Pacific Railroad and the Sacramento River for transportation. Warehouses along the levees and three large and corrugated iron warehouses along the railroad were used for storage. Wells were scattered over Sutter Basin for domestic supply. A complete telephone system traversed the Sutter Basin. SBC had seven large permanent camps used as headquarters for extensive agricultural operations. In July 1949, landowners called on the BOT to offer delinquent lands in existing conditions without irrigation facilities and for sale prior to 1949. After a very rainy winter in 1950, the East Levee experienced damage. As a result, livestock and vehicle transportation on the levees was limited as to reduce damage to levees. Special permits were issued by USACE's State Engineer for transportation on levees (ASAE 1922; BR 1983; SCF 1920).

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Pump House 1, facing northeast



Pump House 1, facing north



Interior of Pump House 1



Pump Houses 1 and 2, facing southwest



Pump house 2, facing northwest



Interior of Pump House 2



Pump house 3, facing northwest



Interior of Pump House 3



Pump house 1 outlets into the East Canal/ Sacramento Slough, facing west



Pump house 2 and 3 outlets into the East Canal/ Sacramento Slough, facing northwest



Shed 2, facing northeast



Shed 1, facing northeast



Shed 3, facing northeast



Shed 1, Shed 2, and Shed 3, facing northwest.



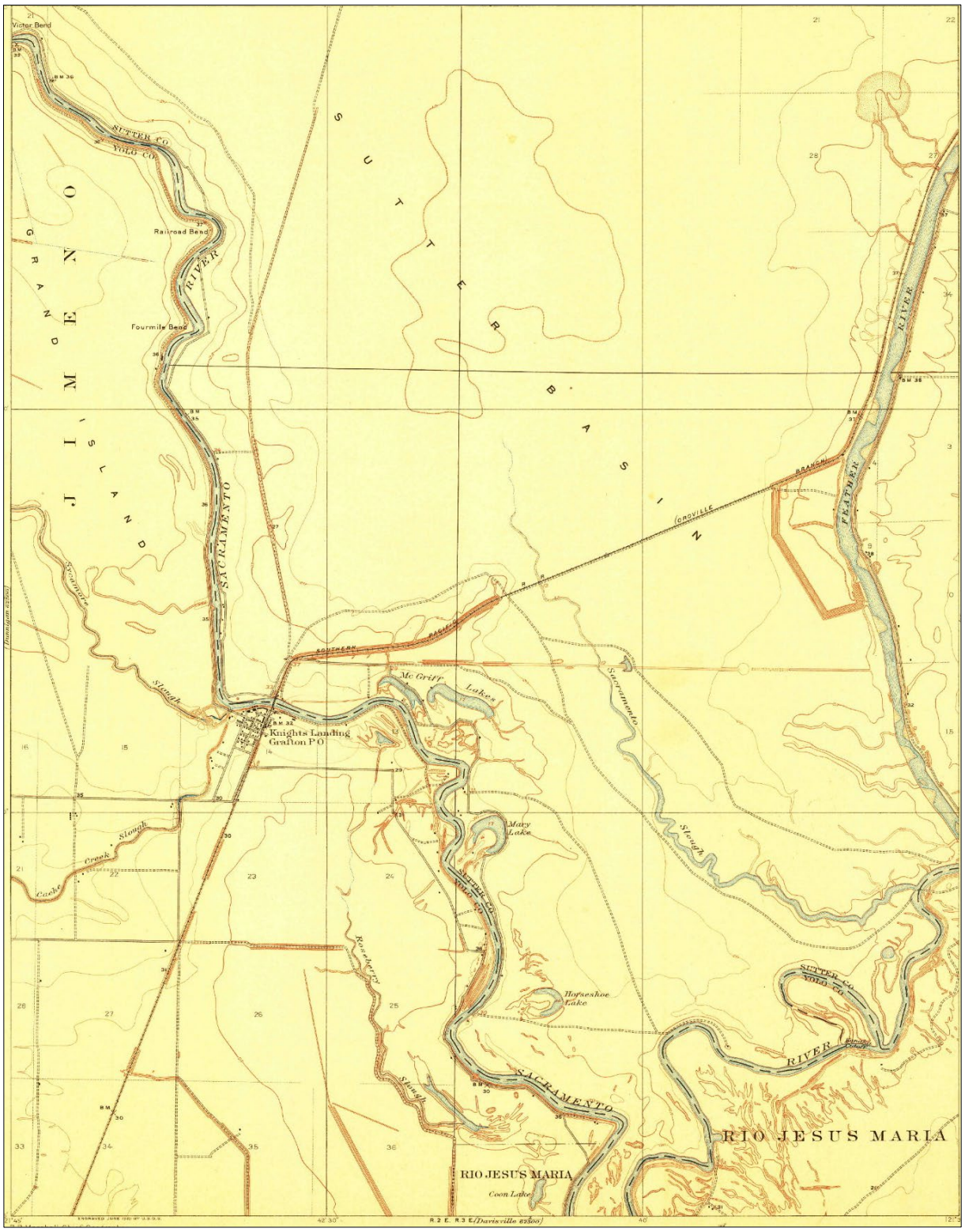
Weather Station, facing west.



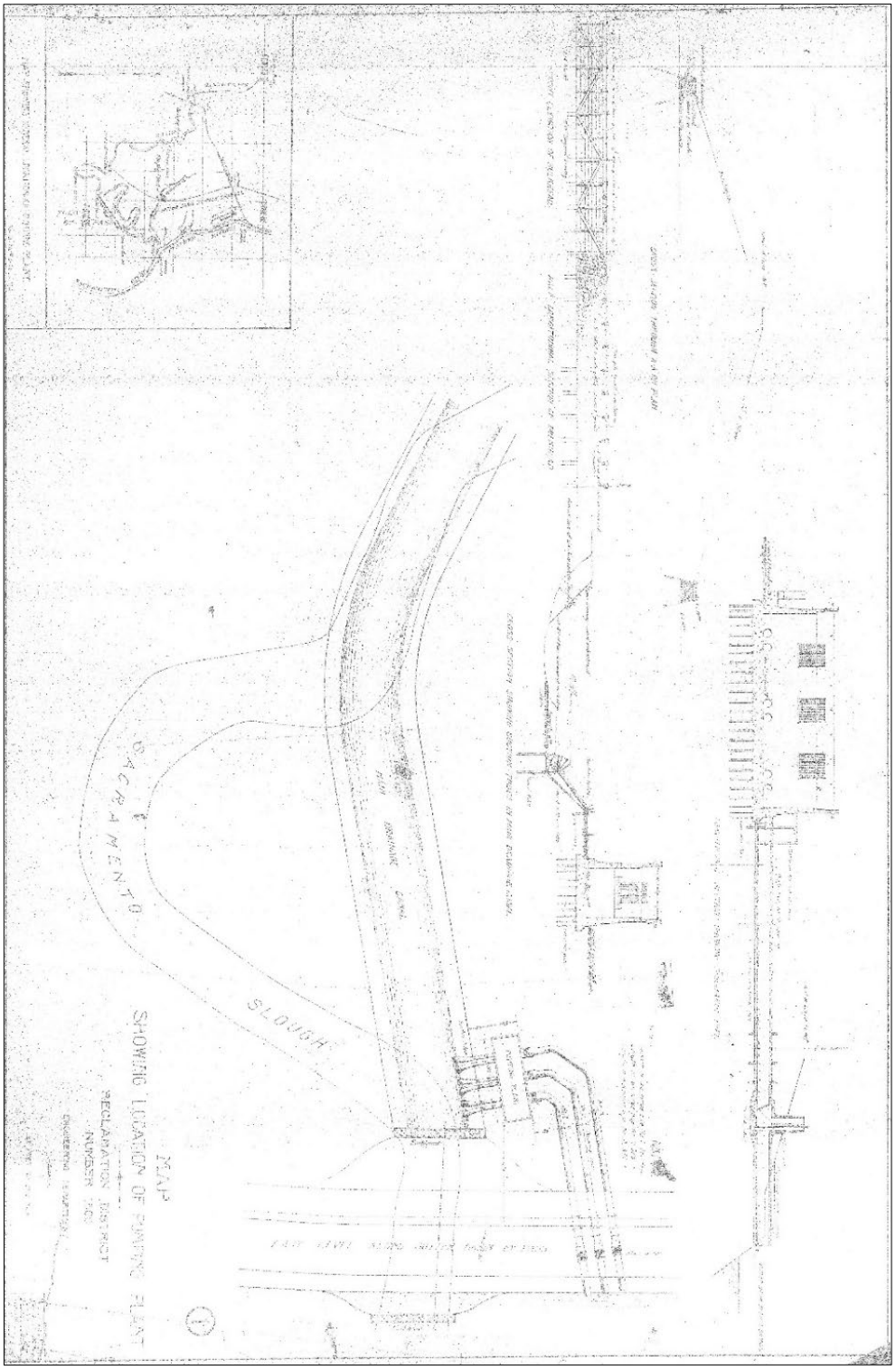
Overview of the ditch, facing northeast.



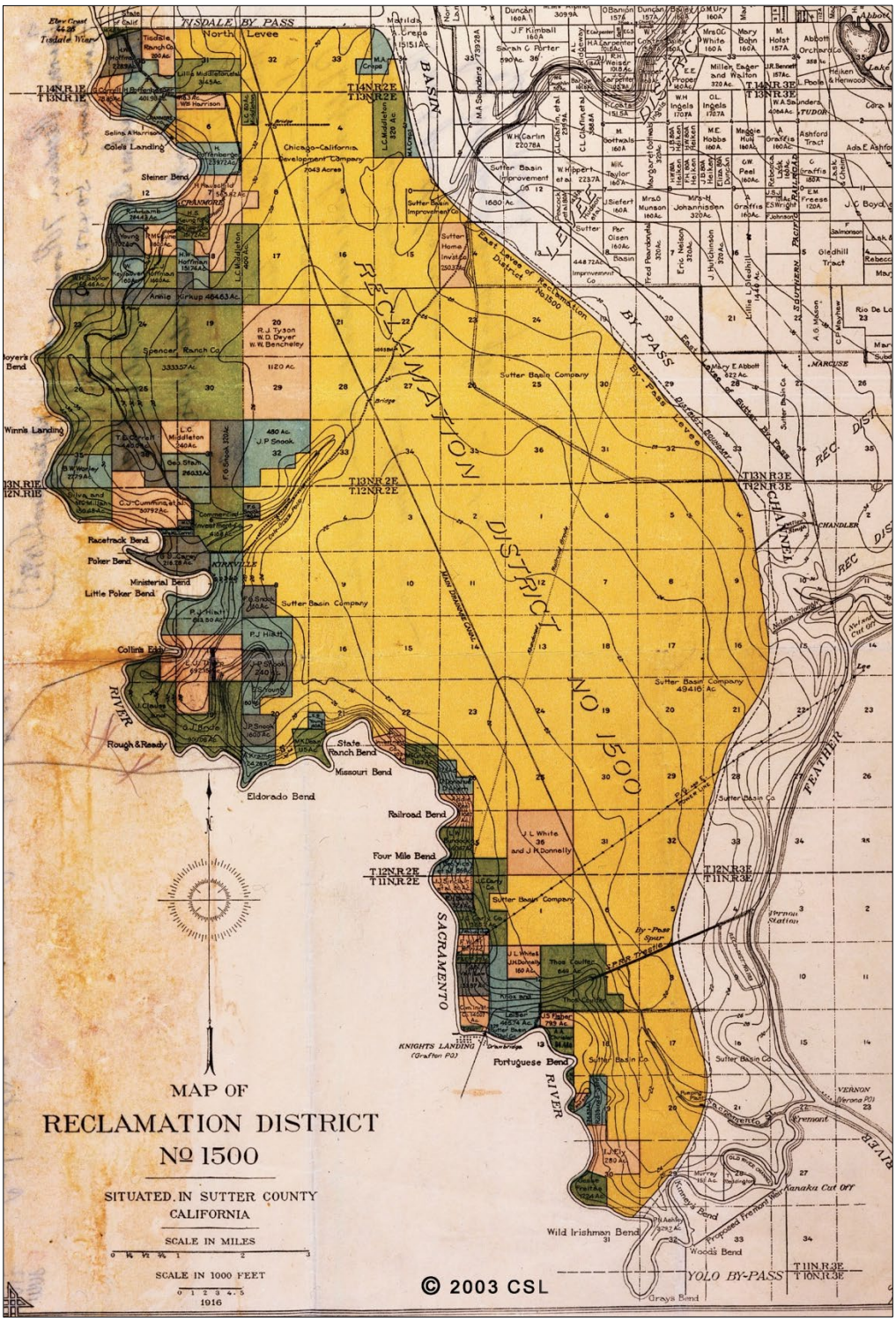
Township 11 North, Range 3 East, Mount Diablo Meridian (GLO Plat 1870). The original location of Sacramento Slough is depicted.



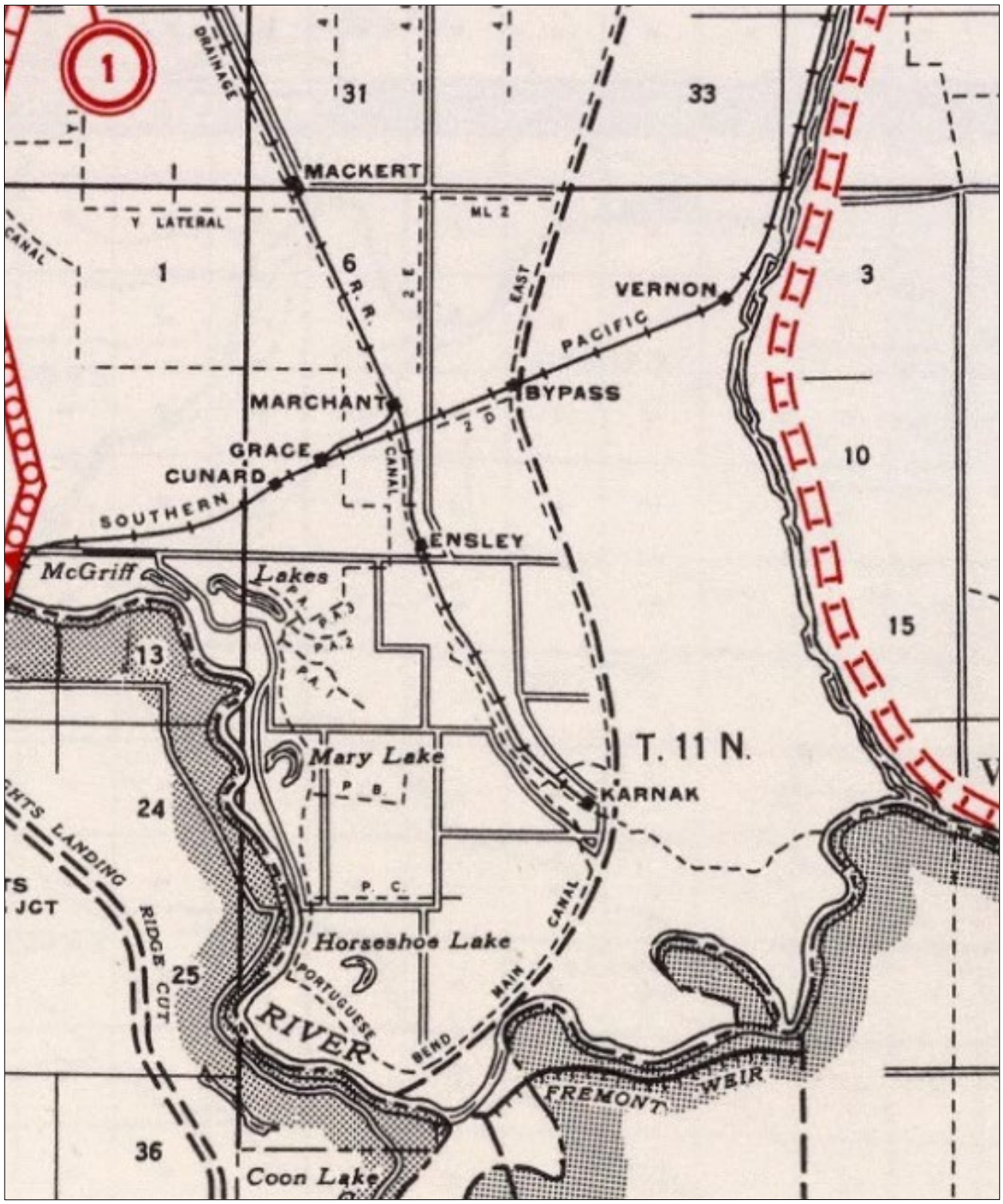
Knights Landing, Calif. 1:31,680 (USGS 1910). The original location of Sacramento Slough is depicted.



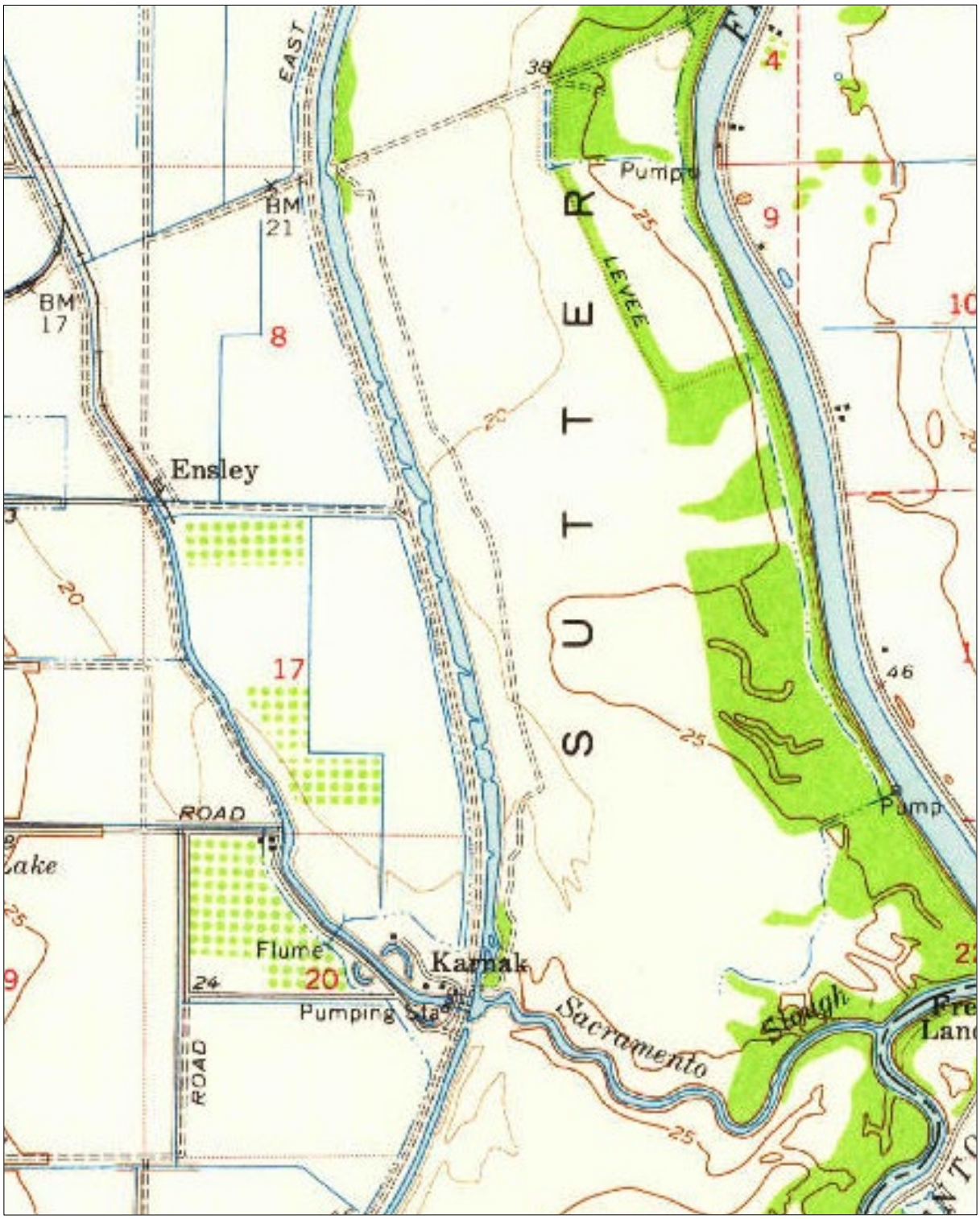
"Map Showing Location of Pumping Plant" (RD 1500 Engineering Department 1914). Karnak Drainage Facility is depicted in its current location.



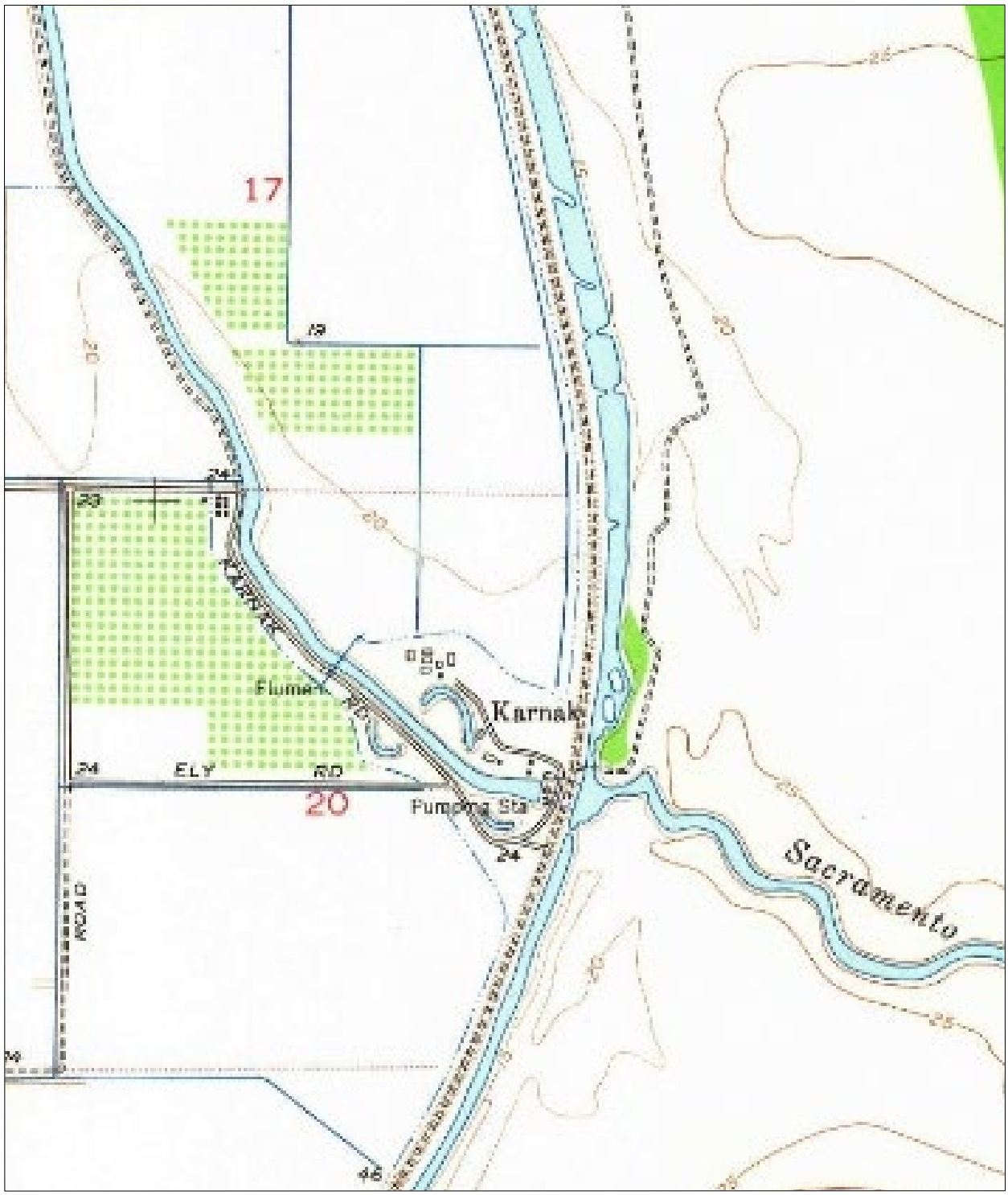
"Map of Reclamation District No. 1500, Situated in Sutter County, California" (California State Library 1916). Karnak Drainage Facility is depicted in its current location, labeled as "Pumping Plant".



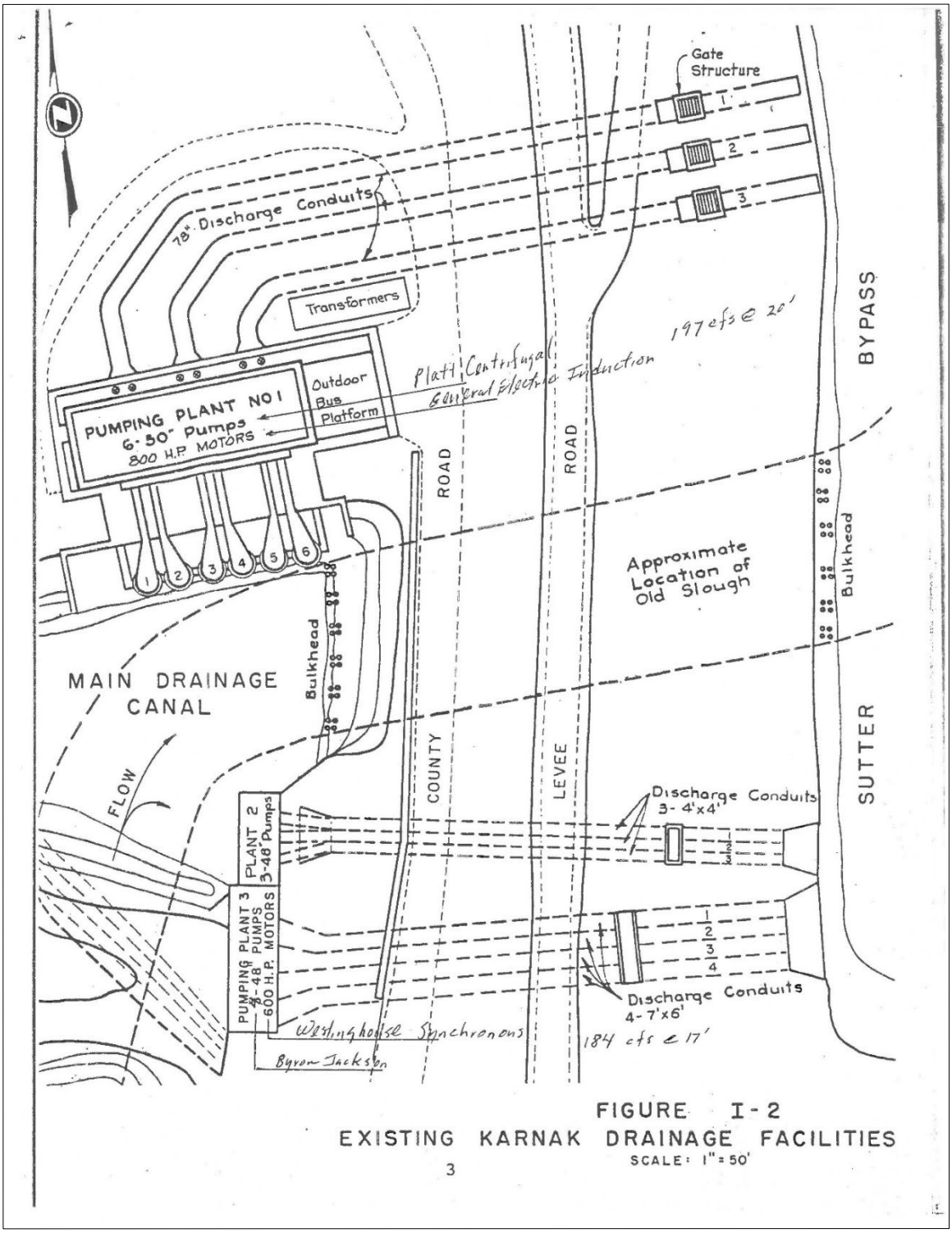
Sutter County (California Division of Highways 1935). Karnak Drainage Facility is depicted in its current location.



Knights Landing, Calif. 1:62,500 (USGS 1952 [ed. 1959]). Karnak Drainage Facility is depicted in its current location.



Knights Landing, Calif 1:24,000 (USGS 1952 [ed. 1964]). Karnak Drainage Facility is depicted in its current alignment.



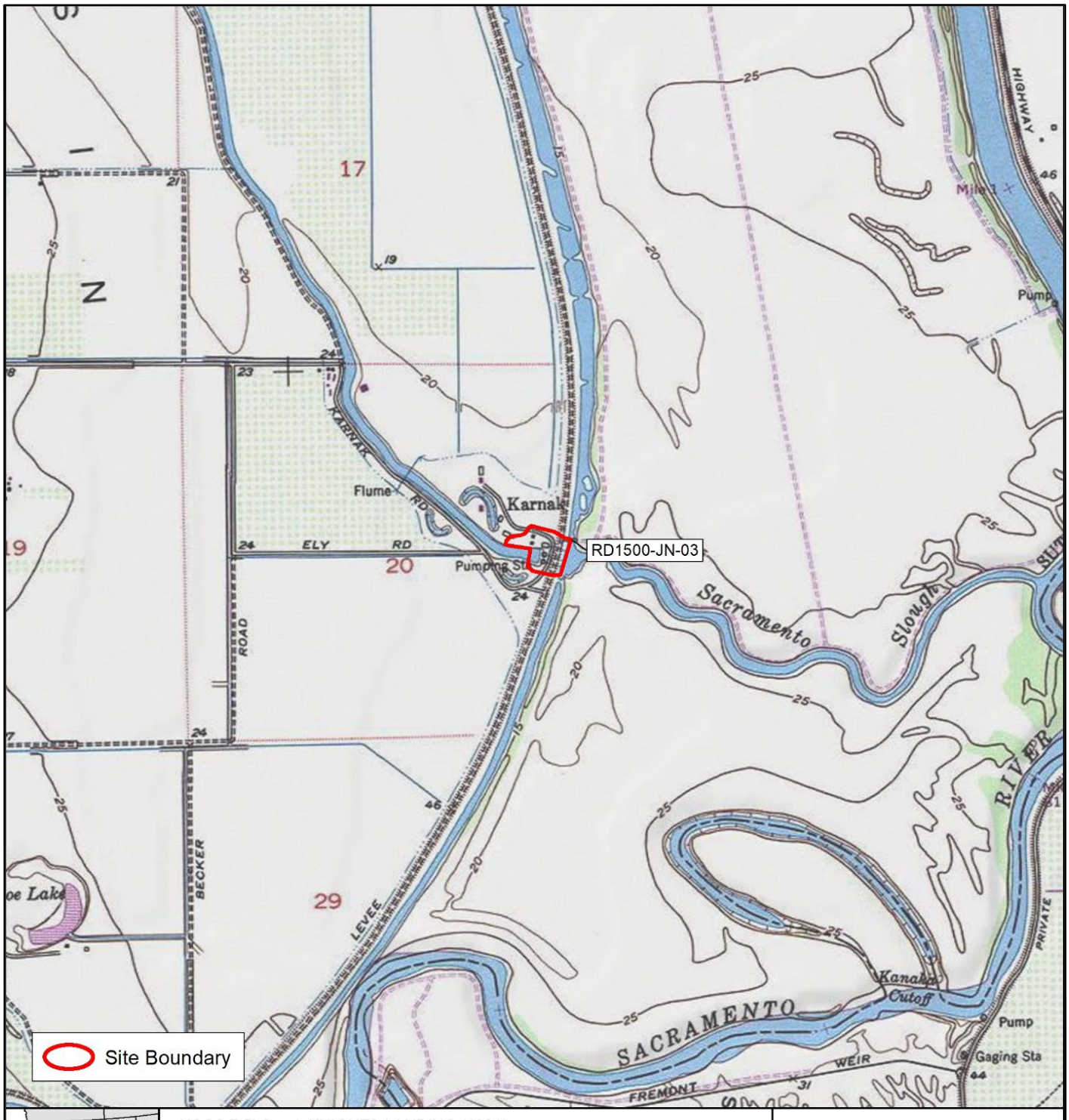
"Existing Karnak Drainage Facility" (BR 1983). The map shows Karnak Drainage Facility in its current location.

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Resource Name or #: RD1500-JN-03
Map Name: Knights Landing, CA
Scale: 1:24,000
Date of map: 1981



Resource Location
RD-1500-JN-03
Sutter County, California

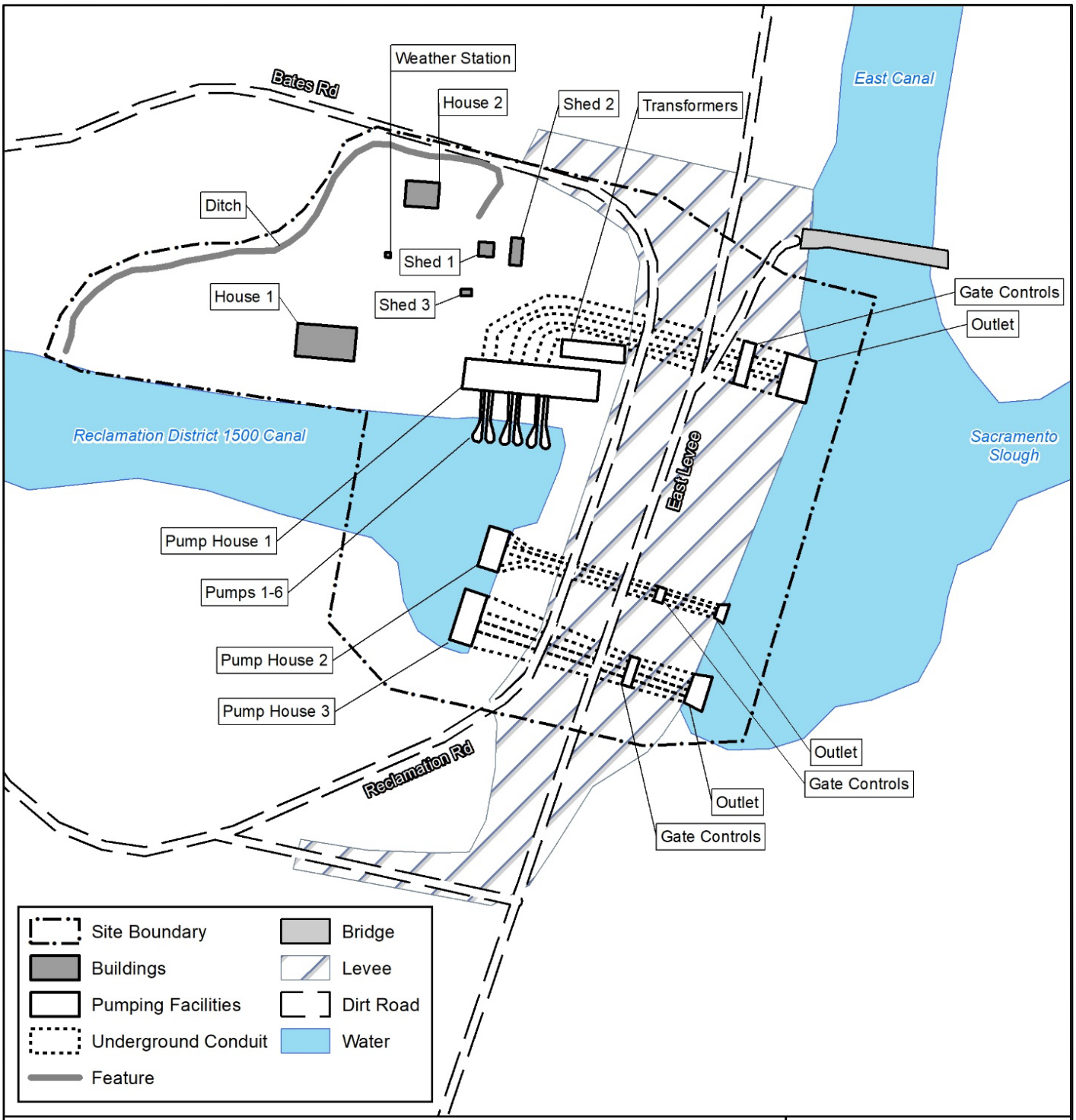
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-03
Date of map: January 21, 2021



NAD 1983 UTM Zone 10N

0 70 140 Feet
0 20 40 Meters

N

Scale 1:1,920
1 inch = 160 feet

Sketch Map
RD1500-JN-03
Sutter County, California

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	Primary # HRI # Trinomial NRHP Status Code Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-04

P1. Reclamation District 1500 Canal

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616737mE/ 4293714mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road and continue for approximately 70 ft.

P3a. Description: This resource consists of a 600 ft segment of the Reclamation District (RD) 1500 Canal (historically referred to as the Main Drainage Canal or Central Canal) at its terminus. The RD 1500 Canal generally follows the original pathway of Sacramento Slough, a natural outlet of flood waters at the southern end of the Sutter Basin. The segment of canal is approximately 125 ft wide and widens to 250 ft at the levee to accommodate the Karnak Drainage Facilities pump houses. Portions of the canal segment are lined with sheet pile walls.

The Sacramento Slough was channelized in the early 20th century as a part of the Sutter Basin reclamation efforts. Sacramento Slough was severed in half with the western section of the slough channelized to convey water more efficiently (now referred to as the RD 1500 Canal). The RD 1500 Canal terminates at the East Levee where the Karnak Drainage Facilities pump overflow water through the levee into the remaining natural course of the Sacramento Slough with eventual discharge into the Sacramento River. The canal is in good condition and generally maintains its original form and function. Construction work in 2019 through 2020 installed sheet pile wall along the south bank of the canal and nine new 10-ft wide automatic conveyor belt-style debris removal screens to replace the existing debris catchment system.



P3b. Resource Attributes: HP20. Canal/aqueduct

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

P5b. Description of Photo: Overview of canal, facing west.

P6. Date Constructed/Age and Source: ☒Historic ☐Prehistoric ☐Both

P7. Owner and Address: RD 1500**,** 15094 Cranmore Rd, Robbins, CA 95676

P8. Recorded by: Kleinfelder
Jessica Neal, Samantha Dunam, and Kate Willis
435 Lincoln Way, Auburn, CA 9560

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

L1. Historic and/or Common Name: Reclamation District 1500 Canal

L2a. Portion Described: ☐Entire Resource ☒Segment ☐Point Observation **Designation:**
Location of point or segment: Terminus of RD 1500 Canal at the Karnak Drainage Facilities.

L3. Description: Sacramento Slough traversed the entire length of RD 1500 north to south and ended where it met with Karnak Draining Facilities; during the Sutter Basin reclamation project, the slough was developed into RD 1500 Canal (historically referred to as the Main Drainage Canal or Central Canal). The RD 1500 Canal originates at the Tisdale Bypass and terminates at the Karnak Drainage Facilities where water is pumped through the East Levee into the natural course of the Sacramento Slough. It is approximately 18 miles long. Between the canal's north end and Karnak Drainage Facilities, it reportedly declined 10 ft in elevation. It had a 690 second-ft capacity and measured 36 ft wide at the bottom for its first 1 mile and broadened out to 60 ft in more level ground. The average depth was 9 ft and 125 ft wide at the south end. The first 0.5 miles of the RD 1500 Canal had a velocity of 2.5 ft per second before flattening out to 1 ft per second. Sediment pumped into RD 1500 Canal tended to be deposited at this gradient change but could easily be removed. The canal was dredged so it could be used in conjunction with the Karnak Drainage Facilities Pump House 1 during early stages of reclamation. It provides critical flood protection to prevent damage from floodwater to homes and other properties, the community of Robbins and surrounding rural residential properties, State Route 113 and other local roadways, and of over 65,000 acres of rural farmland.

This is a segment of the RD 1500 Canal at its terminus. The segment widens from approximately 110 ft to 250 ft to accommodate the Karnak Drainage Facilities' three pump houses and pumps that carry water through the East Levee. The eastern end of the canal is lined with deteriorated concrete and wood piles from the original bulkhead.

L4. Dimensions:
- **a. Top Width**: 125-250 ft
- **b. Bottom Width**: Unknown
- **c. Height or Depth**: Unknown
- **d. Length of Segment**: 600 ft
- **e. Sketch of Cross-Section**: N/A.

L5. Associated Resources:
East Levee (Temp # RD1500-JN-02)
Karnak Drainage Facilities (Temp # RD1500-JN-03)
East Canal (Temp# RD 1500-JN-05)

L6. Setting: The RD 1500 Canal is located northwest of Sacramento between the Sacramento River (to the west) and Feather River (to the east) in low-lying land protected by levees, commonly known as the Sutter Basin. RD 1500 is one of the largest reclamation districts in California. It provides drainage and flood control to approximately 67,850 acres within RD 1500's service area and protects the community of Robbins from flood damage. The area was reclaimed for farming as part of the Sutter Basin reclamation project in the early part of the 20th century.



L7. Integrity Considerations: The segment of the RD 1500 Canal is in good condition, generally retaining its original form and function. Construction work in 2019 installed sheet pile wall along the south bank of the canal and nine new 10-ft wide automatic conveyor belt-style debris removal screens to replace the existing debris catchment system. The canal was assumed eligible only for the purposes that project and resulted in a finding of no effect.

L8b. Description of Photo, Map, or Drawing: RD 1500 Canal and East Levee, facing east-southeast.

L9. Remarks: None

L10. Form Prepared by: J. Neal and Samantha Dunham

L11. Date: 21-Jan-21

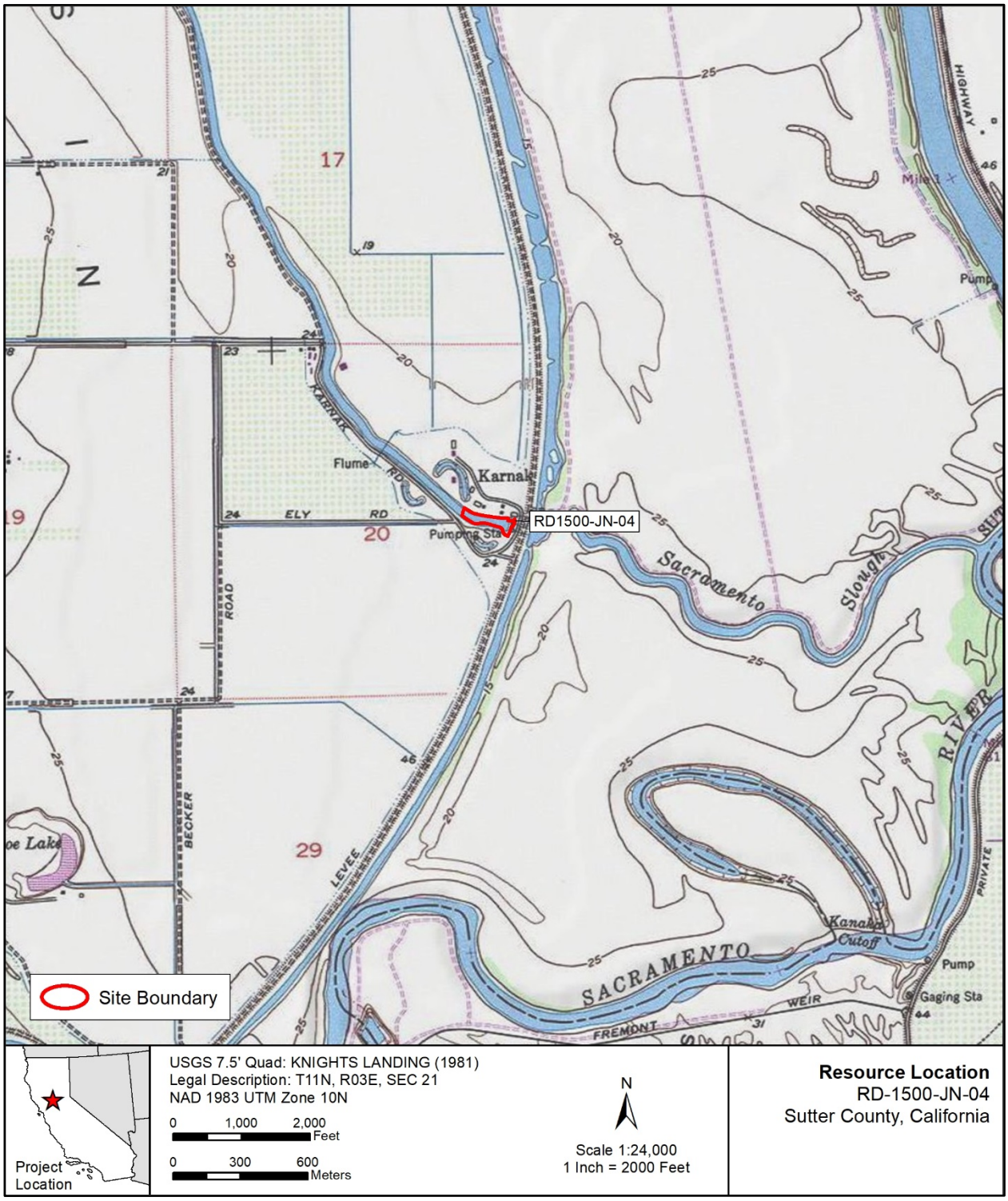
State of California - The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI#**

LOCATION MAP

Trinomial

Resource Name or #: RD1500-JN-04

Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



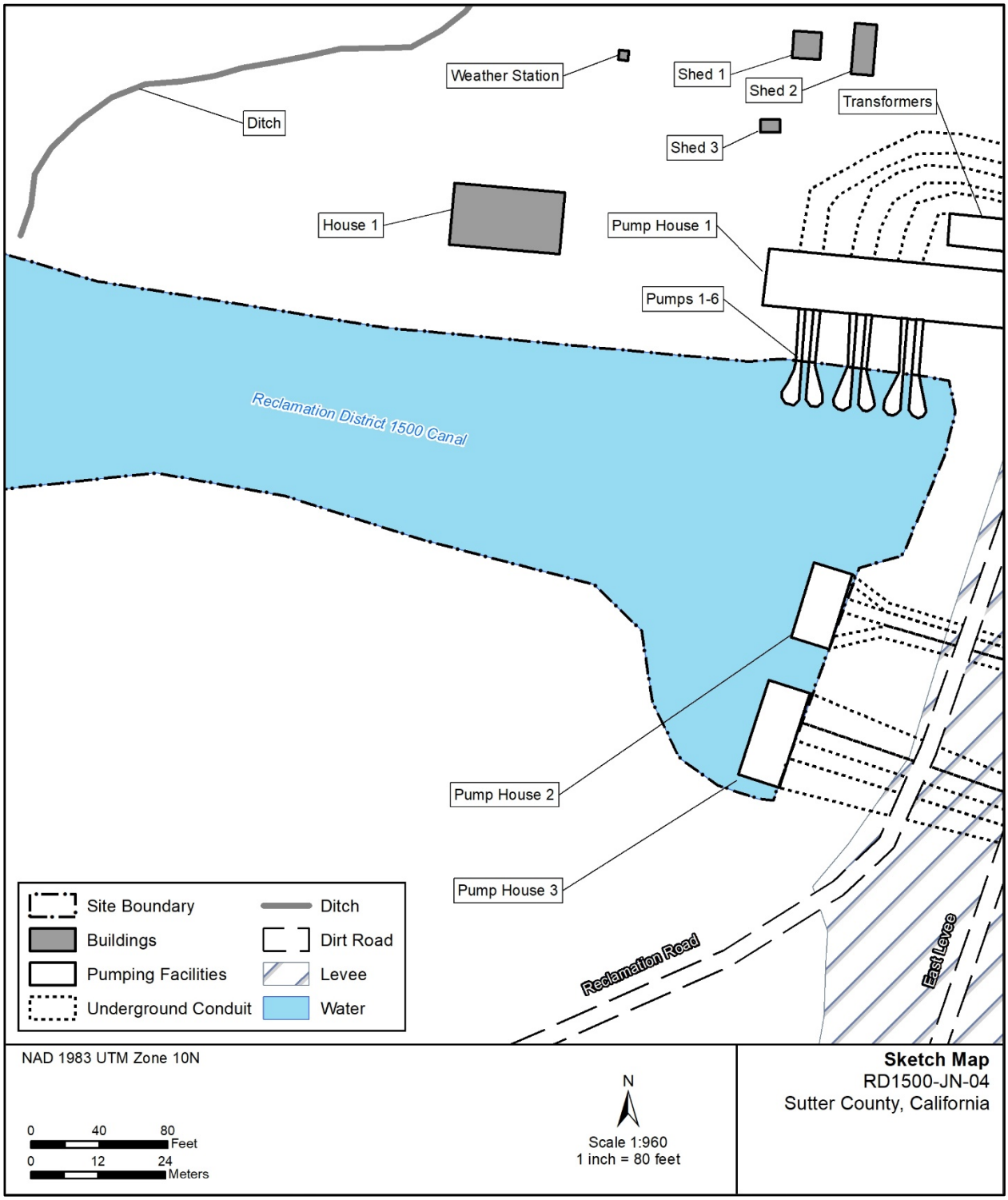
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

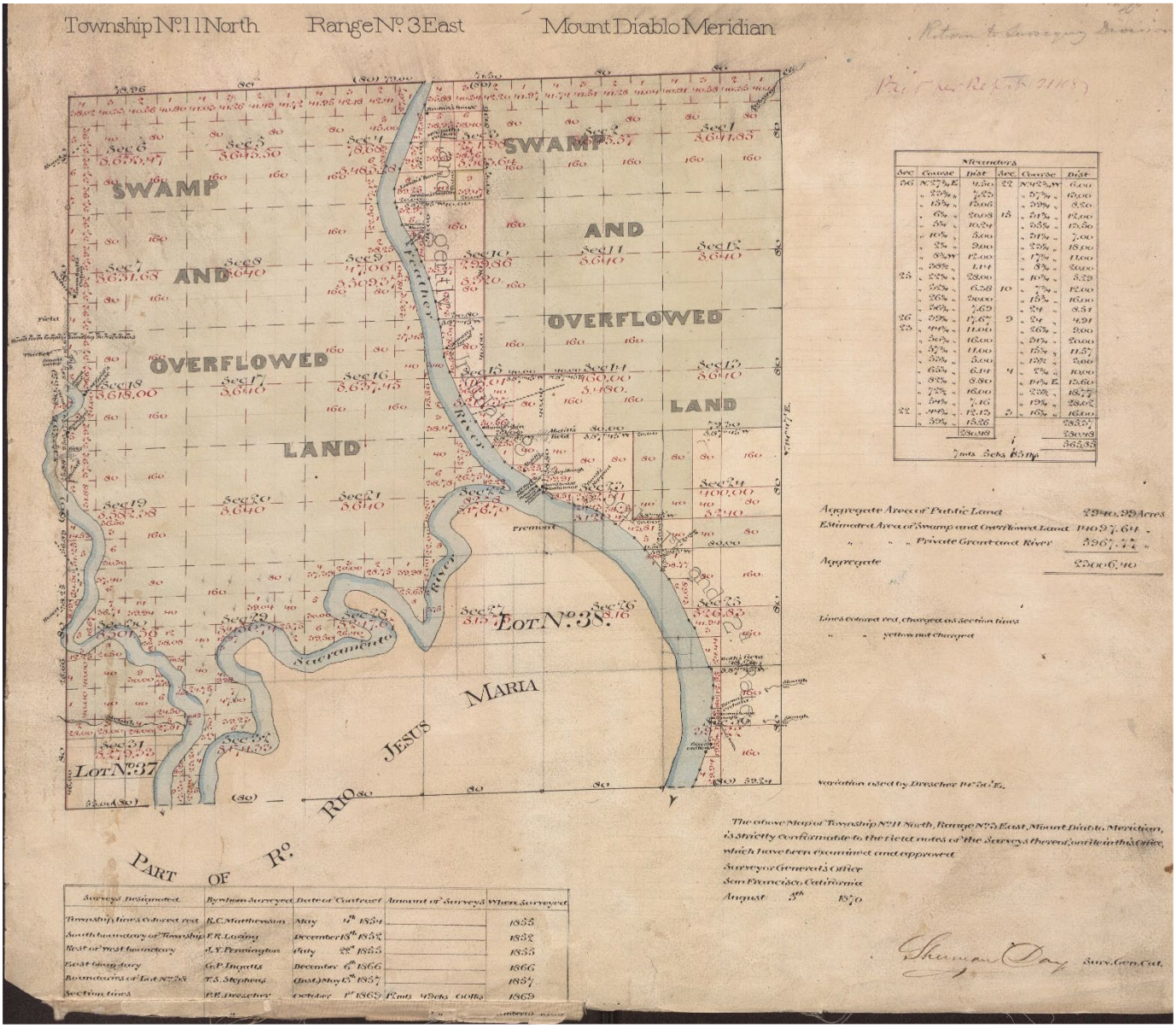
SKETCH MAP

Primary #
HRI#
Trinomial

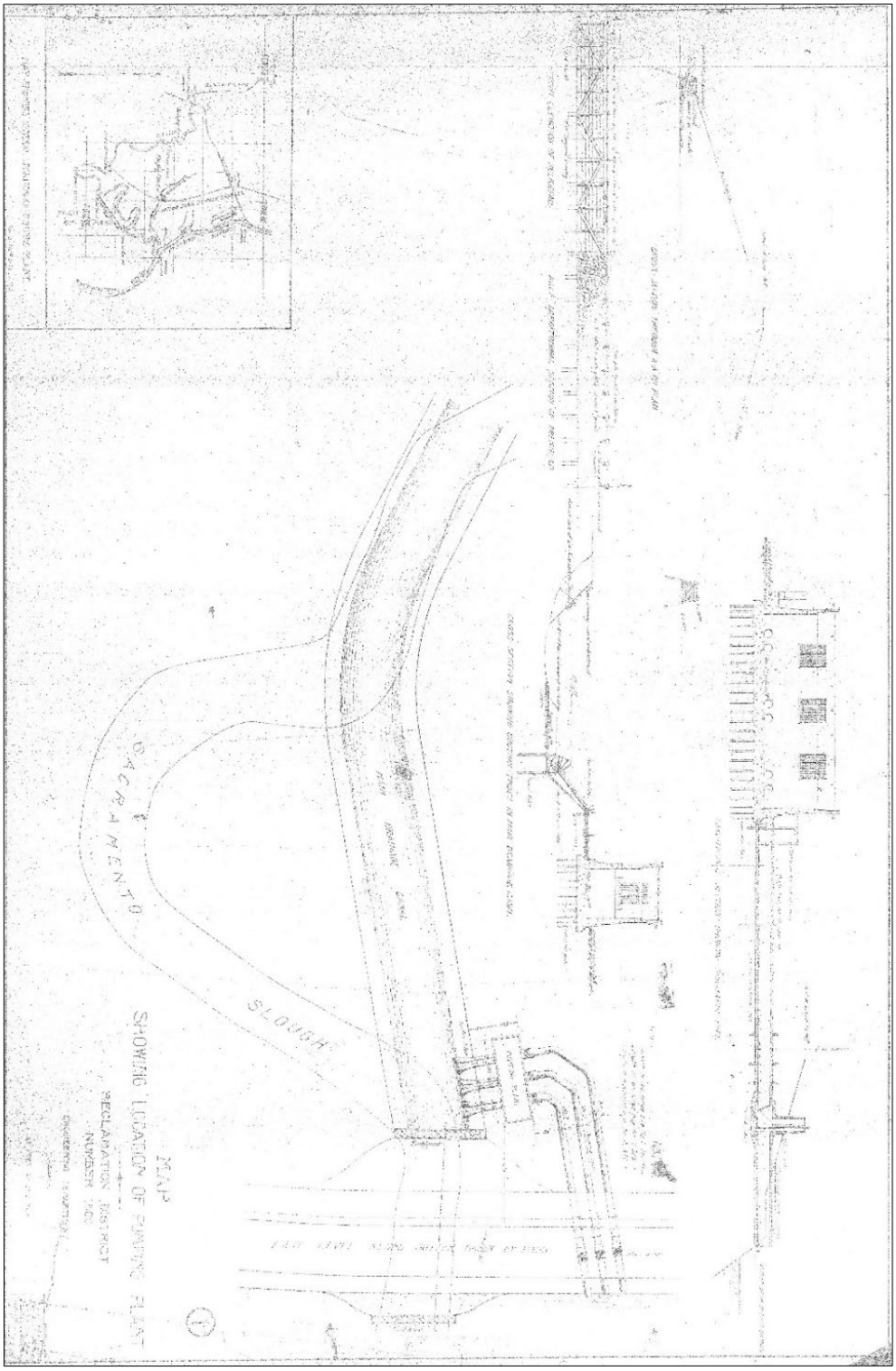
Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-04
Date of map: January 21, 2021

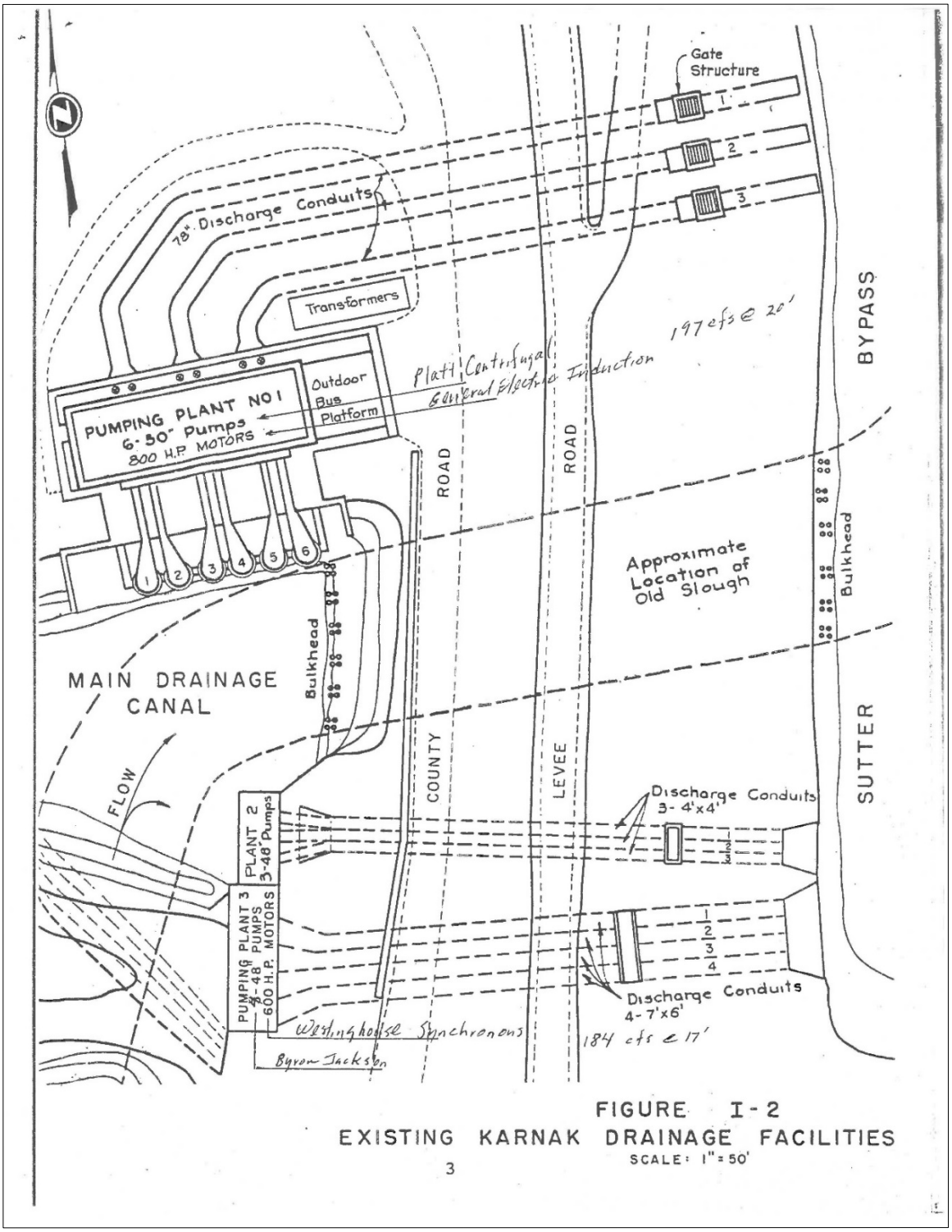




Township 11 North, Range 3 East, Mount Diablo Meridian (GLO Plat 1870). The original location of Sacramento Slough is depicted.



"Map Showing Location of Pumping Plant" (RD 1500 Engineering Department 1914). The RD 1500 Canal (depicted as Main Drainage Canal) is depicted in its current alignment.



"Existing Karnak Drainage Facilities" (BR 1983). The map shows the RD 1500 Canal (depicted as the Main Drainage Canal) in its current alignment.

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION **PRIMARY RECORD**	**Primary #** **HRI #** **Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-05

P1. East Canal

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10, 616897mE/ 4293719mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road for approximately 70 feet (ft).

P3a. Description: This resource is the southernmost segment of the East Canal at its confluence with the RD 1500 Canal, where they merge into the Sacramento Slough, west of the Sacramento River and East of Karnak Drainage Facilities. The recorded segments is approximately 600 ft long and runs generally north to south.

The canal is located in the Sutter Bypass and is bordered to the west by the East Levee. The East Canal was constructed in the early 20th century as a part of the Sutter Bypass reclamation project. It flows along the southwestern edge of the Sutter Bypass from Tisdale to Verona. The East Canal terminates and flows into Sacramento Slough, a natural waterway, and then into the Sacramento River.

P3b. Resource Attributes: HP20. Canal/aqueduct

P4. Resources Present: ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of East Canal, facing northeast.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by:
Kleinfelder
Jessica Neal and Samantha Dunham
435 Lincoln Way
Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Neal, Jessica, Dunham, Samantha, and Kate Willis. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

L1. Historic and/or Common Name: East Canal

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

Location of point or segment: Confluence of East Canal and RD 1500 Canal where they merge into the Sacramento Slough, west of the Sacramento River and east of the Karnak Drainage Facilities.

L3. Description: The southernmost segment of the East Canal at its confluence with RD 1500 Canal where they merge into the Sacramento Slough, west of the Sacramento River and east of the Karnak Drainage Facilities. The East Levee runs west of and parallel to the East Canal. The East Canal begins at the Tisdale Pumping Plant and runs south-southeast and parallel to the Sutter Bypass for the northern half of its length then parallel to the Feather River for the southern half of its length before merging with the RD 1500 Canal into and flowing into the Sacramento Slough (east of the Karnak Drainage Facilities), then letting out into the Sacramento River. The East Canal has a velocity of 500 second-ft capacity. During canal construction, dirt borrowed to make embankments was excavated from the canal section. The old Karnak Drainage Facilities layout depicts bulkheads on the west side of the East Canal at its confluence with the RD 1500 Canal, on the east side of the East Levee.

The East Canal is approximately 25 miles long. This segment of the East Canal is 600 ft long and widens from approximately 100 ft in the north to approximately 200 ft at its confluence with the RD 1500 Canal before feeding into the Sacramento Slough. The west side of the East Canal at the confluence is riprapped with imported rock and some modern and historic refuse and the Karnak Drainage Facilities pump house outlets. An unnamed concrete bridge that leads to agricultural land within the Sutter Bypass crosses the East Canal just north of its confluence with the RD 1500 Canal. No evidence of the bulkhead remains on the eastern side of the East Levee and within the East Canal.

L4. Dimensions:

a. **Top Width**: Unknown
b. **Bottom Width**: Unknown
c. **Height or Depth**: Unknown
d. **Length of Segment**: 600 ft long
e. **Sketch of Cross-Section:** N/A

L5. Associated Resources:
Unnamed Bridge (Temp # RD1500-JN-01)
East Levee (Temp # RD1500-JN-02)
Karnak Pump Station (Temp # RD1500-JN-03)

L6. Setting: The East Canal is in rural Sutter County. Vegetation includes riparian vegetation. This segment of canal at its confluence with RD 1500 Canal where it flows into the Sacramento Slough, west of the Sacramento River and east of the Karnak Drainage Facilities. The East Levee runs west of and parallel to the East Canal. An unnamed concrete bridge that leads to agricultural land within the Sutter Bypass crosses the East Canal just north of its confluence with the RD 1500 Canal.



L7. Integrity Considerations: The segment of the East Canal is in good condition, generally retaining its original form and function. Its form and function have no significant changes since construction.

L8b. Description of Photo, Map, or Drawing:
Where the unnamed concrete bridge crosses the East Canal, facing southeast.

L9. Remarks: None

L10. Form Prepared by: J. Neal and S. Dunham

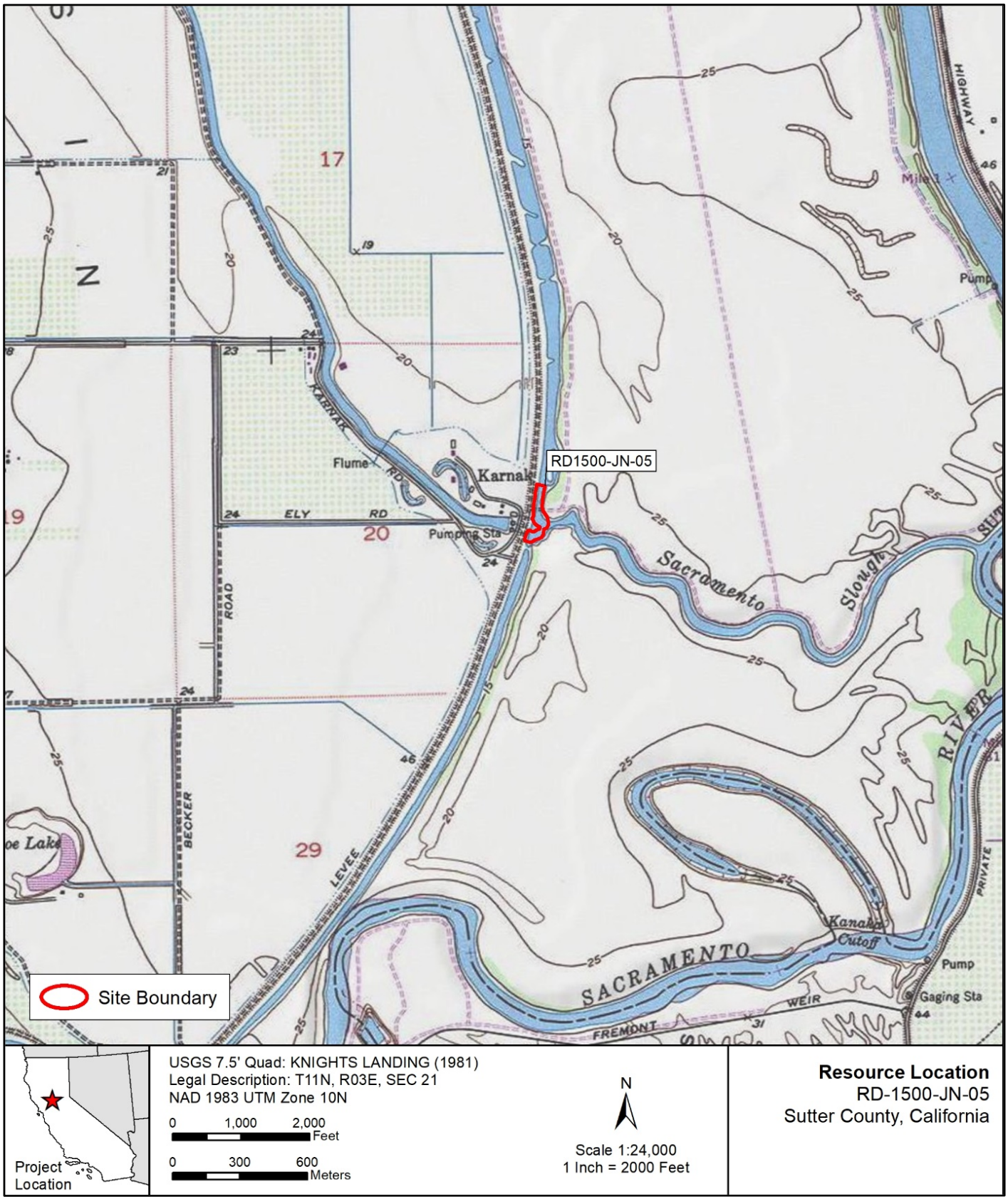
L11. Date: 21-Jan-21

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Resource Name or #: RD1500-JN-05
Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



Resource Location
RD-1500-JN-05
Sutter County, California

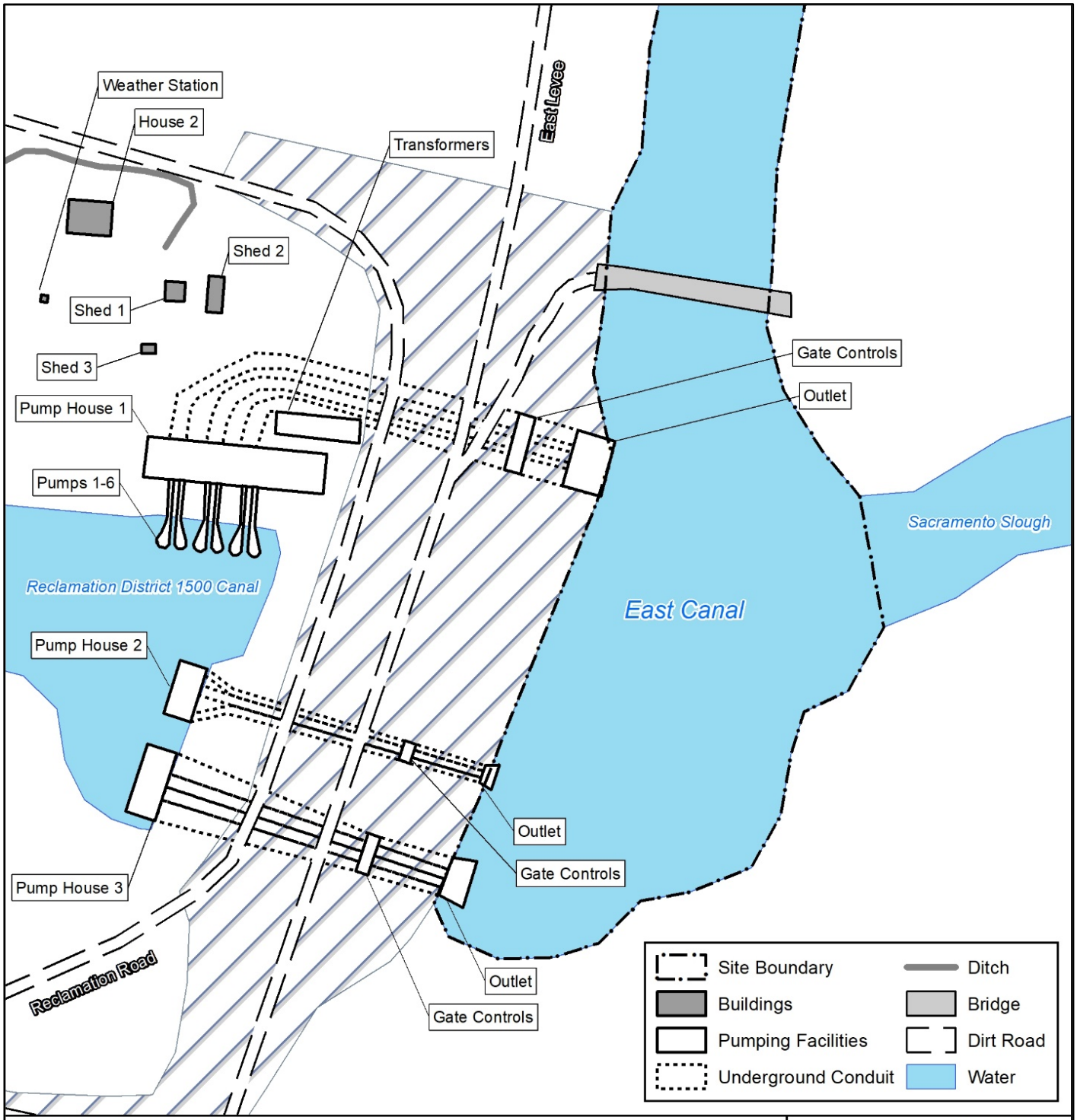
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Drawn by: J. Neal and S. Dunham

Resource Name or #: RD1500-JN-05
Date of map: January 21, 2021



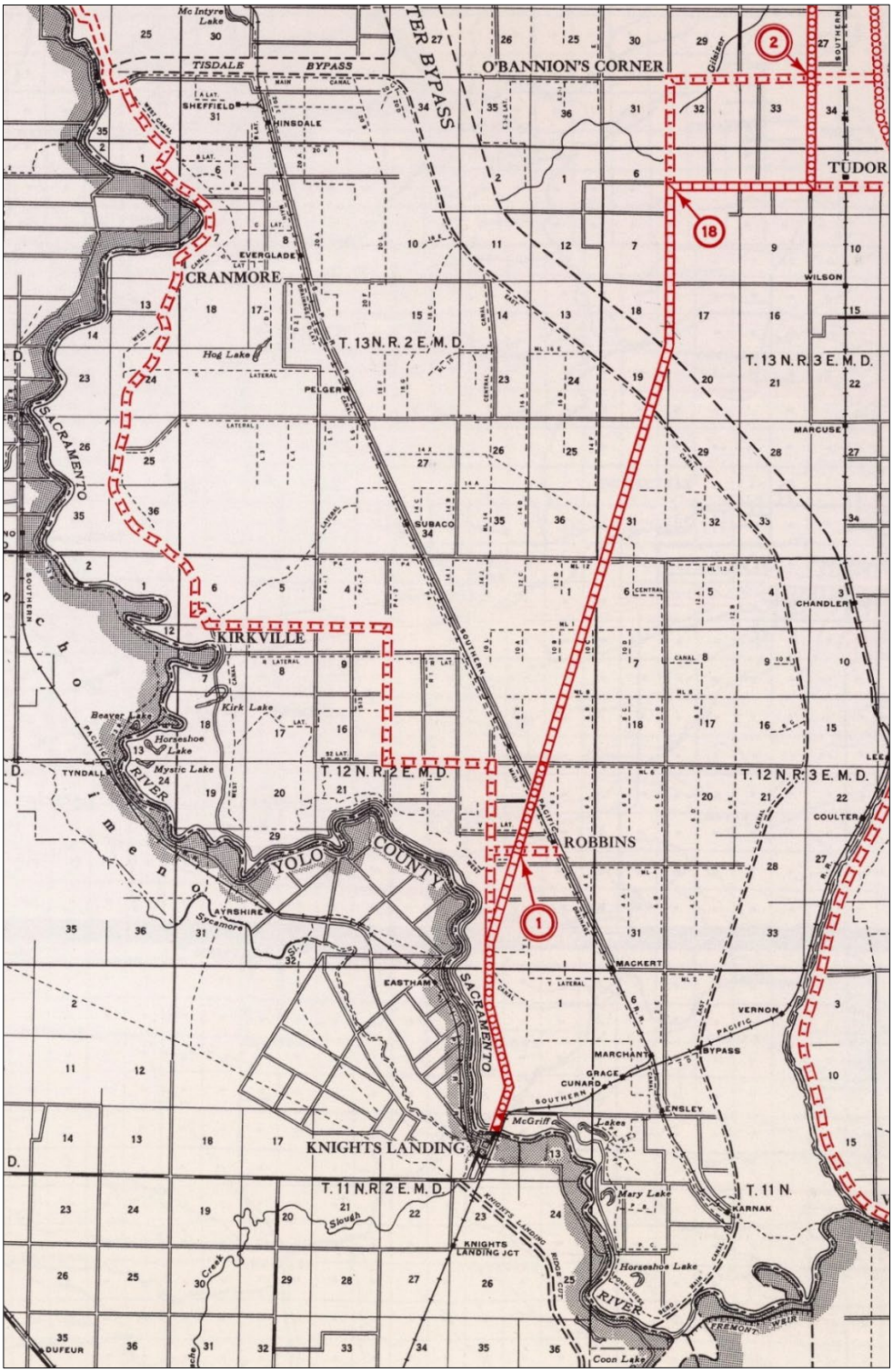
NAD 1983 UTM Zone 10N

0 60 120 Feet
0 20 40 Meters

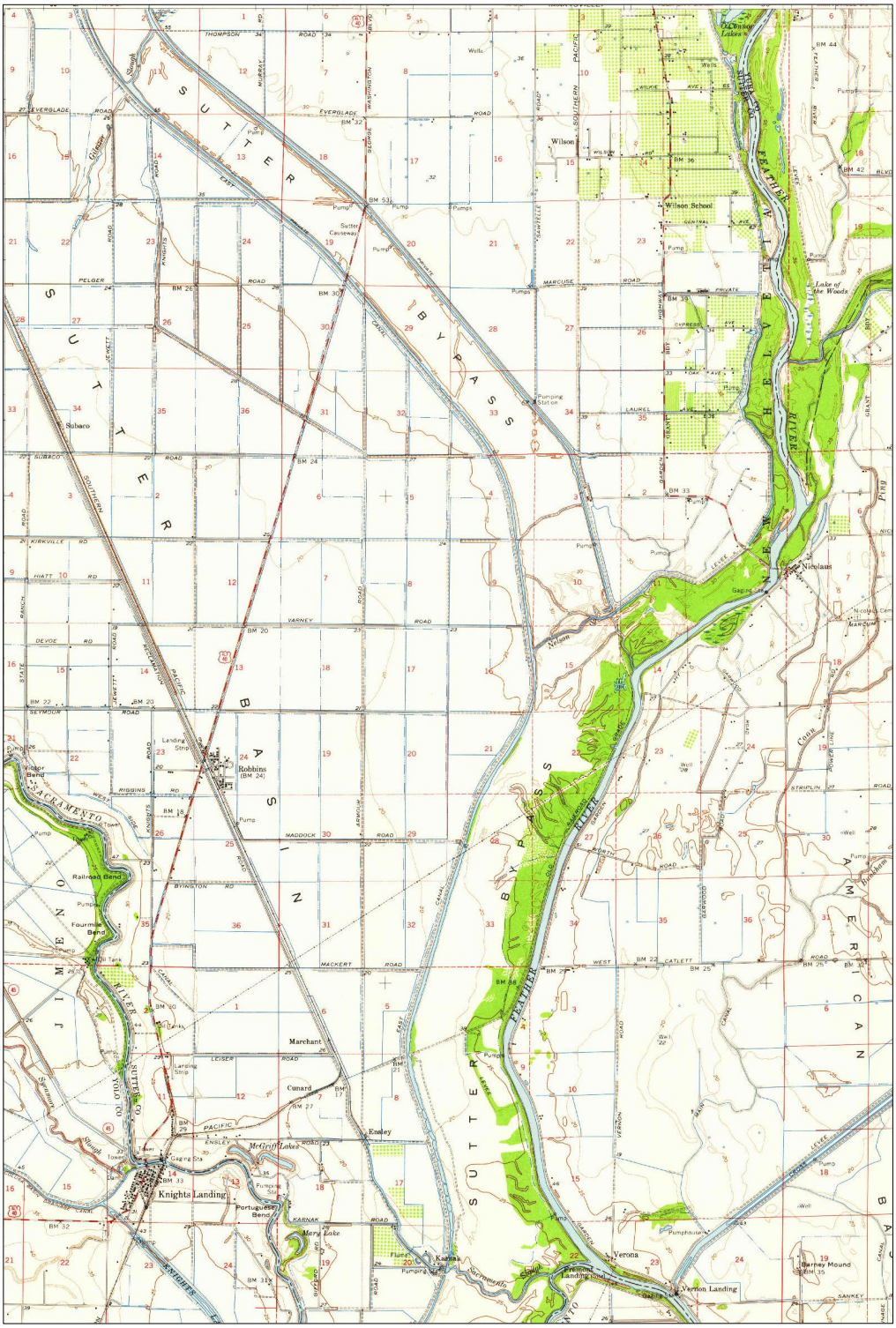
N

Scale 1:1,440
1 inch = 120 feet

Sketch Map
RD1500-JN-05
Sutter County, California



Sutter County (California Division of Highways 1935). The East Canal is depicted in its current alignment.



Knights Landing, Calif. 1:62,500 (USGS 1952 [ed. 1959]). The East Canal is depicted in its current alignment.

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # HRI #
PRIMARY RECORD	**Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-06

P1. House 1

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616714 mE/ 4293760 mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road for approximately 70 feet to the residence.

P3a. Description: This resource consists of a single-story residence of the Minimal Traditional style. The house is constructed of brick and sits on an elevated foundation enclosing a vented crawl space. It is surmounted by a hipped roof. The front elevation features three stepped bays. The side elevations also feature slightly projecting bays. All windows have been replaced. A small, hipped vent extends through the roof above the picture window of the front elevation. The house appears to have been constructed in approximately 1930.

The residential structure serves as housing for employees operating the Reclamation District (RD) 1500 Karnak Drainage Facilities, which consists of three pump houses carrying water from the RD 1500 Canal through the East Levee into the confluence of the East Canal and the RD 1500 Canal and where the two canals merge into the Sacramento Slough. The drainage facilities require staff to be present 24 hours a day. The house is in good condition and appears to have recently renovated with new windows and paint. The house is located on a slight hill north of the RD 1500 Canal and west of one of the pump houses.

P3b. Resource Attributes: HP2. Single family property

P4. Resources Present: ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of house, facing northwest.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by: Kleinfelder
J. Neal, S. Dunham, and K. Willis
435 Lincoln Way
Auburn, CA 9560

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

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

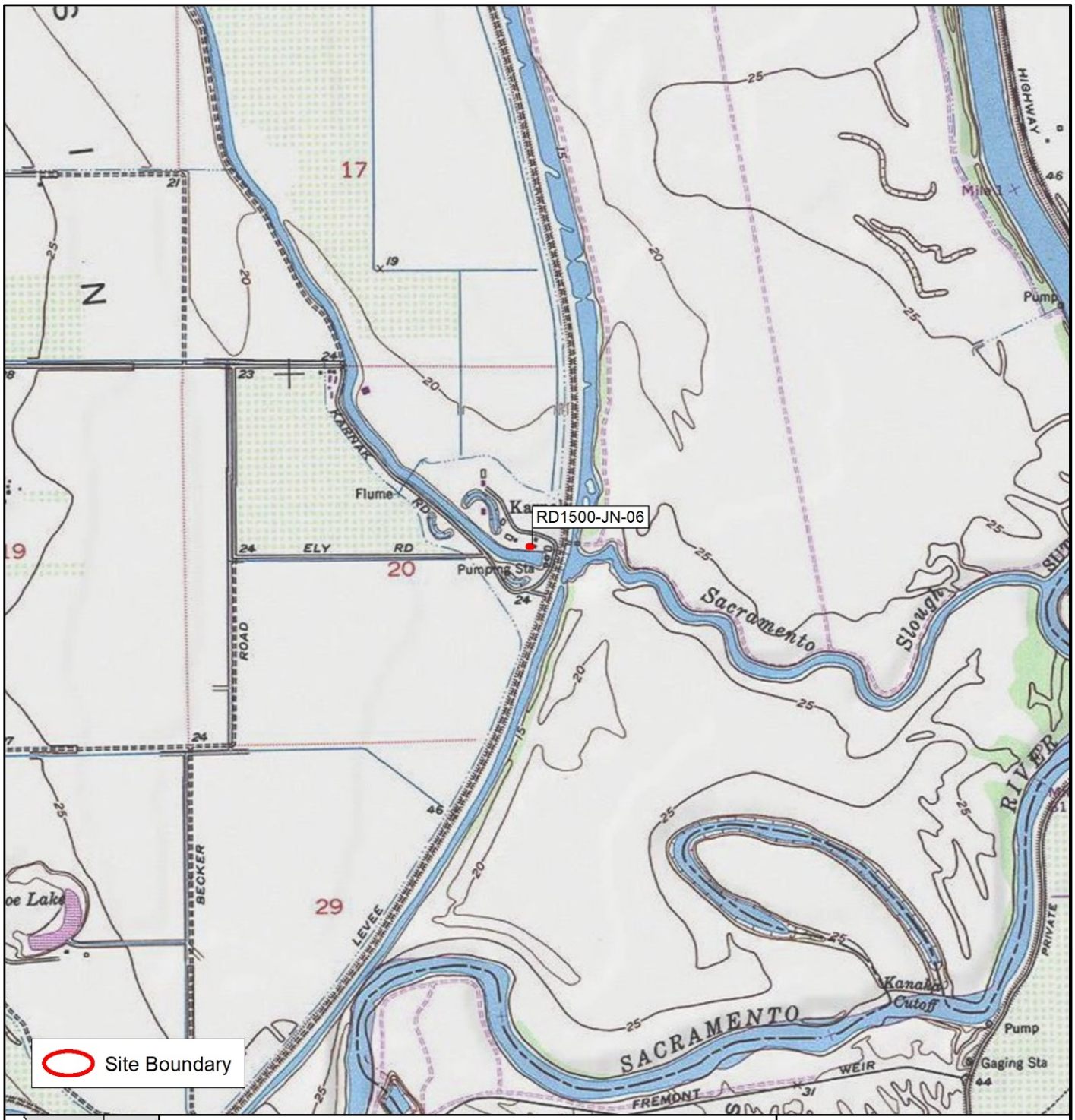
State of California - The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI#**

LOCATION MAP

Trinomial

Resource Name or #: RD1500-JN-06

Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



USGS 7.5' Quad: KNIGHTS LANDING (1981)
Legal Description: T11N, R03E, SEC 21
NAD 1983 UTM Zone 10N

0 1,000 2,000 Feet

0 300 600 Meters

N

Scale 1:24,000
1 Inch = 2000 Feet

Resource Location
RD-1500-JN-06
Sutter County, California

State of California - The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # HRI #
PRIMARY RECORD	**Trinomial** **NRHP Status Code** Other Listings Review Code: Reviewer Date:

 Resource Name or #: RD1500-JN-07

P1. House 2

P2. Location: ☐**Not for Publication** ☒**Unrestricted**

a. County Sutter

b. USGS 7.5' Quad Knights Landing **Date** 1981 **T**11N; **R**03E; SE ¼ **of** the NE ¼ and NE ¼ **of** SE ¼ **of Sec** 20; M.D.**B.M.**

c. Address: N/A

d. UTM: Zone 10N, 616746mE/ 4293809 mN

e. Other Locational Data: From the intersection of Highway 113 and Knights Road in Knights Landing, California, head easterly direction on Knights Road for approximately 0.5 miles. Turn right onto Ensley Road and continue east for 2.2. miles. Turn right onto Reclamation Road and continue in a southerly direction for approximately 2 miles. Turn right onto Bates Road for approximately 70 feet to the residence.

P3a. Description: This resource is a residential structure constructed in approximately 1966. It is a single story, vernacular side gable house. The house is three bays wide by two bays deep with centered entrances on each gable side elevation. The windows are modern, and the house is sheathed in T1-11. It sits on a concrete slab and the roofing materials is asphalt shingle. The gable ends are vented.

The residential structure serves as housing for employees operating the Reclamation District (RD) 1500 Karnak Drainage Facilities, which consists of three pump houses constructed between 1914-1952. The drainage facilities require staff to be present 24 hours a day, and therefore requires staff housing on site. The house is in good condition and appears to have new windows and doors. It is located approximately 170 ft northwest of the largest and oldest pump house.

P3b. Resource Attributes: HP2. Single family property

P4. Resources Present: ☒Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)



P5b. Description of Photo: Overview of house, facing northwest.

P6. Date Constructed/Age and Source:
☒Historic ☐Prehistoric ☐Both

P7. Owner and Address:
Reclamation District 1500
15094 Cranmore Rd
Robbins, CA 95676

P8. Recorded by:
Kleinfelder
J. Neal, S. Dunham, and K. Willis
435 Lincoln Way
Auburn, CA 95603

P9. Date Recorded: January 21, 2021

P10. Survey Type: Intensive Pedestrian Survey

P11. Report Citation: 2021. Dunham, Samantha, Kate Willis, and Jessica Neal. Cultural Resources Identification Report for the Reclamation District 1500 Karnak Pump Station Project in the Community of Karnak, Sutter County, California. On file with Kleinfelder.

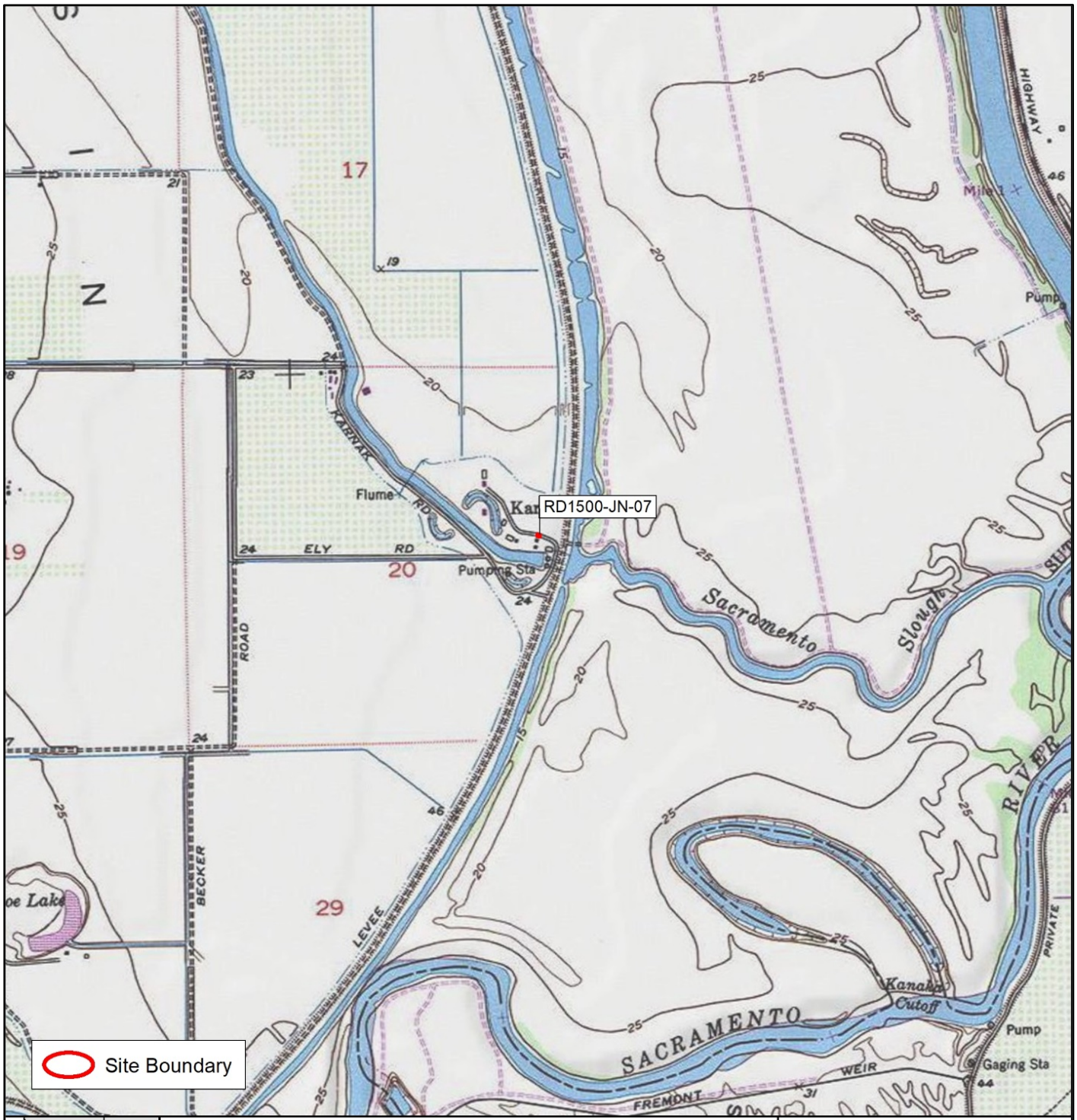
Attachments: ☐ NONE ☒Location Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐Other

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Resource Name or #: RD1500-JN-07
Map Name: Knights Landing, CA **Scale:** 1:24,000 **Date of map:** 1981



Resource Location
RD-1500-JN-07
Sutter County, California

Appendix G

KARNAK DRAINAGE FACILITY DESIGN PLANS

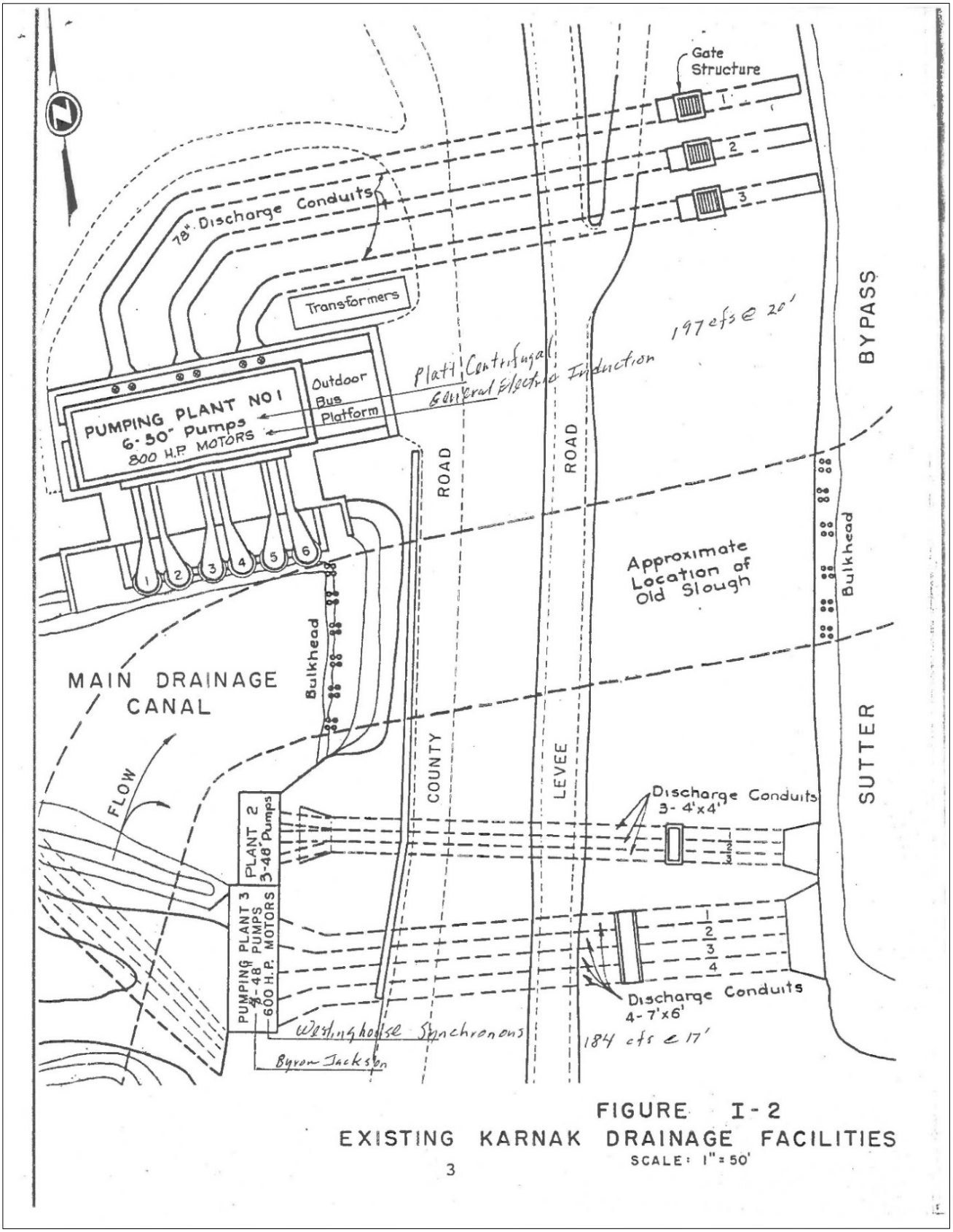
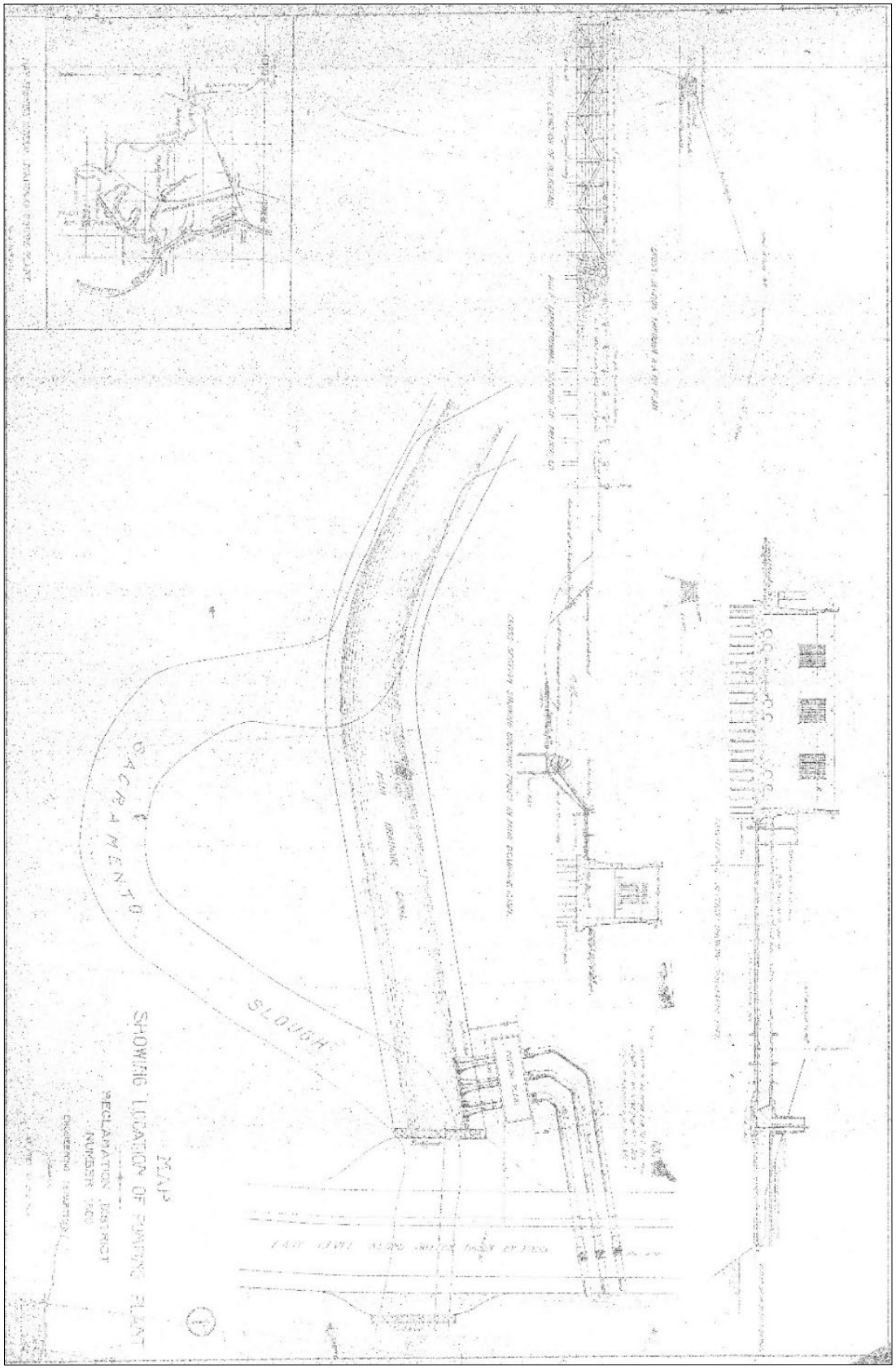


FIGURE I-2
EXISTING KARNAK DRAINAGE FACILITIES
SCALE: 1" = 50'

"Existing Karnak Drainage Facilities" (BR 1983).



"Map Showing Location of Pumping Plant" (RD 1500 Engineering Department 1914).

California Historical Information Center
Northeast Information Center
Non-Confidential Records Search Results

California Historical Resources Information System

BUTTE
GLENN
LASSEN
MODOC
PLUMAS
SHASTA
SIERRA
SISKIYOU
SUTTER
TEHAMA
TRINITY

Northeast Information Center
1074 East Avenue, Suite F
Chico, California 95926
Phone (530) 898-6256
neinfocntr@csuchico.edu

February 5, 2026

Riley Vera
Provost & Pritchard Consulting Group
455 W Fir Ave.
Clovis, CA 93611

IC File # NE26-42
Non-Confidential Record
Search - Standard

RE: RD 1500 Flood Control and Flood Safety Rehabilitation Project
T11N, R3E, Sections 21 & 22 MDBM
USGS Knights Landing 7.5' (1981) & Knights Landing 15' (1964) quadrangle maps
7.6 acres (Sutter County)

Riley Vera:

In response to your request, a records search for the project cited above was conducted by examining the official maps and records for cultural resources and surveys in Sutter County. Cultural resources in our inventory include archaeological objects, sites, landscapes, districts, and all manner of buildings and structures associated with past human activities. Please note that access to archaeological resource records is restricted to qualified individuals.

Results:

Archaeological Resources: According to our records, five resources of this type have been recorded within the project boundaries. For additional information, please review the table below. In addition, no resources of this type have been recorded within the one-mile vicinity.

Primary	Resource Name	Other IDs	Age	Attributes
P-51-000373	RD1500-JN-03	Resource Name - RD1500-JN-03; Other - The Karnak Drainage Facility	Historic	HP09; HP11
P-51-000374	RD1500-JN-04	Resource Name - RD1500-JN-04; Other - Reclamation District 1500 Canal	Historic	HP20
P-51-000375	RD1500-JN-02	Resource Name - RD1500-JN-02; Other - East Levee of Reclamation District No. 1500	Historic	HP39
P-51-000376	RD1500-JN-05	Resource Name - RD1500-JN-05; Other - East Canal	Historic	HP20
P-51-000379	Reclamation District 1500 Historic District (RD1500-JN-08)	Resource Name - Reclamation District 1500 Historic District (RD1500-JN-08)	Historic	HP11; HP20

Built Environment Resources: According to our records, no resources of this type have been recorded within or adjacent to the project boundaries. The Built Environment Resources Directory (BERD), which includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places, does not list any properties within or adjacent to the proposed project area. The BERD is available online at: https://ohp.parks.ca.gov/?page_id=30338

Previous Investigations: According to our records, the project area has been partially surveyed for cultural resources.

Gay Berrien (Shasta-Trinity National Forest)

1986 *Archaeological Reconnaissance Report (Summary) ARR 05-14-757: Eagle Rock Timber Sale, Trinity County, California.*
NEIC-015709

Jessica Neal and Justin Castells (Kleinfelder)

2023 *Cultural Resources Evaluation and Finding of Effects Report for the McGriff Lakes - Sutter Basin Watershed Flood Control & Safety Project in Sutter County, California.*
NEIC-015744

Historical Maps and Literature Search: The official records and maps for archaeological sites and surveys in Sutter County were reviewed. Also reviewed: **National Register of Historic Places - Listed properties and Determined Eligible Properties** (2022); **California Register of Historical Resources** (2022); **California Points of Historical Interest** (2022); **California Inventory of Historic Resources** (1976); **California Historical Landmarks** (2022); **Archaeological Resource Directory** (2022); and **Handbook of North American Indians, Vol. 8, California** (1978).

The USGS Knights Landing 7.5' (1981) & Knights Landing 15' (1964) quadrangle maps depict archaeological sensitive areas within the project's region such as structures, foundations, East canal, pumping stations, and roadways. Additional roadways, as well as Sacramento Slough and flumes are located in the project vicinity.

The project is located in a region utilized by Nisenan populations at the time of Euro-American contact. Indigenous populations used the local region for seasonal and/or permanent settlement, as well as for the gathering of plants, roots, seeds, domestic materials, and hunting seasonal game. Historically, Euro-Americans utilized the region for mining and transportation opportunities.

Sensitivity Assessment and Recommendations:

Based upon the above information and local topography, the project area is considered to have moderate to high sensitivity for cultural resources. Portions of the project along existing sites, roads, and trails are sensitive for archaeological resources. Other areas of sensitivity are flats near creeks, springs, seeps, or rock outcrops that may be located in the project area.

Therefore, because the project area has been previously surveyed for archaeological resources, we recommend that a professional consultant be contacted prior to ground disturbance. The project archaeologist can offer recommendations for avoidance and protection of any existing or newly identified resources. If the proposed project contains buildings or structures that meet the minimum age requirement (45 years in age or older) it is recommended that the resources be assessed by a qualified specialist familiar with architecture and history of the county. Review of the available historic building/structure data has included only those sources listed above and should not be considered comprehensive. A list of qualified consultants is available online at www.chrisinfo.org.

During any phase of parcel development, if any archaeological resources are encountered, all work should cease in the area of the find pending an examination of the site and materials by the project archaeologist. This request to cease work in the area of a potential archaeological find is intended for accidental discoveries made during construction activities and is not intended as a substitute for the recommended cultural resources survey. It is recommended that any identified cultural resources be recorded on DPR 523 historic resource recordation forms, available online from the California Office of Historic Preservation (OHP): https://ohp.parks.ca.gov/?page_id=28351

If human remains are discovered, California Health and Safety Code Section 7050.5 requires you to protect the discovery and notify the county coroner, who will determine if the find is Native American. If the remains are recognized as Native American, the coroner shall then notify the Native American Heritage Commission (NAHC). California Public Resources Code Section 5097.98 authorizes the NAHC to appoint a Most Likely Descendant (MLD) who will make recommendations for the treatment of the discovery.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

Not all known cultural resources have been recorded and submitted to the OHP, so this record search should not be considered an exhaustive list of all cultural resources present in your project area. DPR forms and reports that are used for recording and evaluating sites and individual resources are submitted to the Northeast Information Center by private and public agencies. Please note that the Northeast Information Center is not responsible for misinformation of coordinates presented on the submitted DPR forms. If a discrepancy is found, please contact the lead agency for more information.

Due to processing delays and other factors, not all of the cultural resource reports and resource records that have been submitted to the OHP are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for cultural resource management work in the search area. Finally, Native American tribes have cultural resource information not in the CHRIS Inventory, and the NAHC should be contacted at

(916) 373-3710 for information regarding Native American representatives in the vicinity of the project.

Thank you for your dedication to preserving California's irreplaceable cultural heritage. Please feel free to contact us if you have any questions or need any further information or assistance.

Sincerely,

Ashlyn Weaver

Ashlyn Weaver, M.A., RPA
Coordinator & GIS Specialist
Northeast Information Center
(530) 898-6256

Native American Heritage Commission
Sacred Lands File Search Results

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Reginald Pagaling
Chumash

VICE-CHAIRPERSON
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

SECRETARY
Isaac Bojorquez
Ohlone-Costanoan

PARLIAMENTARIAN
Wayne Nelson
Luiseño

COMMISSIONER
Sara Dutschke
Miwok

COMMISSIONER
Stanley Rodriguez
Kumeyaay

COMMISSIONER
Bennae Calac
Pauma-Yuima Band of Luiseño Indians

COMMISSIONER
Vacant

COMMISSIONER
Vacant

EXECUTIVE SECRETARY
Andrew Alejandre
Paskenta Band of Nomlaki Indians

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov

February 3, 2026

Riley Vera
Provost & Pritchard Consulting Group

Via Email to: rvera@ppeng.com

Re: RD 1500 Flood Control and Flood Safety Rehabilitation Project, Sutter County

To Whom It May Concern:

As requested, a search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed based on information submitted for the above referenced project. The results were negative. Be aware that tribes do not always record their sacred sites in the SLF, nor are they required to do so. As such, an SLF search is not a substitute for consultation with all tribes that are traditionally and culturally affiliated with a project's geographic area.

Attached is a list of Native American tribes that are traditionally and culturally affiliated with the project's geographic area. Please contact all of the listed tribes as they may have information about sacred sites within the project area that is not listed with the NAHC.

If within two weeks of notification, a response has not been received, the Commission requests that you follow up with a telephone call or email to ensure that the project information was received.

If you receive notification of a change of address or phone number from a tribe, please inform the NAHC so that we can assure that our lists contain current information.

In addition to engaging in tribal consultation, you should consult the appropriate regional California Historical Research Information System (CHRIS) information center to determine whether it has information regarding the presence of recorded archaeological sites within the project area.

If you have any questions or need additional information, please contact me at Mathew.lin@nahc.ca.gov.

Sincerely,

Mathew Lin

Mathew Lin, MPP
Cultural Resources Analyst

Attachment

Tribal Correspondence

1500 Reclamation District

February 19, 2026

Glenda Nelson, Chairperson
Estom Yumeka Maidu Tribe of the Enterprise Rancheria
2133 Monte Vista Avenue
Oroville, CA 95966

Subject: Reclamation District 1500 Flood Control & Flood Safety Rehabilitation Project

Dear Chairperson Nelson:

Reclamation District 1500 is preparing an initial study in compliance with the California Environmental Quality Act (CEQA) for the above referenced project and is requesting your review to determine if formal consultation is appropriate pursuant to Public Resources Code Section 21080.3.1 (Assembly Bill [AB] 52).

Project:

Reclamation District 1500 (RD 1500) has proposed to modernize and upgrade the existing Karnak Drainage Facility to allow continued discharge of water from the RD 1500 Canal to the East Canal, which feeds into the Sacramento Slough and then into the Sacramento River in unincorporated Sutter County, California (Project). The Project consists of three antiquated pump stations located on Assessor's Parcel Number (APN) 034-170-012, 034-170-022, 034-170-030, 034-170-031 (Project Site). These APNs total approximately 7.6 acres in size. The Project is adjacent to the Sutter Bypass/East Canal levee with existing culverts through the levee that will continue to be used. The improvements would allow the facility to continue to provide flood protection to the Sutter Basin similar to current operations. One of the three existing pump stations would be modernized to improve pump discharge capabilities as to make the facility easier to maintain and operate. The other two existing pump stations would be demolished, with one of the two being replaced in the same position by a slightly larger pump station. Additionally, new energy efficient equipment would be installed, and the pumping capacity of the station would be increased from 1,900 cubic feet per second (cfs) to 2,200 cfs. The electrical facilities would be upgraded and be flood protected by locating them two feet above the flood stage. An emergency backup generator would be installed on the levee, but otherwise no modifications will be made to the existing levee. Construction of the Project would involve site preparation, grading, paving, construction, and site cleanup. Principal deliveries to the Project site would include construction equipment, concrete and asphalt materials, building materials, and any additional hardware required to construct the Project.

The Project is proposed to be funded in part by the Natural Resources Conservation Service (NRCS) Watershed Flood Prevention and Operations (WFPO) program, and as such, NRCS has previously initiated consultation with you pursuant to Section 106 of the National Historic Preservation Act (Title 54 USC 306108) of 1966, as amended, for the Project. In addition, RD 1500 has submitted an application for a 408 encroachment permit to the Central Valley Flood Protection Board for a geotechnical investigation at the site to provide geotechnical data needed for design of the proposed improvements.

A copy of the topographic map and aerial map for the Project is attached for your reference. Pursuant to AB 52, the Tribe has 30 days to request formal consultation. Please feel free to contact me with any questions or comments at 530.738.4423 or at rcornwell@sutterbasinwater.com.

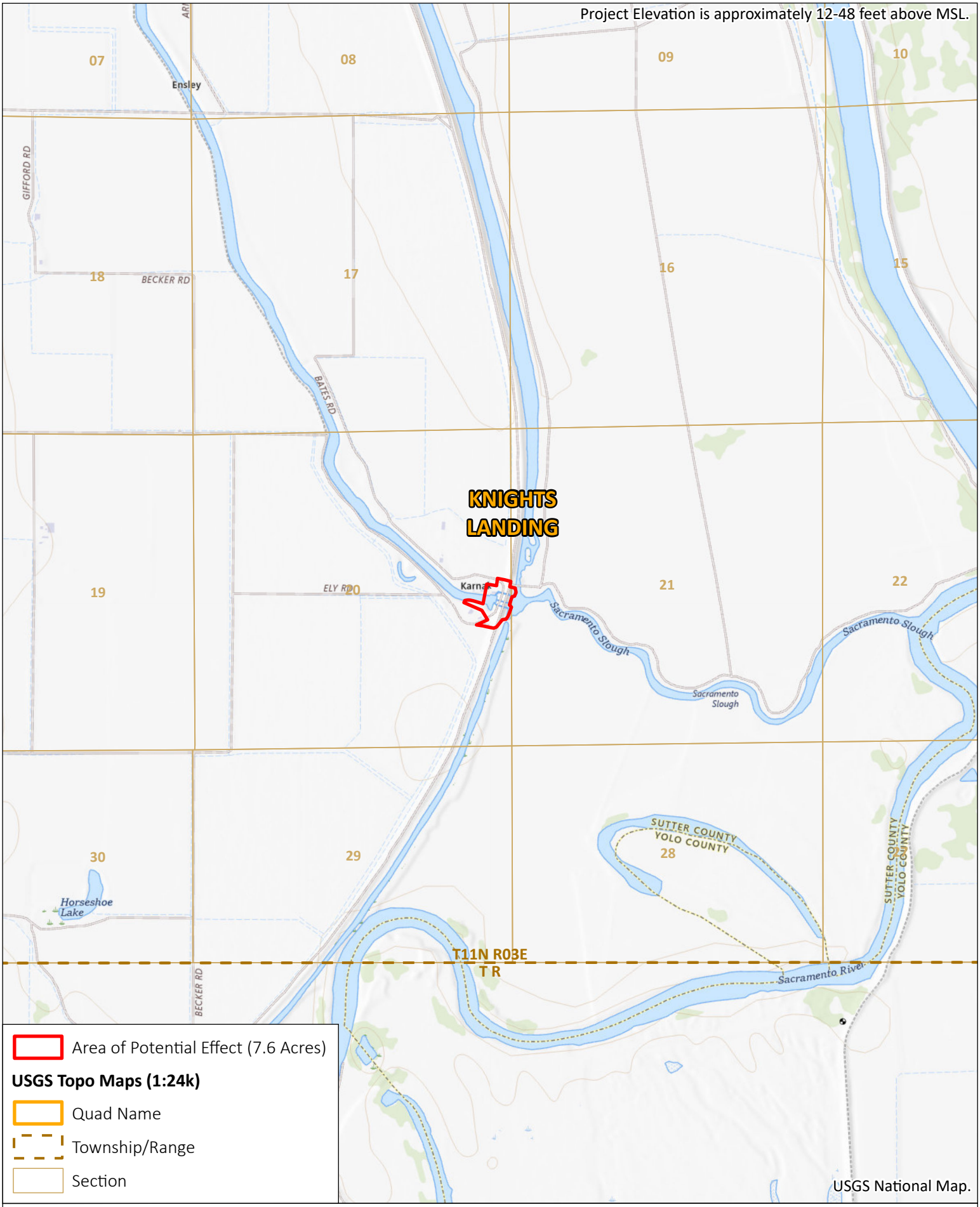
Respectfully,

Roger Cornwell

General Manager, Reclamation District 1500

Attachments Topographic Map

Aerial Map

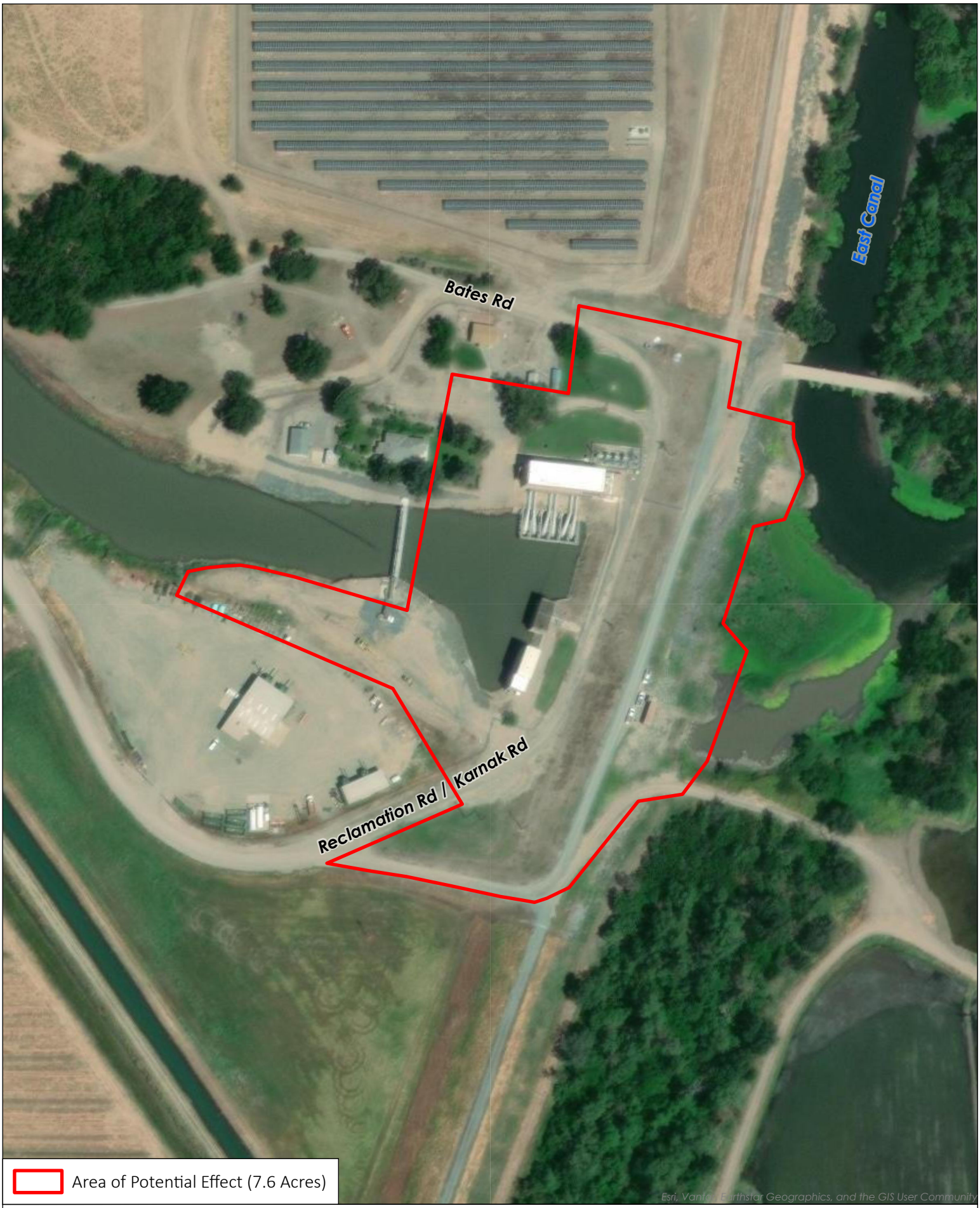


Topographic map

Reclamation District 1500 - Flood Control

PROVOST& PRITCHARD

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0 100 200

Feet

Aerial Map

Reclamation District 1500 - Flood Control

PROVOST& PRITCHARD

1500 Reclamation District

February 19, 2026

Anna Starkey
United Auburn Indian Community of the Auburn Rancheria
10720 Indian Hill Road
Auburn, CA 95603

Subject: Reclamation District 1500 Flood Control & Flood Safety Rehabilitation Project

Dear Anna Starkey:

Reclamation District 1500 is preparing an initial study in compliance with the California Environmental Quality Act (CEQA) for the above referenced project and is requesting your review to determine if formal consultation is appropriate pursuant to Public Resources Code Section 21080.3.1 (Assembly Bill [AB] 52).

Project:

Reclamation District 1500 (RD 1500) has proposed to modernize and upgrade the existing Karnak Drainage Facility to allow continued discharge of water from the RD 1500 Canal to the East Canal, which feeds into the Sacramento Slough and then into the Sacramento River in unincorporated Sutter County, California (Project). The Project consists of three antiquated pump stations located on Assessor's Parcel Number (APN) 034-170-012, 034-170-022, 034-170-030, 034-170-031 (Project Site). These APNs total approximately 7.6 acres in size. The Project is adjacent to the Sutter Bypass/East Canal levee with existing culverts through the levee that will continue to be used. The improvements would allow the facility to continue to provide flood protection to the Sutter Basin similar to current operations. One of the three existing pump stations would be modernized to improve pump discharge capabilities as to make the facility easier to maintain and operate. The other two existing pump stations would be demolished, with one of the two being replaced in the same position by a slightly larger pump station. Additionally, new energy efficient equipment would be installed, and the pumping capacity of the station would be increased from 1,900 cubic feet per second (cfs) to 2,200 cfs. The electrical facilities would be upgraded and be flood protected by locating them two feet above the flood stage. An emergency backup generator would be installed on the levee, but otherwise no modifications will be made to the existing levee. Construction of the Project would involve site preparation, grading, paving, construction, and site cleanup. Principal deliveries to the Project site would include construction equipment, concrete and asphalt materials, building materials, and any additional hardware required to construct the Project.

The Project is proposed to be funded in part by the Natural Resources Conservation Service (NRCS) Watershed Flood Prevention and Operations (WFPO) program, and as such, NRCS has previously initiated consultation with you pursuant to Section 106 of the National Historic Preservation Act (Title 54 USC 306108) of 1966, as amended, for the Project. In addition, RD 1500 has submitted an application for a 408 encroachment permit to the Central Valley Flood Protection Board for a geotechnical investigation at the site to provide geotechnical data needed for design of the proposed improvements.

A copy of the topographic map and aerial map for the Project is attached for your reference. Pursuant to AB 52, the Tribe has 30 days to request formal consultation. Please feel free to contact me with any questions or comments at 530.738.4423 or at rcornwell@sutterbasinwater.com.

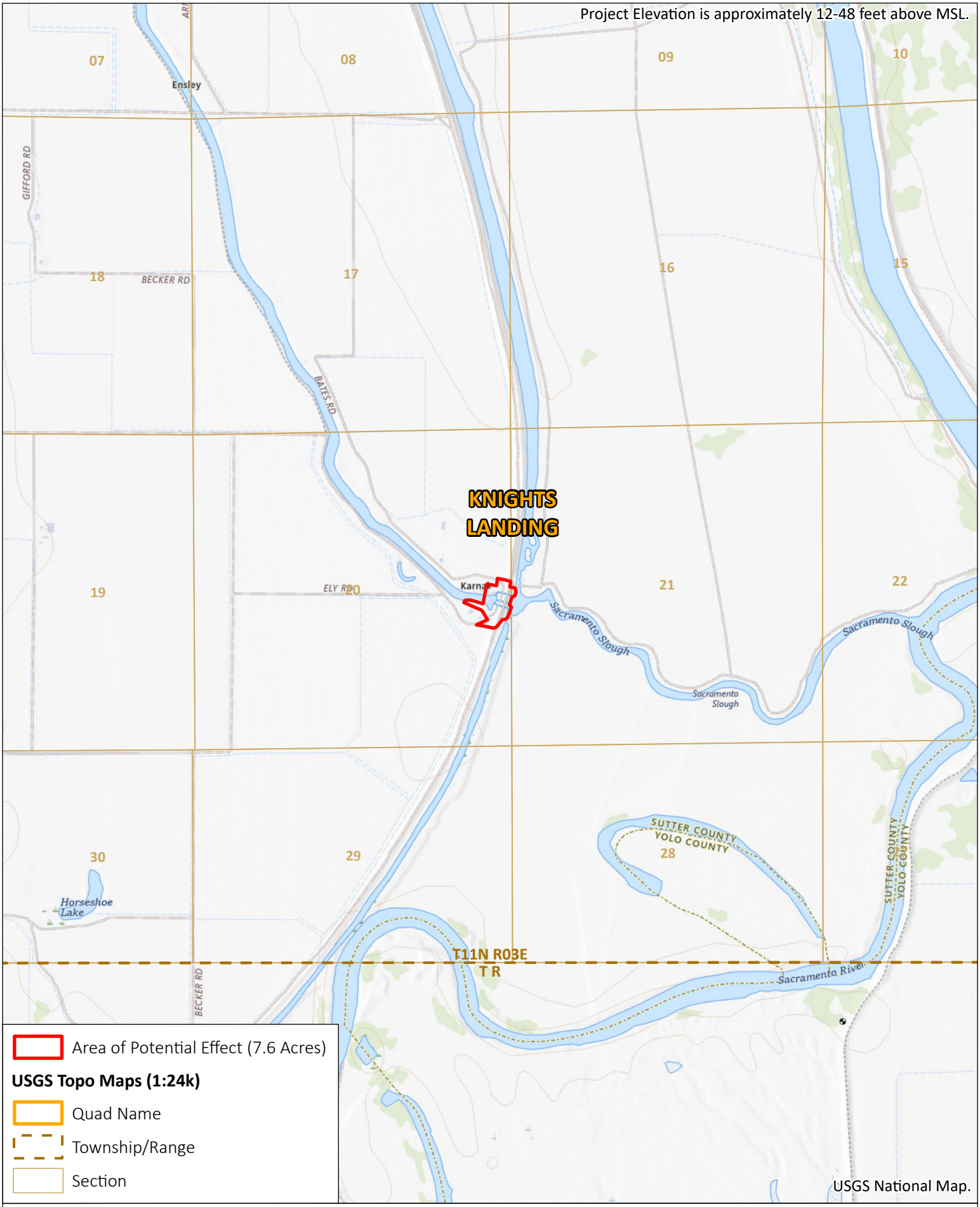
Respectfully,

Roger Cornwell

General Manager, Reclamation District 1500

Attachments: Topographic Map

Aerial Map

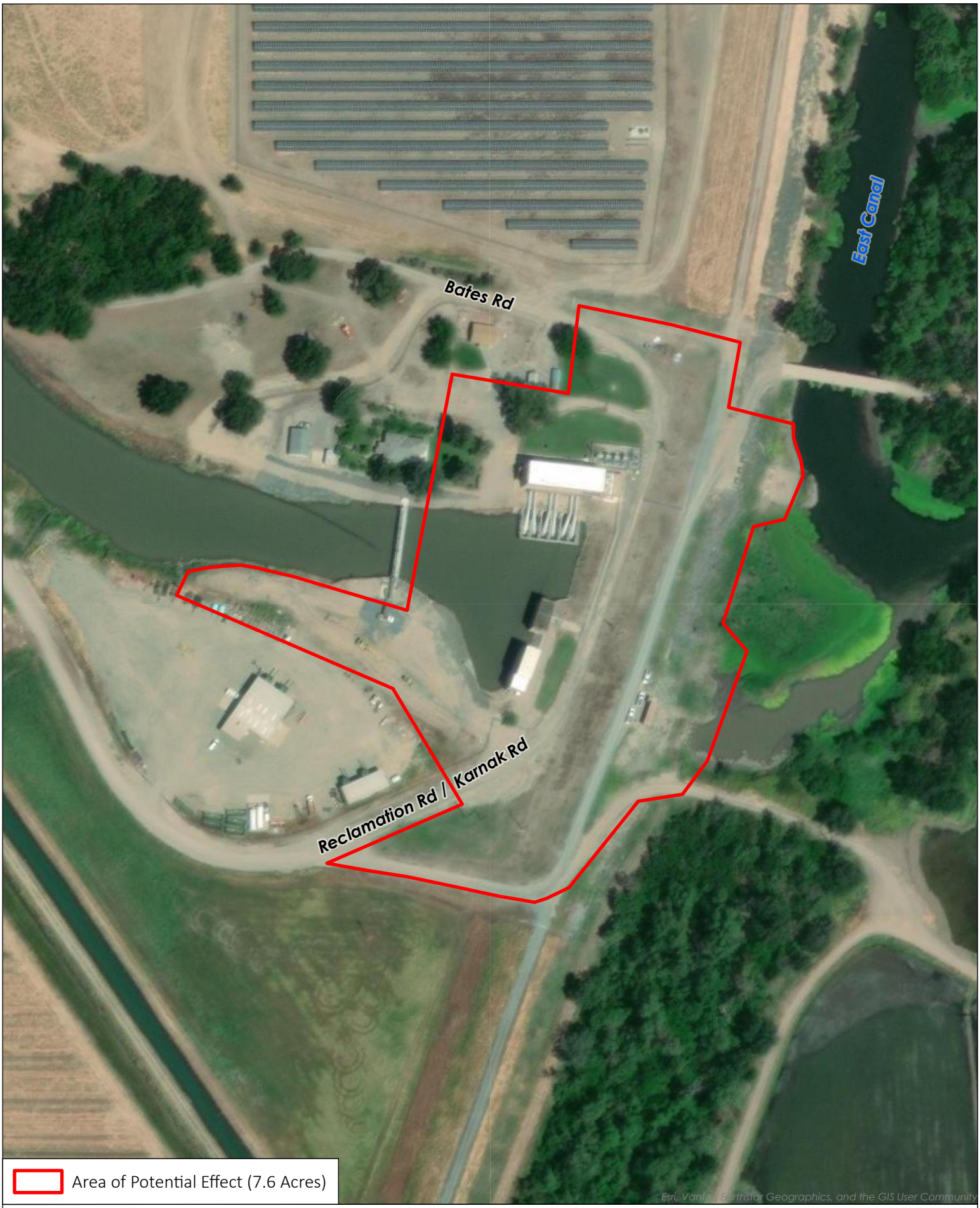


Topographic map

Reclamation District 1500 - Flood Control

PROVOST& PRITCHARD

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Aerial Map

Reclamation District 1500 - Flood Control

PROVOST& PRITCHARD

1500 Reclamation District

February 19, 2026

Gene Whitehouse, Chairperson
United Auburn Indian Community of the Auburn Rancheria
10720 Indian Hill Road
Auburn, CA 95603

Subject: Reclamation District 1500 Flood Control & Flood Safety Rehabilitation Project

Dear Chairperson Whitehouse:

Reclamation District 1500 is preparing an initial study in compliance with the California Environmental Quality Act (CEQA) for the above referenced project and is requesting your review to determine if formal consultation is appropriate pursuant to Public Resources Code Section 21080.3.1 (Assembly Bill [AB] 52).

Project:

Reclamation District 1500 (RD 1500) has proposed to modernize and upgrade the existing Karnak Drainage Facility to allow continued discharge of water from the RD 1500 Canal to the East Canal, which feeds into the Sacramento Slough and then into the Sacramento River in unincorporated Sutter County, California (Project). The Project consists of three antiquated pump stations located on Assessor's Parcel Number (APN) 034-170-012, 034-170-022, 034-170-030, 034-170-031 (Project Site). These APNs total approximately 7.6 acres in size. The Project is adjacent to the Sutter Bypass/East Canal levee with existing culverts through the levee that will continue to be used. The improvements would allow the facility to continue to provide flood protection to the Sutter Basin similar to current operations. One of the three existing pump stations would be modernized to improve pump discharge capabilities as to make the facility easier to maintain and operate. The other two existing pump stations would be demolished, with one of the two being replaced in the same position by a slightly larger pump station. Additionally, new energy efficient equipment would be installed, and the pumping capacity of the station would be increased from 1,900 cubic feet per second (cfs) to 2,200 cfs. The electrical facilities would be upgraded and be flood protected by locating them two feet above the flood stage. An emergency backup generator would be installed on the levee, but otherwise no modifications will be made to the existing levee. Construction of the Project would involve site preparation, grading, paving, construction, and site cleanup. Principal deliveries to the Project site would include construction equipment, concrete and asphalt materials, building materials, and any additional hardware required to construct the Project.

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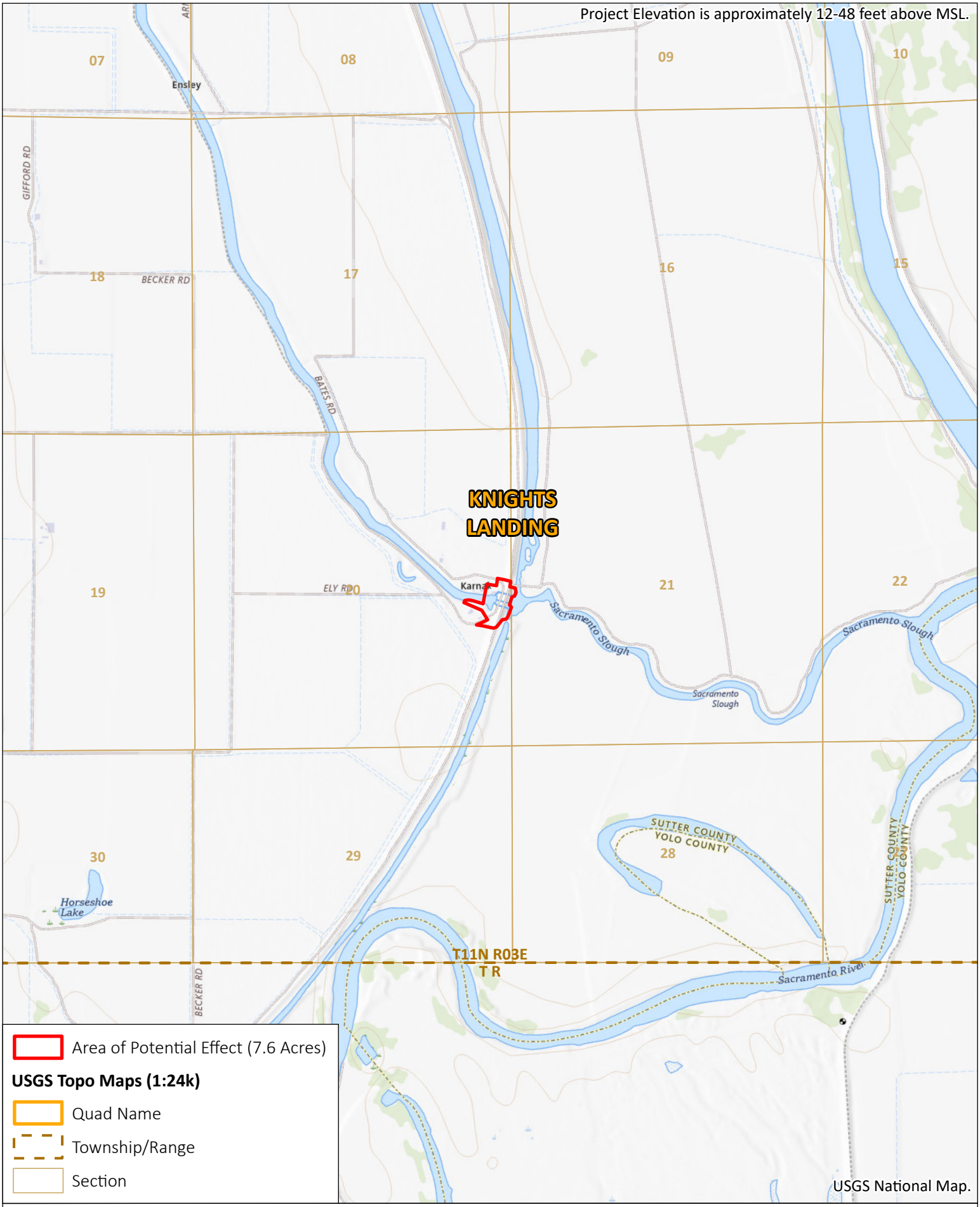
Respectfully,

Roger Cornwell

General Manager, Reclamation District 1500

Attachments: Topographic Map

Aerial Map

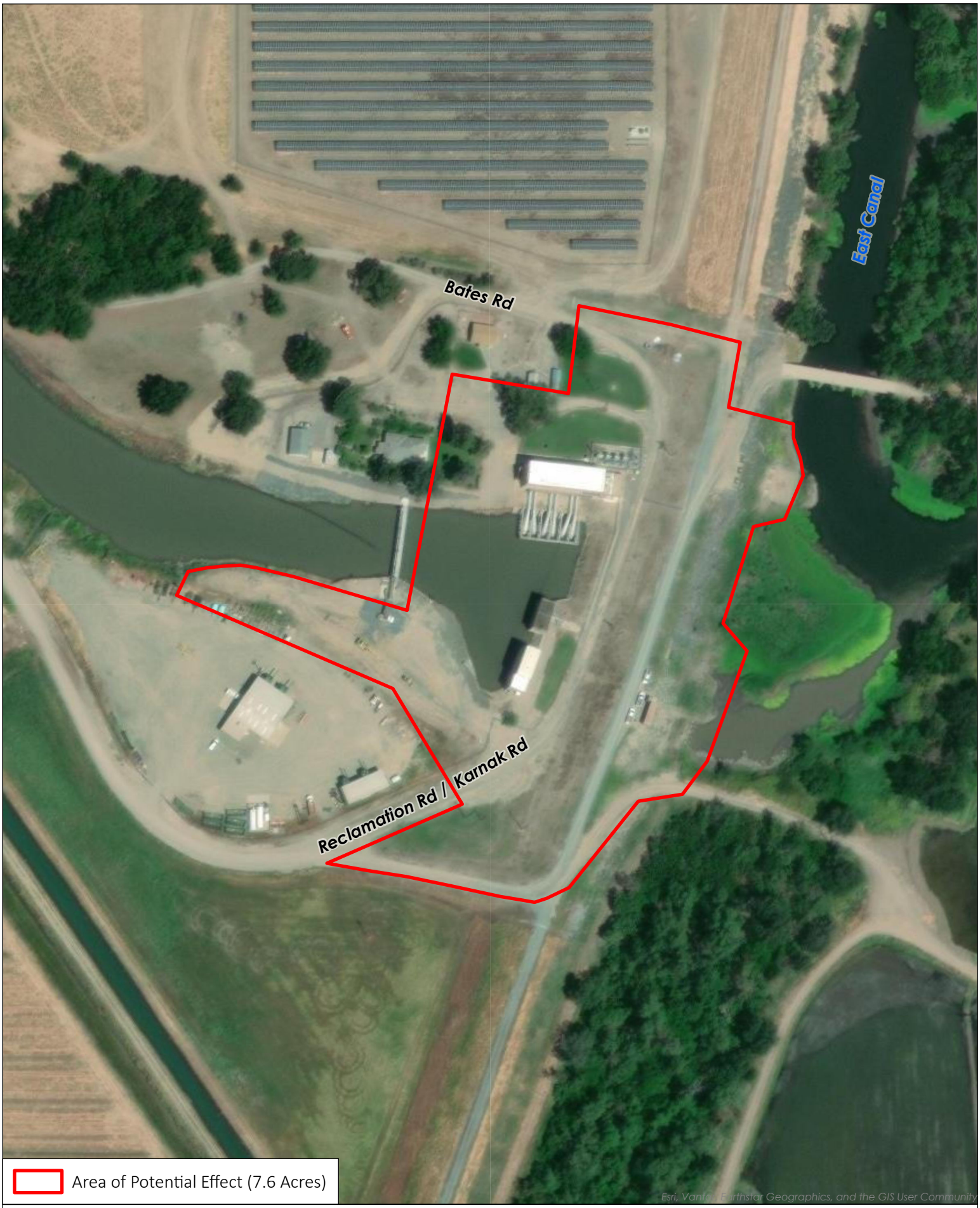


Topographic map

Reclamation District 1500 - Flood Control

PROVOST& PRITCHARD

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Aerial Map

Reclamation District 1500 - Flood Control

PROVOST& PRITCHARD