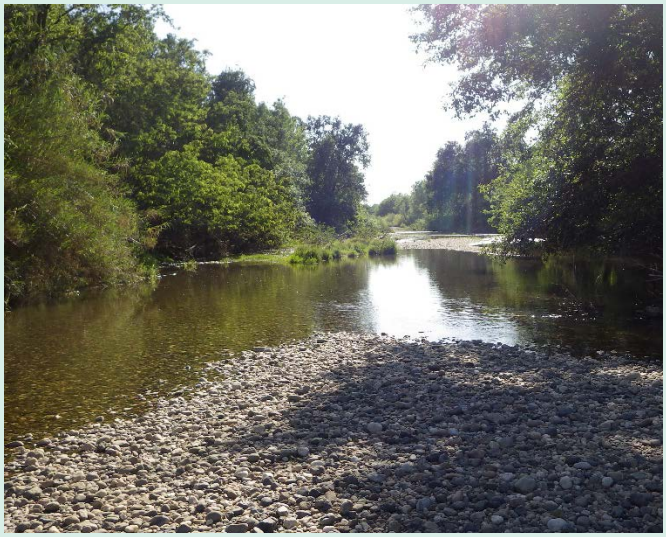
PUBLIC DRAFT ◦ FEBRUARY 2021

Initial Study/Mitigated Negative Declaration for the Bear River Setback Levee Project



PREPARED FOR

Reclamation District No. 817
P.O. Box 261
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Cover photos (counterclockwise starting from top left): Bear River, May 2020; view of Bear River, May 2020; blue elderberry along Bear River, April 2019; Bear River levee and adjacent orchard, September 2019.

PROJECT SUMMARY

Bear River Setback Levee Project	
CEQA lead agency name and address	Reclamation District No. 817 P.O. Box 261 Wheatland, CA 95692
CEQA responsible agencies	California Department of Water Resources
Contact person and phone number	Tom Engler, P.E., CFM, Principal MBK Engineers (916) 437-7507
Project location	Bear River Levee Stations 125–237, Sutter County Agricultural land north of the City of Wheatland, Yuba County
Project sponsor's name and address	Reclamation District No. 817 P.O. Box 261 Wheatland, CA 95692
Zoning	Agriculture
Description of Project	Improve the Bear River levee by constructing approximately 2,800 feet of setback levee, buttressing approximately 8,500 feet of existing levee, and degrading a portion of the existing levee where the setback levee is constructed.
Surrounding land uses and setting	The Project is on land zoned for agriculture. The levee is on the northern bank of the Bear River two miles west-southwest of the City of Wheatland, and the borrow site is approximately 0.5 mile north of the City of Wheatland.
Other public agencies whose approval may be required (e.g., permits, financing approval, or participation agreement)	• Central Valley Flood Protection Board (Encroachment Permit) • U.S. Army Corps of Engineers (Section 408 Permission Letter) • California Department of Fish and Wildlife (California Endangered Species Act, California Fish and Game Code Section 1602) • California State Office of Historic Preservation (Section 106 of the National Historic Preservation Act) • Central Valley Regional Water Quality Control Board, Region 5 (Sections 401 and 402 of the Clean Water Act, Waste Discharge Requirements) • Feather River Air Quality Management District (Authority to Construct/Permit to Operate) • Sutter County (Construction Authorization/Grading Permit) • Yuba County (Construction Authorization/Grading Permit)

PROPOSED MITIGATED NEGATIVE DECLARATION

Project: Bear River Setback Levee Project

Lead Agency: Reclamation District No. 817

Project Location: The Project setback levee and buttress will be constructed on the north bank of the Bear River in Sutter County, approximately two miles west-southwest of the City of Wheatland, California. The borrow site is on private property approximately 0.5 mile north of the City of Wheatland in Yuba County, California.

Project Description: Reclamation District No. 817 plans to address continued erosion and associated flood risk by constructing approximately 2,800 linear feet of setback levee, degrading the same stretch of existing levee, and using the degrade material to buttress a section of the existing levee on the north bank of the Bear River beginning at the downstream tie-in location of the setback levee and extending up to 8,500 linear feet downstream.

Findings: An Initial Study has been prepared to assess the Project's potential effects on the environment and the significance of those effects. Based on the Initial Study, Reclamation District No. 817 has determined that the Project, including mitigation measures included in the Project design, will not have significant effects on the environment. This conclusion is supported by the following findings:

- The Project will have no impacts on the following: land use and planning, mineral resources, population and housing, public services, recreation, and wildfire.
- The Project will result in less than significant impacts on the following: aesthetics, agricultural resources, energy, greenhouse gas emissions, hazards/hazardous materials, hydrology/water quality, noise, and utilities/service systems.
- Mitigation is included in the Project design to reduce potentially significant impacts to less than significant levels for: air quality, biological resources, cultural resources, geology and soils, transportation, and tribal cultural resources.

Mandatory Findings of Significance:

- The Project will not 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, 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.
- The Project will not have environmental effects that are individually limited, but cumulatively considerable.
- The Project will not have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly.
- The Project will not achieve short-term environmental goals to the disadvantage of long-term environmental goals.
- No substantial evidence exists that the Project will have a negative or adverse effect on the environment.

Proposed Mitigation Measures: Mitigation measures included in the Project to avoid or minimize potential environmental impacts are included in the attached Initial Study, which is hereby incorporated and fully made part of this Mitigated Negative Declaration. Implementation of these mitigation measures will ensure that the potential environmental impacts of the Project are less than significant. Reclamation District No. 817 has agreed to implement each of the identified mitigation measures, which will be adopted as part of the Mitigation Monitoring and Reporting Program.

Determination

In accordance with Section 21082.1 of the California Environmental Quality Act (CEQA), Reclamation District No. 817 has independently reviewed and analyzed the Initial Study and proposed Mitigated Negative Declaration for the Project and finds that the Initial Study and proposed Mitigated Negative Declaration reflects the independent judgment of Reclamation District No. 817. The lead agency further finds that the Project mitigation measures will be implemented as stated in the Initial Study and Mitigated Negative Declaration. This Mitigated Negative Declaration is filed in accordance with CEQA and the state CEQA guidelines.

I hereby approve this Project:

_____ _____

Reclamation District No. 817 Date

TABLE OF CONTENTS

Tables

Figures

Appendices

1 INTRODUCTION

Reclamation District 817 (District) is responsible for operation and maintenance of the levees surrounding the Bear River and Dry Creek, which provide flood protection to the Wheatland Basin in Yuba and Sutter counties. The District intends to construct approximately 2,800 feet (ft) of new levee (setback levee) behind a portion of the existing levee that has been identified by the California Department of Water Resources (DWR) as a critical erosion site and to buttress approximately 8,500 ft of the existing levee farther downstream along the right (north) bank of the Bear River. The District will borrow material from a nearby area (borrow site) to build the new setback levee and will degrade the remaining over-steepened and narrow levee. Material from the degrade of the existing levee will be used to accomplish the buttress reinforcements farther downstream. The Bear River Setback Levee Project (Project) is intended to reduce flood risk, increase channel capacity, decrease erosion susceptibility, enhance habitat, and improve maintenance access for inspections and operations during high water events. This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared in compliance with the California Environmental Quality Act (CEQA) to address the potential environmental effects of the Project. With the implementation of conservation measures included in the Project description, any potential impacts associated with this Project are anticipated to be less than significant.

1.1 Project Location

The Project setback levee and buttress will be constructed on the north bank of the Bear River in Sutter County, approximately two miles west-southwest of the City of Wheatland, California (Figure 1-1). This portion of the Bear River is downstream of Camp Far West Reservoir and upstream of the confluence with Dry Creek and is accessible via Wheatland Road off State Route 65. The borrow site is on private property approximately 0.5 mile north of the City of Wheatland in Yuba County, California (Figure 1-1). The Project is located within the Sheridan and Wheatland U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles.

1.2 Project Area

The Project Area consists of three components: the setback levee (including the degrade of the existing levee), the levee buttress, and the borrow site. The setback levee is approximately 2,800 linear ft between levee stations 209 and 237 (Figure 1-2a), and the levee buttress spans approximately 8,500 linear ft from levee station 125 near Pleasant Grove Road to levee station 209 at the downstream end of the setback levee (Figure 1-2b). The levee buttress construction will exclude short stretches along the existing levee near levee stations 163, 180, and 195 due to existing features (i.e., a residence, access ramp, and walnut huller). The borrow site is approximately 18 acres and can be accessed from agricultural access roads via C Street, Nichols Road, or State Route 65 (Figure 1-2c). The Project Area includes the maximum extent of construction activity based on the 90% design for each component. The Project Area consists primarily of agricultural land (English walnut [*Juglans regia*] orchard) and ranges from approximately 60 to 85 ft above sea level (Google Earth Pro 2020).

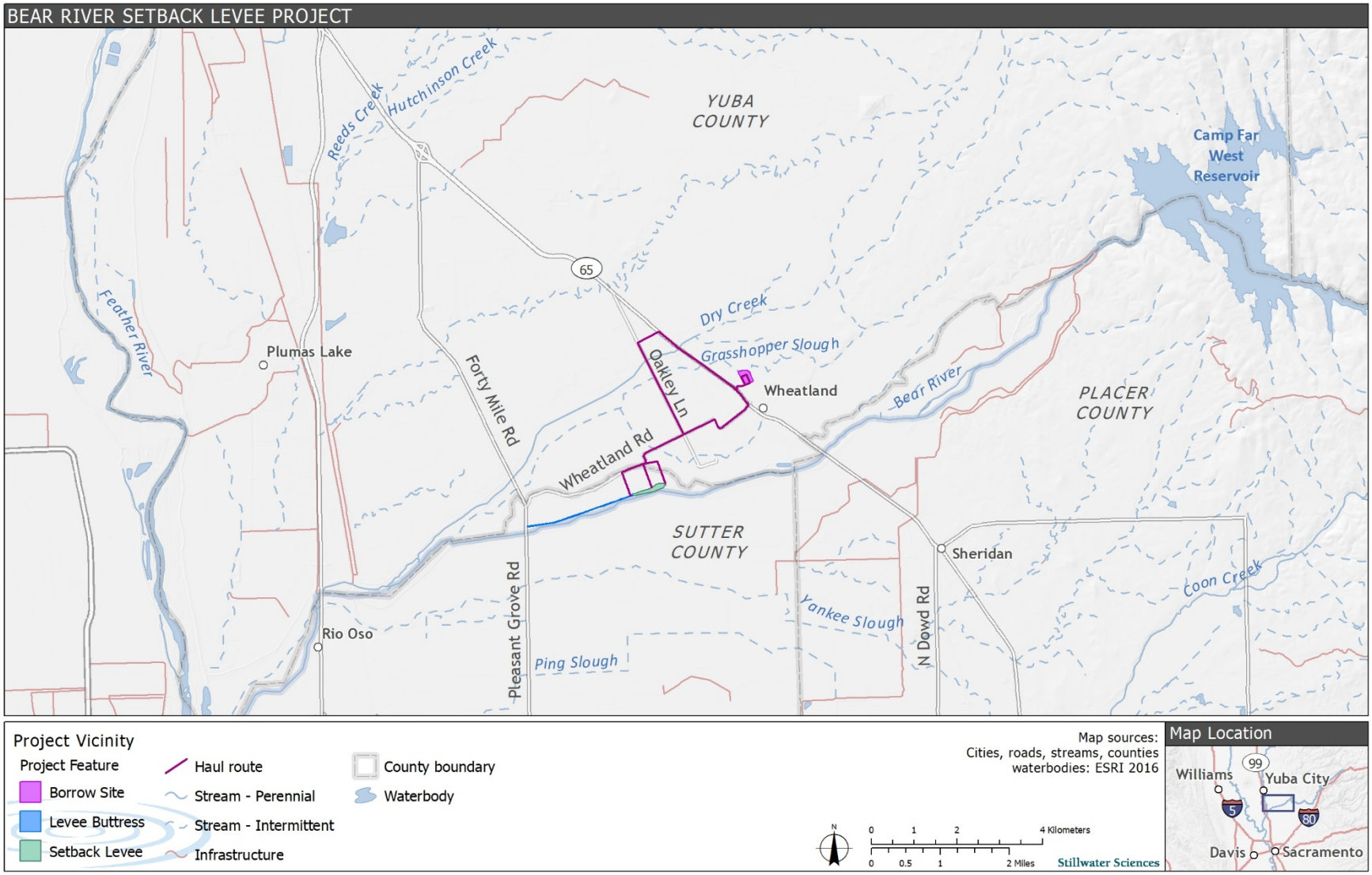

Figure 1-1. Bear River Setback Levee Project location and surrounding vicinity.

Figure 1-2a. Bear River Setback Levee Project Area (setback levee).

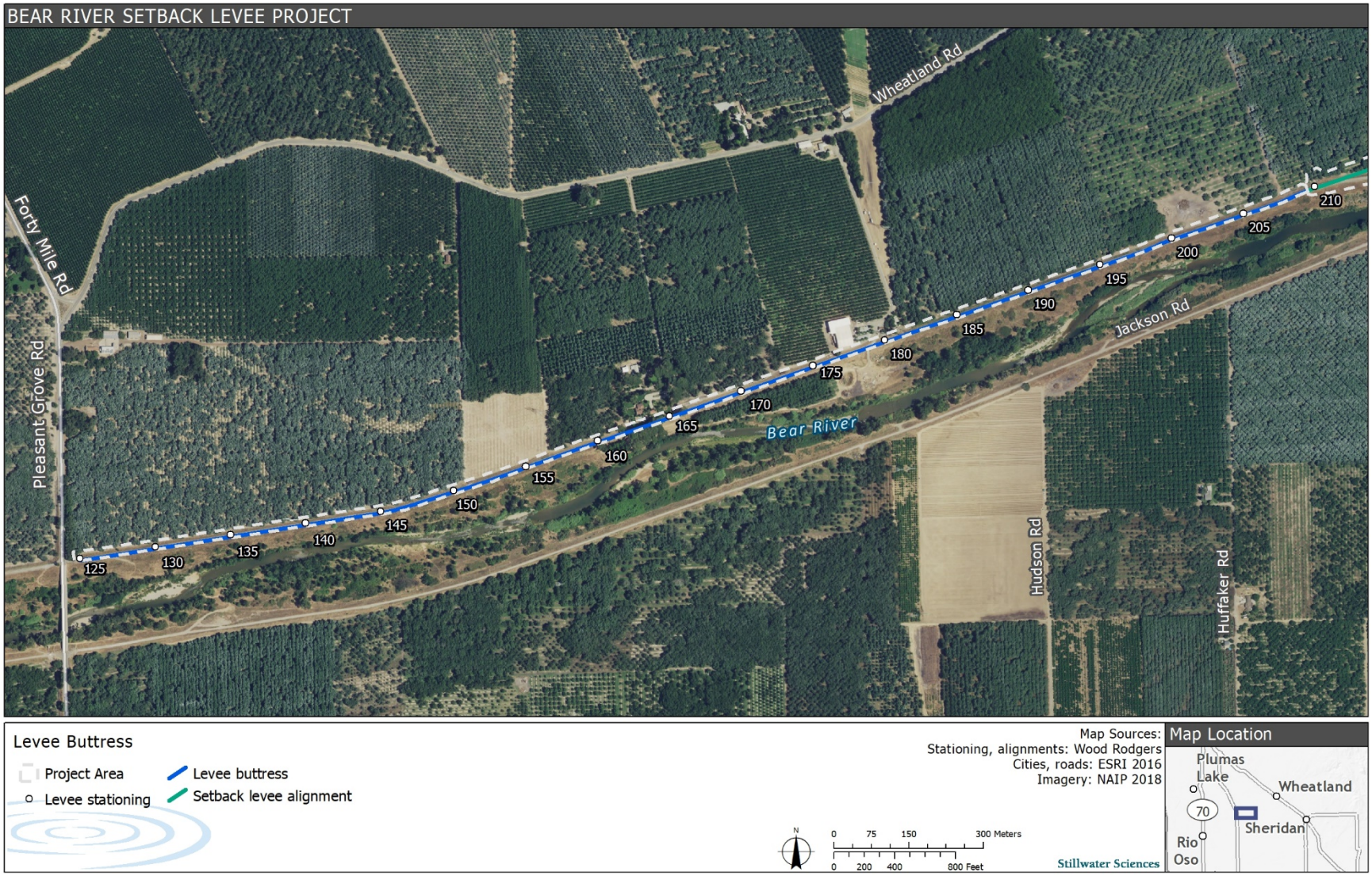

Figure 1-2b. Bear River Setback Levee Project Area (levee buttress).

Figure 1-2c. Bear River Setback Levee Project Area (borrow site).

1.3 Project Description

1.3.1 Project purpose

The Project Area has been identified by DWR as a critical erosion site that has been subject to continued erosion during recent flood seasons and storm events in 2017, 2018, and 2019. The District intends to construct the setback levee to reduce flood risk, increase channel capacity, decrease erosion susceptibility, enhance habitat, and improve maintenance access for inspections and operations during high water events.

The previously completed assessment conducted under the DWR Non-Urban Levee Evaluation (NULE) Program determined the existing levee did not meet seepage or landside slope stability criteria and that the area was susceptible to erosion. Since construction of the existing levee, erosion at this location has occurred during periods of high flows. Based on past performance in the area, it is likely that without mitigation, erosion would continue to advance towards and eventually into the existing levee embankment in its current alignment. DWR completed a Pre-Feasibility Study that included the Project Area in July 2013. In this study, DWR identified a critical erosion site (ID RD0817_01_0240_LM02.63) along this reach of levee. The erosion site was evaluated for several repair alternatives including rock revetment, a widened levee, and construction of a new setback levee.

Based on preliminary evaluation of the three alternatives to address the area of critical erosion described above, a DWR panel initially proposed a lower cost option that included placing rock slope protection on the upper levee slope with rock toe established on a wide berm. Alternatively, the District proposed a new setback levee due to availability of District funds, willingness of adjacent landowners, potential to provide multiple benefits, and opportunity to reduce long-term operation and maintenance. The setback levee will address long-term erosion issues by removing the channel constriction which will decrease in-channel velocities and associated erosion. The Project was approved by DWR, and a Project funding agreement was executed in September 2019.

Construction of the setback levee will generate excess fill material from degrading the existing levee embankment. Through coordination with the adjacent property owners, the Project proposes to reuse this generated material to increase the overall width of the levee prism downstream of the setback levee. The area where buttressing is proposed is along levee embankments that have over-steepened side slopes and present an increased risk of slope instability in the existing condition. The placement of the generated material as a buttress is intended to provide: reduction of risk from through- and under-seepage by lengthening the internal seepage path; resistance to slope failures from excess pore pressures at the landside toe of the embankment; the ability to more successfully flood fight any levee distress; and an overall reduction in the cost of construction by removing the need to dispose of the degraded levee material.

1.3.2 Project actions

The primary Project actions include constructing the new setback levee, degrading the existing levee, and using the degrade material to buttress the existing levee downstream. Secondary Project actions include borrowing and hauling material for the setback levee from a nearby agricultural site (Figure 1-2c). The existing Bear River north levee will be degraded to have a waterward slope of 1–2% to prevent water ponding. The setback levee is proposed to generally have a waterside and landside slope of three to one (horizontal to vertical) with a cutoff wall

along its centerline to a depth 28.5–29.5 ft below the working platform elevation (Figure 1-3). Additionally, a 50-ft-wide and 30-ft-long seepage berm will be incorporated at the downstream setback levee tie-in to provide added resistance to under-seepage. The setback levee cutoff wall will tie into the existing levee cutoff wall at the upstream end of the setback levee, thereby removing the need of a seepage berm at this location. The levee buttress will be constructed along the landside of the existing levee. It is proposed to be approximately 9 ft wide with a slope of two and a half to one (horizontal to vertical) (Figure 1-4).

1.3.3 Site preparation

Site preparation activities include stripping the existing levee, foundation of the setback levee, and borrow site of existing vegetation, which consists primarily of non-native grasslands and agricultural orchards (see Sections 2.2.1 and 2.4.1.2), and surface soil to six inches below the current grade as well as grubbing any remaining roots, tree stumps, buried logs, or other below-grade obstructions. Before the cutoff wall is installed, the trench will be cleared of obstructions (e.g., roots, pipes) if necessary. Concrete structures designated for removal on the plans will be safely disposed of offsite.

1.3.4 Fill material

Fill material imported from the borrow site will be used for construction of the setback levee. The Project will require an estimated 88,000 cubic yards of fill. Suitable topsoil stripped from the ground surface during site preparation will be stockpiled and reapplied to the setback levee slopes. Material from the existing levee degrade along with material from the setback levee foundation excavation will be used to construct the seepage berm and levee buttress.

1.3.5 Erosion control

Appropriate Best Management Practices (BMPs) and a Stormwater Pollution Prevention Plan (SWPPP) will be developed and implemented during construction to prevent and control potential impacts on waters from erosion during Project construction (Section 1.3.9, *Conservation Measures*). Upon completion of the setback levee and buttress, the slopes will be seeded with a native hydroseed mix. The levee crown and patrol roads will not be vegetated but will be covered with six inches of compacted aggregate base to provide all-weather access.

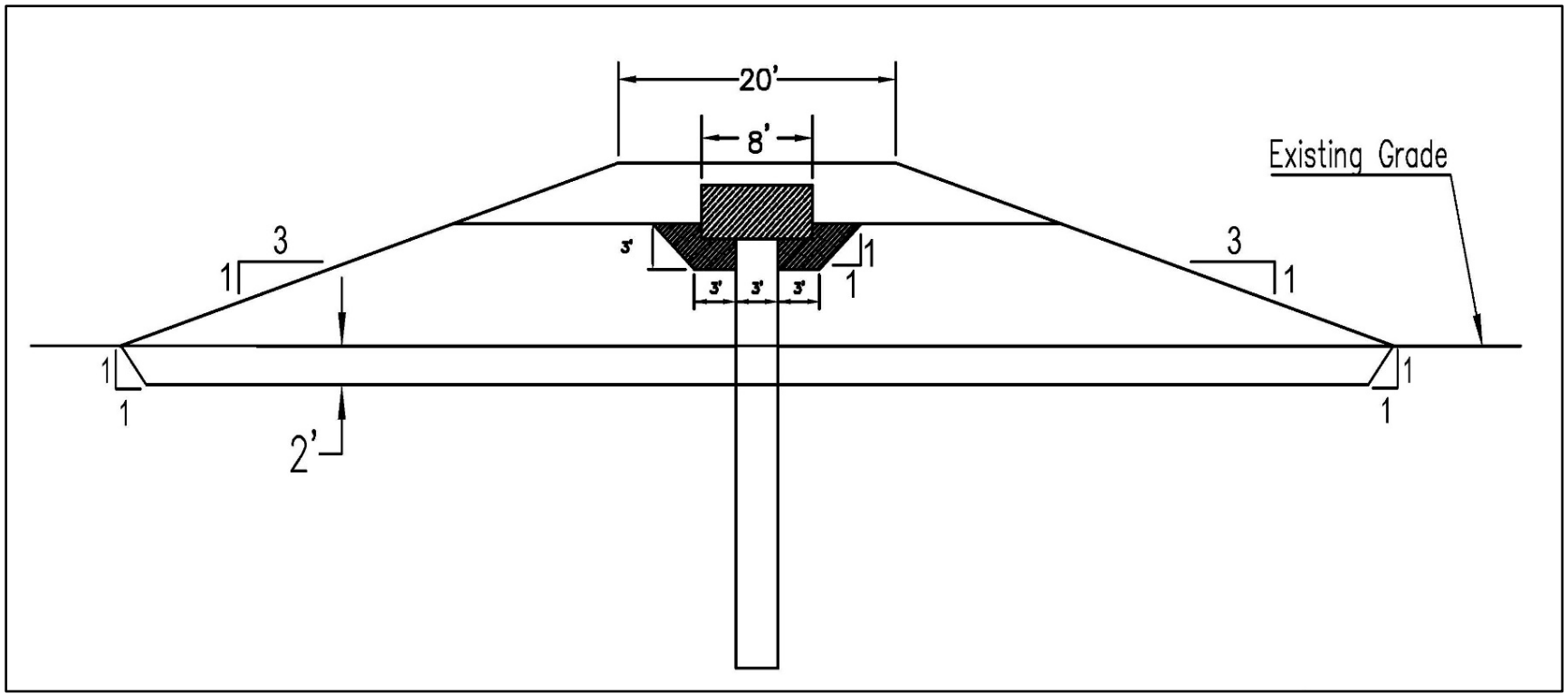

Figure 1-3. Typical setback levee cross-section for the Bear River Setback Levee Project (Source: AECOM).

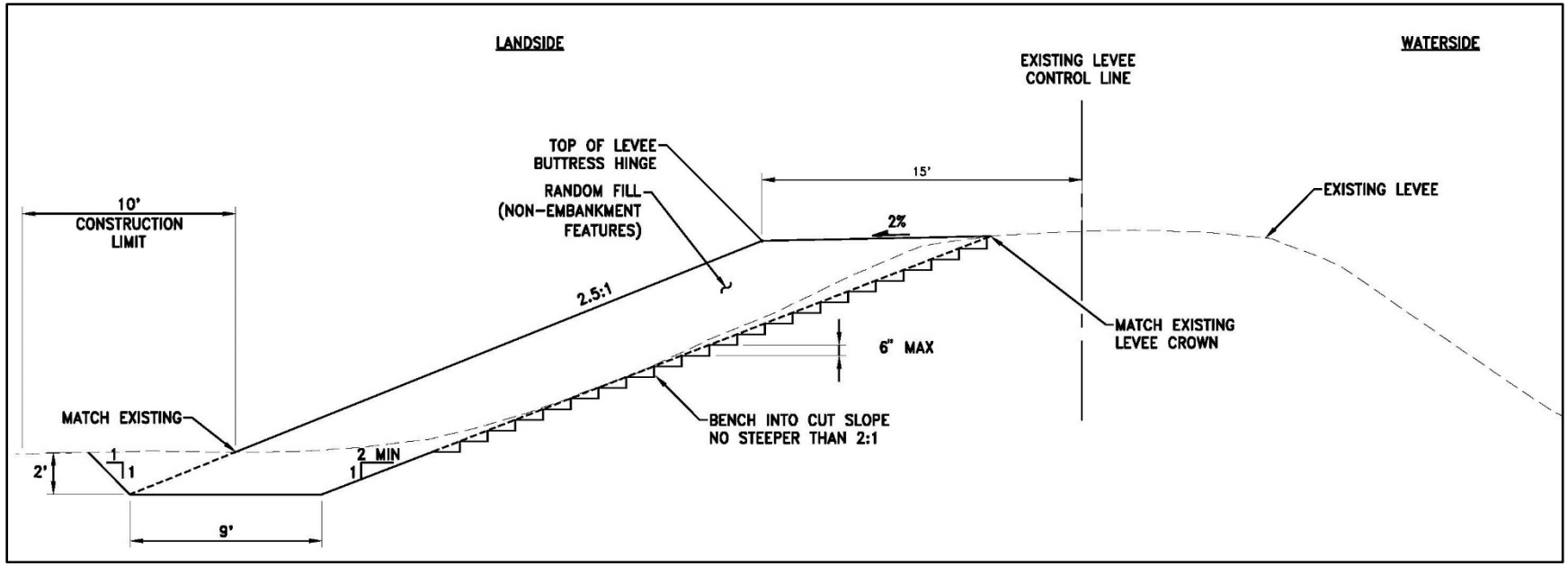

Figure 1-4. Typical levee buttress cross-section for the Bear River Setback Levee Project (Source: Wood Rodgers).

1.3.6 Equipment

Table 1-1 provides a list of equipment that is anticipated to be used for the Project.

Table 1-1. Equipment planned for the Bear River Setback Levee Project.

Equipment type	Running time (hours)
Elevating scraper	1020
Excavator	500
Dozer	1010
Front end loader	840
Haul truck	4810
Hydroseeding truck	60
Pallet Loader	340
Pickup truck	1050
Motor grader	470
300kW generator	160
Slurry pump	160
Vibratory roller	590
Water truck	840

Construction equipment and materials (e.g., fill) will be transported to the setback levee from the borrow site via haul trucks. The haul route will be restricted to existing Bear River patrol roads, agricultural access roads, 1st Street, Wheatland Road, Oakley Lane, Dairy Road, and State Route 65 (Figure 1-5); no new roads will be created. Temporary ramps will be created from surplus material generated from the levee degrade and foundation excavations. These temporary routes will be used for equipment access during construction. Upon construction completion, the material from the ramps will be disposed of at an approved facility.

Large construction equipment (i.e., scrapers, excavators, dozers, and front-end loaders) will be used for clearing, excavation, cutoff wall construction, and levee fill. Cutoff wall construction will also require the use of a generator and slurry pump. Water trucks will be used to control dust throughout Project construction.

1.3.7 Staging area

Fill materials, equipment, and contractor facilities will be located in a staging area within the Project's construction limits. Cutoff wall construction will also require a temporary slurry generation pond with adjacent areas for large tanks for water storage and bulk bag supplies of bentonite.

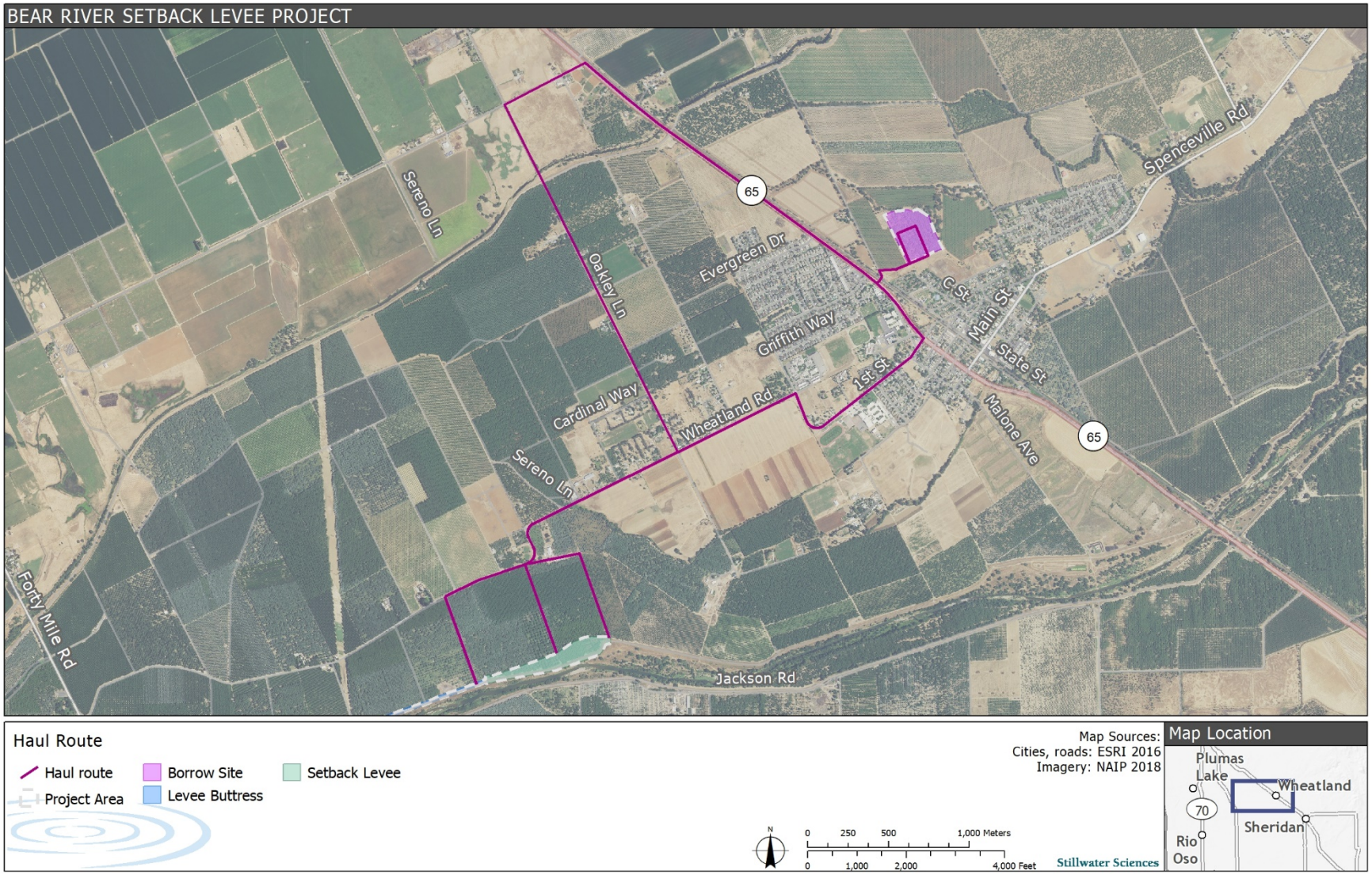

Figure 1-5. Haul route between the borrow site and setback levee for the Bear River Setback Levee Project.

1.3.8 Construction schedule

Project construction is expected to take three to four months in total. Work is anticipated to begin in late summer or fall 2021; work in 2022 may be necessary. Limited operating periods described in the conservation measures for the Project (Section 1.3.9) will be adhered to. A typical workday is assumed to be from 7:00 am to 6:00 pm Monday through Friday and 8:00 am to 5:00 pm Saturday. No construction will occur on Sundays, although minor maintenance may be performed between 9:00 am and 4:00 pm. Construction work will not be performed on holidays. Work outside these hours (e.g., night work) may occur if necessary and will avoid nearby residences in accordance with local noise ordinances.

An estimation of construction timing is as follows:

- approximately three weeks for mobilization of construction equipment and preliminary site preparation;
- approximately two weeks for import and placement of the setback levee embankment up to the working platform;
- approximately two weeks for cutoff wall construction;
- approximately five weeks for cutoff wall settlement and completion of the setback levee embankment;
- approximately three weeks for the existing levee degrade and construction of the levee buttress; and
- approximately two weeks for aggregate base placement, site cleanup, hydroseeding, and demobilization.

1.3.9 Conservation measures

The following sections describe BMPs that will be implemented as part of the Project or additional mitigation measures that will help assure the Project will have no impact or only less than significant impacts on the environment.

1.3.9.1 Best Management Practices

BMPs include those for hazards/hazardous materials and hydrology/water quality. These measures comply with existing regulations and/or requirements or standard practices to avoid, minimize, reduce, or compensate for potential impacts on environmental resources.

- **HAZ-1.** Following is a list of BMPs that will be used during Project construction to avoid and minimize potential effects from hazards and hazardous materials:
    a) No potentially hazardous materials will be stored in a location where there is potential to enter any waterway and/or contaminate aquatic resources.
    b) All construction materials with the potential to pollute runoff will be handled with care and stored under cover and/or surrounded by berms when rain is forecast or during wet weather.
    c) An effort will be made to store only the amount of a potentially hazardous product necessary to complete the job.
    d) Materials, fuels, liquids and lubricants, and equipment supplies stored onsite will be stored in a neat, orderly manner, in their appropriate containers, with the original manufacturer's label and, if possible, in an enclosure.

e) Any hazardous materials will be stored and labeled according to local, state, and federal regulations.

f) If drums must be stored without overhead cover, they will be stored at a slight angle to reduce corrosion and ponding of rainwater on the lids.

g) Substances will not be mixed with one another unless recommended by the manufacturer.

h) Manufacturer's recommendations for proper use and disposal of a product will be followed.

i) Whenever possible, the full amount of a product will be used before disposal of its container.

j) If surplus product must be disposed of, the manufacturer's or the local and state recommended methods for proper disposal will be followed.

- **HAZ-2.** The following are measures to prevent, control, and minimize impacts from a spill of a hazardous, toxic, or petroleum substance during construction of the Project:

  a) Minor spills are those that can be controlled by onsite personnel. The following actions will occur upon discovery of a minor spill:

     - The spread of the spill will be contained.
     - If the spill occurs on impermeable surfaces, such as any temporary surfaces installed for pollution prevention during construction, it will be cleaned up using "dry" methods (i.e., absorbent materials, cat litter, and/or rags).
     - If the spill occurs in permeable substrate areas, it will be immediately contained by constructing an earthen dike. The contaminated soil will be excavated and properly disposed.
     - If the spill occurs during rain, the impacted area will be covered to avoid runoff, and appropriate clean-up steps will be taken after precipitation has ceased.
     - All steps taken to report and contain a spill will be recorded.

  b) Onsite personnel should not attempt to control major spills until the appropriate and qualified emergency response staff has arrived at the site. Failure to report major spills can result in significant fines and penalties.

     - If a major spill occurs, the Governor's Office of Emergency Services Warning Center will be notified at (800) 852-7550 in addition to local authorities.
     - For spills of federal reportable quantities, the National Response Center will also be notified at (800) 424-8802. The federal reportable spill quantity for petroleum products is any oil spill that (1) violates applicable water quality standards, (2) causes a film or sheen upon or discoloration of the water surface or adjoining shoreline, or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.
     - A written report will be sent to all notified authorities.

  c) Diesel fuel, oil, gasoline, and lubricants are considered petroleum products. These materials will be handled carefully to minimize their exposure to storm water. The risks in using petroleum products will be reduced by following these steps:

     - Waste oil and other petroleum products will not be discharged into the ground or other water bodies.
     - Petroleum products will be stored in tightly sealed containers that are clearly labeled, in a covered area, within prefabricated spill containment devices, earthen berms, or similar secondary containment features.

- Onsite vehicles will be monitored for fluid leaks and receive regular preventative maintenance to reduce the chance of leakage (e.g., check for and fix fuel oil leaks in construction vehicles on a regular basis).
- Bulk storage tanks having a capacity of more than 55 gallons will be provided with a secondary containment measure. Containment can be provided by a prefabricated temporary containment mat, a temporary earthen berm, or other measure.
- Bulk fuel or lubricating oil dispensers will have a valve that must be held open to allow the flow of fuel into construction vehicles. During fueling operations, the contractor will have personnel present to detect and contain spills.

d) The following additional spill control and cleanup practices will be followed:

- Spills will be contained and cleaned up immediately after discovery.
- Manufacturer's methods for spill cleanup of a material will be followed as described on the material safety data sheets (kept with product containers).
- Materials and equipment needed for cleanup procedures will be kept readily available onsite, either at an equipment storage facility or on the contractor's trucks. Equipment to be kept onsite will include, but not be limited to, brooms, dust pans, shovels, granular absorbents, sand, sawdust, absorbent pads and booms, plastic and metal trash containers, gloves, and goggles.
- Onsite personnel will be made aware of cleanup procedures, the location of spill cleanup equipment, and proper disposal procedures.
- Toxic, hazardous, or petroleum product spills required to be reported by regulations will be documented and a record of the spills will be kept with Project documents.
- If a spill occurs that is reportable to the federal, state, or local agencies, the contractor is responsible for making and recording the reports.

- **HAZ-3.** The following are measures to reduce the potential for fire:
  a) Smoking will be permitted only in designated smoking areas or within the cabs of vehicles or equipment.
  b) Every fuel truck will carry a large fire extinguisher with a minimum rating of 40 B:C, and all flammable materials will be removed from equipment parking and storage areas.
- **HYD-1.** The following BMPs will be implemented during the Project to avoid and minimize potential impacts on waters from erosion:
  a) Construction will occur only during dry periods.
  b) Prior to storm events, all construction activities will cease, and appropriate erosion control measures implemented.
  c) Soil, silt, or other organic materials will not be placed, stockpiled, or stored where such materials could pass into surface water or surface water drainage courses during unexpected rain events.
  d) All areas disturbed by Project activities will be protected from washout or erosion prior to the onset of the rainy season.
  e) All temporarily affected areas will be restored to pre-construction contours and conditions upon completion of construction activities.

f) Prior to initiation of any waterside work, erosion control measures will be utilized throughout all phases of operation where silt and/or earthen fill threaten to enter waters of the U.S and/or state.

1.3.9.2 Mitigation measures

Mitigation measures have been added to the Project to avoid or minimize potential effects on air quality, biological resources, cultural resources, geology and soils, and tribal cultural resources. Pre-construction surveys will be conducted for each year of Project implementation, if applicable. Results from all pre-construction surveys described in the following conservation measures will be provided to California Department of Fish and Wildlife (CDFW) staff for review prior to the initiation of construction.

- **AIR-1.** The following are measures to prevent, control, and minimize emissions during Project construction:
    a) All vehicles will be model year 2010 or newer.
    b) All diesel-fueled construction equipment will be outfitted with California Air Resources Board (CARB) Tier 4 engines.
    c) The District will submit a Fugitive Dust Control Plan to FRAQMD (Feather River Air Quality Management District) for review and approval prior to beginning work.
    d) All construction equipment will be properly tuned and maintained prior to and for the duration of onsite operation.
    e) The Project will utilize clean fuel generators.
    f) A traffic plan will be developed to minimize traffic flow interference from construction activities.
    g) All grading operations will be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.
    h) Work areas will be watered or treated with dust suppressants as necessary to prevent fugitive dust violations.
    i) An operational water truck will be available at all times. Water will be applied as needed to control dust and to prevent visible emissions violations and offsite dust impacts.
    j) Onsite dirt piles or stockpiled materials will be covered; wind breaks will be installed; and water or soil stabilizers will be employed to reduce wind-blown dust emissions.
    k) All transfer processes involving a free fall of soil or other particulate matter will be operated in such a manner as to minimize the free fall distance and fugitive dust emissions.
    l) Approved chemical soil stabilizers will be applied to all inactive construction areas (i.e., previously graded areas that remain inactive for 96 hours) following the manufacturer's specifications.
    m) To prevent track-out, wheel washers will be installed where Project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment will be washed prior to each trip. Alternatively, a gravel bed may be

installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.

n) Paved streets will be swept frequently if soil material has been carried onto adjacent paved, public thoroughfares from the Project Area.

o) Traffic speeds on all unpaved surfaces will be reduced to 15 miles per hour or less. Appropriate training, enforcement, and signage will be provided.

p) Ground cover will be re-established in the Project Area as soon as possible after construction.

q) Prior to Project construction, the District will submit a comprehensive inventory list (i.e., make, model, engine year, horsepower, emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower and greater) that will be used 40 or more hours during Project construction to FRAQMD for approval. A monthly summary of heavy-duty off-road equipment usage will be provided to FRAQMD throughout Project construction.

- **BIO-1.** All contractors and equipment operators will be provided Worker Environmental Awareness Program training to educate them on the environmental resources of the Project Area and required protection measures. Training will include information about the federal and California Endangered Species Acts (ESA and CESA, respectively), and the consequences of noncompliance with these acts. Workers will be informed about the presence, life history, and habitat requirements of all special-status species that may be affected in the Project Area. Training will also include information on state and federal laws protecting nesting birds and water resources. This training will be conducted prior to construction for each year of Project implementation, if applicable, and will be provided to any new staff/contractors added during the Project.
- **BIO-2.** All areas with blue elderberry (*Sambucus nigra* subsp. *caerulea*) to be avoided during construction will be fenced or flagged. Construction activity will have an avoidance area of at least 20 ft from the dripline of existing elderberry shrubs where feasible. An environmental monitor will be present where work occurs within this buffer to ensure there is no damage to valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) habitat (see **BIO-3**). Herbicides will not be used within the dripline, and insecticides will not be used within 100 ft of the dripline.
- **BIO-3.** A qualified biologist with appropriate knowledge and experience in the biology, life history, and identification characteristics of special-status species and sensitive natural communities that have the potential to be encountered during the proposed activities will be present at Project-appropriate intervals during construction activities that have the potential to adversely affect these resources. This monitor will be given the authority to halt any work they deem may be a cause for concern of endangering special-status species or resources. Any additional terms and conditions regarding monitoring as described by the U.S. Fish and Wildlife Service's (USFWS) Biological Opinion will also be followed.
- **BIO-4.** Surveys for western pond turtles (*Actinemys marmorata*) and any active pond turtle nests (during the nesting and emergence of hatchling season, April through November) will be conducted by a qualified biologist within seven days prior to onset of staging or construction activities. If a western pond turtle nest is found, a 100-ft no-disturbance buffer zone will be established around the nest using flagging, fencing, and/or signage as appropriate. No construction activities will occur within the buffer zone until a qualified biologist has determined that the nest is not in use. If an active western pond turtle nest is found, CDFW will be notified to determine the appropriate course of action. If a western pond turtle is observed at any time before or during construction, it will be left alone to

move out of the area on its own or may be relocated by a qualified biologist to suitable aquatic habitat outside of the Project Area; translocation of turtles will only be performed in consultation with CDFW, and by an individual possessing a valid scientific collecting permit.

- **BIO-5.** For Project activities conducted during the typical avian breeding season (February 1–September 1), a pre-construction nest survey will be conducted within 10 days of start of construction and if there is break in construction of more than 10 days. Pre-construction surveys will include areas suitable for ground-nesting birds as well as trees, shrubs, buildings, or other structures suitable for nesting within 300 ft of the Project Area. If active nests (nests containing eggs or young) are identified, a no-disturbance buffer zone will be established around the nest using flagging, fencing, and/or signage as appropriate. A biological monitor will be present during construction in the vicinity of the nests to ensure that no construction activities occur within the buffer zone until a qualified biologist has determined that the young have fledged or that construction activities within the buffer zone are not disturbing the nesting birds. The width of the buffer zone will be determined by a qualified biologist in coordination with CDFW; recommended buffers are 500 ft for raptors and 100 ft for other birds.
- **BIO-6**. Western burrowing owl (*Athene cunicularia hypugaea*) may be present in the work area. Avoidance of take of individual burrowing owls, their nests, and eggs is currently mandated under Fish and Game Code Sections 86, 3503, 3503.5 and 3513. No more than 14 days prior to the start of construction, a qualified biologist will conduct a pre-construction survey for active burrowing owl burrows using methods recommended by CDFW in the Staff Report on Burrowing Owl Mitigation (CDFG 2012). Occupied habitat includes areas burrowing owls may use for breeding/nesting (February 1 to August 31), wintering (September 1 to January 31), foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can typically be verified by an observation of at least one burrowing owl or, alternatively, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement, and/or loose soil near the burrow entrance. If burrowing owl presence is demonstrated, a 1,600-ft buffer, as recommended in the Staff Report on Burrowing Owl Mitigation, will be established. Project-related activities necessary within the buffer will be monitored by a qualified biologist to ensure the owls are not detrimentally affected by Project construction. The on-site biologist will have the authority to stop work if the owls are exhibiting agitated behavior.
- **BIO-7**. The following measures will be implemented for Project activities conducted between March 1 and September 1 to minimize effects on Swainson's hawk (*Buteo swainsoni*) and other protected raptors:
    a) In order to avoid take (FGC §86) of protected raptors (FGC §3503.5), including Swainson's hawk, three pre-construction raptor nest surveys will be conducted within a 0.25-mile buffer of the Project Area by a CDFW-approved biologist in order to identify active nests in the Project vicinity. Surveys should be completed for at least two Swainson's hawk survey periods immediately prior to initiating any Project-related construction work (as described in the Swainson's Hawk Technical Advisory Committee's [2000] Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley). At least one survey will be conducted no more than 15 days prior to the initiation of construction activities. The results of the survey will be submitted to the District and CDFW.
    b) If active nests are found, an initial temporary nest disturbance buffer of 0.25 mile will be established. If Project-related activities within the temporary nest disturbance buffer are determined to be necessary during the nesting season, then an on-site

biologist/monitor experienced with raptor behavior will be retained by the Project proponent to monitor the nest. The monitor and the Project proponent will consult with CDFW to determine the best course of action necessary to avoid nest abandonment or take of individuals.

c) Work may only be allowed to proceed within the temporary nest disturbance buffer if raptors are not exhibiting agitated behavior such as defensive flights at intruders, getting up from a brooding position, or flying off the nest, and only with the agreement of CDFW. Based on the behavior observed, the buffer may be reduced if the birds are tolerant of construction activities. The designated on-site biologist/monitor will have the authority to stop work if raptors are exhibiting agitated behavior.

- **BIO-8.** Removal of suitable roost trees for western red bat (*Lasiurus blossevillii*) will be conducted during a period that avoids the winter torpor season (generally November through mid-March) and the maternity season (May–July), when non-volant [i.e., non-flying] young may be present.
- **BIO-9.** Prior to construction, sensitive natural communities will be flagged or otherwise marked (e.g., staked) for avoidance, including a 10-ft minimum buffer (20-ft buffer for elderberries; see **BIO-2**). Where avoidance is not possible, sensitive natural communities will be re-planted and/or re-seeded with a commensurate seed mixture (see Section 2.4.2).
- **BIO-10.** All vegetation, including non-native communities, that is permanently removed during Project construction (see Section 2.4.2) will be replaced with application of a native seed mixture.
- **CUL-1.** The following measures will be implemented during Project excavation to mitigate the inadvertent finds of archaeological resources, cultural resources, tribal cultural resources, or human remains:
  a) If interested Native American tribes provide information demonstrating the significance of the Project location and tangible evidence supporting the determination that the site is highly sensitive for tribal cultural resources, the District will retain a tribal monitor from a culturally and geographically affiliated California Native American Tribe to prepare a worker awareness brochure, invite archaeologists and the District to review the worker awareness brochure, and monitor for potential tribal cultural resources during initial ground-disturbing activities,
  b) If intact archaeological deposits or features are found during excavation, work within a 100-ft radius will cease. The District will retain a professional archaeologist who meets the Secretary of the Interior's Professional Standards for Archaeologists to assess the discovery and recommend what, if any, further treatment or investigation will be necessary for the find. Any necessary treatment or investigation will be developed in coordination with interested Native American tribes providing recommendations, and in consultation with the State Historic Preservation Officer and U.S Army Corps of Engineers, if necessary. The investigation and treatment will be completed before construction continues in the vicinity of the find.
  c) Should human remains be encountered during excavation, work within a 100-ft radius will be halted and the coroner will be notified immediately. If the remains are determined to be Native American, then the Native American Heritage Commission (NAHC) will be notified within 24 hours as required by Public Resources Code 5097. The NAHC will notify the designated Most Likely Descendant who will provide recommendations for the treatment of the remains within 48 hours of being granted access to the site.

- **GEO-1.** The following measures will be implemented during Project excavation to mitigate the inadvertent finds of paleontological resources:
    a) Before the start of any ground-disturbing activities at the borrow site, the District will retain a qualified scientist to prepare a worker awareness brochure to train all construction personnel regarding the possibility of encountering fossils, the types of fossils likely to be seen, and proper notification procedures if fossils are encountered.
    b) If paleontological resources are found during construction, work within a 100-ft radius will cease, and Yuba County will be notified. The District will retain a qualified paleontologist to assess the discovery and prepare a recovery plan in accordance with Society of Vertebrate Paleontology guidelines (SVP 2010). Recommendations in the recovery plan that are determined by Yuba County to be necessary and feasible will be implemented before construction continues in the vicinity of the find.
- **TRA-1.** The following measures will be implemented to mitigate Project impacts to transportation:
    a) The District will develop a traffic control plan for implementation during hauling operations. This plan will identify actions that will be taken to reduce potential impacts to traffic circulation and maximize safety. Potential actions include speed limits, worker training, construction signage, emergency procedures, and coordination with the City of Wheatland and Sutter and Yuba counties regarding other projects with potential effects on traffic circulation.
    b) The District will provide an appropriate payment to the City of Wheatland and Yuba County (using the Yuba County road impact fee schedule) for impacts to roads as a result of haul truck traffic during Project construction.

2 ENVIRONMENTAL SETTING AND IMPACTS

Each of the following resource sections includes a completed checklist (from Appendix G of the CEQA Guidelines) of environmental factors potentially affected and identifies potential Project impacts by significance level (i.e., no impact, less than significant impact, less than significant impact with mitigation incorporated, and potentially significant impact). The environmental factors checked in Table 2-1 would potentially be affected by this Project; mitigation measures will be implemented to ensure potential impacts are reduced to less than significant levels.

Table 2-1. Summary of environmental factors potentially affected by the Project.

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

2.1 Aesthetics

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Except as provided in Public Resources Code Section 21099, would the Project:				
a) Have a substantial adverse effect on a scenic vista?	❑	❑	❑	✓
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic 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?	❑	❑	✓	❑
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	❑	❑	❑	✓

2.1.1 Environmental setting

The term "aesthetics" typically refers to the perceived visual character of an area, such as of a scenic view, open space, or architectural facade. The aesthetic value of an area is a measure of its visual character and visual quality combined with viewer response (FHA 1983). This combination may be affected by the components of a project (e.g., buildings constructed at heights that obstruct views, hillsides cut and graded, open space changed to an urban setting), as well as the length and frequency of viewer exposure to the setting. Aesthetic impacts are changes in viewer response as a result of Project construction and operation.

Neither Wheatland Road nor State Highway 65 is a designated scenic highway. The existing levee road provides nearby views of Bear River on the waterside and of agricultural land, primarily a walnut orchard, to the landward side. These are not rare or uncommon scenic views, and the existing levee itself does not provide considerably high value as a scenic resource.

Viewers of the landward side of the levee and the borrow site predominantly include agricultural workers and inhabitants of the few nearby residences and drivers on Wheatland Road. Boaters on the Bear River can see the setback footprint and the waterside of the levee.

2.1.1.1 Relevant local or county ordinance

The Sutter County General Plan (Sutter County 2019) includes the following goal and policy that are applicable to the Project:

Goal ER 7. Preserve the visual and scenic resources that define Sutter County.

Policy 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.

2.1.2 Findings

a) Would the Project have a substantial adverse effect on a scenic vista?

The Project Area is not within a scenic vista, but the setback levee and buttress are adjacent to the Bear River, a scenic resource in Sutter County. The Bear River itself will not be affected by construction of the setback levee and buttress, and its floodplain and riparian corridor will be expanded and enhanced following Project construction. Therefore, there will be no negative impact.

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

Wheatland Road and State Highway 65 are not designated as state scenic highways, so there will be no impact.

c) In non-urbanized areas, would the Project substantially degrade the existing visual character or quality of public views of the site and its surroundings?

Construction activities will temporarily disrupt the limited visual character and quality of the Project Area. The Project Area is mostly the existing levee with a small portion of walnut orchard. Active construction in the Project Area will be visible to a limited number of agricultural workers and nearby domestic residences. These impacts will occur for a short period of time (approximately three to four months) during construction and will be seen by a limited number of viewers.

Construction of the setback levee and buttress will not substantially change the long-term visual character or the aesthetic quality of the Project Area or surrounding areas since the view will continue to be primarily of the levee and adjacent walnut orchard. Effects are therefore less than significant.

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

There will be no new permanent source of substantial light or glare as a result of the Project. Nighttime construction is not planned and will only occur if necessary; any night work will be temporary and only occur during Project construction. There will be no impact.

2.2 Agricultural Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural land?	❑	❑	✓	❑
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?	❑	❑	❑	✓

2.2.1 Environmental setting

The Project Area is located in the Central Valley near the Sacramento, Feather, and Bear rivers and is characterized by deep, rich soils. These rich soils combined with a climate allowing for a lengthy growing season promote extensive agricultural production in Sutter and Yuba counties. Together, these counties have over 600,000 acres of agricultural land in production, with rice, walnuts, prunes, and peaches as their leading agricultural commodities (Sutter County Agricultural Department 2019 and Yuba County Department of Agriculture 2019).

The Project Area includes agricultural land in use as English walnut orchards along the landside of the existing levee and at the borrow site. Walnut trees in the Project Area are planted in monospecific rows and are maintained via regular irrigation, fertilization, and weed and pest control. Harvest typically occurs between mid-September and November. The orchards in the Project Area and surrounding vicinity contain trees of varying maturity; walnut trees typically

take five to seven years to produce harvestable nuts and have an average productive life span of about 35 years. Walnut trees in the orchard block north of the setback levee footprint were removed in September 2020 due to decreasing yields associated with age, and walnut trees in the borrow site will be similarly removed prior to Project implementation. Following Project completion, the entire borrow site and most of the orchard block north of the setback levee, except for the approximately 12 acres within the setback levee footprint, will be returned to agricultural use.

2.2.1.1 Farmland

The California Farmland Mapping and Monitoring Program (FMMP), administered by the State Division of Land Resource Protection, is responsible for producing agricultural resource maps based on soil quality and land use. The purpose of the FMMP is to provide information to be used in planning for current and future use of the state's agricultural lands. The FMMP designates land into the following categories: Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Farmland of Local Importance, Grazing Land, Urban and Built-up Land, Other Land, and Water. Descriptions of these categories are detailed in the FMMP (DOC 2020).

Most of the setback levee and levee buttress Project Area is designated as Prime Farmland (18.1 of the 29.2 total acres), including 12.0 acres of the proposed setback levee footprint and 6.0 acres of the levee buttress footprint (CFMMP 2016a and 2016b). There are also 0.2 acres in the setback levee footprint and 0.4 acres in the levee buttress footprint that are designated as Unique Farmland. The Project Area does not include any Farmland of Statewide or Local Importance. The land to the north of the setback levee and buttress is also designated as Prime Farmland; to the south is the Bear River (Figure 2-1).

The borrow site is 18.0 acres, including 15.6 acres of Prime Farmland and 2.4 acres of Unique Farmland. The borrow site is currently an active walnut orchard and will return to agricultural production upon Project completion.

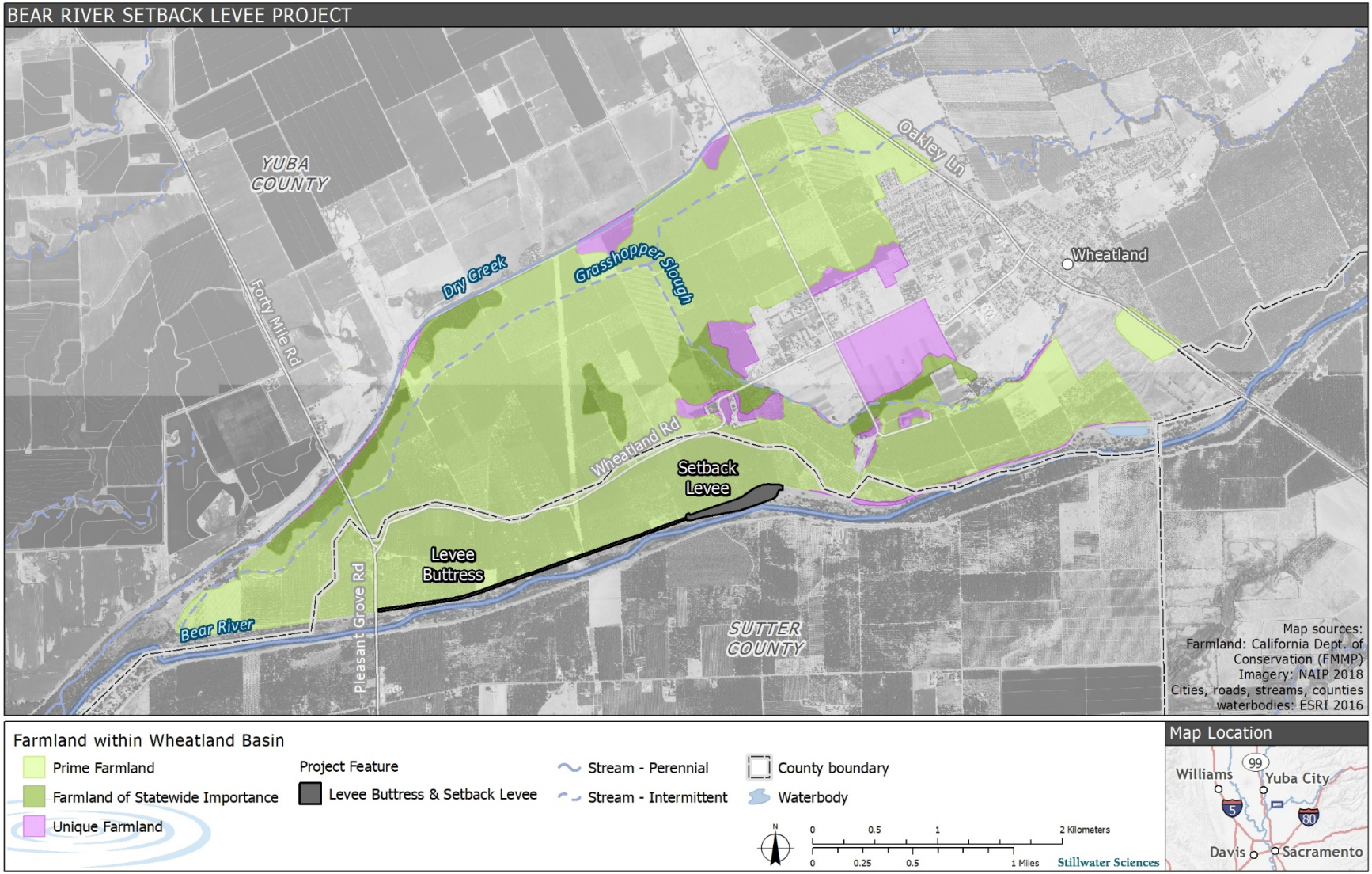

Figure 2-1. Farmland in the Wheatland Basin in the vicinity of the Bear River Setback Levee Project Area.

2.2.1.2 Relevant local or county ordinance

The Sutter County General Plan (Sutter County 2019) includes the following goals and policies that are applicable to the Project as it pertains to agricultural resources:

Goal LU 2. Preserve Sutter County's agricultural heritage and natural resources.

Policy LU 2.1 Long-term Conservation
Promote the long-term conservation of agricultural and open space lands in accordance with the goals and policies of the Agricultural Resources and Environmental Resources elements.

Goal AG 1. Preserve and protect high-quality agricultural lands for long-term agricultural production.

Policy 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.

Policy 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.

Policy AG 1.6 Interrelationship with Habitat Conservation
Permit agriculturally designated lands to be used for habitat conservation and/or mitigation with approval of a development agreement, provided such use does not interfere or adversely affect existing or planned agricultural uses or impact County flood control operations.

Goal ER 2. Conserve, protect, and enhance Sutter County's significant natural wetland and riparian habitats.

Policy ER 2.1 No Net Loss
Require new development to ensure no net loss of state and federally regulated wetlands, other waters of the United States (including creeks, rivers, ponds, marshes, vernal pools, and other seasonal wetlands), and associated functions and values through a combination of avoidance, restoration, and compensation.

Goal ER 3. Conserve, protect, and enhance Sutter County's varied wildlife and vegetation resources.

Policy ER 3.6 Natural Vegetation
Preserve important areas of natural vegetation and the ecological integrity of these habitats, where feasible, but not limited to riparian, vernal pool, marshes, oak woodlands and annual grasslands.

Goal ER 4. Conserve, protect, and enhance Sutter County's unique natural open space lands, drainages, floodplains, and resources.

Policy ER 4.1 Preserve Natural Resources
Preserve natural landforms, natural vegetation, and natural resources as open space to the extent feasible.

Policy 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.

Policy ER 4.4 Acquisition of Additional Open Space Areas
Support efforts to acquire additional open space adjoining protected natural resource areas to increase the size, connectivity, and buffering of existing habitat.

Goal PHS 1. Minimize the potential for loss of life, personal injury, and property damage associated with floods.

Policy PHS 1.8 Inter-Agency Coordination
Coordinate efforts with local, regional, state, and federal agencies to maintain and improve the existing levee system to protect life and property. Ensure that dams, levees, and supporting facilities are properly operated and maintained to incorporate recreational opportunities, conserve natural habitat, and preserve scenic values, and provide adequate long-term flood protection.

2.2.2 Findings

a) Would the Project 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 land?

The Project will result in conversion of 18.1 acres of Prime Farmland and 0.6 acres of Unique Farmland to non-agricultural use. The conversion will represent approximately 0.007% of the total farmland, 0.011% of the total Prime Farmland, and 0.004% of the total Unique Farmland in Sutter County (CFMMP 2016a). This conversion will not substantially affect overall farmland acreage or agricultural productivity in Sutter County. In contrast to this small area of farmland conversion, the setback levee and buttress will provide substantial protection from future flood damage to neighboring Prime Farmland in the Wheatland Basin downstream of the setback levee (Figure 2-1); therefore, the Project will have a cumulative benefit to agricultural resources via flood protection. Furthermore, the Project will convert the 18.1 acres of Prime Farmland and 0.6 acres of Unique Farmland to habitat rather than to paved or developed land uses. Such a conversion of farmland to open space for increased flood protection is consistent with Sutter County General Plan goals and policies (see below).

The borrow site encompasses 15.6 acres of Prime Farmland and 2.4 acres of Unique Farmland. This farmland will be temporarily taken out of production during Project construction, but the entirety of the borrow site will be returned to a condition such that agricultural production can resume following completion of construction. There will be no permanent loss of Prime or Unique Farmland at the borrow site.

For the abovementioned reasons, conversion of Prime and Unique Farmland in the Project is considered less than significant.

b) Would the Project conflict with existing zoning for agricultural use, or a Williamson Act contract?

Lands in Sutter County were previously eligible to have entered Williamson Act contracts, but the Project Area does not include any such parcels. Lands in Yuba County are not eligible to enter Williamson Act contracts. There will be no conflict.

The setback levee and levee buttress are on land currently zoned for agricultural use. The Sutter County General Plan includes policies for the conservation and preservation of agricultural lands for agricultural use (Sutter County 2019). Policy AG 1.5 of the General Plan allows for conversion of agricultural lands only if: (a) such conversion provides a net community benefit that outweighs the need to protect the land for long-term agricultural use; (b) no feasible alternative locations for the proposed use that would appreciably reduce impacts upon agricultural lands exist; and (c) the use will not have significant adverse effects, or can mitigate such effects, upon existing and future adjacent agricultural lands and operations. The Project fulfills each of these requirements in that the expansion of the Bear River floodplain and enhancement of the existing levee will substantially increase flood protection for neighboring agricultural lands at a site that has been specifically designated as critical for its erosion susceptibility. This flood protection for adjacent orchards outweighs the conversion of only 18.7 acres of agricultural land, and the Project is supported by the owner of the land where the setback levee would be placed and owners of the neighboring farms.

In addition to the above considerations, the Project will be converting agricultural land to open space rather than to urban development. This land conversion is consistent with the Sutter County General Plan's goals and policies for the protection and enhancement of floodplains, habitat, river corridors, and open spaces (Sutter County 2019).

The borrow site is also on land zoned for agricultural use. It will be returned to agricultural production after Project completion.

For these reasons, the conflict with existing zoning for agricultural use is considered less than significant.

c) Would the Project 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 portion of the Project Area is zoned for forest land, timberland, or Timberland Production. There will be no impact.

d) Would the Project result in the loss of forest land or conversion of forest land to non-forest use?

The Project will not result in the loss of forest land or conversion of forest land to non-forest use. There will be no impact.

e) Would the Project 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?

The Project will not involve other changes to the existing environment that could result in additional conversion of Farmland to non-agricultural use or any conversion of forest land to non-forest use. There will be no impact.

2.3 Air Quality

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	❑	✓	❑	❑
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?	❑	✓	❑	❑
c) Expose sensitive receptors to substantial pollutant concentrations?	❑	❑	✓	❑
d) Result in other emissions such as those leading to odors adversely affecting a substantial number of people?	❑	❑	❑	✓

2.3.1 Environmental setting

The Project is in the Sacramento Valley Air Basin (SVAB), which includes: Butte, Colusa, Glenn, Placer (western), Sacramento, Shasta, Solano (eastern), Sutter, Tehama, Yolo, and Yuba counties and is administered by the FRAQMD. The SVAB is bounded by mountainous areas to the east, west, and north, with an opening to the south into the Sacramento-San Joaquin Delta. The region experiences relatively long summers with generally hot and dry conditions, and short winters with cool, wet conditions. Subtropical high air pressure events can occur year-round and result in the formation of strong atmospheric inversion layers. The combination of these topographical and meteorological factors can prevent the dispersion of pollutants and are particularly conducive to poor air quality.

2.3.1.1 Criteria Air Pollutants

The Federal Clean Air Act of 1970 and CARB have established air quality standards for several common pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, sulfates, and hydrogen sulfide (CARB 2020a). Air quality data for the SVAB from 2015 to 2019 are summarized in Table 2-2 and describe the existing conditions for some criteria air pollutants in the Project vicinity.

Table 2-2. Summary statistics for air quality data in the SVAB from 2015 to 2019 (Source: CARB 2020b).

Year	Pollutant (averaging time)	Maximum concentration	No. of days exceeding federal standards	No. of days exceeding state standards
2015	Ozone (1 hour)	0.122 ppm	0	9
	Ozone (8 hour)	0.100 ppm	38	42
	$PM_{2.5}$ (daily)	109.8 µg/m^3	9	n/a
	PM_{10} (daily)	118.0 µg/m^3	0	25
2016	Ozone (1 hour)	0.115 ppm	0	17
	Ozone (8 hour)	0.100 ppm	59	61
	$PM_{2.5}$ (daily)	46.8 µg/m^3	3	n/a
	PM_{10} (daily)	88.9 µg/m^3	n/a	12
2017	Ozone (1 hour)	0.121 ppm	0	8
	Ozone (8 hour)	0.092 ppm	45	47
	$PM_{2.5}$ (daily)	85.9 µg/m^3	12	n/a
	PM_{10} (daily)	242.0 µg/m^3	6	19
2018	Ozone (1 hour)	0.135 ppm	0	16
	Ozone (8 hour)	0.116 ppm	49	53
	$PM_{2.5}$ (daily)	411.7 µg/m^3	24	n/a
	PM_{10} (daily)	478.7 µg/m^3	9	60
2019	Ozone (1 hour)	0.103 ppm	0	3
	Ozone (8 hour)	0.082 ppm	13	16
	$PM_{2.5}$ (daily)	41.4 µg/m^3	3	n/a
	PM_{10} (daily)	179.1 µg/m^3	1	45

n/a = not available
$PM_{2.5}$ = respirable particulate matter (less than 2.5 microns in diameter)
PM_{10} = respirable particulate matter (less than 10 microns in diameter)
ppm = parts per million
µg /m^3 = micrograms per cubic meter of air

The SVAB does not consistently meet all applicable air quality standards (CARB 2020c). The SVAB is currently designated as nonattainment for state daily PM_{10}[1] standards, while Yuba County is designated as nonattainment for state ozone standards (CARB 2020c), and Sutter County is designated as nonattainment for federal 8-hour ozone standards (USEPA 2020). Otherwise, the Project Area is designated as attainment for $PM_{2.5}$[2], carbon monoxide, nitrogen dioxide, sulfur dioxide, and sulfate standards.

FRAQMD criteria air pollutants and precursors of primary concern for construction activity in California include ozone precursors (i.e., nitrogen oxides [NO_X] and reactive organic gases [ROG]), and fugitive/exhaust dust particulate matter (PM_{10}) (FRAQMD 2010). FRAQMD has not yet established a threshold for $PM_{2.5}$. Carbon monoxide, sulfur dioxide, and lead are of less concern because construction activities are not likely to generate substantial quantities of these criteria air pollutants.

Emissions thresholds for criteria pollutants developed by the FRAQMD and the U.S. Environmental Protection Agency (USEPA) were used in determining the significance of Project-

[1] Respirable particulate matter less than 10 microns in diameter
[2] Respirable particulate matter less than 2.5 microns in diameter

related air quality effects. Since the FRAQMD thresholds are more stringent than the USEPA thresholds, emissions would be considered significant if they exceeded the local thresholds established by the FRAQMD for construction activities. Thresholds established by the FRAQMD are:

- 25 pounds per day of NO_X (nitrogen oxides)[3]
- 25 pounds per day of ROG (reactive organic gas)[3]
- 80 pounds per day of PM_{10} (summed for dust and exhaust)

2.3.1.2 Sensitive Receptors

Some individuals have heightened health risks associated with exposure to air pollution, and for some air quality constituents, impacts are determined based on the distance to the closest sensitive receptor. Sensitive receptors include but are not limited to residential areas, schools, and hospitals. The nearest sensitive receptors to the Project Area are the rural residences north of the setback levee and levee buttress and the City of Wheatland residences south of the borrow site. FRAQMD requires analysis of possible impacts of diesel particulate matter on these nearby sensitive receptors (FRAQMD 2010).

2.3.2 Findings

This section describes the potential air quality effects of the Project, including exhaust emissions from construction equipment, fugitive dust generated by construction activities, and vehicle travel over unpaved roads. To complete the air quality analysis, information was collected on Project construction activities, duration, timing, and equipment use for the anticipated construction period and used to run the Road Construction Emission Model Version 9.0.0 to estimate Project emissions. The Road Construction Emissions Model summary sheet is included as Appendix A.

The modeling was based on the material amounts and construction equipment assumptions described in Table 2-3, and the following: (1) a 51-acre Project Area; (2) a 6.5-acre maximum daily disturbance; (3) a total of 107,307 cubic yards of imported fill; (4) a round-trip distance of 8.25 miles for imported material; and (5) an equipment operational estimate of 10 hours per day over 113 days.

Additional model assumptions include all feasible FRAQMD best available control technology (BACT) and application of BMPs such that all on-road heavy-duty trucks will be limited to vehicles of model year 2010 or newer and all off-road construction equipment meet CARB Tier 4 standards for diesel engines.

[3] NO_x and ROG construction emissions may be averaged over the life of the project but may not exceed 4.5 tons/year (FRAQMD 2010).

Table 2-3. Project emission sources and assumptions used to determine air emissions.

Emission source	Project assumptions
Imported material used for construction	79,052 cubic yards
Imported material used for setback buttress	27,260 cubic yards
Imported material used for levee surface	995 cubic yards
Fuel-fired construction equipment	Excavator (2) Front-end loader (4) Dozer (2) Scraper (2) Motor grader (2) Vibratory roller (2) Pallet loader (2) Slurry pump (1) Generator (1) Hydroseed truck (1) Pickup truck (2) Water truck (1) Haul trucks (24)
Employee commute trips	5–19 employee trips/day (varying by phase) 23 miles one way

Model results for the daily emissions in pounds per day for the Project construction period are shown in Table 2-4.

Table 2-4. Daily Project construction emission estimates (pounds per day).

	NO_X (average)	**ROG (average)**	**PM_{10} (maximum)**	**$PM_{2.5}$ (maximum)**
Daily Project emissions	24.60	3.01	66.51	14.42
FRAQMD threshold	25	25	80	n/a

NO_x = nitrogen oxides
$PM_{2.5}$ = respirable particulate matter (less than 2.5 microns in diameter)
PM_{10} = respirable particulate matter (less than 10 microns in diameter)
ROG = reactive organic gases

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

Based on the air quality modeling, construction of the Project is expected to result in temporary emissions that are below FRAQMD and state standards with the implementation of conservation measure **AIR-1**, which includes requirements for vehicles model year 2010 or newer and CARB Tier 4 engines along with other BMPs. There will be no change in long-term operational emissions. This impact will therefore be less than significant with mitigation.

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?

The model results show Project construction is not expected to exceed FRAQMD thresholds for criteria air pollutants for which the Project region is currently designated as nonattainment

(including $PM_{2.5}$, PM_{10}, and ozone precursors [i.e., NO_x and ROG]). Although the Project will result in some emissions for which the SVAB is designated as nonattainment, implementation of conservation measure **AIR-1** will minimize their levels. The Project will not result in a cumulatively considerable net increase of these pollutants. This impact will therefore be less than significant with mitigation.

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

Project construction is not expected to expose sensitive receptors to substantial pollutant concentrations. The nearest sensitive receptors to the Project Area are the rural residences north of the setback levee and levee buttress and the City of Wheatland residences south of the borrow site. The Project will not result in substantial pollutant concentrations; maximum exhaust emissions of particulate matter are 1.51 pounds per day PM_{10} and 0.90 pounds per day $PM_{2.5}$ (Appendix A). Project construction will also be temporary, only resulting in increased emissions over the course of four months. For these reasons, the Project's impact on exposing sensitive receptors to substantial pollutant concentrations will 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?

Project construction is not expected to result in other emissions adversely affecting a substantial number of people, such as those leading to objectionable odors. Post-construction, the Project will not result in any change to current operation or maintenance of the levee that would result in additional emissions. The Project is expected to have no impact.

2.4 Biological Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and 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 state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	❑	❑	❑	✓

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
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?	❑	❑	❑	✓

2.4.1 Environmental setting

The Project Area is comprised predominantly of the existing levee along the north side of the Bear River and agricultural land primarily used as walnut orchards. The Bear River riparian corridor, composed of a mix of native and non-native vegetation, borders the Project Area for the setback levee and levee buttress to the south (Figure 1-2a and 1-2b). The borrow site and haul route are near the City of Wheatland (Figure 1-1), and the borrow site's northern and eastern edges border Grasshopper Slough (Figure 1-2c), a seasonal tributary to the Bear River.

During 2019 and 2020, several resources evaluations were performed to identify sensitive natural resources that may occur within or near the Project and inform the development of appropriate avoidance, minimization, and mitigation measures. These evaluations included a land cover classification and vegetation mapping, surveys for special-status plants, a habitat assessment for special-status fish and wildlife species, and a delineation of potentially jurisdictional waters/wetlands (Stillwater Sciences 2020a and 2020b). Methods and key findings from these evaluations used to inform the impacts determinations are summarized in subsequent sections.

2.4.1.1 Methods

Definitions

Special-status species are defined as those:

- listed, proposed, or under review as endangered or threatened under ESA or CESA;
- designated by CDFW as a Species of Special Concern;
- designated by CDFW as Fully Protected under the California Fish and Game Code (Sections 3511, 4700, 5050, and 5515);
- protected under the federal Bald and Golden Eagle Protection Act;
- designated as rare under the California Native Plant Protection Act; and/or
- included on CDFW's most recent *Special Vascular Plants, Bryophytes, and Lichens List* (CDFW 2020b) with a California Rare Plant Rank of 1, 2, 3, or 4.

In addition, sensitive natural communities are defined as:

- vegetation communities identified as critically imperiled (S1), imperiled (S2), or vulnerable (S3) on the most recent *California Sensitive Natural Communities List* (CDFW 2019a).

Desktop review

The special-status plant, fish, and wildlife species and sensitive natural communities with the potential to occur within or near the Project Area were identified through a query of the following resources:

- CDFW's California Natural Diversity Database (CDFW 2020a) for the two USGS 7.5-minute quadrangles in which the Project is located (Section 1.1) and the surrounding ten quadrangles,
- USFWS's Information for Planning and Conservation portal (USFWS 2020a),
- National Marine Fisheries Service's West Coast Region, California Species List Tool (NMFS 2016), and
- California Native Plant Society's online Inventory of Rare and Endangered Vascular Plants of California (CNPS 2020a).

Database query results are presented in Appendix B (for special-status plants and sensitive natural communities) and Appendix C (for special-status fish and wildlife species).

In addition, the following resources were queried to inform the delineation of preliminary jurisdictional waters and wetlands:

- USFWS's National Wetlands Inventory online application, Wetlands Mapper (USFWS 2020b)
- U.S. Department of Agriculture Natural Resources Conservation Service's Soil Survey Geographic Database (USDA NRCS 2020a), and
- Hydric Soils List for Sutter and Yuba counties (USDA NRCS 2020b)

Field evaluations

All surveys (Stillwater Sciences 2020a and 2020b) were conducted by qualified biologists using the following methods:

- Vegetation alliances were keyed using vegetation composition data and the online *Manual of California Vegetation* (CNPS 2020b); final alliances were checked against the current list of natural communities (CDFW 2019a) to determine if they are considered sensitive natural communities.
- Botanical surveys for special-status plants were comprehensive, conducted during appropriate bloom periods, and followed the *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 1996) and *Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities* (CDFW 2018).
- The habitat assessment for special-status fish and wildlife species applied one of the following categories of likelihood of occurrence for each special-status species identified in the desktop queries based on the current known range and habitat requirements of the species in comparison with habitat elements present in or near the Project Area: None (no potential to occur), Low (not expected to occur) Moderate (may occur), or High (previously documented and/or highly suitable habitat).

- The delineation of potentially jurisdictional wetlands was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (1987 Manual) (USACE 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Arid West Supplement) (USACE 2008a).
- Boundaries of waters of the U.S. were determined following *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (USACE 2008b) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2010).
- Additional or extended waters and/or wetland features that may fall under the regulatory purview of CDFW and/or the Regional Water Quality Control Board (RWQCB) were delineated in consideration of California Fish and Game Code (Section 1600 et seq.) and the Porter-Cologne Water Quality Control Act, respectively.

2.4.1.2 Results

Land cover and vegetation mapping

The setback levee and levee buttress support agricultural areas and a matrix of native and introduced plant species intermixed with areas of disturbance related to farm and levee maintenance (e.g., mowing). The borrow site is predominantly in active agricultural use, although the western third is not currently in production. The Project Area includes 41.2 acres of vegetated[4] land and 6.0 acres of non-vegetated land (Table 2-5 and Figure 2-2a–Figure 2-2e). Vegetated areas characterized as agricultural throughout the Project Area consist primarily of walnut orchards of varying maturity that are annually harvested and periodically removed and replanted. Small amounts of three sensitive natural communities, described in more detail below, were documented in the Project Area (Table 2-5; Figure 2-2a and Figure 2-2e).

Table 2-5. Land cover and vegetation types in the Project Area.

Land cover type	Sensitive natural community?	Acres	Percent of Project Area
Non-vegetated			
Developed	no	6.00	12.7%
Vegetated			
Agriculture	no	32.98	69.9%
Annual brome grasslands	no	7.55	16.0%
Ashy ryegrass–creeping ryegrass turfs	yes (S3)	0.23	0.5%
Blue elderberry stands	yes (S3)	0.03	0.1%
Valley oak woodland	yes (S3)	0.17	0.4%
Yellow star-thistle fields	no	0.21	0.4%
Total		**47.16**	**100.0%**

S3 = Vulnerable (CNPS 2020b).

[4]Common and scientific names used to map vegetation in the Project Area conformed to the *Manual of California Vegetation* (CNPS 2020b) classification system and, therefore, may not reflect current taxonomic nomenclature defined in the *Jepson Manual* (Jepson Flora Project 2020), which was used for comprehensive botanical surveys.

Ashy ryegrass–creeping ryegrass turfs (*Leymus cinereus–Leymus triticoides* Herbaceous Alliance)

In the Project Area, ashy ryegrass–creeping ryegrass turfs were dominated by beardless wild rye (*Elymus triticoides* [*Leymus triticoides*]) with low cover of the non-native forb yellow star-thistle (*Centaurea solstitialis*) and the native forb telegraph weed (*Heterotheca grandiflora*). A total of 0.23 acres (0.5 percent) of ashy ryegrass–creeping ryegrass turfs—which have a sensitive natural community rank of S3 (vulnerable) (CNPS 2020b)—were documented in the Project Area in the southeastern corner of the setback levee footprint (Table 2-5; Figure 2-2a).

Blue elderberry stands (*Sambucus nigra* Shrubland Alliance)

In the Project Area, blue elderberry stands were dominated by a dense layer of the native shrub blue elderberry. No trees were present, and the herbaceous layer was moderate and generally included the non-native ripgut grass (*Bromus diandrus*) and the non-native forb shortpod mustard (*Hirschfeldia incana*). A total of 0.03 acres (0.1 percent) of blue elderberry stands—which have a sensitive natural community rank of S3 (vulnerable) (CNPS 2020b)—were documented in the Project Area along the southwestern edge of the setback levee footprint (Table 2-5; Figure 2-2a).

Valley oak woodland (*Quercus lobata* Woodland Alliance)

In the Project Area, valley oak woodland had approximately 25 percent cover where valley oak (*Quercus lobata*) canopy overlaps a small portion of the setback levee and borrow site. The herbaceous layer included a mixture of ruderal and perennial plants (e.g., ripgut grass and miner's lettuce [*Claytonia perfoliata*]). A total of 0.17 acres (0.4 percent) of valley oak woodland—which has a sensitive natural community rank of S3 (vulnerable) (CNPS 2020b)—was documented in the Project Area (Table 2-5; Figure 2-2a and Figure 2-2e).

Special-status plant species

No special-status species were documented within the Project Area. Appendix D provides a comprehensive list of plants documented in the Project Area during the botanical surveys.

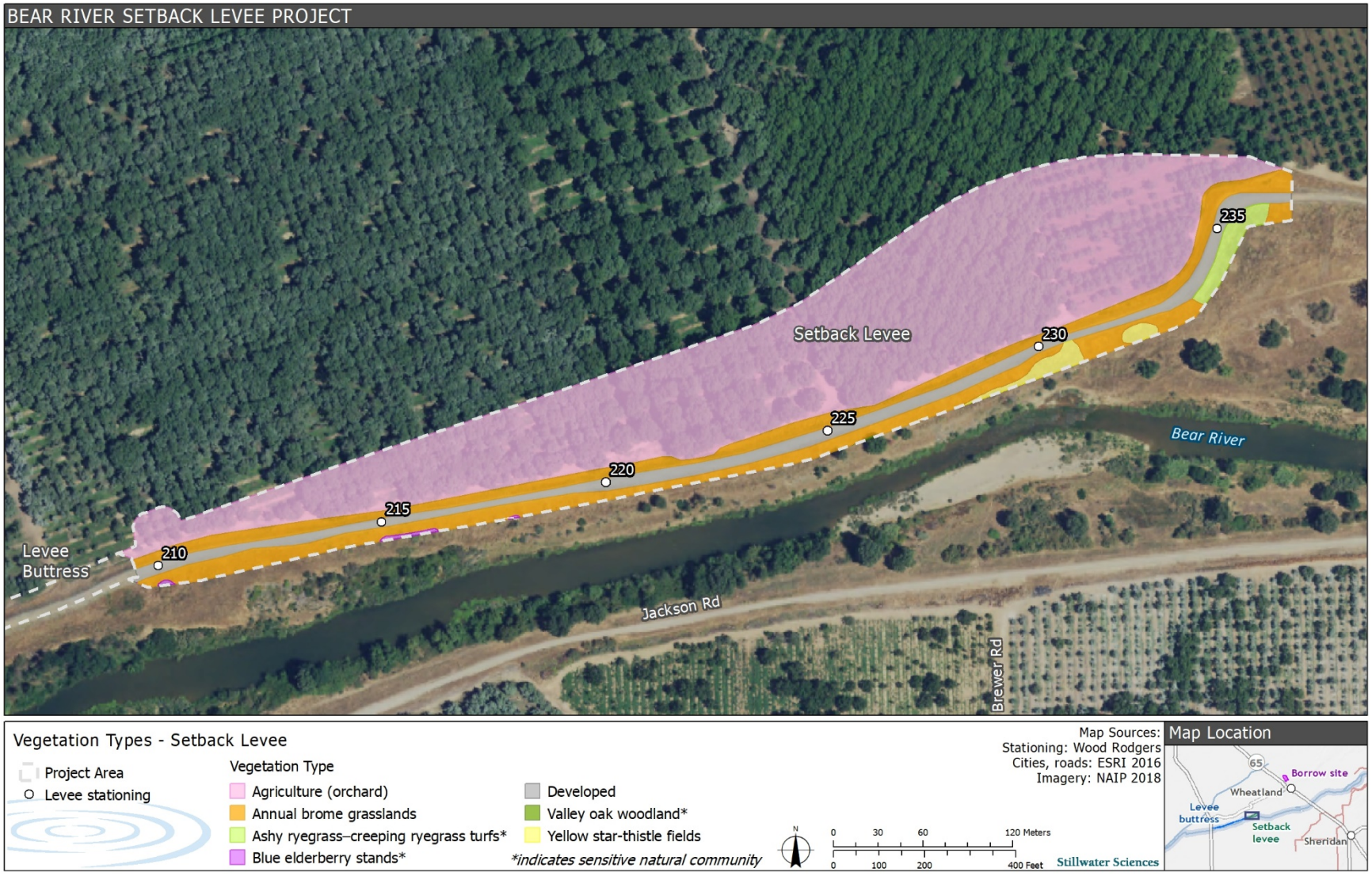

Figure 2-2a. Land cover and vegetation types in the Project Area for the Bear River Setback Levee Project (setback levee).

Figure 2-2b. Land cover and vegetation types in the Project Area for the Bear River Setback Levee Project (levee buttress).

Figure 2-2c. Land cover and vegetation types in the Project Area for the Bear River Setback Levee Project (levee buttress).

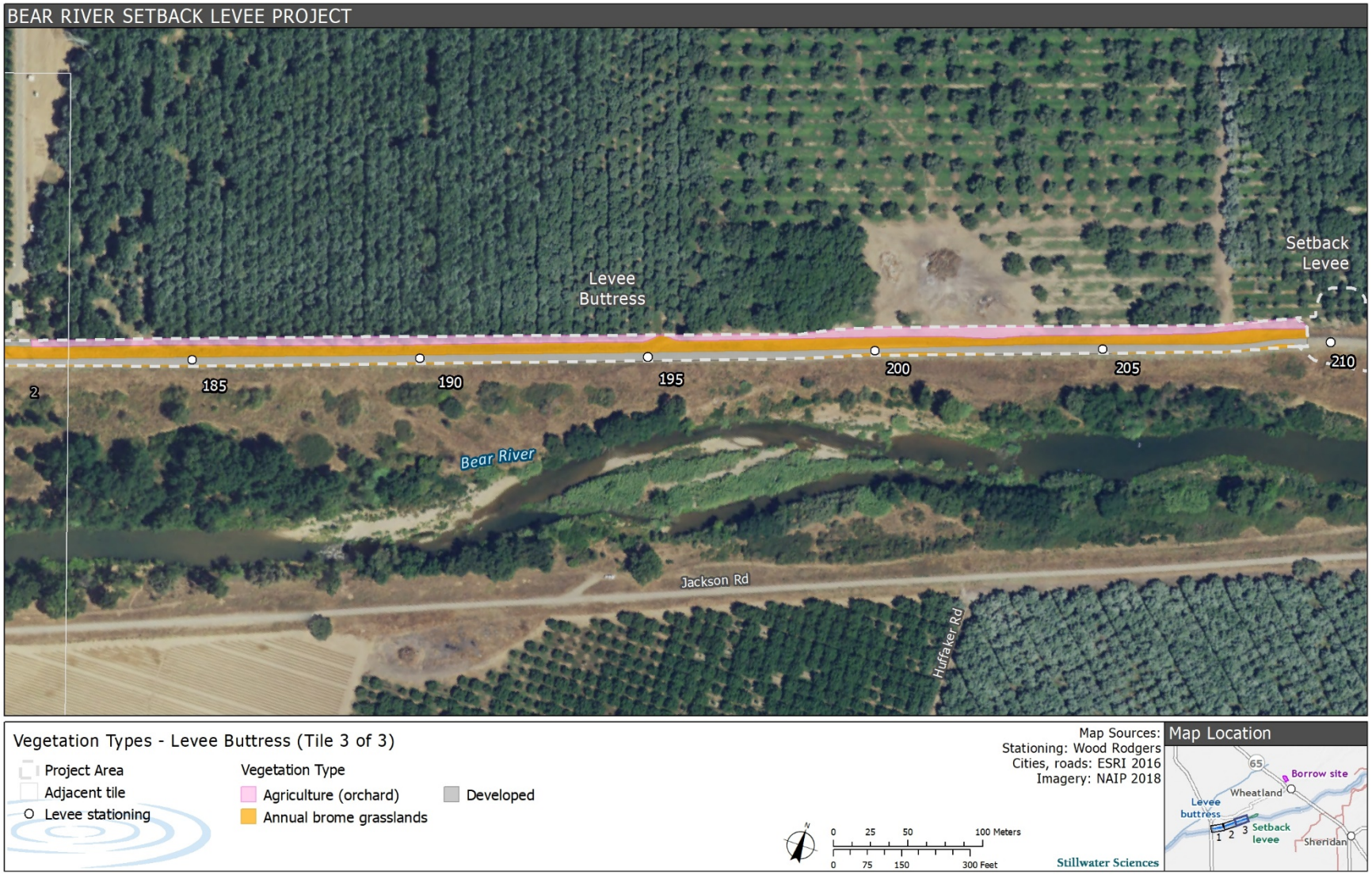

Figure 2-2d. Land cover and vegetation types in the Project Area for the Bear River Setback Levee Project (levee buttress).

Figure 2-2e. Land cover and vegetation types in the Project Area for the Bear River Setback Levee Project (borrow site).

Special-status fish and wildlife species

Thirty-four special-status fish and wildlife species were identified from database queries as potentially occurring in the Project region (Appendix C). Of these, 25 species have no or low potential to occur in or near the Project Area because no or marginally suitable habitat is present, and/or the Project Area is outside of the species' known range. The nine special-status wildlife species with moderate to high potential to occur within or near the Project Area are shown in Table 2-6. Appendix C includes a brief description of habitat associations for these and other species identified from database queries.

Table 2-6. Special-status wildlife species with moderate to high potential to occur in the Project Area.

Common name ***Scientific name***	**Status Federal/State**	**Likelihood to occur in the Project Area**
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	Federally Threatened/None	**Moderate.** A small amount of suitable habitat is present within the Project Area, and there are several records of species in the Project vicinity (CDFW 2020a). Additional suitable habitat is present adjacent to the setback levee and levee buttress.
Western pond turtle *Actinemys marmorata*	None/Species of Special Concern	**Moderate.** The Project Area for the setback levee and levee buttress has a moderate amount of suitable upland habitat, and suitable aquatic habitat is present in the nearby Bear River. There are several records of occurrence in the Project vicinity (CDFW 2020a).
White-tailed kite *Elanus leucurus*	None/Fully Protected	**High.** Suitable habitat for nesting and foraging is present within and adjacent to the Project Area, and there are many records of occurrence in the Project vicinity (eBird 2020, CDFW 2020a).
Northern harrier *Circus cyaneus*	None/Species of Special Concern	**High.** Suitable habitat for nesting and foraging is present within and adjacent to the Project Area, and there are many records of occurrence in the Project vicinity (eBird 2020, CDFW 2020a).
Swainson's hawk *Buteo swainsoni*	None/State Threatened	**High.** Suitable nesting habitat within and adjacent to the Project Area and moderately suitable foraging habitat nearby; many records of occurrence in the Project vicinity (eBird 2020, CDFW 2020a).
Western burrowing owl *Athene cunicularia hypugaea*	None/Species of Special Concern	**Moderate.** Several records of occurrence in the Project vicinity (CDFW 2020a, eBird 2020), and although suitable burrows were not present in the Project Area at the time of evaluation, they could become established in the future. Species also uses human-made structures such as pipes and culverts, which may be present in nearby agricultural areas.
Song sparrow ("Modesto" population) *Melospiza melodia*	None/Species of Special Concern	**Moderate.** Project Area contains a moderate amount of suitable habitat for foraging and nesting, and additional habitat is present in adjacent areas. Species is known to occur in the Central Valley (Gardali 2008).
Tricolored blackbird *Agelaius tricolor*	None/State Threatened	**Moderate.** Although there is limited habitat suitable for nesting in the Project Area, species is abundant in the Project vicinity with several nearby occurrences (CDFW 2020a and eBird 2020) and may inhabit riparian scrub and/or grasslands within or adjacent to the Project Area.
Western red bat *Lasiurus blossevillii*	None/Species of Special Concern	**Moderate.** There is suitable roosting and foraging habitat scattered throughout the Project Area.

Other migratory birds

Other non-listed but otherwise protected migratory bird species could establish nests in and near the Project Area, either in trees or in ruderal vegetation. Several trees on the northern shore of the Bear River to the south of the setback levee and levee buttress or along Grasshopper Slough to the north and east of the borrow site provide potential nesting opportunities. Protection of migratory birds, their occupied nests, and their eggs is required by CDFG Code Sections 3503, 3513, and 3800. Nesting season for migratory birds is generally February 1 through August 15.

Waters and wetlands

The Bear River and Grasshopper Slough are adjacent to the Project Area (Figure 1-1). The Bear River is a perennial stream that flows westward from the Sierra Nevada and is regulated at a series of impoundments including Camp Far West Reservoir, Lake Combie, and Rollins Lake prior to its confluence with the Feather River, approximately eight miles southeast of the setback levee. Grasshopper Slough, located adjacent to the borrow site, is a seasonally intermittent tributary to the Bear River.

A delineation of waters/wetlands (Stillwater Sciences 2020b) that has been verified by the USACE determined that federally jurisdictional (i.e., below the ordinary high water mark) waters are not present in the Project Area; as such, the Project will not require a Clean Water Act Section 404 permit (a no permit required letter from the USACE is in progress). A small portion of the floodplain and riparian corridor above the ordinary high water mark for the Bear River is within the Project Area near the setback levee. This area falls under the regulatory purview of CDFW and the RWQCB (Figure 2-3a and 2-3b); respectively, the Project will require a Lake and Streambed Alteration Agreement (LSAA) and a Waste Discharge Requirement (WDR).

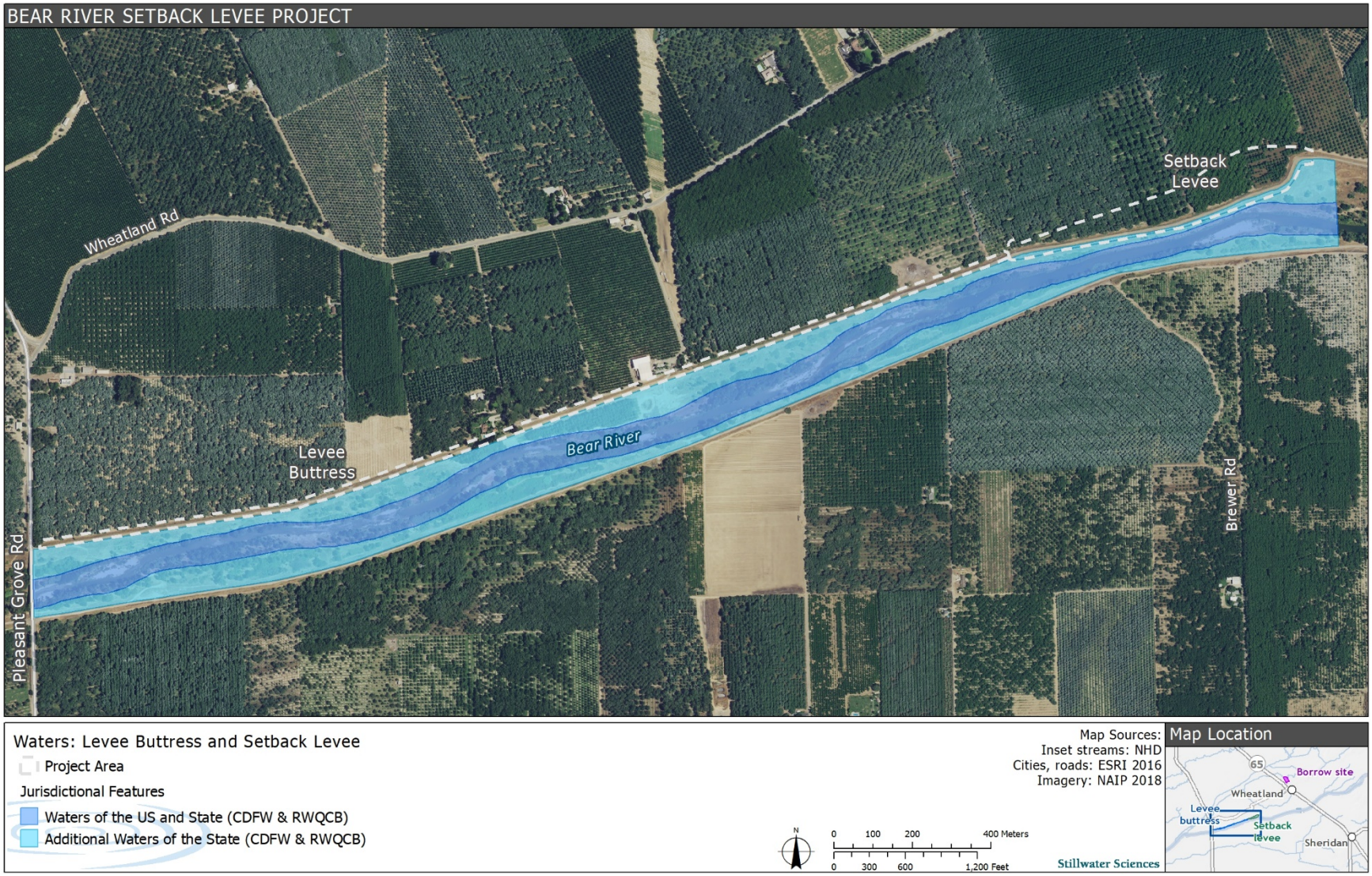

Figure 2-3a. Waters within and adjacent to the Project Area for the Bear River Setback Levee Project (setback levee and levee buttress).

Figure 2-3b. Waters within and adjacent to the Project Area for the Bear River Setback Levee Project (borrow site).

2.4.2 Findings

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?

Special-status plant species

No special-status plant species were documented within the Project Area; therefore, Project-related impacts on special-status plants are not anticipated.

Special-status fish and wildlife species

Fish. The Project Area is located above the ordinary high water mark of the Bear River and Grasshopper Slough and no in-water work will occur during Project implementation. As such, special-status fish species will not be directly impacted by construction activities. Furthermore, implementation of **HAZ-1**, **HAZ-2**, and **HYD-1** (Section 1.3.9) would ensure that there are no indirect impacts on adjacent aquatic habitat as a result of hazardous material spills, soil erosion, and/or stormwater runoff during construction.

Valley elderberry longhorn beetle. There is limited potential for Project-related effects on valley elderberry longhorn beetle because none of the blue elderberry (the valley elderberry longhorn beetle host plant) documented within the Project Area will be trimmed or removed as part of the Project. Work will occur outside of the dripline of most elderberry shrubs or stands located within or near the Project Area. Some work may be necessary within a small portion of the dripline of three stands near the setback levee where they overlap with the Project Area (Figure 2-2a).

Construction activities also have the potential to affect valley elderberry longhorn beetle via dust, noise, or vibration. Water trucks will minimize dust (**AIR-1**), and vibration and noise levels near elderberry shrubs will be limited by implementation of the additional proposed conservation measures described below.

BIO-1 includes training construction personnel regarding the ecological value of the site, including the importance of minimizing the potential for any impacts to elderberry shrubs (Section 1.3.9). Avoidance will be further ensured by the addition of fencing or flagging around elderberry shrubs and stands (**BIO-2**, Section 1.3.9) and the presence of a qualified biologist when work occurs within 20 ft of an elderberry shrub dripline (**BIO-3**, Section 1.3.9). **HYD-1** includes erosion control and revegetation measures that will provide additional protection to existing elderberry shrubs (Section 1.3.9). With the incorporation of these mitigation measures, the potential impacts of the Project on valley elderberry longhorn beetle will be less than significant. Consultation with USFWS under Section 7 of the ESA regarding potential Project effects on valley elderberry longhorn beetle is currently underway.

Western pond turtle. Turtles that may be migrating overland through the Project Area can be injured or killed by Project vehicles or construction equipment. **BIO-1** includes training construction personnel about western pond turtle and what to do in the event one is encountered (Section 1.3.9). Additionally, measure **BIO-4** will be implemented to ensure that western pond turtles are not adversely affected by the Project, including preconstruction surveys, and allowing turtles in harm's way to move from the construction area on their own accord (Section 1.3.9). Impacts on western pond turtle will be less than significant with mitigation measures **BIO-1** and **BIO-4** incorporated.

Special-status and migratory birds. There may be Project-related effects on ground-nesting special-status and migratory birds (e.g., western burrowing owl, northern harrier [*Circus cyaneus*]) if disturbance occurs to or near active nest sites during the breeding season. Direct impacts may occur from stepping on or excavating a ground nest.

Mature riparian trees adjacent to the Project Area along the Bear River and Grasshopper Slough could potentially support nesting white-tailed kite (*Elanus leucurus*) or Swainson's hawk; walnut trees on the landside of the setback levee and levee buttress and within the borrow site could also potentially support nesting white-tailed kite. Riparian trees will not be directly affected (e.g., by removal or trimming), but walnut trees within the Project Area will be removed during construction. Preconstruction nesting bird surveys (**BIO-5**; Section 1.3.9) will be conducted to avoid direct impacts to nesting birds, and walnut tree removal will occur outside nesting season (typically February 1–September 1) to the extent feasible. The borrow site will be returned to agricultural production as a walnut orchard after Project construction, so loss of nesting habitat will be temporary. No walnut trees will be replanted within the setback levee footprint; however, the width of the riparian corridor on the waterside of the setback levee will be expanded, thereby providing additional riparian habitat for nesting and foraging.

Construction activities during nesting season could also impact nesting birds. Impacts may occur from construction noise (for example, from heavy equipment, vehicles, generators, and human presence) or vibration near nests on the ground or in nearby trees or structures, which could lead to nest abandonment or premature fledging.

Impacts on nesting birds and raptors will be less than significant with incorporation of mitigation measures **BIO-1** and **BIO-5** through **BIO-7** which include worker environmental awareness training, pre-construction nesting bird surveys, avoidance of burrowing owl take, and targeted preconstruction surveys for Swainson's hawk nests (Section 1.3.9).

Special-status and migratory bird species are unlikely to forage in the borrow site due limited habitat value. Foraging habitat along the setback levee and levee buttress will be disturbed temporarily during Project construction, but the final setback levee alignment will increase the amount of foraging habitat relative to existing conditions. The impact on foraging habitat will therefore be less than significant.

Western red bat. No evidence of western red bat occupancy was observed during the preliminary habitat assessment, but mature riparian and walnut trees adjacent to and within the Project Area could potentially support roosting bats. There may be Project-related effects on western red bad if active roost sites are disturbed. Direct impacts may occur as a result of removing or trimming suitable trees while roosting bats are present. Indirect impacts may occur from construction noise or vibration.

Riparian trees will not be directly affected by Project construction (e.g., by removal or trimming), but walnut trees within the Project Area will be removed. Mitigation measure **BIO-8** includes measures to ensure orchard tree removal does not occur during western red bat maternity season or months in which they may be in winter torpor (Section 1.3.9). Upon Project completion, the borrow site will be returned to agricultural production, so loss of roosting habitat will be temporary. No walnut trees will be replanted within the setback levee footprint; however, the width of the riparian corridor on the waterside of the setback levee will be expanded, thereby providing additional riparian habitat for roosting and foraging (**BIO-9**, Section 1.3.9). For these reasons, impacts on western red bat will 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 Game or U.S. Fish and Wildlife Service?

Riparian corridors exist along the Bear River and Grasshopper Slough to the south of the setback levee and levee buttress and to the northeast of the borrow site, respectively. Riparian vegetation from these corridors occurs in small portions of the Project Area for the setback levee and borrow site as blue elderberry stands and valley oak woodland (Figure 2-2a and Figure 2-2e). Both riparian communities are classified as sensitive natural communities with a rank of S3 (vulnerable) (CNPS 2020b). The ashy ryegrass–creeping ryegrass turf on the waterside of the existing Bear River levee, in the southeastern corner setback levee footprint, is also classified as a sensitive natural community with a rank of S3 (vulnerable) (CNPS 2020b).

Neither the blue elderberry stands nor the valley oak woodland will be significantly impacted by Project construction. Some work may be necessary within a small portion of the dripline of the blue elderberry stands, but no elderberry will be trimmed or removed. Similarly, Project construction will occur under the canopy of one valley oak at the setback levee and several valley oaks along Grasshopper Slough at the borrow site, but no valley oaks will be trimmed or removed.

A small portion (0.23 acres) of ashy ryegrass–creeping ryegrass turf within the Project Area will be removed during the degrade of the existing levee. The ashy ryegrass-creeping ryegrass turf extends (0.17 acres) past the eastern and southern Project Area boundaries at the setback levee (Stillwater Sciences 2019), so the entire community will not be removed during Project construction. Additionally, all vegetation permanently removed during Project construction (i.e., 7.41 acres of annual brome grasslands, 15.13 acres of orchard, 0.23 acres of ashy ryegrass–creeping ryegrass turfs, and 0.21 acres of yellow star-thistle fields) will be replaced with a hydroseed mixture appropriate for ashy ryegrass–creeping ryegrass turf as defined by the *Manual of California Vegetation* (CNPS 2020b). There will therefore be a net increase in total acreage of ashy ryegrass–creeping ryegrass turf in the Project Area from 0.23 acres to approximately 23 acres (**BIO-9** and **BIO-10**; Section 1.3.9).

Sensitive natural communities within or adjacent to the Project Area that could potentially be damaged or destroyed by Project construction will be staked, fenced, and/or flagged for avoidance prior to construction (**BIO-9**); a biological monitor will also be present during construction activities that have the potential to adversely affect these resources (**BIO-3**; Section 1.3.9). Where avoidance is not possible, impacts to sensitive natural communities will be mitigated via implementation of conservation measures **BIO-9** and **BIO-10** which facilitate the re-establishment of vegetation within the Project Area (Section 1.3.9). Impacts on sensitive natural communities will therefore be less than significant with the incorporation of mitigation.

c) Would the Project 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?

No federally protected wetlands are in the Project Area; however, portions of the floodplain and/or riparian corridor above the ordinary high water mark for the Bear River and Grasshopper Slough fall under the regulatory purview of the RWQCB and CDFW. Project construction does not include any direct removal, filling, or hydrological interruption of these waterways. Additionally, conservation measures **HAZ-1**, **HAZ-2**, and **HYD-1** will be implemented to

prevent and control potential impacts on waters during Project construction. There will be no impact.

d) Would the Project 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?

The Project includes modifications to existing levee infrastructure and will not include construction of any elements that will block wildlife movement. Therefore, the Project will not interfere substantially with the movement of any native resident wildlife species, nor impede the use of any wildlife nursery sites. There will be no impact.

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

The Project will not conflict with any local policies or ordinances protecting biological resources; no woody vegetation other than orchard trees will be removed. Nearby valley oaks will be fenced, and/or flagged for avoidance prior to construction as part of conservation measure **BIO-8**. There will be no impact.

f) Would the Project 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 conservation plans currently include the Project Area. A Yuba-Sutter Regional Conservation Plan has been proposed but not yet implemented (USFWS 2014). There will be no impact.

2.5 Cultural Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	❑	✓	❑	❑
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	❑	✓	❑	❑
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	❑	✓	❑	❑

2.5.1 Environmental setting

The Project is located at the northeastern edge of the Great Valley geomorphic province where it borders the Sierra Nevada geomorphic province. Deep river canyons in the western slope of the Sierra Nevada geomorphic province transport and deposit sediments onto the Great Valley floor and onward into the San Francisco Bay Delta. The transitional geography between the Sierra

Nevada foothills and the Central Valley creates an archaeological crossroads with several interpretive schemes that may be relevant in the Project Area.

The Project Area primarily includes agricultural orchards and the existing earthen Bear River north levee. The horizontal Area of Potential Effect (APE) for the Project includes the footprints of the setback levee, levee buttress, and borrow site; the vertical APE includes surface disturbance to a depth of 2 ft at the setback levee and levee buttress and an excavation depth of 5 ft at the borrow site.

The APE is situated on the Pliocene-age Laguna Formation and Pleistocene-age Riverbank Formation (AECOM 2021). Within the setback levee and levee buttress portions of the Project Area as well as the northern and eastern edges of the borrow site, these formations are mantled by surficial historic and Holocene-age sediments consisting of various alluvial deposits associated with the Bear River and Dry Creek. The soils within this portion of APE are characterized by thin plow zones underlain by minimally weathered, sandy sediments indicative of consistent aggradation as a result of hydraulic mining in the Sierra Nevada (AECOM 2021). The young age of surficial deposits in the APE, along with its generally flat slope and proximity to water, make the area highly sensitive for buried archaeological resources, although no buried archaeological sites have previously been identified within the Project vicinity.

AECOM Technical Services, Inc. (AECOM) conducted archaeological investigations for the Project, which consisted of background historical research, a records search (of known cultural resources within the APE and the surrounding vicinity), Native American consultation, and pedestrian and geoarchaeological surveys of the APE (AECOM 2021). This report (*Draft-Final Cultural, Tribal, Archaeological & Historical Resources Assessment, Sutter and Yuba Counties*) is summarized in this section and included as Appendix E. Pre-contact historic, ethnographic, and post-contact historic context of the region are detailed further in the report.

2.5.1.1 Literature review

AECOM conducted archival and literature review, and a records search was conducted by the North Central (NCIC) and Northeastern Information Centers (NEIC) of the California Historical Resources Information System (CHRIS). The records search included the following sources (AECOM 2021, Appendix E):

- the National Register of Historic Places (NRHP)
- the California Register of Historical Resources (CRHR), and
- the Historic Property Data File for Placer, Sutter, and Yuba counties.

The records search indicated that 25 previous cultural resources investigations were conducted within the APE or the 0.5-mile radius of the APE (AECOM 2021). The prior surveys were primarily associated with levee or bridge repair, transportation improvement, residential and commercial development, and telecommunications installation projects.

Previous studies indicated six sites within the vicinity of the APE that are listed as California Points of Historic Interest, seven sites that qualified for the California Inventory of Historic Resources, and 43 historic landmarks within or surrounding the City of Wheatland. Additional details on these sites are included in Appendix E.

NCIC and NEIC have no records for any cultural resources within the Project APE, but two resources were identified within a 0.5-mile radius (AECOM 2021). A prehistoric site (P-58-1275)

with unknown constituents is located at an unspecified location between Grasshopper Slough and the Bear River. This site has been leveled and buried with sediments, so subsurface investigations would be required to determine its exact location. A segment of the Southern Pacific Railroad (P-31-003593/P-58-001354) passes the western border of the borrow site. This railroad segment has not been previously evaluated for listing in the NRHP, although other segments have been determined eligible for listing because of their significance as an important transportation route in the west. The segment that runs adjacent to the Project Area likely contributes to the overall significance of the resource.

2.5.1.2 Native American consultation

AECOM initiated outreach with the NAHC to solicit information about potential Tribal resources in or near the Project APE and the treatment of those resources (AECOM 2021). Resources of interest might include archaeological deposits, traditionally important plants, or locales that have been or are currently used for Tribal activities. The NAHC provided a list of local tribes that should be contacted, and tribal notifications were sent out by the District on June 22, 2020. Matthew Hatcher, Tribal Historic Preservation Officer with the Mooretown Rancheria, stated that they are not aware of any cultural or tribal cultural resources within the Project Area. Ana Starkey, United Auburn Indian Community (UAIC) of the Auburn Rancheria Cultural Regulatory Specialist, stated that their records indicate tribal village sites in the Project vicinity that may extend into the Project Area and that the Bear River itself is culturally significant; additional consultation with UAIC is currently being pursued by the Project team. The Mechoopda Indian Tribe representative has not responded to date.

2.5.1.3 Pedestrian survey

On April 1–2, 2020, AECOM archaeologists conducted a surface reconnaissance survey of the entire APE (AECOM 2021). The reconnaissance survey involved walking the APE at 10–15-meter intervals to observe the surface for evidence of archaeological materials, documented by written notes and photos. No archaeological cultural material was observed within the APE for the setback levee, levee buttress, or borrow site. One architectural resource, the existing Bear River north levee, was documented within the APE. Although the existing levee generally retains historic integrity to its original construction between 1910 and 1913, it does not meet any significance criteria necessary for eligibility for listing in either the NRHP or CRHR.

2.5.1.4 Geoarchaeological survey

AECOM excavated nine trenches 11 ft in length within the footprint of the setback levee and levee buttress between April 20 and April 23, 2020 as a method of exploration for buried landforms and archaeological sites. AECOM did not excavate any trenches at the borrow site since it is situated on the Pleistocene-age Riverbank Formation and therefore has a low sensitivity for buried archaeology. No archaeological resources or buried soils were identified within any excavated trenches.

2.5.2 Findings

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

The records search, consultation, and field reconnaissance revealed one architectural resource, the existing Bear River levee, within the APE (AECOM 2021, Appendix E). The existing levee

generally retains historic integrity to its original construction between 1910 and 1913, but it does not meet any significance criteria necessary for eligibility for listing in either the NRHP or CRHR. Background research, intensive field survey, and formal geoarchaeological investigations failed to reveal the presence of buried paleosols, indicating that there is low potential for the presence of prehistoric and historic-era archaeological resources. Conservation measure **CUL-1** (Section 1.3.9) includes provisions to evaluate and protect, if necessary, historical resources located during Project construction. If any historical resources are identified during Project construction, implementation of **CUL-1** would reduce any possible impacts to a less than significant level with mitigation.

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

The records search, consultation, and field reconnaissance revealed no cultural resources within the APE (AECOM 2021, Appendix E). As stated above, implementation of **CUL-1** in the event an archaeological resource is located during construction would limit any impacts to a less than significant level with mitigation.

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

Historical documents and records searches do not indicate any human burials within the Project Area, and no human remains were encountered during the surface reconnaissance or geoarchaeological surveys (AECOM 2021), so no impact is likely. Per conservation measure **CUL-1**, should human remains be encountered during construction work within a 100-ft radius will be halted and the coroner will be notified immediately. If the remains are determined to be Native American, the NAHC will be notified within 24 hours as required by Public Resources Code 5097, and the NAHC will notify the designated Most Likely Descendant who will provide recommendations for the treatment of the remains within 48 hours of being granted access to the site. Therefore, with the implementation of **CUL-1**, any impacts to human remains encountered during Project construction would be less than significant with mitigation.

2.6 Energy

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	❑	❑	✓	❑
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	❑	❑	❑	✓

2.6.1 Environmental setting

Energy sources are either renewable (e.g., solar, wind) or nonrenewable (e.g., fossil fuels) and can be combusted to power vehicles and equipment or converted to electricity as a secondary energy source.

In 2017, California consumed more energy than all other states except Texas, but its per capita consumption of 200 million British thermal units (Btu) was the fourth lowest in the nation (USEIA 2020). The California Energy Commission (CEC), established by the Warren-Alquist Act in 1975, has been instrumental in limiting California's energy consumption, particularly via energy efficiency standards that are updated every three years in Title 24 (CEC 2020).

The Project will utilize fossil fuels, a nonrenewable energy source, to power construction vehicles and equipment. The fossil fuel consumption will be on a short-term basis during construction and will not persist upon Project completion. No electricity consumption will be associated with the Project.

2.6.2 Findings

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

Project construction equipment will use fossil fuels for power. The use of such equipment is necessary to construct the setback levee and buttress for flood protection. Construction equipment will be used as efficiently as feasible (e.g., by reducing idling). The impact will therefore be less than significant.

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

The Project will not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. There will be no impact.

2.7 Geology and Soils

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	❑	❑	❑	✓
ii) Strong seismic ground shaking?	❑	❑	❑	✓
iii) Seismic-related ground failure, including liquefaction?	❑	❑	❑	✓
iv) Landslides?	❑	❑	❑	✓
b) Result in substantial soil erosion or the loss of	❑	❑	✓	❑

	Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
	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 geologic feature?	❑	✓	❑	❑

2.7.1 Environmental setting

The Project is located at the northeastern edge of the Great Valley geomorphic province where it borders the Sierra Nevada geomorphic province. The Great Valley geomorphic province is a large, elongated structural trough that contains a thick sequence of sediments that have been deposited almost continuously since the Jurassic (about 160 million years ago). The Project lies within an area of nonmarine and marine (continental) sedimentary rocks of Pleistocene to Holocene age, near the boundary with nonmarine (continental) sedimentary rocks of Pliocene to Pleistocene age (California DOC and CGS 2020).

Most near-surface deposition in the Project Area is related to climate change that has occurred since the last glacial maximum (approximately 19,000 years ago), sea level rise, and more recent human-induced landscape changes. Around 6,500 years ago, rising sea level resulted in the formation of extensive brackish and freshwater wetlands (the Delta), and the rising base level of the Delta caused the lower reaches of many Sacramento Valley channels to fill with sediments, migrate laterally, and deposit additional sediment farther upstream (Brown and Pasternack 2004). Deposition was supplemented in the nineteenth century during the Gold Rush when intensive hydraulic mining caused rapid channel aggradation, temporarily raising channel beds up to 10–15 ft and causing extensive flooding, channel migration, and sediment deposition throughout the lower portions of the Sacramento Valley (Gilbert 1917). As much as 16 ft of sediment deposited during this period now covers the pre-mining surface in the lower Bear River (James 1989).

Surficial geology within the setback levee and levee buttress portions of the Project Area consists of historic and Holocene-age sediments from various channel, crevasse splay, natural levee, overbank, and general alluvial deposits associated with the Bear River (AECOM 2021). Surficial geology within the borrow site is predominantly Pleistocene Riverbank Formation, with smaller proportions of Holocene-age alluvial deposits and Pliocene Laguna Formation. Soils within the Project Area are predominantly composed of sand and loam (Table 2-7) (UC Davis and UCANR 2020).

Table 2-7. Soil map units in the Bear River Setback Levee Project Area.

Soil map unit	Typical horizons	Location within Project Area
Conejo loam, 0 to 1 percent slopes, MLRA 17	Loam	Borrow site
Holillipah loamy sand (channeled), 0 to 2 percent slopes, MLRA 17	Loamy sand, sand, fine sandy loam, loamy fine sand	Waterside of proposed setback levee and levee buttress alignments
Holillipah loamy sand, 0 to 2 percent slopes	Loamy sand, stratified sand to silt loam	Landside of proposed setback levee and levee buttress alignments
San Joaquin loam, 0 to 1 percent slopes	Loam, clay, duripan	Southwestern corner of borrow site

MLRA = major land resource area

2.7.2 Findings

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?

The Project is not located within an Alquist Priolo Earthquake Fault Zone (California DOC 2020a). There will be no impact.

ii) Strong seismic ground shaking?

There are no faults in the immediate vicinity of the Project Area. The Spenceville and Deadman Faults, part of the Foothills fault system, pass near the City of Auburn, approximately 20 miles southeast of the Project Area (California DOC 2020a). During an earthquake on a single fault in this area, displacement may be up to 3.5 inches or greater, dependent on the location along the length of the rupture, earthquake magnitude, as well as the fault length and area (USGS 1996). Given that the Project Area is approximately 20 miles from the nearest major fault system, there is low potential for strong seismic ground shaking. Project construction will not result in any operational or land use change that will alter the people or structures exposed to strong seismic ground shaking. The Project will have no adverse effects involving strong seismic ground shaking.

iii) Seismic-related ground failure, including liquefaction?

The Project Area is not mapped as a liquefaction hazard zone (Cal OES 2020). Additionally, the Project will minimize the risk of levee failure by construction of the setback levee and levee buttress. Project construction will also result in no operational or land use change that will alter the number or location of people or structures exposed to seismic-related ground failure. The Project will, therefore, have no impact on seismic-related ground failure.

iv) Landslides?

There are no records of landslides in the area identified in the California Landslide Inventory (California DOC 2020b). The Project Area consists primarily of agricultural land (existing walnut orchard) with a relatively flat topography, except for the Bear River levee itself. The setback levee is proposed to have a slope of three to one, and the levee buttress is proposed to have a slope of two and a half to one; these levee slopes will generally be more gradual than the slopes on the existing over-steepened and narrow levee. The Project Area is, therefore, not considered susceptible to landslides. The Project will also not result in any operational or land use change that will alter the people or structures exposed to landslides. The Project will have no impact on landslide occurrence or risk.

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

During active construction, there is potential for stormwater-related erosion of surficial soil. To minimize the risk of soil erosion during construction, the Project will implement conservation measure **HYD-1** (Section 1.3.9). Upon completion of the setback levee and buttress, the slopes will be seeded with a native hydroseed mix. The levee crown and patrol roads will not be vegetated but will be covered with six inches of compacted aggregate base. The borrow site will be returned to agricultural production. Because the new setback levee will be farther from the Bear River than the existing levee, the potential for riverine erosion will be reduced. Over the long-term, these measures will stabilize the levee slope, which has been designed to have a stable gradient of three to one or less. Impacts of the Project on soil erosion and loss of topsoil will be less than significant.

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?**

The geologic units underlying the existing Bear River levee are stable and not at large risk of landslide or liquefaction (California DOC 2020b, Cal OES 2020). Project construction will not change the underlying topography or geology in the Project Area and will only affect the existing earthen levee. The Project involves installation of a cutoff wall and seepage berm at the setback levee to provide resistance to under-seepage, thereby reducing the risk of levee failure. Construction of the levee buttress will also increase levee stability. Overall, the Project will have a beneficial, stabilizing effect and will not cause instability in a geologic unit or soil that could potentially result in landslide, lateral spreading, subsidence, liquefaction, or collapse. There will 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?

The soils in the vicinity of the levee setback are predominantly sands and contain a small percentage of clay (Table 2-7), as such the Project is not located on expansive soil. Additionally, soil testing completed by AECOM along the setback levee alignment and at the borrow site confirmed appropriate soil conditions for levee construction (AECOM 2019). There will be no impact from expansive soils on life or property.

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?

The few agricultural residences to the north of the setback levee and levee buttress are currently served by private septic systems. Residences near the borrow site in the City of Wheatland are connected to the city's sewer system. The Project will not include installation or disturbance to any existing septic tanks or alternative wastewater disposal systems. Additionally, the setback levee and levee buttress will offer increased flood protection to private septic systems at residences north of the levee. There will be no impact.

f) Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Historic and Holocene-age surficial deposits underlying the setback levee and levee buttress are unlikely to contain unique paleontological resources due to their relatively young age. The Pleistocene-age Riverbank Formation that underlies the borrow site, however, is typically considered highly sensitive for paleontological resources due to the large number of recorded fossil finds in that formation (Hilton 2000, Jefferson 1991). The Laguna Formation that underlies a small portion of the borrow site also has the potential for paleontological resources due to its Pliocene age and the alluvial nature of the deposits.

Geotechnical investigations by AECOM at the borrow site included excavation of six exploratory test pits to depths of approximately 10 ft (AECOM 2019). These excavations uncovered no paleontological resources or unique geologic features. No impact to paleontological resources is therefore expected; nevertheless, there is a possibility of an unanticipated discovery of a unique paleontological resource during work at the borrow site. Implementation of mitigation measure **GEO-1**, which includes worker training and provisions to protect any resources identified during construction, would prevent destruction of any unique paleontological resources and limit any impacts to a less than significant level with mitigation.

2.8 Greenhouse Gas Emissions

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	❑	❑	✓	❑
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	❑	❑	❑	✓

2.8.1 Environmental setting

Greenhouse gases (GHGs) can absorb and emit infrared radiation, trapping energy in the atmosphere and causing it to warm. GHGs have impacts that are more global than regional and

are different from air pollutants that impact the general area near where they are released. GHGs can occur naturally or as a direct result of human activities. State law defines GHG to include the following emissions: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (Health and Safety Code, § 38505(g)). The most common GHG resulting from human activity is carbon dioxide, followed by methane and nitrous oxide.

California GHG emissions decreased 14% from their 2004 peak to 424 million metric tons of carbon dioxide equivalent (CO_2e) in 2017, while statewide per capita emissions decreased by 24% from their peak in 2001 to 2017 (14.1 metric tons per person to 10.7 metric tons per person) (CARB 2019). The transportation sector consistently emits more GHGs than any other sector, accounting for 40% of state GHG emissions in 2017.

Sutter County emitted approximately 1.2 million metric tons of CO_2e in 2008, with agriculture contributing 66% of the total emissions (Sutter County 2010). Transportation is the largest source of GHG emissions in Yuba County, contributing 47% of total emissions in 2007 (CDSA 2011).

2.8.1.1 State regulatory setting

In January 2008, California Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, went into effect. This bill required the California Air Resources Board (CARB) to develop regulations to address global climate change due to GHG emissions. The act also requires a statewide GHG emissions limit, equal to the 1990 level, as a limit to be achieved by December 31, 2020. The 2020 GHG emissions limit is 431 million metric tons of CO_2e (CARB 2018), and as of 2017, statewide GHG emissions were 424 million metric tons of CO_2e (CARB 2019). Signed into law in 2016, Senate Bill 32 expanded upon AB 32 by specifying an emissions limit which further requires California to reduce statewide GHG emissions to 40 percent below the 1990 level by the year 2030 (CARB 2018).

2.8.1.2 Local regulatory setting

Sutter County has established a Project emissions threshold of 3,000 metric tons of CO_2e per year, below which a Project's impact on GHG emissions is considered less than significant (Sutter County Development Services Department 2016). This threshold is based on a study by the Governor's Office of Planning and Research that analyzed a statewide list of projects and determined that projects generating less than 3,000 metric tons of CO_2e per year have a negligible contribution, both cumulatively and individually, to overall emissions (County of San Bernardino 2015). Neither FRAQMD nor Yuba County have established a quantitative threshold for significance for GHG emissions (FRAQMD 2010 and Yuba County Planning Department 2011); therefore, Sutter County's emissions threshold of 3,000 metric tons of CO_2e per year is used to determine the significance of Project impacts.

The Sutter County General Plan Goal M7 is to employ strategies that reduce the use of fossil fuels, reduce GHG emissions caused by transportation, and improve air quality (Sutter County 2019). Sutter County developed a Climate Action Plan in 2010 to provide specific measures for reducing GHG emissions to levels consistent with the targets in AB 32 (Sutter County 2010). Measures applicable to the Project include reductions in construction waste and increases in vehicle efficiency.

The Yuba County General Plan Goal HS6 is to use construction practices and operational strategies that minimize air pollution (CDSA 2011). Yuba County is also planning to prepare a Greenhouse Gas Reduction Plan, but it has not yet been adopted.

2.8.2 Findings

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

Project construction, which will take approximately four months, is not expected to generate GHG emissions that would have a significant impact on the environment. The results from the Road Construction Emissions model used for determining the significance of Project-related air quality effects predict a total of 927 metric tons (1,022 tons) of CO_2e during construction of the Project, which is less than the 3,000 metric tons per year of CO_2e used by Sutter County as a threshold of significance for impacts of Project construction (Appendix A). Impacts from the Project's generation of GHG emissions are therefore expected to 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?

Sutter County's Climate Action Plan and the Yuba County General Plan both include measures to increase efficiency of construction projects for the purpose of reducing emissions (Sutter County 2010, CDSA 2011). Implementation of **AIR-1** will ensure efficiency of Project vehicles and equipment through the usage of vehicles model year 2010 and clean fuel generators. Project construction will also follow BMPs for vehicle usage (e.g., by reducing idling times). The Project will therefore not conflict with any applicable plans, policies, or regulations; there will be no impact.

2.9 Hazards and Hazardous Materials

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	❑	❑	✓	❑
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the 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?	❑	❑	✓	❑

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
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?	❑	❑	✓	❑

2.9.1 Environmental setting

Land uses surrounding the Project Area are predominantly agricultural and open space, along with some residences. The lands surrounding the Project Area have the potential to contain hazardous substances. Petroleum products and pesticides are the most likely materials that may have been stored or released into the surrounding environment. Older gas wells, underground storage tanks used to store petroleum products, and septic systems may develop leaks. These leaks can lead to the contamination of soils and groundwater. A query of the California Department of Toxic Substances Control's (CDTSC's) database reveals that there are no known sites in the Project Area having cleanup, permitted, or other hazardous materials status (CDTSC 2020).

2.9.2 Findings

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

The Project has the potential to accidently spill diesel fuel or other hazardous material used by construction equipment. To minimize the risk of an inadvertent hazardous-materials release during construction, the Project will implement hazardous materials BMPs as outlined in conservation measures **HAZ-1** and **HAZ-2** (Section 1.3.9). All fuels and other hazardous materials will be handled and stored according to the manufacturer's specifications. A containment area will be established for construction equipment staging, and the ground will be protected from potential contamination within the containment area. In the event of a spill, crew personnel will stop the spillage at its source, contain the spilled material, and notify Project supervisors and appropriate agency representatives. Impacts related to the transport, use, or disposal of hazardous materials will therefore be less than significant with incorporation of **HAZ-1** and **HAZ-2**.

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?

As stated above, implementation of hazardous materials management BMPs as outlined in **HAZ-1** and **HAZ-2** (Section 1.3.9) will occur during construction; therefore, there will be a less than significant impact.

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?

Bear River Middle School and Wheatland Union High School are located on the haul route, so haul trucks will pass within one-quarter mile of the school 48 times per hour during the workday for four weeks during Project construction. These haul trucks have the potential to spill diesel fuel, but implementation of the BMPs outlined in **HAZ-1** and **HAZ-2**, as described above, will reduce the risks of spills and the potential impacts to less than significant.

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 portion of the Project Area is included on a list of hazardous materials sites. The Project will have 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?

There are no public-use airports within two miles of the Project Area. The Project will therefore have no impact.

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

Bear River Middle School, Wheatland Union High School, Wheatland Fire Authority Fire Station #3, and several businesses and residences occur along the Project haul route. The haul route also includes State Route 65, a major area thoroughfare and primary emergency evacuation route in Yuba County (CDSA 2011). No roads will be closed during Project construction, and all roadway traffic supporting Project construction will adhere to applicable laws for motor vehicles and comply with the Sutter County's Office of Emergency Management and Yuba County's Office of Emergency Services. Conservation measure **TRA-1** includes development of a traffic control plan with specific actions to be taken, if necessary, to facilitate an emergency response or evacuation. The Project Manager will comply with local fire, policy, and medical responders during any emergency. For these reasons, the impact will 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?

The Project is not located in lands classified as moderate, high, or very high fire hazard severity zones (CalFire 2007). Accordingly, the Project will not expose people or structures to a

significant risk of loss, injury, or death involving wildland fires. In addition, the Project will implement conservation measure **HAZ-3** to reduce the potential for a grass fire (Section 1.3.9). Therefore, the impact will be less than significant.

2.10 Hydrology and Water Quality

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

2.10.1 Environmental setting

Waterways adjacent to the Project Area include portions of the mainstem Bear River and Grasshopper Slough (Figure 1-2). The Bear River is a tributary to the Feather River that is regulated upstream at the Camp Far West Reservoir. This area is within Hydrologic Unit Code (HUC) 180201260403 (USGS and USDA-NRCS 2014). Levees surrounding the Bear River provide protection to the Wheatland Basin in Yuba and Sutter counties. The average width of the Bear River channel (i.e., from levee crown to levee crown) adjacent to the proposed setback levee is approximately 425 ft. The setback levee would widen the existing channel by up to 300 ft. Grasshopper Slough is a tributary to the Bear River. This area is within HUC 180201260502

(USGS and USDA-NRCS 2014). There will be no changes to channel width on Grasshopper Slough as a result of the Project.

The Project Area experiences a Mediterranean climate which is characterized by dry, hot summers and wet, cool winters. Mean annual rainfall at the Project Area between 1980 and 2019 was 20.8 inches (PRISM 2020). Rainfall typically occurs between October and March (PRISM 2020). The Bear River hydrograph follows annual rainfall patterns, with peak discharges typically occurring during winter (February and March) and the lowest discharges occurring during late summer/early fall (September and October) (USGS 2020). Mean monthly discharges in Bear River between 1980 and 2019 at the USGS river gage near Wheatland (USGS gage #11424000) ranged from approximately 1,200 cubic feet per second (cfs) (February and March) to 22 cfs (September and October) (USGS 2020). Grasshopper Slough is classified as an intermittent stream, which includes channels that contain flowing water only part of the year (Stillwater Sciences 2020b). There are no gage data for Grasshopper Slough.

Water quality objectives and beneficial uses for surface water and groundwater are in the Water Quality Control Plan for the Central Valley (Basin Plan) (Central Valley RWQCB 2018). The water quality objectives apply to all surface waters in the Sacramento and San Joaquin River basins, including Bear River and Grasshopper Slough. Existing and potential beneficial uses for the Bear River include municipal and domestic supply, agriculture, power, recreation, freshwater fish habitat, migration, spawning, and wildlife habitat. In accordance with Section 303(d) of the Clean Water Act, the Bear River has been classified as *impaired* by the State Water Resources Control Board (SWRCB) (SWRCB 2012). This designation is assigned to waterbodies where established water quality objectives as specified in the Basin Plan are not being met or where beneficial uses are not protected. The regional water board has classified lower Bear River (below Camp Far West Reservoir) as impaired for metals (copper and mercury) and pesticides (chlorpyrifos and diazinon) (SWRCB 2012). Placement of a waterbody on the 303(d) list triggers the development of a pollution control plan, called a Total Maximum Daily Load (TMDL), for each water body and associated pollutant/stressor on the list. The TMDL serves as the means to attain and maintain water quality standards for the impaired water body.

2.10.2 Findings

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

There will be no in-water work associated with the Project. Project-related ground disturbance, however, could temporarily increase the potential for localized erosion and sediment-laden stormwater runoff. To minimize the risk of soil erosion and stormwater runoff during construction, the Project will implement BMPs including **HYD-1** (Section 1.3.9). In addition, the Project will implement a SWPPP to mitigate potential pollution associated with stormwater runoff. The Project will also implement hazardous materials BMPs (**HAZ-1** and **HAZ-2**) to minimize the potential for accidental spills of hazardous materials to enter waterways (Section 1.3.9). To reduce erosion upon completion of the setback levee and buttress, the slopes will be seeded with a native hydroseed mix. The levee crown and patrol roads will not be vegetated but will be covered with six inches of compacted aggregate base to provide all-weather access. In the long-term, the Project will decrease the potential for erosion and sediment-laden runoff through the construction of the setback levee which will reduce flood risk and decrease erosion susceptibility. Impacts from implementation of the Project will therefore be less than significant.

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?

The Project will not alter existing groundwater pumping rates or natural recharge potential. The Project will therefore have 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?

Movement of earth and fill material using large equipment during construction of the setback levee, degradation of the existing levee, reinforcement of the downstream landside levee (i.e., levee buttress), and creation of temporary ramps could temporarily disturb surficial soils and alter runoff potential at low levels during construction. Appropriate BMPs, a SWPPP, and conservation measure **HYD-1** will be implemented during construction to prevent and control potential temporary impacts on waters from erosion during Project construction. In the long-term, construction of the new setback levee will reduce erosion during flood seasons and storm events and will therefore result in reduced erosion and siltation in the Bear River. The Project will, therefore, have a less than significant impact.

ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

During construction, the Project has the potential to cause minor alterations to the existing drainage patterns of the Bear River and Grasshopper Slough in a manner that would not result in an increased risk of flooding. Completion of the Project will reduce the risk of flooding, therefore there will be no impact.

(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?

The Project does not involve alteration of a stormwater drainage system and will not create or contribute runoff water or provide additional sources of polluted runoff. The Project will therefore have no impact.

(iv) impede or redirect flood flows?

The Project will increase channel capacity, decrease erosion susceptibility, and reduce flood risk during high water events. Potential effects to water surface elevation on Bear River as a result of the Project were evaluated via hydrologic simulations that included a one-dimensional Hydrologic Engineering Center's River Analysis System (HEC-RAS) hydraulic model and a sensitivity analysis of the Manning's roughness coefficient within the setback levee area (MBK Engineers 2020). Results of the hydraulic model demonstrated that effects of Project implementation on the maximum water surface elevation would be minimal (-0.02 ft to +0.04 ft) in comparison to existing conditions (without the setback levee in place) and the sensitivity analysis also showed a negligible

effect (-0.006 ft to +0.008 ft) on the maximum water surface elevation. Additionally, the Project is specifically intended to increase flood protection; therefore, there will be no impact.

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

Because the Project will reduce the risk of flood events, it will also reduce the risk of pollutant release associated with unanticipated inundations. The Project is not in a tsunami or seiche risk zone (CGS 2020). The Project will therefore have no impact.

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

The project will not conflict with or obstruct the implementation of the Central Valley Regional Water Quality Control Board Basin Plan (Central Valley RWQCB 2018) or sustainable groundwater management plan. There will be no impact.

2.11 Land Use and Planning

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Physically divide an established community?	❑	❑	❑	✓
b) Cause a significant environmental impact due to a conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	❑	❑	❑	✓

2.11.1 Environmental setting

The zone designation for the setback levee and buttress under the Sutter County General Plan is agriculture (20-acre minimum) (Sutter County 2019). The Project will convert the existing walnut orchards in this area into open space in order to increase flood protection for surrounding farmland.

The zone designation for the borrow site is agriculture (City of Wheatland 2017). This land currently serves as a walnut orchard and will be returned to agricultural production upon Project completion.

The Sutter County General Plan (Sutter County 2019) includes the following goals and policies that are applicable to the Project as it pertains to land use:

Goal LU 2. Preserve Sutter County's agricultural heritage and natural resources.

Policy LU 2.1 Long-term Conservation

Promote the long-term conservation of agricultural and open space lands in accordance with the goals and policies of the Agricultural Resources and Environmental Resources elements.

Goal AG 1. Preserve and protect high-quality agricultural lands for long-term agricultural production.

Policy 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.

Policy 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.

Policy AG 1.6 Interrelationship with Habitat Conservation
Permit agriculturally designated lands to be used for habitat conservation and/or mitigation with approval of a development agreement, provided such use does not interfere or adversely affect existing or planned agricultural uses or impact County flood control operations.

Goal ER 2. Conserve, protect, and enhance Sutter County's significant natural wetland and riparian habitats.

Policy ER 2.1 No Net Loss
Require new development to ensure no net loss of state and federally regulated wetlands, other waters of the United States (including creeks, rivers, ponds, marshes, vernal pools, and other seasonal wetlands), and associated functions and values through a combination of avoidance, restoration, and compensation.

Goal ER 3. Conserve, protect, and enhance Sutter County's varied wildlife and vegetation resources.

Policy ER 3.6 Natural Vegetation
Preserve important areas of natural vegetation and the ecological integrity of these habitats, where feasible, but not limited to riparian, vernal pool, marshes, oak woodlands and annual grasslands.

Goal ER 4. Conserve, protect, and enhance Sutter County's unique natural open space lands, drainages, floodplains, and resources.

Policy ER 4.1 Preserve Natural Resources
Preserve natural landforms, natural vegetation, and natural resources as open space to the extent feasible.

Policy 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.

Policy ER 4.4 Acquisition of Additional Open Space Areas
Support efforts to acquire additional open space adjoining protected natural resource areas to increase the size, connectivity, and buffering of existing habitat

Goal PHS 1. Minimize the potential for loss of life, personal injury, and property damage associated with floods.

Policy PHS 1.8 Inter-Agency Coordination
Coordinate efforts with local, regional, state, and federal agencies to maintain and improve the existing levee system to protect life and property. Ensure that dams, levees, and supporting facilities are properly operated and maintained to incorporate recreational opportunities, conserve natural habitat, and preserve scenic values, and provide adequate long-term flood protection.

2.11.2 Findings

a) Would the Project physically divide an established community?

The Project will not physically divide any established community and will therefore have no impacts.

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

The Project is in conflict with the Sutter County General Plan's policies for the conservation and preservation of agricultural lands for agricultural use, but the purpose of these policies is not to protect against environmental impacts. The Project will be converting agricultural land to open space rather than to urban development. This land conversion is consistent with the Sutter County General Plan's goals and policies for the protection and enhancement of floodplains, habitat, river corridors, and open spaces (Sutter County 2019). As such, the Project will not cause a significant, negative environmental effect due to a conflict with a land use plan; there will be no impact.

The borrow site is zoned for agriculture and will be returned to agricultural use after Project completion; there will be no impact.

2.12 Mineral Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	❑	❑	❑	✓

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

2.12.1 Environmental setting

No area in Sutter County is classified by the California State Mining and Geology Board as having mineral deposits of regional or statewide significance (Sutter County 2019), but portions of Yuba County along the Yuba River between Marysville and Smartsville contain regionally significant sand and gravel deposits used in the production of Portland cement concrete aggregate (DOC 1988). None of the Project Area falls within this significant Mineral Resource Zone (DOC 2015).

2.12.1.1 Relevant local or county ordinance

Sutter County

The Sutter County General Plan (Sutter County 2019) includes the following goal and policy that are applicable to the Project as it pertains to mineral resources:

Goal ER 5. Encourage commercial resource extraction activities in locations where environmental, aesthetic, and adjacent land use compatibility impacts can be adequately mitigated.

Policy 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.

Yuba County

The Yuba County General Plan (CDSA 2011) includes the following goal and policy that are applicable to the Project as it pertains to mineral resources:

Goal NR8. Soil and Mineral Resources. Provide for sustained mining operations as a fundamental component of the local economy.

Policy NR8.3

The County's zoning and development standards will be designed to protect Mineral Resource Zones and prevent introduction of incompatible land uses in areas with ongoing, viable mining operations.

2.12.2 Findings

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?

There are no known mineral resources in the Project Area. The Project will have 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?

There are no known mineral resources in Project Area. The Project does not conflict with a local plan and will have no impact.

2.13 Noise

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	❑	❑	✓	❑
b) Generation of excessive groundborne vibration or groundborne noise levels?	❑	❑	✓	❑
c) For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project Area to excessive noise levels?	❑	❑	❑	✓

2.13.1 Environmental setting

2.13.1.1 Noise

Noise can be defined as unwanted sound and is generally measured in decibels (dB). The decibel scale is weighted as a means of quantification. The most common metric is A-weighting, which measures noise levels in a way that can be easily perceived by humans. A-weighted noise is also measured in decibels but is reported with an "A" appended to the unit (i.e., dBA) to distinguish measurements to which A-weighting has been applied. A whisper is about 30 dBA; normal speaking is roughly 60 dBA; and a shout is about 100 dBA. On this scale, a change of 3 dBA is considered noticeable but acceptable. A significant impact could result from an increase of 5 dBA or more. Long-term exposure to noises exceeding a level of 70 dBA can cause hearing loss. The equivalent energy noise level, L_{eq}, is the constant noise level that would deliver the same acoustic energy as the actual time-varying noise levels over the same exposure time. L_{eq} is the preferred method to measure noise levels that vary over time.

Sutter County restricts noise-generating construction activities within 1,000 ft of noise-sensitive land uses (e.g., residential areas) to the hours between 7:00 am and 6:00 pm on weekdays and 8:00 am and 5:00 pm on Saturdays (Sutter County 2019). Construction is prohibited on Sundays and holidays without permission from the County. Sutter County does not provide noise level standards for temporary construction noise provided that all activities occur within the requisite schedule.

The City of Wheatland requires noise created by new non-transportation sources to adhere to noise level standards as indicated in Table 2-8 (City of Wheatland 2006). These standards apply as measured immediately within the property line of noise-sensitive land uses.

Table 2-8. City of Wheatland noise level performance standards for new projects affected by or including non-transportation sources (Source: City of Wheatland 2006).

Noise level descriptor	Daytime (7am–10pm) (dB)	Nighttime (10pm–7am) (dB)
Hourly L_{eq}	50	45
Maximum Noise Level	70	65

Due to the remote location, ambient noise levels near the setback levee and buttress are limited to the use of heavy equipment (e.g., tractors and harvesters) for routine agricultural and maintenance activities in the orchards to the north. Average noise levels for this type of farm operational equipment typically range from 75 to 93 dB (Depczynski et al. 2005). Ambient noise levels at the borrow site also include heavy equipment for agricultural use and are generally higher due to proximity to the City of Wheatland, including State Route 65, a major regional transportation corridor, and a Union Pacific railroad line with frequent freight train travel with approximately 30 train operations in a 24-hr period—average noise levels for railroad operations are approximately 98 dB from a distance of 200 ft (City of Wheatland 2005).

2.13.1.2 Vibration

Vibrations are periodic oscillations of a medium, including groundborne vibrations caused by machinery or construction equipment. Groundborne noise is noise produced by the vibration of other objects, such as room surfaces, resulting from groundborne vibrations. Vibrations are typically measured by their root mean squared velocity expressed as vibration decibels (VdB).

Sutter County requires construction projects to adhere to groundborne vibration standards based on Federal Transit Administration Criteria as shown in Table 2-9 (Sutter County 2019). Neither the City of Wheatland nor Yuba County provide quantitative standards.

Table 2-9. Sutter County groundborne vibration impact criteria (Source: Sutter County 2019).

Land use category	Impact levels (VdB)		
	Frequent events[1]	Occasional events[2]	Infrequent events[3]
Buildings where vibration would interfere with interior operations	65	65	65
Residences and buildings where people normally sleep	72	75	80
Institutional land uses with primarily daytime uses	75	78	80

[1] Frequent events is defined as more than 70 vibration events of the same source per day.
[2] Occasional events is defined as between 30 and 70 vibration events of the same source per day.
[3] Infrequent events is defined as fewer than 30 vibration events of the same source per day.

Existing vibration levels are relatively low near the setback levee and buttress. Vibrations in the vicinity are primarily produced by routine agricultural and maintenance equipment in the orchards to the north or on the existing levee. Vibrations in the vicinity of the borrow site are stronger and more frequent due to the neighboring railroad line, State Route 65, and orchards with agricultural equipment.

2.13.1.3 Sensitive land uses

Noise- and vibration-sensitive land uses are defined as uses that can be adversely affected by high levels of noise and vibration. Residences, schools, hospitals, nursing homes, religious facilities, and other areas of similar use are often considered to be sensitive receptors to noise. The nearest sensitive receptors to the Project are the rural residences north of the setback levee and buttress and residences within the City of Wheatland to the south of the borrow site.

2.13.2 Findings

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?

Typical construction equipment (e.g., scraper, dozer, front end loader) noise emissions for the Project are estimated between 80 and 85 dB, 50 ft from the source equipment (USDOT 2006). A general rule is that noise commonly decreases by 10 dB with every 100 ft distance from the source (Solano County Planning Department 1977). Applying this general rule, construction equipment noise emissions would be at or below the City of Wheatland exterior noise standards (50 dB during daytime hours) at locations between approximately 400 ft and 950 ft from the borrow site and not audible at locations greater than 950 ft away from the source. Sutter County does not have noise restrictions for temporary construction during daytime hours.

Depending on type of equipment and location, noise levels during Project implementation will at times exceed the City of Wheatland daytime noise level standard of 50 dB for residences within a 400 ft of the borrow site. There are two houses and one apartment complex within this radius, approximately 250 ft from the southern boundary of the borrow site (Figure 1-2c), that may temporarily experience noise above typical exterior noise standards when construction activities are at the southernmost end of the borrow site. The vast majority of the borrow site, however, is over 400 ft from these residences. There is one house located adjacent to the levee buttress in Sutter County; however, noise sources associated with construction activities between 7:00 am and 6:00 pm on weekdays and between 8:00 am and 5:00 pm on Saturdays are exempt from Sutter County noise standards.

A typical workday during Project construction is assumed to be from 7:00 am to 6:00 pm, Monday through Friday and 8:00 am to 5:00 pm Saturday. No construction will occur on Sundays, although minor maintenance may be performed between 9:00 am and 4:00 pm. Construction work will not be performed on holidays. Work outside these hours (e.g., night work) may occur if necessary and will avoid nearby residences in accordance with local noise ordinances. Construction work will generally occur during weekday daytime hours when many residents are expected to be away from their homes or less sensitive to noise, though there will be construction work on Saturdays and light maintenance on Sundays. To minimize disturbance during weekend work, the District and its contractor will try to coordinate construction activities to occur greater than 400 ft away from the few residences in proximity to the Project. Although City of Wheatland daytime noise standards will temporarily be exceeded when equipment is operating in the southernmost extent of the borrow site during the four-week borrow period, overall noise associated with the borrow is not anticipated to greatly exceed existing ambient noise associated with proximity to State Route 65 and the Union Pacific railroad line as described in Section 2.13.1.1. Additionally, construction at the borrow site will only last four weeks and will be coordinated to minimize disturbance to nearby residences. No construction activities at the

setback levee and levee buttress will exceed Sutter County noise standards. The impact will therefore be less than significant.

b) Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Groundborne vibration levels for construction equipment associated with the Project (e.g., dozer, loaded truck) are estimated at approximately 87 VdB, 25 ft from the source equipment (USDOT 2006). The few residences that are approximately 250 ft from the southern end of the borrow site may experience a slight increase in groundborne vibration during construction, but it is unlikely to exceed the Sutter County groundborne vibration criteria of 72–80 VdB for events near residences (Table 2-9). Moreover, these residences are located in Yuba County, which does not have any groundborne vibration standards. The Sutter County groundborne vibration criteria are only anticipated to be exceeded during the brief period when work is occurring in the immediate vicinity of one house along the levee buttress. Construction work will generally occur between 7:00 am and 6:00 pm when many residents are expected to be away from their homes or less sensitive to noise and vibration, though there will be construction work on Saturdays and light maintenance on Sundays. To minimize disturbance, the District and its contract contractor will try to schedule construction activities occurring near residences during weekday hours. Any increases of groundborne vibration and/or noise levels during construction will be temporary, lasting three to four months. Because groundborne vibration and/or noise generated from construction will not be excessive during most of construction, will last three to four months, and will be coordinated to minimize disturbance to nearby residences, the impact is 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?

The Project is not located within the vicinity of a private airstrip or within two miles of a public airport or public use airport; therefore, there will be no impact.

2.14 Population and Housing

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
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?	❑	❑	❑	✓

2.14.1 Environmental setting

The Project is located within Sutter and Yuba counties in rural areas with generally low population densities (Figure 1-1). The nearby City of Wheatland, approximately two miles east-northeast of the setback levee and buttress and 0.5 miles south of the borrow site, has a population of approximately 3,500. Areas surrounding the Project are primarily agricultural with a few domestic residences, although the haul route between the borrow area and setback levee will pass through the City of Wheatland.

2.14.2 Findings

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)?

This Project does not include any elements that would induce population growth. There will be no impact.

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

No existing housing will be displaced. There will be no impact.

2.15 Public Services

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	❑	❑	❑	✓
Fire protection?	❑	❑	✓	❑
Police protection?	❑	❑	❑	✓
Schools?	❑	❑	❑	✓
Parks?	❑	❑	❑	✓
Other public facilities?	❑	❑	❑	✓

2.15.1 Environmental setting

The setback levee and buttress are bordered by Bear River to the south and by agricultural land to the north (Figure 1-1). This section of the Project Area neighbors a few domestic residences scattered throughout the surrounding agricultural land. The borrow site is located along the northern perimeter of the City of Wheatland, east of State Route 65. No government facilities, public resources, or services occur within the Project Area, although the haul route between the

borrow site and the setback levee passes the Wheatland Fire Authority Fire Station #3 on Dairy Road, and Bear River Middle School and Wheatland Union High School on Wheatland Road (Figure 1-5).

2.15.2 Findings

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: Fire protection? Police protection? Schools? Parks? Other public facilities?

The haul route passes Wheatland Fire Authority Fire Station #3, Bear River Middle School, Wheatland Union High School, and residences along Wheatland Road. Movement of 48 haul trucks per hour each workday (Section 1.3.8, *Construction Schedule*) along the haul route will increase traffic, possibly slowing emergency access for approximately four weeks during construction; however, conservation measure **TRA-1** includes development of a traffic control plan to maximize transportation safety and minimize the potential for effects to public services as a result of the Project (Section 1.3.9). This impact will be temporary and less than significant.

The Project will not result in new or altered police protection services, schools, parks, or other public facilities. There will be no impact.

2.16 Recreation

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	❑	❑	❑	✓
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	❑	❑	❑	✓

2.16.1 Environmental setting

No neighborhood or regional parks or other recreational facilities exist in or near the Project Area. Additionally, there are no public access points (e.g., boating ramps) on the Bear River near the Project Area, but the river may be used for boating, fishing, and/or wildlife viewing.

2.16.2 Findings

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?

The Project will not change the current use of existing recreational facilities within the City of Wheatland or surrounding areas. There will 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?

The Project does not include recreational facilities or require the construction or expansion of recreational facilities. There will be no impact.

2.17 Transportation

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	❑	✓	❑	❑
b) Conflict 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?	❑	✓	❑	❑

2.17.1 Environmental setting

The setback levee and buttress are accessible from the north via local access roads off Wheatland Road, and the borrow site is accessible from agricultural access roads via C Street, Nichols Road, or State Route 65. The existing levee also has a road along its crown that is used for levee maintenance, which will be replaced on the crown of the new setback levee. During construction, vehicles will follow a haul route between the borrow site and the levee that traverses existing Bear River patrol roads, agriculture access roads, 1st Street, Wheatland Road, Oakley Lane, Dairy Road, and State Route 65. State Route 65 acts as the main transportation corridor in the Project vicinity, but the roads immediately surrounding the Project Area that will be used for Project access service only the few nearby residences and orchards and are not used as thoroughfares. The Project will temporarily increase construction traffic in the Project vicinity, primarily along the haul route, but will result in no long-term changes in any traffic or transportation circulation system.

2.17.2 Findings

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

While the Project will not directly conflict with a program plan, ordinance, or policy addressing the circulation system, conservation measure **TRA-1** includes development of a traffic control plan to maximize transportation safety and minimize the potential for effects to traffic circulation as a result of the Project (Section 1.3.9). An alternate, longer haul route involving two-way traffic on Dairy Road and Oakley Lane and installation of a temporary southbound left turn lane on State Route 65 by the California Department of Transportation was evaluated but not chosen due to logistical feasibility and potential for increased impacts to air quality that would likely exceed the state (i.e., FRAQMD) threshold for NO_x. **TRA-1** also includes provisions for reimbursement for impacts to roads in Yuba County and the City of Wheatland. Impacts will therefore be less than significant with mitigation.

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

Automobile vehicle miles traveled are not expected to change due to the Project since no detours will be implemented during construction and no transportation systems will change permanently. There will 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)?

The curve in the new setback levee road will be more gradual than the one in the existing levee road. Thus, there will be a decrease in hazards due to improving a geometric design feature and no increase in hazards from incompatible uses. There will be no impact.

d) Would the Project result in inadequate emergency access?

The haul route passes Wheatland Fire Authority Fire Station #3, Bear River Middle School, Wheatland Union High School, and residences along Wheatland Road. Movement of 48 haul trucks per hour along the haul route each workday (Section 1.3.8, *Construction Schedule*) will increase traffic in the Project vicinity for approximately four weeks during Project construction. Increased traffic has the potential to slow response time for emergency services during construction; however, haul trucks will yield to emergency vehicles. Alternative haul routes were also evaluated (see item a above) but were not preferred due to the potential for significant air quality effects. Conservation measure **TRA-1** includes development of a traffic control plan which will include procedures to minimize the potential for Project effects to emergency access (Section 1.3.9). This impact will be temporary and less than significant with mitigation.

2.18 Tribal Cultural Resources

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
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 a 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 Resource 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.	❑	✓	❑	❑

2.18.1 Environmental setting

Three Maidu groups inhabited the northeastern half of the Sacramento Valley and the adjoining western slopes of the Sierra Nevada; the Project Area occurs specifically within the ethnographic territory of the Nisenan, or Southern Maidu (Kroeber 1925, Wilson and Towne 1978). The Nisenan inhabited numerous villages within the Project vicinity, including villages along the Yuba, Feather, and lower Bear rivers (Wilson and Towne 1978).

The Maiduan language family consisted of multiple groups, including the language of the Nisenan. The Nisenan territory encompassed the drainages of the Yuba, Bear, and American rivers and the lower drainages of the Feather River, extending from the crest of the Sierra Nevada to the banks of the Sacramento River. The southern boundary of the Nisenan territory was likely a few miles south of the American River, bordering an area extending to the Cosumnes River used by both Miwok and Nisenan groups (Bennyhoff 1961). The eastern boundary bordered the Washoe, with whom the Nisenan had a mostly friendly relationship (Wilson 1972). The northern boundary has not been clearly established due to similarities in the languages of neighboring tribes (Wilson and Towne 1978).

The Nisenan generally occupied permanent settlements located on low rises along major watercourses. Larger villages had populations exceeding 500 individuals, but smaller settlements

of 15–25 individuals and extended families were also common (Kroeber 1925). Specific task groups would set out from villages seasonally to hunt, fish, and gather resources, often in the rich valley plain between the Sacramento River and the foothills. The economy of the Nisenan inhabiting valley sites typically involved mostly riparian resources (e.g., salmon), while the resource base of foothill settlements consisted of acorn and game (e.g., deer and rabbit) procurement.

Europeans colonized Nisenan territory in the nineteenth century, resulting in a series of events that subsequently altered Nisenan culture and reduced their population. In 1917, the presence of a separate, cohesive band of Maidu and Miwok Indians occupying a village on the outskirts of the City of Auburn in Placer County led the United States to acquire land in trust for the Auburn Band and formally establish a reservation known as the Auburn Rancheria near the City of Auburn. In 1967, the United States terminated federal recognition of the Auburn Band; however, in 1976, the United States Senate and House of Representatives repudiated the policy of federal termination in favor of a new policy of Indian Self-Determination. Surviving members of the Auburn Band reorganized in 1991 as the United Auburn Indian Community (UAIC) and requested restoration of their federal recognition, which occurred in 1994 with passage of the Auburn Indian Restoration Act. This act provided that the UAIC may acquire land in Placer County to establish a new reservation. Today, Nisenan descendants form a growing and thriving community that is actively involved in stewardship of their ancestors' sites.

A review of ethnographic data (Kroeber 1925, Tatsch 2006, Wilson and Towne 1978) did not indicate any ethnographic locations within the Project Area (AECOM 2021, Appendix E).

Records searches performed for the Project included the California Inventory of Historic Resources, the Historic Property Data File for Placer, Sutter, and Yuba counties, and outreach to Native American Tribes (AECOM 2021, Appendix E). These sources have thus far failed to identify tribal cultural resources in the Project Area but did note one site reflecting prehistoric land use (P-58-001275) in the Project vicinity, although its exact location is unknown and described as between Grasshopper Slough and the Bear River. Matthew Hatcher, Tribal Historic Preservation Officer with the Mooretown Rancheria, stated that they are not aware of any cultural or tribal cultural resources within the Project Area. Ana Starkey, UAIC of the Auburn Rancheria Cultural Regulatory Specialist, stated that their records indicate tribal village sites in the Project vicinity that may extend into the Project Area and that the Bear River itself is culturally significant; additional consultation with UAIC is currently being pursued by the Project team. The Mechoopda Indian Tribe representative has not responded (AECOM 2021, Appendix E).

2.18.2 Findings

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 a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

AECOM's records searches and surveys did not identify any sites listed or eligible for listing in the California Register of Historical Resources or in a local register of historical resources

(AECOM 2021). Additionally, background research, intensive field survey, and formal geoarchaeological investigations failed to reveal the presence of buried paleosols, indicating that there is low potential for the presence of prehistoric and historic-era archaeological resources. Furthermore, conservation measure **CUL-1** describes the process to mitigate the inadvertent find of a tribal cultural resource during excavation in the unlikely event one is found. The Project will not likely cause a substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the California Register of Historical Resources or in a local register of historical resources, and implementation of **CUL-1** would limit any impacts to a less than significant level with mitigation incorporated if tribal cultural resources are found during Project construction.

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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

The Bear River is culturally significant to the United Auburn Indian Community of the Auburn Rancheria. The Project Area does not include the Bear River, and the Project design is intended to increase the floodplain and open space along the Bear River in the vicinity of the setback levee. Additionally, conservation measure **CUL-1** includes retention of a tribal monitor to monitor for potential tribal cultural resources during ground-disturbing activities if interested Native American tribes provide evidence supporting the determination that the site is highly sensitive for tribal cultural resources. **CUL-1** also includes provisions to evaluate and protect, if necessary, tribal cultural resources located during Project construction. If any resources are identified during Project construction, implementation of **CUL-1** would reduce any possible impacts to a less than significant level with mitigation.

2.19 Utilities and Service Systems

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater 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?	❑	❑	❑	✓

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
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?	❑	❑	❑	✓

2.19.1 Environmental setting

2.19.1.1 Wastewater

Existing public liquid waste facilities in Sutter County include the sewer collection systems and wastewater treatment for the communities of Robbins and Rio Ramaza (Sutter County 2019). The remainder of Sutter County is served by private septic systems. All buildings within Wheatland city limits are connected to the sewer system (City of Wheatland 2005). A wastewater treatment plant servicing the City of Wheatland is located just south of the City, north of the Bear River levee, and east of State Route 65.

2.19.1.2 Solid waste

The California State Legislature passed the California Integrated Waste Management Act of 1989 (AB 939) to minimize the disposal of solid wastes. AB 939 required diversion of 25 percent of solid waste by 1995 and 50 percent by 2000. Sutter County established Policy I4.1 in its General Plan to reduce the solid waste stream via waste reduction, diversion, and recycling (Sutter County 2019).

Yuba-Sutter Regional Waste Management Authority and Recology Yuba-Sutter provide services for the collection, recycling, and disposal of solid waste in Sutter and Yuba counties (Sutter County 2019 and City of Wheatland 2005). The Project plans to divert waste from landfills by reusing excess material generated from the degrade of the existing levee to construct the levee buttress.

2.19.1.3 Utilities

Pacific Gas & Electric (PG&E) provides electricity to Sutter County and the City of Wheatland (Sutter County 2019 and City of Wheatland 2005). The Project will result in the relocation of ten power service poles currently located in the levee buttress footprint between levee station 183 and levee station 208. They will be relocated to a minimum of 15 ft landward from the levee buttress toe. An additional four power poles within the setback levee footprint will be permanently removed because the irrigation well they service will be abandoned (see below). All 14 of the

poles to be removed or relocated fall within an existing Central Valley Flood Protection Board (CVFPB) flood control easement and were identified in a recent USACE inspection as unpermitted (USACE 2013). Accordingly, the District has been coordinating with PG&E regarding relocation of these and other poles that are within the floodplain and impede operation and maintenance activities on the levee. While the utility realignment is not an action evaluated for potential environmental effects in this document, the service poles will be placed on private property in agricultural land outside of the CVFPB flood control easement. A preliminary evaluation of the intended area suggests little to no potential for environmental effects. An environmental analysis and determination of impacts will be conducted by the lead agency (i.e., PG&E) prior to relocation of the poles.

Private properties near the Project receive water from onsite irrigation wells. As a result of Project construction, an irrigation well near levee station 210 will be abandoned in place according to local well abandonment standards. The landowner will replace the well elsewhere on the same parcel; the District and landowner are coordinating with PG&E to ensure the new well is tied in to the relocated service line on the property.

2.19.2 Findings

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

The Project will result in the removal of four existing power poles, the relocation of ten existing power poles, and the abandonment of one irrigation well. The power pole relocations and new irrigation well will be on private agricultural property north of the setback levee and levee buttress but will not result in any loss of agricultural function or significant environmental effects (an environmental analysis and determination of impacts will be conducted by PG&E, as referenced above). There will be no impact.

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?

Construction water will be supplied by existing irrigation wells or irrigation systems on adjacent properties. The Project is expected to have a sufficient water supply based on the relatively small amount of water needed to complete the Project. Upon completion of Project construction, no additional water supplies will be necessary. There will 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?

The Project will not create a need for increased wastewater treatment capacity. There will 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?

To the extent possible, material from the levee degrade will be used in the construction of the setback levee and buttress instead of being hauled off-site for disposal. Materials not suitable for use in levee construction (e.g., cleared plant material) will be disposed of at an off-site waste facility. The Project will not 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. There will be no impact.

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

The Project will comply with federal, state, and local management and reduction statutes and regulations related to solid waste by reusing material generated from the degrade of the existing levee to construct the levee buttress. There will be no impact.

2.20 Wildfire

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

2.20.1 Environmental setting

Within Sutter and Yuba counties, the highest wildfire risk is in foothill or mountain areas with large fuel loads. The Project Area has generally flat topography and primarily includes agricultural land adjoining the Bear River and the City of Wheatland. The Project is located in unzoned Local Responsibility Areas[5] and does not contain lands classified as moderate, high, or very high fire hazard severity zones (CalFire 2007).

[5] Local Responsibility Areas are lands on which neither the state nor the federal government has any legal responsibility for providing fire protection.

2.20.2 Findings

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?

The Project is not located in or near state responsibility areas or lands classified as very high fire hazard severity zones and does not occur along major roads designated for emergency evacuation. There will 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?

The Project is not located in or near state responsibility areas or lands classified as very high fire hazard severity zones. The Project will be lessening the slope of the levee and will not exacerbate wildfire risk. There will 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?

The Project is not located in or near state responsibility areas or lands classified as very high fire hazard severity zones and does not require the installation of associated infrastructure. There will 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?

The Project is not located in or near state responsibility areas or lands classified as very high fire hazard severity zones. The Project Area's generally flat topography will not result in increased runoff or slope instability, and the levee setback and buttress will provide increased flood protection to neighboring properties. There will be no impact.

2.21 Mandatory Findings of Significance

Issues	Potentially significant impact	Less than significant with mitigation incorporated	Less than significant impact	No impact
Would the Project:				
a) Does the Project have the potential to degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of a rare or endangered plant or animal; or eliminate important examples of the major periods of California history or prehistory?	❑	✓	❑	❑
b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects.)	❑	❑	✓	❑
c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	❑	✓	❑	❑

3 DETERMINATION

On the basis of this evaluation:

I find that the Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	❑
I find that although the 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 Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	❑
I find that the 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 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 Project, nothing further is required.	❑

4 LIST OF PREPARERS

The table below lists the preparers of this IS/MND and participants in the related planning, data gathering, and analytical tasks.

Name	Title	Affiliation	Project role
Tom Engler, P.E., CFM Principal	RD 817 District Engineer	MBK Engineers	Project design oversite, Senior review
Anthony Deus, P.E.	Project Manager and Engineer	MBK Engineers	Project management, engineering, hydraulic analysis, Project design
Krista Orr	Senior Ecologist	Stillwater Sciences	Project management, senior review, environmental analysis, and document preparation
Emily Applequist	Environmental Scientist	Stillwater Sciences	Environmental analysis, document preparation
Christina Buck	Aquatic Biologist	Stillwater Sciences	Environmental analysis, document preparation: hydrology and water quality
Lorna Thurston	Environmental Scientist	Stillwater Sciences	Environmental analysis, document preparation: geology and soils
Wayne Swaney	Senior Environmental Scientist	Stillwater Sciences	Environmental analysis, document preparation: air quality, greenhouse gases
Rob Thoms	Botanist & Plant Ecologist	Stillwater Sciences	Environmental analysis, biological resources
Holly Burger	Senior Wildlife Biologist	Stillwater Sciences	Senior review
Karley Rodriguez	GIS Analyst	Stillwater Sciences	GIS support, maps
Kelli Wheat Dawson	Document Production	Stillwater Sciences	Document production
Peter Blum, P.E.	Associate Engineer	Wood Rogers	Project design and engineering
Nagesh Malyala, P.E.	Engineering Technical Lead	AECOM	Project design and engineering
Richard Deis	Senior Cultural Resources Specialist	AECOM	Cultural resources, tribal cultural resources

5 CONSULTATION AND COORDINATION

The Draft IS/MND was circulated to agencies, individuals, and/or organizations known to have a special interest in the proposed Project and was made available to the public for a 30-day review period. The public was notified as follows:

- A Notice of Intent (NOI) to adopt an MND, with the Uniform Resource Locator (URL) for a publicly accessible online version of the IS/MND, was posted for publication in a local newspaper and electronically sent to the Sutter and Yuba county clerks.
- The NOI and a link to an electronic copy of the IS/MND were sent via email to potentially interested parties and stakeholders (e.g., responsible agencies and landowners).
- The proposed IS/MND, NOI, and Notice of Completion (NOC), were electronically submitted to the State Clearinghouse via the CEQAnet Web Portal for distribution.
- The proposed IS/MND was distributed electronically by the State Clearinghouse to interested parties.
- Executive Orders N-54-20 and N-80-20 suspended the requirement to provide hard copies of the proposed IS/MND for public review in publicly accessible locations (e.g., county clerk offices) due to the COVID-19 pandemic.

6 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

6.1 Federal

Clean Air Act. Section 176(c) of this act prohibits federal action or support of activities that do not conform to a State Implementation Plan. The Project is not expected to violate any air quality standard, increase air quality violations in the Project region, exceed the USEPA's general conformity *de minimis* threshold, or hinder the attainment of air quality objectives in the local air basin. The Project will have no adverse effect on the future air quality of the Project Area and is compliant with this act.

Clean Water Act (Sections 401 and 404). Section 404 of this act requires that a permit be obtained from the U.S. Army Corps of Engineers for fill of waters of the U.S., including wetlands, prior to Project implementation. In compliance with Section 401 of the Act, a water quality certification or a waiver of water quality certification needs to be obtained from the Central Valley RWQCB. This Project does not require 404 or 401 permits since there will be no waterside work below the ordinary high water mark; however, the Project will require approval for Waste Discharge Requirements from the RWQCB. If it is determined that the Project may impact waters of the U.S., then Section 404 and 401 permits will be secured prior to Project implementation, in compliance with this act.

Endangered Species Act. The ESA prohibits unauthorized take of species listed or proposed for listing as threatened or endangered. The ESA also ensures that the actions of federal agencies do not jeopardize the continued existence of threatened and endangered species. The conservation measures incorporated into the Project will assure compliance with the ESA.

Migratory Bird Treaty Act. Protection of migratory birds, their occupied nests, and their eggs is required by the Migratory Bird Treaty Act (MBTA) (16 USC 703 et seq.), Title 50 Code of Federal Regulations (part 10), and CDFG Code Sections 3503, 3513, and 3800. The full list of the species protected under the MBTA appears in Title 50, Section 10.13, of the Code of Federal Regulations (50 CFR 10.13) and includes federally and state-listed migratory birds as well as other non-listed migratory birds. Conservation measures incorporated into the Project will assure compliance with the MBTA.

6.2 State

California Environmental Quality Act. This Initial Study/Mitigated Negative Declaration has been prepared to comply with CEQA.

California Land Conservation Act (also known as the Williamson Act). The California Land Conservation Act of 1965 permits local governments to enter into contracts with private landowners to restrict parcels of land to agricultural or related open space use. Participating counties enact their own rules and regulations (e.g., allowable uses, enforcement procedures) for implementation of the Act.

California Endangered Species Act. Generally, CDFW administers the state laws providing protection of fish and wildlife resources, including the CESA. CESA parallels the ESA and was

written to protect state endangered and threatened species. Conservation measures incorporated into the Project will assure compliance with CESA.

Native Plant Protection Act. The California Native Plant Protection Act (NPPA) of 1973 directed CDFW to preserve, protect, and enhance native plants. It gave CDFW the authority to designate native plants as endangered or rare and require that landowners who have been notified of state-listed species on their property, and who wish to destroy those plants and their habitat, to provide CDFW with notice to salvage the plants no less than 10 days before destruction occurs. Many of the species designated under the NPPA were subsumed by CESA, but there is a subset of species, subspecies, and varieties of plants that were not, and are protected as rare under the NPPA. The Project Area does not contain plants protected by the NPPA (Section 2.4) and, therefore, will be in compliance with NPPA.

Fish and Game Code Sections 3503 and 3513. Under California Fish and Game Code Section 3503 it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided. Fish and Game Code Section 3503.5 protects all birds-of-prey (raptors) and their eggs and nests and under Section 3513 it is unlawful to take or possess any migratory non-game bird designated under the MBTA. Conservation measures incorporated into the Project will assure compliance with these Fish and Game Code sections.

Fish and Game Code Wetland Regulation (Section 1600 et seq.). California Fish and Game Code Section 1600 et seq. gives authority to CDFW to regulate activities that would interfere with the natural flow of, or substantially alter the channel, bed, or bank of a lake, river, or stream. Any work on the waterside levee, from the hinge point down, requires the District to notify CDFW and apply for a Lake or Streambed Alteration Agreement. If it is determined that the activity will have substantial adverse effects on fish and wildlife resources, the Lake or Streambed Alteration Agreement includes conditions to protect these resources. The Project will therefore be in compliance with these Fish and Game Code sections.

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Appendices

Appendix A

Road Construction Emissions Model Summary Sheet

Road Construction Emissions Model, Version 9.0.0

Daily Emission Estimates for -> Bear River Setback Levee

Project Phases (Pounds)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	SOx (lbs/day)	CO2 (lbs/day)	CH4 (lbs/day)	N2O (lbs/day)	CO2e (lbs/day)
Grubbing/Land Clearing	2.31	43.47	6.48	65.26	0.26	65.00	13.74	0.22	13.52	0.08	7,438.50	2.30	0.10	7,524.88
Grading/Excavation	5.36	101.51	43.32	66.51	1.51	65.00	14.42	0.90	13.52	0.31	31,406.23	4.71	2.57	32,290.67
Drainage/Utilities/Sub-Grade	3.76	67.42	36.00	66.31	1.31	65.00	14.26	0.74	13.52	0.25	25,759.03	3.43	2.45	26,574.07
Paving	1.49	30.06	7.45	0.25	0.25	0.00	0.18	0.18	0.00	0.06	6,091.03	1.45	0.28	6,212.09
Maximum (pounds/day)	5.36	101.51	43.32	66.51	1.51	65.00	14.42	0.90	13.52	0.31	31,406.23	4.71	2.57	32,290.67
Total (tons/construction project)	0.17	3.21	1.39	2.48	0.05	2.43	0.53	0.03	0.51	0.01	1,022.37	0.16	0.09	1,051.67

Notes:

Project Start Year ->	2021
Project Length (months) ->	4
Total Project Area (acres) ->	15
Maximum Area Disturbed/Day (acres) ->	7
Water Truck Used? ->	Yes

	Total Material Imported/Exported Volume (yd^3/day)		Daily VMT (miles/day)			
Phase	Soil	Asphalt	Soil Hauling	Asphalt Hauling	Worker Commute	Water Truck
Grubbing/Land Clearing	0	0	0	0	230	46
Grading/Excavation	5,646	0	3,886	0	437	46
Drainage/Utilities/Sub-Grade	5,452	0	3,754	0	414	46
Paving	498	0	347	0	115	46

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

Total Emission Estimates by Phase for -> Bear River Setback Levee

Project Phases (Tons for all except CO2e. Metric tonnes for CO2e)	ROG (tons/phase)	CO (tons/phase)	NOx (tons/phase)	Total PM10 (tons/phase)	Exhaust PM10 (tons/phase)	Fugitive Dust PM10 (tons/phase)	Total PM2.5 (tons/phase)	Exhaust PM2.5 (tons/phase)	Fugitive Dust PM2.5 (tons/phase)	SOx (tons/phase)	CO2 (tons/phase)	CH4 (tons/phase)	N2O (tons/phase)	CO2e (MT/phase)
Grubbing/Land Clearing	0.01	0.19	0.03	0.29	0.00	0.29	0.06	0.00	0.06	0.00	32.73	0.01	0.00	30.04
Grading/Excavation	0.09	1.79	0.76	1.17	0.03	1.14	0.25	0.02	0.24	0.01	552.75	0.08	0.05	515.57
Drainage/Utilities/Sub-Grade	0.06	1.04	0.55	1.02	0.02	1.00	0.22	0.01	0.21	0.00	396.69	0.05	0.04	371.26
Paving	0.01	0.20	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.20	0.01	0.00	37.19
Maximum (tons/phase)	0.09	1.79	0.76	1.17	0.03	1.14	0.25	0.02	0.24	0.01	552.75	0.08	0.05	515.57
Total (tons/construction project)	0.17	3.21	1.39	2.48	0.05	2.43	0.53	0.03	0.51	0.01	1022.37	0.16	0.09	954.06

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns G and H. Total PM2.5 emissions shown in Column I are the sum of exhaust and fugitive dust emissions shown in columns J and K.

CO2e emissions are estimated by multiplying mass emissions for each GHG by its global warming potential (GWP), 1 , 25 and 298 for CO2, CH4 and N2O, respectively. Total CO2e is then estimated by summing CO2e estimates over all GHGs.

The CO2e emissions are reported as metric tons per phase.

Appendix B

Database Query Results for Special-status Plant Species and Sensitive Natural Communities in the Bear River Setback Levee Project Vicinity

Table B-1. Database query results for special-status plant species documented in the Bear River Setback Levee Project vicinity.

Scientific name	Common name	Status[1] Federal/State/ CRPR	Scoping source	Blooming period	Habitat associations	Elevation range (ft)	Potential to occur in the Project Area?
Astragalus tener var. *ferrisiae*	Ferris' milk-vetch	–/–/1B.1	CNDDB	April–May	Subalkaline flats of valley and foothill grassland, vernally mesic meadows and seeps	7–246	No; suitable habitat not present
Balsamorhiza macrolepis	big-scale balsamroot	–/–/1B.2	CNPS, CNDDB	March–June	Sometimes serpentine soils in chaparral, cismontane woodland, valley and foothill grassland	145–5,100	Yes; suitable habitat may be present
Brodiaea rosea subsp. *vallicola*	valley brodiaea	–/–/4.2	CNPS	April–May (June)	Silty, sandy, and gravelly loam soils of old alluvial terraces in valley and foothill grassland swales and vernal pools	30–1,100	Yes; suitable habitat may be present
Brodiaea sierrae	Sierra foothills brodiaea	–/–/4.3	CNPS	May–August	Usually serpentine or gabbroic areas in chaparral, cismontane woodland, and lower montane coniferous forest	160–3,215	Yes; suitable habitat may be present
Chloropyron molle subsp. *hispidum*	hispid bird's-beak	–/–/1B.1	CNPS, CNDDB	June–September	Alkaline areas of meadows and seeps, playas, and valley and foothill grassland	0–510	No; suitable habitat not present

Scientific name	Common name	Status[1] Federal/State/ CRPR	Scoping source	Blooming period	Habitat associations	Elevation range (ft)	Potential to occur in the Project Area?
Clarkia biloba subsp. *brandegeeae*	Brandegee's clarkia	–/–/4.2	CNPS, CNDDB	May–July	Often on roadcuts in chaparral, cismontane woodland, and lower montane coniferous forest	245–3,000	No; suitable habitat not present
Delphinium recurvatum	recurved larkspur	–/–/1B.2	CNDDB	March–June	Alkaline areas of chenopod scrub, cismontane woodland, and valley and foothill grassland	10–2,592	No; suitable habitat not present
Downingia pusilla	dwarf downingia	–/–/2B.2	CNPS, CNDDB	March–May	Vernal pools and mesic areas of valley and foothill grassland	0–1,460	Yes; suitable habitat may be present
Fritillaria agrestis	stinkbells	–/–/4.2	CNPS	March–June	Clay and sometimes serpentine areas in chaparral, cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland	30–5,100	Yes; suitable habitat may be present
Gratiola heterosepala	Boggs Lake hedge-hyssop	–/CE/1B.2	CNPS, CNDDB	April–August	Clay areas in vernal pools and lake margin marshes and swamps	30–7,790	No; suitable habitat not present
Hibiscus lasiocarpos var. *occidentalis*	woolly rose-mallow	–/–/1B.2	CNPS, CNDDB	June–September	Often in riprap on sides of levees in freshwater marshes and swamps	0–395	Yes; suitable habitat may be present

Scientific name	Common name	Status[1] Federal/State/ CRPR	Scoping source	Blooming period	Habitat associations	Elevation range (ft)	Potential to occur in the Project Area?
Juncus leiospermus var. *ahartii*	Ahart's dwarf rush	–/–/1B.2	CNPS, CNDDB	March–May	Mesic valley and foothill grassland	95–750	Yes; suitable habitat may be present
Juncus leiospermus var. *leiospermus*	Red Bluff dwarf rush	–/–/1B.1	CNPS, CNDDB	March–June	Vernally mesic areas of chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, and vernal pools	110–4,100	Yes; suitable habitat may be present
Legenere limosa	legenere	–/–/1B.1	CNPS, CNDDB	April–June	Vernal pools	0–2,885	No; suitable habitat not present
Monardella venosa	veiny monardella	–/–/1B.1	CNPS, CNDDB	May, July	Heavy clay areas in cismontane woodland and valley and foothill grassland	195–1,345	No; suitable habitat not present
Navarretia myersii subsp. *myersii*	pincushion navarretia	–/–/1B.1	CNPS, CNDDB	April–May	Often acidic vernal pools	65–1,085	No; suitable habitat not present
Navarretia nigelliformis subsp. *nigelliformis*	adobe navarretia	–/–/4.2	CNPS	April–June	Clay and sometimes serpentine areas in vernally mesic valley and foothill grassland, sometimes in vernal pools	325–3,280	No; outside of elevation range
Pseudobahia bahiifolia	Hartweg's golden sunburst	FE/CE/1B.1	CNDDB	March–April	Clay and often acidic areas of cismontane woodland, valley and foothill grassland	49–492	No; suitable habitat not present

Scientific name	Common name	Status[1] Federal/State/ CRPR	Scoping source	Blooming period	Habitat associations	Elevation range (ft)	Potential to occur in the Project Area?
Sagittaria sanfordii	Sanford's arrowhead	–/–/1B.2	CNPS, CNDDB	May–October (November)	Assorted shallow freshwater marshes and swamps	0–2,135	Yes; suitable habitat may be present
Wolffia brasiliensis	Brazilian watermeal	–/–/2B.3	CNPS, CNDDB	April, December	Assorted shallow freshwater marshes and swamps	65–330	Yes; suitable habitat may be present

[1] Status:
Federal
FE Federally listed endangered
State
CE California State listed endangered

California Rare Plant Rank (CRPR)
1B Plants rare, threatened, or endangered in California and elsewhere
2B Plants rare, threatened, or endangered in California, but more common elsewhere
4 Plants of limited distribution, a watch list
0.1 Seriously threatened in California (high degree/immediacy of threat)
0.2 Moderately threatened in California (moderate degree/immediacy of threat)
0.3 Not very threatened in California (low degree/immediacy of threats or no current threats known)

Table B-2. Documented occurrences of sensitive natural communities in the Bear River Setback Levee Project vicinity.

Natural Community (Holland 1986)	Status[1] (Global rank/State rank)	Distribution[2]	Habitat description[2]	Potential Sensitive Vegetation Alliances[3]	Potential to Occur in Project Area
Alkali Meadow	G3/S2.1	Occurs in valley bottoms and on the lower portions of alluvial slopes east of the Cascades and Sierra Nevada, around Alkali Seeps from Kern to Placer counties, and the salty grasslands of the western Sacramento Valley from San Joaquin to Glenn and Colusa counties. Occurs at elevations of 3,500 to 7,000 ft.	Occurs on fine-textured alkaline soils that are generally permanently moist. Dominated by an open growth of perennial grasses and sedges. Usually low growing, but occasionally with tufts to 3 ft high. Associated species include alkali sacaton (*Sporobolus airoides*).	• *Anemopsis californica–Helianthus nuttallii–Solidago spectabilis* • *Carex douglasii* • *Cressa truxillensis–Distichlis spicata* • *Frankenia salina* • *Spartina gracilis* • *Sporobolus airoides* • *Sporobolus airoides–Muhlenbergia asperifolia–Spartina gracilis*	None; species and structure not present
Alkali Seep	G3/S2.1	Scattered throughout the desert regions of California; less common in other areas.	Occurs in temporarily exposed to permanently flooded alkali marshes. Dominated by low-growing perennial herbs, usually forming relatively complete cover, growing throughout the year in areas with mild winters.	• *Carex serratodens* • *Ruppia* (*cirrhosa*, *maritima*)	None; species and structure not present
Northern Hardpan Vernal Pool	G3/S3.1	On the east side of the Great Valley from Tulare or Fresno County north to Shasta County in "Red Dirt Hogwallow Lands," on old alluvial terraces.	A low, amphibious, herbaceous community dominated by annual herbs and grasses. Germination and growth begin with winter rains. Rising spring temperatures evaporate the pools, leaving concentric bands of vegetation as the pool dries.	• *Lasthenia fremontii–Downingia* (*bicornuta*) • *Lasthenia glaberrima* • *Layia fremontii–Achyrachaena mollis*	None; species and structure not present
Northern Volcanic Mud Flow Vernal Pool	G1/S1.1	Great Valley and foothills of the Cascade Range	Occurs in seasonally flooded or seasonally saturated habitats with brackish or freshwater. Pools are generally small and irregular, impounded by rocks on gently sloping surfaces of Tertiary volcanic mudflows.	n/a	None; species and structure not present

Natural Community (Holland 1986)	Status[1] (Global rank/State rank)	Distribution[2]	Habitat description[2]	Potential Sensitive Vegetation Alliances[3]	Potential to Occur in Project Area
Great Valley Cottonwood Riparian Forest	G2/S2.1	Remnant or young stands along the major depositional rivers throughout the Great Valley. Typically occurs below 1,000 ft in the northern Great Valley and below 3,000 ft in the southern Great Valley	Occurs on fine-grained alluvial soils along perennial streams (or where subsurface irrigation is provided) that provide nutrient and soil inputs from annual inundation events. Dominated by Fremont cottonwood (*Populus fremontii*) and Goodding's black willow (*Salix gooddingii*). Understories may include wild grape (*Vitis californica*), box elder (*Acer negundo*), and Oregon ash (*Fraxinus latifolia*).	• *Populus fremontii* • *Salix gooddingii*	Yes; species and structure may be present
Great Valley Mixed Riparian Forest	G2/S2.2	Remnant stands on floodplains of low-gradient, depositional streams of the Great Valley, usually below 500 ft.	A tall, dense, winter-deciduous, riparian forest with a well-closed tree canopy that includes box elder, Northern California black walnut (*Juglans hindsii*), western sycamore (*Platanus racemosa*), Fremont cottonwood, Goodding's black willow, red willow (*Salix laevigata*), and Pacific willow (*Salix lasiandra* var. *lasiandra*). Understories include California button willow (*Cephalanthus occidentalis*) and Oregon ash. Wild grape and other vines are present in both tree and shrub canopies.	• *Acer negundo* • *Fraxinus latifolia* • *Populus fremontii* • *Salix gooddingii* • *Salix laevigata* • *Salix lucida*	Yes; species and structure may be present

[1] Status:

Global Rank		State Rank		Additional Threat Ranks:	
G1	Critically Imperiled	S1	Critically Imperiled	0.1	Very threatened
G2	Imperiled	S2	Imperiled	0.2	Threatened
G3	Vulnerable	S3	Vulnerable		

[2] Source: Holland (1986) unless otherwise noted.

[3] Source: CNPS 2020b.

Appendix C

Database Query Results for Special-status Fish and Wildlife Species in the Bear River Setback Levee Project Vicinity

Table C-1. Database query results for special-status fish and wildlife species documented in the Bear River Setback Levee Project Vicinity.

Common name *Scientific name*	Query sources	Status[1] Federal/ State	Distribution in California	Habitat association	Potential to occur in the Project Area
Invertebrates					
Conservancy fairy shrimp *Branchinecta conservatio*	CNDDB, USFWS	FE/–	Disjunct occurrences in Tehama, Glenn, Butte, Yolo, Solano, Stanislaus, Merced, and Ventura counties	Large, deep vernal pools in annual grasslands	**None.** No suitable habitat in the Project Area.
Vernal pool fairy shrimp *Branchinecta lynchi*	CNDDB	FT/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County; isolated populations also in Riverside County	Vernal pools; also found in sandstone rock outcrop pools	**None.** No suitable habitat in the Project Area.
Vernal pool tadpole shrimp *Lepidurus packardi*	CNDDB, USFWS	FE/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	**None.** No suitable habitat in the Project Area.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	CNDDB, USFWS	FT/–	Streamside habitats throughout the Central Valley; below 3,000 ft	Riparian and oak savanna habitats with host plant *Sambucus* sp. (blue elderberry)	**Moderate.** A small amount of suitable habitat is present within the Project Area, and there are several records of species in the Project vicinity (CDFW 2020a). Additional suitable habitat is present adjacent to the setback levee and levee buttress.
Fish					
North American green sturgeon: southern DPS *Acipenser medirostris*	NMFS	FT/SSC	San Francisco, San Pablo, Suisun, and Humboldt bays; Sacramento-San Joaquin Delta, Sacramento and Klamath rivers	Spawns in pools of large freshwater river mainstems with cool water and cobble, clean sand, or bedrock; in San Francisco Bay adults tend to utilize water depths less than 30 ft to swim near the surface or forage along the sea floor	**None.** There is no suitable habitat in the Project Area. A limited amount of suitable habitat is present in the nearby Bear River; however, most occurrences in the Project vicinity are found in the Feather River, where critical habitat elements are present (NMFS 2018).

Common name ***Scientific name***	**Query sources**	**Status[1] Federal/ State**	**Distribution in California**	**Habitat association**	**Potential to occur in the Project Area**
Sacramento splittail *Pogonichthys macrolepidotus*	CNDDB	–/SSC	Lower portions of the Napa, Petaluma, Sacramento and San Joaquin rivers; Sacramento-San Joaquin Delta including Suisun Bay, Suisun Marsh	Low elevation mainstem rivers and estuaries with low to moderate salinity (0-18 ppt); shallow, flooded vegetated habitat for spawning and foraging	**None.** Project Area is located outside of the primary range for the species and lacks suitable habitat for spawning and/or foraging.
Delta smelt *Hypomesus transpacificus*	USFWS	FT/SE	Found only in the Sacramento-San Joaquin Estuary, including the lower reaches of Sacramento and Napa rivers; the Delta including Suisun Bay, Goodyear, Suisun, Cutoff, First Mallard, and Montezuma sloughs	Estuarine or brackish waters up to 18 parts per thousand (ppt); spawn in shallow brackish water upstream of the mixing zone (zone of saltwater-freshwater interface) where salinity is around 2 ppt	**None.** The Project Area and sections of the Bear River adjacent to it are outside of the known range for the species.
Chinook salmon, Central Valley spring-run ESU *Oncorhynchus tshawytscha*	CNDDB, NMFS	FT/ST	Sacramento River and its tributaries (Deer, Mill, Antelope, Battle, Beegum, Butte, and Big Chico creeks and the Feather and Yuba rivers)	Low- to mid-elevation rivers and streams with cold water, clean gravel of appropriate size for spawning and adequate rearing habitat; typically rear in freshwater for one or more years before migrating to the ocean	**None.** There is no suitable habitat in the Project Area. Critical habitat exists in the Project vicinity at the confluence of the Bear and Feather rivers, approximately 7 miles downstream of the Project Area.
Chinook salmon, Sacramento River winter-run ESU *Oncorhynchus tshawytscha*	NMFS	FE/SE	Sacramento River and its tributaries; Sacramento-San Joaquin Delta; San Francisco, San Pablo and Suisun bays	Mainstem river reaches with cool water and available spawning gravel; rear 5 to 10 months in the river and estuary; migrate to the ocean to feed and grow until sexually mature	**None.** There is no suitable habitat in the Project Area and no critical habitat in the Bear River, which is outside of main range of species.
Chinook salmon, Central Valley fall-/ late-fall run ESU *Oncorhynchus tshawytscha*	Site visit Literature review	–/SSC	Sacramento River and its tributaries	Spawning and rearing occurs in cold, deep mainstem river reaches	**None.** There is no suitable habitat in the Project Area. Moderately suitable habitat is present in the nearby Bear River, where species was documented in the Bear River studies for the Camp Far West Hydroelectric Project Relicensing (South Sutter Water District 2018)

Common name ***Scientific name***	**Query sources**	**Status[1] Federal/ State**	**Distribution in California**	**Habitat association**	**Potential to occur in the Project Area**
River lamprey *Lampetra ayresi*	Literature review	–/SSC	Lower Sacramento-San Joaquin River system: Napa River, Sonoma Creek, Alameda Creek, tributaries to the San Francisco Bay, and lower Sacramento and San Joaquin rivers; Salmon Creek, Russian River, Eel River	Spawning adults need clean, gravelly riffles in permanent streams, while the ammocoetes require sandy backwaters or stream edges in which to bury themselves, with temperatures below 25°C	**None.** There is no suitable habitat in the Project Area. Species is rare in Central Valley tributaries and has low potential to occur in the nearby Bear River.
Steelhead, Central Valley DPS *Oncorhynchus mykiss*	CNDDB, NMFS	FT/–	Sacramento and San Joaquin rivers and their tributaries	Rivers and streams with cold water, clean gravel of appropriate size for spawning, and suitable rearing habitat; typically rear in freshwater for one or more years before migrating to the ocean	**None.** There is no suitable habitat in the Project Area. Critical habitat and a moderate amount of suitable spawning and rearing habitat is present in the nearby Bear River.
Amphibians					
Western spadefoot *Spea hammondii*	CNDDB	–/SSC	Near Redding, south throughout the Central Valley and nearby foothills; Coast Ranges south of Monterey Bay; and coastal southern California south of the Transverse Mountains and west of the Peninsular Mountains	Areas with sparse vegetation and/or short grasses in sandy or gravelly soils; primarily in washes, river floodplains, alluvial fans, playas, alkali flats, among grasslands, chaparral, or pine-oak woodlands; breeds in ephemeral rain pools with no predators	**Low.** Project Area lacks suitable breeding habitat, and there are no records of occurrence within 5 miles of the Project Area and limited occurrences greater than 5 miles in the Project vicinity (CDFW 2020a).
California red-legged frog *Rana draytonii*	USFWS	FT/SSC	Largely restricted to coastal drainages on the central coast from Mendocino County to Baja California; in the Sierra foothills south to Tulare and possibly Kern counties	Breeds in still or slow-moving water with emergent and overhanging vegetation, including wetlands, wet meadows, ponds, lakes, and low-gradient, slow moving stream reaches with permanent pools; uses adjacent uplands for dispersal and summer retreat	**None.** Species has largely been extirpated from the floor of the Central Valley (USFWS 2002). There are no CNDDB occurrences in the Project vicinity (CDFW 2020a), and the closest known population is in the foothills of Butte County near Oroville, over 50 miles from the Project Area (USFWS 2002).

Common name ***Scientific name***	**Query sources**	**Status[1] Federal/ State**	**Distribution in California**	**Habitat association**	**Potential to occur in the Project Area**
Foothill yellow-legged frog *Rana boylii*	CNDDB	–/SE	From the Oregon border along the coast to the Transverse Ranges, and south along the western side of the Sierra Nevada Mountains to Kern County; a possible isolated population in Baja California	Shallow tributaries and mainstems of perennial streams and rivers, typically associated with cobble or boulder substrate	**None.** There is no suitable habitat in the Project Area, and the adjacent section of the Bear River is outside of the current known range for the species (CDFW 2019b).
Reptiles					
Western pond turtle *Actinemys marmorata*	CNDDB	–/SSC	From the Oregon border along the coast ranges to the Mexican border, and west of the crest of the Cascades and Sierras	Permanent, slow-moving fresh or brackish water with available basking sites and adjacent open habitats or forest for nesting	**Moderate.** The Project Area for the setback levee and levee buttress has a moderate amount of suitable upland habitat, and suitable aquatic habitat is present in the nearby Bear River. There are several records of occurrence in the Project vicinity (CDFW 2020a).
Giant garter snake *Thamnophis gigas*	CNDDB	FT/ST	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low- gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	**Low.** There is no suitable habitat in the Project area for the borrow site. The Project Area for the setback levee and levee buttress has a limited amount of suitable upland habitat; however, the nearby section of the Bear River has little emergent vegetation suitable for foraging and cover. There is only one CNDDB record within 5 miles of the Project Area (CDFW 2020a), which is near the outer edge of the known range for the species Project.

Common name ***Scientific name***	**Query sources**	**Status[1] Federal/ State**	**Distribution in California**	**Habitat association**	**Potential to occur in the Project Area**
Birds					
White-tailed kite *Elanus leucurus*	CNDDB	–/SFP	Year-round resident; found in nearly all lowlands of California west of the Sierra Nevada mountains and the southeast deserts	Lowland grasslands and wetlands with open areas; nests in trees near open foraging area	**High.** Suitable habitat for nesting and foraging is present within and adjacent to the Project Area and there are many records of occurrence in the Project vicinity (eBird 2020, CDFW 2020a).
Northern harrier *Circus cyaneus*	CNDDB	–/SSC	Year-round resident; scattered throughout California; in the northwest, nests largely within coastal lowlands from Del Norte County south to Bodega Head in Sonoma County, inland to Napa County	Nests, forages, and roosts in wetlands or along rivers or lakes, but also in grasslands, meadows, or grain fields	**High.** Suitable habitat for nesting and foraging is present within and adjacent to the Project Area, and there are many records of occurrence in the Project vicinity (eBird 2020, CDFW 2020a).
Swainson's hawk *Buteo swainsoni*	CNDDB	–/ST	Summer resident; breeds in lower Sacramento and San Joaquin valleys, the Klamath Basin, and Butte Valley; highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	**High.** Suitable nesting habitat within and adjacent to the Project Area and moderately suitable foraging habitat nearby; many records of occurrence in the Project vicinity (eBird 2020, CDFW 2020a).
California black rail *Laterallus jamaicensis coturniculus*	CNDDB	–/ST, SFP	Northern San Francisco Bay area (primarily San Pablo and Suisun bays) and Sacramento-San Joaquin Delta	Large tidally-influenced marshes with saline to brackish water, typically with a high proportion of pickleweed (*Salicornia virginica*); also can be associated with bulrush (*Schoenoplectus* spp.), cattail (*Typha* spp.), or rushes (*Juncus* spp.); peripheral vegetation at and above mean high higher water necessary to protect nesting birds during extremely high tides	**None.** The Project Area has limited suitable habitat (i.e., freshwater marsh) that is not contiguous enough to support species; all occurrences within the Project vicinity are associated with the Sierra foothills population (CDFW 2020a, Tsao et al. 2015), which is higher in elevation than the Project Area.

Common name ***Scientific name***	**Query sources**	**Status[1] Federal/ State**	**Distribution in California**	**Habitat association**	**Potential to occur in the Project Area**
Western yellow-billed cuckoo *Coccyzus americanus*	CNDDB, USFWS	FT/SE	Breeds in limited portions of the Sacramento River and the South Fork Kern River; small populations may nest in Butte, Yuba, Sutter, San Bernardino, Riverside, Inyo, Los Angeles, and Imperial counties	Summer resident of valley foothill and desert riparian habitats; nests in woodland with clearings and low, dense, scrubby vegetation	**Low.** Riparian vegetation in the Project Area is likely not contiguous enough to support breeding; species is rare, and the infrequent occurrences in the Project vicinity are along the Feather River, greater than 5 miles from the Project Area (CDFW 2020a, eBird 2020).
Western burrowing owl *Athene cunicularia hypugaea*	CNDDB	–/SSC	Year-round resident throughout much of the state; Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast	Level, open, dry, heavily grazed or low- stature grassland or desert vegetation with available burrows	**Moderate.** Several records of occurrence in the Project vicinity (CDFW 2020a, eBird 2020), and although suitable burrows were not present in the Project Area at the time of the evaluation, they could become established in the future. Species also uses human-made structures such as pipes and culverts, which may be present in nearby agricultural areas.
Long-eared owl *Asio otus*	CNDDB	–/SSC	Uncommon resident throughout the state, scarce and irregular breeder in the Central Valley and Southern California deserts	Riparian habitat; nests in dense vegetation close to open grassland, meadows, riparian, or wetland areas for foraging.	**Low.** Species rarely breeds in the Central Valley (Hunting 2008), and only one CNDDB record exists in the Project vicinity (CDFW 2020a).
Purple martin *Progne subis*	CNDDB	–/SSC	Summer resident and migrant; most densely populated in central and northern coastal conifer forests and smaller and more localized areas in the Sierra Nevada, interior foothills, and southern California	Conifer, valley-foothill, montane-hardwood forests with large snags in open areas; most nest sites located in upper slopes of hilly terrain; also, may nest in human-made structures with cavities	**Low.** There is very limited suitable habitat in and adjacent to the Project Area and only one CNDDB record in the Project vicinity (CDFW 2020a).

Common name ***Scientific name***	**Query sources**	**Status[1] Federal/ State**	**Distribution in California**	**Habitat association**	**Potential to occur in the Project Area**
Least Bell's vireo *Vireo bellii pusillus*	CNDDB	FE/SE	Summer resident; breeds in scattered locations around southern California	Nests in dense vegetative cover of riparian areas; often nests in willow or mulefat; forages in dense, stratified canopy	**Low.** Project Area lacks habitat suitable for nesting and foraging, although adjacent areas support a limited amount. Species currently breeds mostly in southern California, but small populations have been returning to its historical range, including the Central Valley (Kus 2002, Howell et al. 2010). There are no eBird occurrences and only one CNDDB record in the Project vicinity, which is over 100 years old (CDFW 2020a).
Bank swallow *Riparia riparia*	CNDDB	–/ST	Summer resident; occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American rivers; and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou counties; small populations near the coast from San Francisco County to Monterey County	Nests in vertical bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam	**Low**. Although species is known to occur in several locations along the Bear River approximately 2 miles upstream of the Project Area (CDFW 2020a, eBird 2020), the Project Area lacks suitable vertical bank habitat for nesting.
Yellow warbler *Setophaga petechia*	CNDDB	–/SSC	Summer resident; nests in most of California, except most of the Central Valley, high Sierras, and Mojave and Colorado deserts	Open canopy, deciduous riparian woodland close to water, along streams or wet meadows	**Low.** Species may occur in migration, but the Project Area is outside of its typical breeding range (Zeiner et al. 1990, Heath 2008) and there is very limited suitable habitat present within or adjacent to it.

Common name ***Scientific name***	**Query sources**	**Status[1] Federal/ State**	**Distribution in California**	**Habitat association**	**Potential to occur in the Project Area**
Yellow-breasted chat *Icteria virens*	CNDDB	–/SSC	Uncommon summer resident and migrant in coastal California and in foothills of the Sierra Nevada	Early successional riparian habitats with a dense shrub layer and an open canopy	**Low.** There is limited suitable habitat present within and adjacent to the Project Area, and it is outside of the typical breeding range for the species (Eckerle and Thompson 2001, Comrack 2008). There are very few records in the Project vicinity (CDFW 2020a, eBird 2020).
Grasshopper sparrow *Ammodramus savannarum*	CNDDB	–/SSC	Summer resident; nests in Mendocino, Trinity, and Tehama counties south, west of the Cascade–Sierra Nevada axis and southeastern deserts, to San Diego County	Typically found in moderately open grasslands with scattered shrubs	**Low.** Documented occurrences in the Project vicinity are limited (CDFW 2020a, eBird 2020), and breeding records in the Central Valley are infrequent (Unitt 2008). Grasslands in the Project Area are likely not large or contiguous enough to support species (Slater 2004).
Song sparrow ("Modesto" population) *Melospiza melodia*	CNDDB	–/SSC	Year-round resident; north-central portion of the Central Valley	Foraging: freshwater marsh, riparian woodland, riparian scrub habitats, and vegetated irrigation canals and levees. Nesting: emergent marsh and riparian scrub	**Moderate.** Project Area contains a moderate amount of suitable habitat for foraging and nesting and additional habitat is present in adjacent areas. Species is known to occur in the Central Valley (Gardali 2008).
Tricolored blackbird *Agelaius tricolor*	CNDDB	–/ST	Permanent resident, but makes extensive migrations both in breeding season and winter; common locally throughout Central Valley and in coastal areas from Sonoma County south	Feeds in grasslands and agriculture fields; nesting habitat components include open accessible water, a protected nesting substrate (including flooded or thorny vegetation), and a suitable nearby foraging space with adequate insect prey	**Moderate.** Although there is limited habitat suitable for nesting in the Project Area, species is abundant in the Project vicinity with several nearby occurrences (CDFW 2020a and eBird 2020) and may inhabit riparian scrub and/or grasslands within or adjacent to the Project Area.

Common name ***Scientific name***	**Query sources**	**Status[1] Federal/ State**	**Distribution in California**	**Habitat association**	**Potential to occur in the Project Area**
Mammals					
Western red bat *Lasiurus blossevillii*	CNDDB	–/SSC	Near the Pacific Coast, Central Valley, and the Sierra Nevada	Riparian forests, woodlands near streams, fields, and orchards	**Moderate.** There is suitable roosting and foraging habitat throughout the Project Area.
Pallid bat *Antrozous pallidus*	CNDDB	–/SSC	Throughout California except for elevations greater than 9,800 ft in the Sierra Nevada	Roosts in rock crevices, tree hollows, mines, caves, and a variety of vacant and occupied buildings; feeds in a variety of open woodland habitats	**Low.** Project Area has limited habitat suitable for roosting, but species may forage in the area.

[1] Status:
– = None

Federal
FE = Listed as endangered under the federal Endangered Species Act
FT = Listed as threatened under the federal Endangered Species Act

State
SE = Listed as Endangered under the California Endangered Species Act
ST = Listed as Threatened under the California Endangered Species Act
SSC = CDFW Species of Special Concern
SFP = CDFW Fully Protected species

Appendix D

Comprehensive List of Plant Species Documented during Special-status Plant Surveys for the Bear River Setback Levee Project

Table D-1. Comprehensive list of plant species documented during special-status plant surveys for the Bear River Setback Levee Project[1].

Scientific Name	Common Name	Family	Native?	Cal-IPC Rating[2]	Setback Levee and Buttress	Borrow Site
Acmispon americanus var. *americanus*	American bird's-foot trefoil	Fabaceae	Yes	–	●	
Acmispon parviflorus	desert deervetch	Fabaceae	Yes	–	●	
Aegilops triuncialis	barbed goat grass	Poaceae	No	High	●	
Aesculus californica	California buckeye	Sapindaceae	Yes	–		●
Agoseris retrorsa	spearleaf agoseris	Asteraceae	Yes	–		●
Agrostis avenacea	Pacific bent grass	Poaceae	No	Limited	●	
Ailanthus altissima	tree of heaven	Simaroubaceae	No	Moderate	●	
Aira caryophyllea	silver hair grass	Poaceae	No	–	●	
Amaranthus albus	tumbleweed	Amaranthaceae	No	–	●	●
Ambrosia psilostachya	western ragweed	Asteraceae	Yes	–	●	
Ammi visnaga	bisnaga	Apiaceae	No	–	●	
Amsinckia menziesii	common fiddleneck	Boraginaceae	Yes	–	●	
Anthriscus caucalis	bur-chervil	Apiaceae	No	–	●	●
Apocynum cannabinum	hemp dogbane	Apocynaceae	Yes	–	●	
Artemisia douglasiana	mugwort	Asteraceae	Yes	–	●	
Asclepias cordifolia	purple milkweed	Apocynaceae	Yes	–	●	
Avena barbata	slender wild oat	Poaceae	No	Moderate	●	
Avena sativa	cultivated oat	Poaceae	No	–	●	●
Baccharis pilularis	coyote brush	Asteraceae	Yes	–	●	
Brachypodium distachyon	purple false brome	Poaceae	No	Moderate	●	
Briza minor	annual quaking grass	Poaceae	No	–	●	
Brodiaea elegans subsp. *elegans*	harvest brodiaea	Themidaceae	Yes	–	●	
Bromus catharticus	rescuegrass	Poaceae	No	–	●	

Scientific Name	Common Name	Family	Native?	Cal-IPC Rating[2]	Setback Levee and Buttress	Borrow Site
Bromus catharticus var. *catharticus*	rescue grass	Poaceae	No	–		●
Bromus diandrus	ripgut grass	Poaceae	No	Moderate	●	
Bromus hordeaceus	soft chess	Poaceae	No	Limited	●	
Bromus madritensis subsp. *rubens*	red brome	Poaceae	No	High	●	
Calandrinia menziesii	red maids	Montiaceae	Yes	–		●
Capsella bursa-pastoris	shepherd's purse	Brassicaceae	No	–	●	●
Carduus pycnocephalus subsp. *pycnocephalus*	Italian thistle	Asteraceae	No	Moderate	●	
Castilleja attenuata	valley tassels	Orobanchaceae	Yes	–	●	
Centaurea solstitialis	yellow star-thistle	Asteraceae	No	High	●	
Chenopodium album	lamb's quarters	Chenopodiaceae	No	–	●	
Claytonia perfoliata	miner's lettuce	Montiaceae	Yes	–		●
Convolvulus arvensis	bindweed	Convolvulaceae	No	–	●	●
Crassula tillaea	moss pygmyweed	Crassulaceae	No	–	●	
Croton setiger	doveweed	Euphorbiaceae	Yes	–	●	
Cuscuta occidentalis	chaparral dodder	Convolvulaceae	Yes	–	●	
Cynodon dactylon	Bermuda grass	Poaceae	No	Moderate	●	●
Cyperus eragrostis	tall flatsedge	Cyperaceae	Yes	–	●	
Cyperus esculentus	yellow nutsedge	Cyperaceae	Yes	–	●	
Daucus carota	carrot	Apiaceae	No	–	●	
Dichelostemma capitatum subsp. *capitatum*	bluedicks	Themidaceae	Yes	–	●	
Dittrichia graveolens	stinkwort	Asteraceae	No	Moderate	●	
Echinochloa crus-galli	barnyardgrass	Poaceae	No	–	●	
Eleusine tristachya	three-spiked goose grass	Poaceae	No	–	●	●
Elymus caput-medusae	medusa head	Poaceae	No	High	●	●

Scientific Name	Common Name	Family	Native?	Cal-IPC Rating[2]	Setback Levee and Buttress	Borrow Site
Elymus glaucus	blue or western wild-rye	Poaceae	Yes	–	●	
Elymus triticoides	beardless wild rye	Poaceae	Yes	–	●	
Epilobium brachycarpum	tall annual willowherb	Onagraceae	Yes	–	●	
Epilobium ciliatum	fringed willowherb	Onagraceae	Yes	–	●	
Equisetum arvense	common horsetail	Equisetaceae	Yes	–	●	
Equisetum laevigatum	smooth scouring rush	Equisetaceae	Yes	–	●	
Erigeron bonariensis	flax-leaved horseweed	Asteraceae	No	–	●	●
Erigeron canadensis	horseweed	Asteraceae	Yes	–	●	
Erodium botrys	longbeak stork's bill	Geraniaceae	No	–	●	
Erodium moschatum	greenstem filaree	Geraniaceae	No	–	●	●
Eschscholzia californica	California poppy	Papaveraceae	Yes	–	●	
Euphorbia maculata	spotted spurge	Euphorbiaceae	No	–	●	●
Euphorbia peplus	petty spurge	Euphorbiaceae	No	–	●	
Euthamia occidentalis	western goldenrod	Asteraceae	Yes	–	●	
Festuca myuros	rattail sixweeks grass	Poaceae	No	Moderate	●	
Festuca perennis	rye grass	Poaceae	No	Moderate	●	
Foeniculum vulgare	fennel	Apiaceae	No	Moderate	●	
Fragaria vesca	wood strawberry	Rosaceae	Yes	–	●	
Galium aparine	goose grass	Rubiaceae	Yes	–	●	●
Galium murale	tiny bedstraw	Rubiaceae	No	–	●	●
Geranium dissectum	cutleaf geranium	Geraniaceae	No	Limited	●	
Geranium molle	dovefoot geranium	Geraniaceae	No		●	
Helminthotheca echioides	bristly ox-tongue	Asteraceae	No	Limited	●	
Heterotheca grandiflora	telegraph weed	Asteraceae	Yes	–	●	
Hirschfeldia incana	shortpod mustard	Brassicaceae	No	Moderate	●	

Scientific Name	Common Name	Family	Native?	Cal-IPC Rating[2]	Setback Levee and Buttress	Borrow Site
Hordeum marinum subsp. *gussoneanum*	Mediterranean barley	Poaceae	No	Moderate	●	
Hordeum murinum	wall barley	Poaceae	No	Moderate	●	
Hypericum calycinum	Aaron's beard	Hypericaceae	No	–	●	
Hypericum concinnum	gold-wire	Hypericaceae	Yes	–	●	
Hypericum perforatum subsp. *perforatum*	Klamathweed	Hypericaceae	No	Limited	●	
Hypochaeris glabra	smooth cat's-ear	Asteraceae	No	Limited	●	●
Hypochaeris radicata	rough cat's-ear	Asteraceae	No	Moderate		●
Juglans hindsii	northern California black walnut	Juglandaceae	Yes	–	●	
Juglans regia	Persian or English walnut	Juglandaceae	No	–	●	●
Kickxia elatine	sharpleaf cancerwort	Plantaginaceae	No	–		●
Koeleria gerardi	annual June grass	Poaceae	No	–	●	
Lactuca serriola	prickly lettuce	Asteraceae	No	–	●	●
Leontodon saxatilis subsp. *saxatilis*	hawkbit	Asteraceae	No	–	●	
Logfia gallica	daggerleaf cottonrose	Asteraceae	No	–	●	
Lotus corniculatus	bird's-foot trefoil	Fabaceae	No	–	●	
Lupinus bicolor	miniature lupine	Fabaceae	Yes	–	●	
Lysimachia arvensis	scarlet pimpernel	Myrsinaceae	No	–	●	●
Lythrum hyssopifolia	hyssop loosestrife	Lythraceae	No	Moderate		●
Malva nicaeensis	bull mallow	Malvaceae	No	–	●	
Malva parviflora	cheeseweed	Malvaceae	No	–	●	●
Marah fabacea	California man-root	Cucurbitaceae	Yes	–	●	
Marrubium vulgare	horehound	Lamiaceae	No	Limited	●	
Matricaria discoidea	pineapple weed	Asteraceae	Yes	–	●	

Scientific Name	Common Name	Family	Native?	Cal-IPC Rating[2]	Setback Levee and Buttress	Borrow Site
Medicago polymorpha	California burclover	Fabaceae	No	Limited	●	●
Melilotus albus	white sweetclover	Fabaceae	No	–	●	
Melilotus indicus	sourclover	Fabaceae	No	–	●	
Mollugo verticillata	green carpetweed	Molluginaceae	No	–	●	
Nicotiana acuminata var. *multiflora*	manyflower tobacco	Solanaceae	No	–	●	
Oxalis micrantha	dwarf wood-sorrel	Oxalidaceae	No	–	●	
Panicum sp.	panicgrass	Poaceae	Yes	–		●
Paspalum dilatatum	dallis grass	Poaceae	No	–	●	
Petrorhagia dubia	hairypink	Caryophyllaceae	No	–	●	
Phyla nodiflora	turkey tangle fogfruit	Verbenaceae	Yes	–	●	
Plantago lanceolata	English plantain	Plantaginaceae	No	Limited	●	
Poa annua	annual blue grass	Poaceae	No	–	●	●
Polygonum aviculare	knotweed	Polygonaceae	No	–	●	●
Polypogon monspeliensis	annual beard grass	Poaceae	No	Limited	●	
Portulaca oleracea	purslane	Portulacaceae	No	–	●	
Quercus lobata	valley oak	Fagaceae	Yes	–	●	●
Ranunculus muricatus	spinyfruit buttercup	Ranunculaceae	No	–		●
Raphanus sativus	radish	Brassicaceae	No	Limited	●	
Robinia pseudoacacia	black locust	Fabaceae	No	Limited	●	
Rosa californica	California rose	Rosaceae	Yes	–	●	
Rubus armeniacus	Himalayan blackberry	Rosaceae	No	High	●	●
Rubus ursinus	California blackberry	Rosaceae	Yes	–	●	
Rumex crispus	curly dock	Polygonaceae	No	Limited	●	
Rumex stenophyllus	narrowleaf dock	Polygonaceae	No	–		●
Sagina apetala	dwarf pearlwort	Caryophyllaceae	No	–	●	●

Scientific Name	Common Name	Family	Native?	Cal-IPC Rating[2]	Setback Levee and Buttress	Borrow Site
Salsola tragus	Russian thistle	Chenopodiaceae	No	Limited	●	
Sambucus nigra subsp. *caerulea*	blue elderberry	Adoxaceae	Yes	–	●	
Senecio vulgaris	common groundsel	Asteraceae	No	–		●
Setaria parviflora	knotroot bristle grass	Poaceae	Yes	–	●	
Sherardia arvensis	field madder	Rubiaceae	No	–		●
Silene gallica	small-flower catchfly	Caryophyllaceae	No	–	●	
Silybum marianum	blessed milkthistle	Asteraceae	No	Limited	●	●
Solanum americanum	American black nightshade	Solanaceae	Yes	–	●	
Sonchus asper subsp. *asper*	prickly sow thistle	Asteraceae	No	–	●	●
Sonchus oleraceus	common sow thistle	Asteraceae	No	–	●	
Sorghum halepense	Johnson grass	Poaceae	No	–	●	●
Stellaria media	common chickweed	Caryophyllaceae	No	–		●
Stellaria pallida	lesser chickweed	Caryophyllaceae	No	–		●
Toxicodendron diversilobum	western poison oak	Anacardiaceae	Yes	–	●	
Triadica sebifera	Chinese tallowtree	Euphorbiaceae	No	Moderate	●	
Tribulus terrestris	punctureveine	Zygophyllaceae	No	Limited	●	
Trifolium arvense	rabbitfoot clover	Fabaceae	No	–	●	
Trifolium campestre	hop clover	Fabaceae	No	–	●	
Trifolium hirtum	rose clover	Fabaceae	No	Limited	●	
Trifolium repens	white clover	Fabaceae	No	–		●
Verbascum blattaria	moth mullein	Scrophulariaceae	No	–	●	
Verbascum thapsus	woolly mullein	Scrophulariaceae	No	Limited	●	
Verbena litoralis	seashore vervain	Verbenaceae	No	–	●	
Veronica persica	Persian speedwell	Plantaginaceae	No	–		●
Vicia villosa subsp. *villosa*	winter vetch	Fabaceae	No	–	●	

Scientific Name	Common Name	Family	Native?	Cal-IPC Rating[2]	Setback Levee and Buttress	Borrow Site
Vitis californica	California wild grape	Vitaceae	Yes	–	●	
Xanthium strumarium	cocklebur	Asteraceae	Yes	–	●	
Zeltnera venusta	California centaury	Gentianaceae	Yes	–	●	

[1] Special-status plant surveys encompassed the entirety of the Project Area as well as a 20-ft buffer for the setback levee, a 50-ft levee on the landside of the levee buttress, and a 10-ft buffer on the waterside of the levee buttress.

[2] Cal-IPC ratings:

High Species having severe ecological impacts on physical processes, plant and animal communities, and vegetation structure.

Moderate Species having substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure.

Limited Species having minor ecological impacts on a statewide level of for which there is not enough information to justify a higher score.

Appendix E

Draft-Final Cultural, Tribal, Archaeological and Historical Resources Assessment, Sutter and Yuba Counties (AECOM 2021)

Draft-Final Cultural, Tribal, Archaeological & Historical Resources Assessment, Sutter and Yuba Counties

Bear River Setback Levee Project
Reclamation District No. 817
Bear River Right Bank
California

January 2021

Prepared for:

Reclamation District No. 817
Mr. Joe Conant, President
P.O. Box 261
Wheatland, CA 95692

Prepared by:

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2020 L Street, Suite 400
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PREPARERS

This study has been prepared and reviewed by the following principal investigators, who meet the Secretary of the Interior's Standards for Professional Qualifications (SOIPQS) (62 *Federal Register* 33708-33723):

- Chandra Miller was principal investigator for the historic-age built environment and coauthored this report. She has a BA degree in History from Humboldt State University; an MA degree in Public History (with Cultural Resource Management emphasis) from California State University, Sacramento; and a Certificate in Historic Preservation and Restoration Technology from the College of the Redwoods. She has more than 10 years of experience conducting architectural investigations in California, and she meets the SOIPQS for work in history and architectural history.
- Diana Ewing was principal investigator for archaeology and conducted the field survey. She has a BA degree in Anthropology (Archaeology) from the University of California, Davis, and an MA degree in Anthropology (Archaeology) from the University of Nevada, Las Vegas, (earned in California). She has more than 10 years of experience in northern and coastal California, the Alaskan Arctic, Arizona, and Nevada. She meets the SOIPQS for work in archaeology.
- Richard Deis, RPA (Register of Professional Archaeologists) provided guidance and input for this study. He has an MA degree in Anthropology from California State University, Sacramento, and has more than 28 years of professional archaeological experience in California and Nevada. Mr. Deis specializes in lithic technology and shell bead and ornament analyses, with an interest in studies related to ethnic boundaries and population replacement, acculturation, and determining ethnicity and recreating culture history from historic remains. He meets the SOIPQS for work in archaeology.
- Kathleen Kubal has over 16 years of experience in archaeology and cultural resources management in California and over 8 years of experience conducting geoarchaeological investigations. Ms. Kubal completed a Master's degree at Sonoma State University and has since taken numerous geoscience courses, giving her the necessary skillset to employ a multidisciplinary approach to the study of buried archaeological site potential. She meets the SOIPQS for work in geoarchaeology.

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TABLE OF CONTENTS

APPENDICES

LIST OF TABLES AND FIGURES

Tables **Page**

Figures **Page**

LIST OF ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
APE	Area of Potential Effects
B.P.	Before Present
CEQA	California Environmental Quality Act
CRHR	California Register of Historical Resources
CVFPB	Central Valley Food Protection Board
GLO	General Land Office
IWW	International Workers of the World
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NCIC	North Central
NEIC	Northeastern Information Centers
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
O&C	Oregon & California Railroad Company
PRC	Public Resources Code
RD	Reclamation District
SHPO	State Historic Preservation Officer
SOIPQS	Secretary of the Interior's Standards for Professional Qualifications
SPRR	Southern Pacific Railroad
TCP	tribal cultural property
TCRs	tribal cultural resources
UAIC	United Auburn Indian Community
UPRR	Union Pacific Railroad Valley
USACE	U.S. Army Corps of Engineers
USDA	United States Department of Agriculture

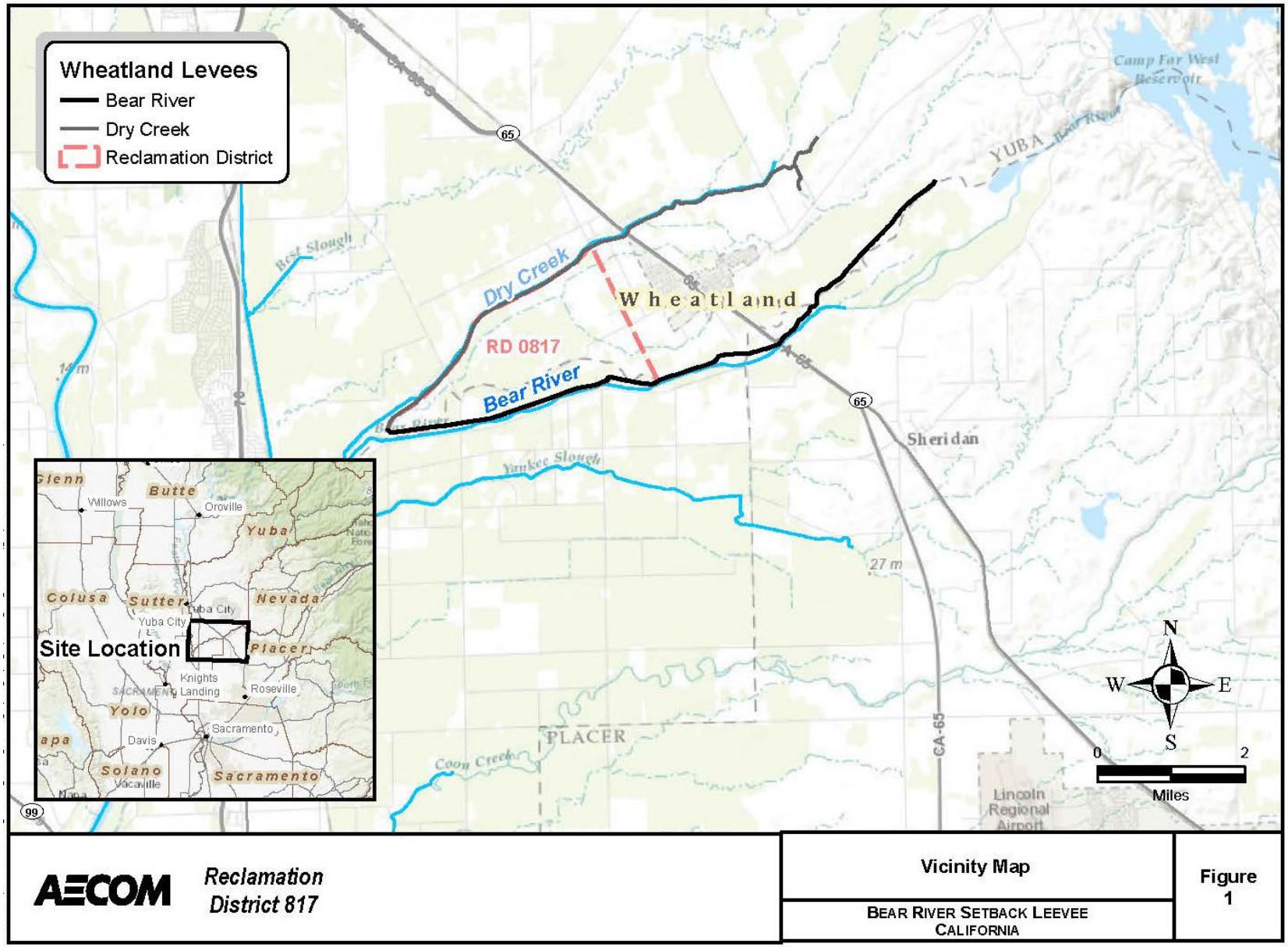
INTRODUCTION

RD 817 is planning to improve flood facilities along the north bank of the Bear River. As part of this effort, RD 817 proposes to construct a 2,800-foot-long setback levee with a slurry cut-off wall to a depth of 29 feet below the foundation. The project includes a 50 feet wide drained seepage berm at the downstream end of the cut-off wall. A stability buttress immediately downstream of the seepage berm, on the landside of existing levee, is being considered. The buttress extends for a distance of 2,600 feet up to 40-mile Road, with a limited length of non-buttress area along the way, due to the existing landside utilities. RD 817 is proposing to use borrow for the planned setback levee from one or more of three borrow locations. Material from degrading the remnant existing levee segment, within the limits of the setback levee, will be used to construct a stability buttress. Excavation at the borrow sites would be to depth of 5 feet but may extend deeper. Topsoil will be stripped within the footprint of the setback levee, seepage berm, and buttress resulting in surface disturbance that will extend to a approximate depth of 2 feet. Together, these Project elements comprise the horizontal and vertical Area of Potential Effects (APE).

PROJECT LOCATION

The project area is within Sutter and Yuba Counties and is shown in Figure 1. The project area is part of the Wheatland study area, which is bounded by the south levee of Dry Creek to the north and by the north levee of the Bear River to the south (Figures 1 and 2). The project area is part of the greater regional Sacramento River Flood Control Project, which was authorized by the Flood Control Act of March 1, 1917, and subsequently modified by the Acts of 1928, 1937, and 1941. The Project is federally authorized and non-federally owned by the local sponsor, the Central Valley Food Protection Board (CVFPB). The segments of the Project are operated and maintained by the land management agencies under agreements with the CVFPB.

The Bear River is a major Sierra Nevada mountain stream between and parallel to two large rivers, the Yuba River to the north and the American River to the south. Flowing from an elevation of 5,500 feet in the Sierra Nevada, westward 65 miles to its confluence with the Feather River at an elevation of 100 feet, the Bear River watershed above Wheatland covers 292 square miles (U.S. Geological Survey National Water Information System). The river is dammed at several locations, upstream from the study area impoundments include the Camp Far West Reservoir, Lake Combie, and Rollins Lake (FWLA 2009) (Figure 1).



Source: AECOM 2020

Figure 1. Project Vicinity Map

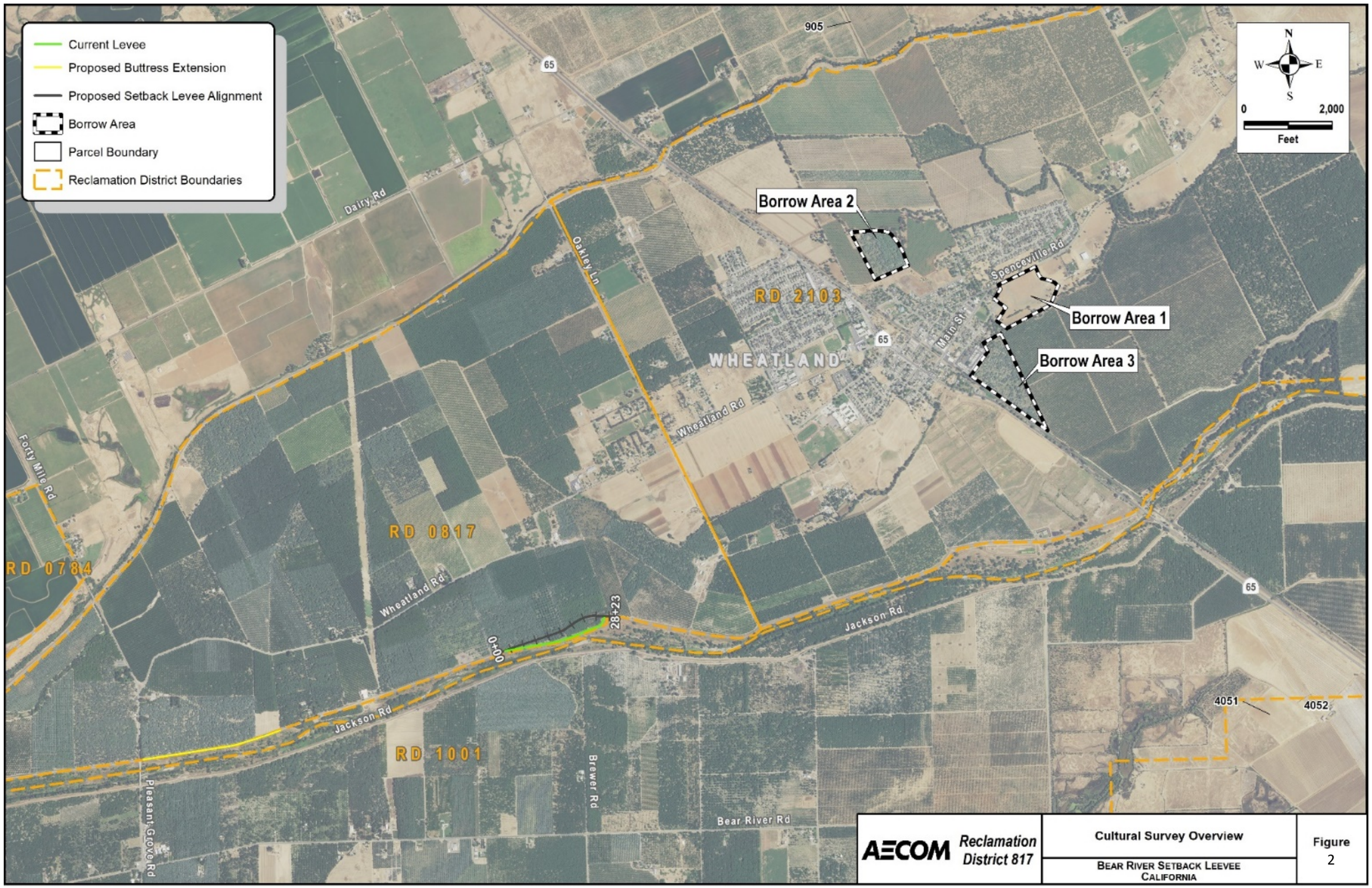


Figure 2. Project Elements and Location

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AREA OF POTENTIAL EFFECTS

RD 817 is planning to improve flood facilities along the north bank of the Bear River. As part of this improvement effort, RD 817 proposes to construct a 2,800-foot-long levee setback with a slurry cut-off wall to a depth of 29 feet below the foundation. The project also includes a 50 feet wide end-around drained seepage berm at the downstream end of the cut-off wall. A stability buttress immediately downstream of the seepage berm, on the landside of existing levee, is being considered. The buttress extends for a distance of 2,600 feet upto 40-mile Road, with a limited length of non-buttress area along the way, due to the existing landside utilities.

RD 817 is proposing to use borrow for the planned setback levee from one or more of three borrow locations, and the material from degrading the existing levee segment, to construct a stability buttress. Excavation at the borrow sites would be to depth of 5 feet but may extend deeper.

Topsoil will be stripped within the footprint of the setback levee, seepage berm and buttress resulting in surface disturbance that will extend to a maximum depth of 2 feet. Together, these Project elements comprise the horizontal and vertical Area of Potential Effects (APE).

REGULATORY CONTEXT

NATIONAL REGISTER OF HISTORIC PLACES

NRHP Evaluation Criteria Section 106 requires that effects on historic properties be taken into consideration in any federal undertaking. The process contains five steps: (1) initiating the Section 106 process; (2) identifying historic properties; (3) assessing adverse effects; (4) resolving adverse effects; and (5) implementing stipulations in an agreement document. Section 106 affords the Advisory Council on Historic Preservation and the State Historic Preservation Officer (SHPO), as well as other consulting parties, a reasonable opportunity to comment on any undertaking that would adversely affect historic properties listed in or eligible for listing in the NRHP. SHPOs administer the national historic preservation program at the state level, review NRHP nominations, maintain data on historic properties that have been identified but not yet nominated, and consult with federal agencies during Section 106 review. The NRHP uses the NRHP eligibility criteria (36 Code of Federal Regulations Section 60.4) to evaluate significance of properties that:

A. are associated with events that have made a significant contribution to the broad patterns of our history; or

B. are associated with the lives of persons significant to our past; or

C. embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master; or that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. have yielded, or may be likely to yield, information important in prehistory or history.

Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a Native American tribe to be determined eligible for NRHP inclusion. In addition, a broader range of tribal cultural property (TCP) also is considered and may be determined eligible for or listed in the

NRHP. TCPs are places associated with the cultural practices or beliefs of a living community that (a) are rooted in that community's history; and (b) are important in maintaining the continuing cultural identity of the community. In the NRHP programs, "culture" is understood to mean the traditions, beliefs, practices, lifeways, arts, crafts, and social institutions of any community, be it an Indian tribe, a local ethnic group, or the nation as a whole.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA offers directives regarding impacts on historical resources and unique archaeological resources. Generally, CEQA states that if implementation of a project would result in significant environmental impacts, then public agencies should determine whether such impacts can be substantially lessened or avoided through feasible mitigation measures or feasible alternatives. This general mandate applies equally to significant environmental effects related to certain cultural resources. Only significant cultural resources (e.g., "historical resources" and "unique archaeological resources") need to be addressed. The State CEQA Guidelines define a "historical resource" as "a resource listed or eligible for listing in the California Register of Historical Resources" (CEQA Guidelines, Section 15064.5, Subdivision [a][1]; see also PRC Sections 5024.1, 21084.1). A historical resource may be eligible for inclusion in the California Register of Historical Resources (CRHR), as determined by the State Historical Resources Commission or the lead agency, if the resource:

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

In addition, a resource is presumed to constitute a "historical resource" if it is included in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant" (CEQA Guidelines, Section 15064.5, Subdivision [a][2]). The State CEQA Guidelines require consideration of unique archaeological sites (Section 15064.5; see also PRC Section 21083.2). A "unique archaeological resource" is defined as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, a high probability exists that it meets any of the following criteria (PRC 21083.2):

1. contains information needed to answer important scientific research questions and a demonstrable public interest exists in that information; or
2. has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
3. is directly associated with a scientifically recognized important prehistoric or historic event or person.

If a cultural resource does not meet the criteria for inclusion in the CRHR but meets the definition of a unique archaeological resource as outlined in Section 21083.2 of the PRC, it is entitled to special protection or attention under CEQA. Treatment options under Section 21083.2 of CEQA include activities that preserve such resources in place, in an undisturbed state. Other acceptable methods of mitigation under Section 21083.2 include excavation and curation or study in place without excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a "unique archaeological resource"). The State CEQA Guidelines require that excavation activities be

stopped whenever human remains are uncovered, and that the county coroner be called to assess the remains. If the county coroner determines that the remains are those of Native Americans, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. At that time, Section 15064.5(d) of the State CEQA Guidelines directs the lead agency to consult with the appropriate Native Americans, as identified by the NAHC, and directs the lead agency (or project applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains. Sacramento County would be responsible for compliance with CEQA.

ASSEMBLY BILL 52

Assembly Bill (AB) 52, passed in 2014, amends sections of CEQA relating to Native Americans. AB 52 established a new category of cultural resources, named tribal cultural resources (TCRs), and states that a project that may cause a substantial adverse change in the significance of a TCR may have a significant effect on the environment. Section 21074 was added to the PRC to define TCRs, as follows:

(a) "TCRs" are either of the following:

(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

(A) Included or determined to be eligible for inclusion in the California Register of Historical Resources.

(B) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

(2) 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 Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

(b) A cultural landscape that meets the criteria of subdivision is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

(c) 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 may also be a tribal cultural resource if it conforms with the criteria of subdivision.

Per AB 52, the lead agency must begin consultation with any tribe that traditionally or culturally is affiliated with the geographic area. In addition, AB 52 includes time limits for certain responses regarding consultation, as follows:

- within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice;
- after provision of the formal notification by the public agency, the California Native American tribe has 30 days to request consultation; and
- the lead agency must begin consultation process within 30 days of receiving a California Native American tribe's request for consultation.

HISTORIC INTEGRITY

In addition to meeting one or more of the NRHP/CRHR criteria, a property also must retain a significant amount of its historic integrity to be considered eligible for listing. Historic integrity is made up of seven aspects: location, design, setting, materials, workmanship, feeling, and association, and specifically:

1. Location is the place where the historic property was constructed or the place where the historic event occurred.
2. Design is the combination of elements that create the form, plan, space, and style of a property.
3. Setting is the physical environment of a historic property.
4. Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern of configuration to form a historic property.
5. Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
6. Feeling is a property's expression of the aesthetic or historic sense of a particular period of time.
7. Association is the direct link between an important historic event or person and a historic property.

GEOLOGICAL AND CULTURAL SETTING

GEOLOGICAL SETTING

The Project is located at the northeastern edge of the Great Valley geomorphic province where it borders the Sierra Nevada geomorphic province. The Great Valley geomorphic province is a large, elongated structural trough that contains a thick sequence of sediments that have been deposited almost continuously since the Jurassic (about 160 million years ago). The Sierra Nevada geomorphic province is a tilted fault block nearly 400 miles long. Its east face is a high, rugged multiple scarp, contrasting with the gentle western slope (about 2 degrees) that disappears under sediments of the Great Valley. Deep river canyons are cut into the western slope, and transport and deposit sediments out onto the Great Valley floor and out into the San Francisco Bay Delta.

PREHISTORIC SETTING

This section describes, in general terms, broad patterns in the prehistory of north-central California, focusing on major environmental, technological, and adaptive changes evident in the archaeological record of this region. The Project location is at an archaeological crossroads, where several different interpretive schemes may be relevant based on the transitional geography from the Sierra Nevada foothills to the Sacramento Valley.

Initially, Lillard and Purves (1936) recognized a three-part cultural sequence (Early, Middle, and Late horizons) that was derived from the archaeological analysis of midden and cemetery sites in central California. This scheme was later described in more detail by Lillard et al. (1939) and was later refined by Beardsley (1948, 1954). In an attempt to unify the various hypothesized cultural periods in California, Fredrickson (1973, 1974, 1993) proposed an all-encompassing scheme for cultural development, while acknowledging that these general trends may manifest themselves differently and there may be some variation between subregions. These general cultural periods are described below.

North-Central Sierra Nevada

Late Pleistocene Pattern and Period (>10,000 Before Present [B.P.])

When humans first entered the central valley prior to about 13,000 years ago, glaciers had already receded from the Sierran crest; conifer forests were established at mid- to upper-elevations on the western slope; and the Sacramento Valley included extensive grasslands and riparian forest, providing forage for a diverse array of large mammals, many of which would shortly become extinct.

Evidence of earliest human occupation in the foothill region and eastern Sacramento Valley is practically nonexistent. Possible exceptions are sites CA-SAC-370 and CA-SAC-379, located near Rancho Murieta. They produced numerous bifaces, cores, and raw materials (which may be indicative of prehistoric quarrying operations) from gravel strata estimated to be between 12,000 and 18,000 years in age (Moratto 1984). It is possible that cultural deposits dating to this time period may be covered with several meters of alluvium and have yet to be discovered. Contextually, difficulties exist with these sites as the artifact assemblages may have been redeposited, and no organic materials suitable for radiocarbon dating were encountered.

Early Holocene Pattern and Period (ca. 10,000–7000 B.P.)

Jackson and Ballard (1999) use the all-encompassing Western Pluvial Lakes Tradition to describe this broad time frame, which was a human adaptation to lake, marsh, and grassland environments that were prevalent around 11,000 B.P.; however, the tradition slowly disappeared by ca. 8000–7000 B.P. (Moratto 1984).

Archaic Pattern and Period – (ca. 7000–3200 B.P.)

As the central California climate became warmer and drier, milling stones become abundant, suggesting an emphasis on the exploitation of plant resources and a lesser focus on hunting. Flaked stone tools are primarily formed from locally procured materials. One of the most notable cultural occurrences during this time consists of the Windmiller pattern that dates to as early as 4750 B.P. and possibly as late as 2500 B.P. Sites from this time frequently contain numerous mortar fragments, indicating that acorns and/or various seeds were relatively important food items (Moratto 1984). However, the remains of numerous faunal species are often found on Windmiller sites, and the presence of angling hooks and baked clay artifacts possibly used as net or line sinkers indicates a varied and efficient subsistence system.

Windmiller sites also indicate that a great deal of trade was taking place as evidenced by the presence of non-local obsidian, *Haliotis* and *Olivella* shell beads and ornaments, quartz crystals, and other exotic materials frequently found on these sites (Heizer 1949, 1974; Moratto 1984). Connections between the Great Basin and Central Valley appear to have been established at least by 4000 B.P., and possibly as early as 7000 B.P., as evidenced by the exchange of marine shell beads and other artifacts for obsidian from the east side of the Sierran crest. While primarily a Sacramento Valley and lower foothill phenomenon, similar culture elements are found at elevations up to 3,000 feet in the foothills of the west slope, suggesting that peoples of this time frame may have acted as middle men within this trade network (Bennyhoff and Heizer 1958; Bennyhoff and Hughes 1983).

Sierran Pattern (ca. 3200–600 B.P.)

This broad time period, composed of the Early, Middle, and Late Sierran, exhibits an increased use of obsidian, which may indicate an expansion in regional land use, and the regular use of certain locales. This pattern begins with a return to cool/moist climatic conditions, where forays into the Sierra may

have been made by groups with resident populations in the western Sierran foothills, Central Valley, and/or Great Basin. No evidence of permanent, year-round habitation has been found above 3,500 feet within the American River watershed, and it has been suggested that peoples may have timed their forays to the availability of the local resources. Jackson and Ballard (1999:45) suggest that increased use and adaptation are reflected in the reliance upon acorns and the heavy exploitation of large game. Using a model of site patterning first proposed by Jackson (1984) and collaborated by geographic information system modeling (Hunt 1999), the increased exploitation of resources during the later portion (ca. post 1400 B.P.) of this time period is marked by the adoption of mortar technology. Based upon their distribution, use of mortars is most intense below the snow-line, with high usage continuing within the black oak and sugar pine woodlands above the snow-line, and decreasing within the alpine zone (Hunt 1999). Models of toolstone acquisition suggest east/west trade routes existed during this period between the Sierran crest and the Central Valley of California (McGuire and Bloomer 1996; Day et al. 1996).

Late Sierran (ca. 600–150 B.P.)

Regionally, this period is characterized by continued intensive use of the western slope of the Sierra, including a significant use of acorns, but with less of a focus on seeds; exploitation of fauna, including deer and rabbits; year-round occupation of sites below 3,000–3,500 feet; and short-term seasonal occupation of mid- to high-elevation Sierran sites. The presence of single-component sites dating to this time period is given as evidence for this intensified use (Jackson and Ballard 1999:250). In some subregions, the use of the small contracting stemmed points disappears abruptly and is replaced by small Desert side-notched types, with the continued use of small corner-notched points. However, Jackson and Ballard (1999) suggest the possible re-emergence of large corner-notched, stemmed, and contracting stemmed points during the latter portion of this period.

Within the Late Sierran in the foothill region, archaeological village sites generally correspond to those identified in the ethnographic literature. Diagnostic artifacts are small contracting-stemmed points, clam shell disk beads, and trade beads introduced near the end of the period, marking the arrival of European groups (Beardsley 1954:77–79; Elsasser 1978:44; Fredrickson 1984).

Central Valley Sequence

The Central Valley has been the subject of archaeological inquiry for over 100 years. Despite this long-standing interest, relatively little is known about the archaeology of the lower Sacramento Valley region, particularly as it pertains to fundamental aspects of the subsistence economy and its relationship to long-term developments in native culture. The following background discussion reviews the Central California Taxonomic System, and development of a modern chronology for central California. This is followed by a general overview of Central Valley prehistory organized into three main periods: Paleo-Indian, Archaic, and Emergent (AECOM formerly EDAW 2008).

The Three Horizon Model and the Central California Taxonomic System

By 1939, sufficient evidence had been assembled to recognize that sites previously identified by Schenck and Dawson as Group II, and by Lillard and Purves as Intermediate, actually represented at least two discrete time periods. Lillard et al. (1939) recognized three sequential archaeological “cultures” based on stratigraphic patterns and a relatively detailed analysis of grave accompaniments—the Early Period, the Transitional Period, and the Late Period. Their study also resulted in the first formal artifact typologies for the region, including classifications for ground stone, projectile points, and, more importantly for chronological purposes, shell beads. Shortly after publication of the Sacramento Junior College Bulletin 2 in 1939, the periods were redefined as cultural “horizons.”

Richard Beardsley (1948, 1954) further refined Lillard et al.'s (1939) Central Valley sequence and extended the taxonomic system of cultural horizons to include archaeological manifestations recognized to the west, across the San Francisco Bay area. Beardsley found no evidence for the Early Period culture around San Francisco Bay and argued that Middle Horizon and Late Horizon cultures extended from the coast to the Central Valley; however, he warned that these assemblages might not be temporally equivalent across all of central California. Beardsley's revised classification ultimately came to be called the Central California Taxonomic System (Gerow with Force 1968; Hughes 1994), and it stood as the basic integrative paradigm of central California archaeology for the next 20 years (AECOM formerly EDAW 2008).

Bullard's Bar Chronological Sequence

More specifically applicable to the Wheatland area, excavations of three prehistoric sites at Bullard's Bar, Yuba County, were conducted by Stephen Humphreys in 1969 and provided data for the development of a three-phase cultural chronology that is relevant to the project area. Bullard's Bar I, the oldest period, dates from about 1000 to 500 B.C. and is characterized by the use of millingstones and handstones, large projectile points, stone palettes, ochre, and a dominant use of basalt as a lithic source. Bullard's Bar II, dating roughly from 500 B.C. to A.D. 1000, is represented by the replacement of millingstones with the use of bedrock mortars, an increased use of steatite, smaller projectile point forms, and a more diverse variety of tool stone. The final period, Bullard's Bar III, dates roughly from A.D. 1000 to historic times, and is characterized by an increased use of bedrock mortars and a dominant use of small Desert side-notched projectile points (Humphreys 1969:85–92).

ETHNOGRAPHIC SETTING

The project site is situated within the ethnographic territory of the Nisenan, one of three Maidu groups inhabiting the northeastern half of the Sacramento Valley and the adjoining western slopes of the Sierra Nevada (Kroeber 1925; Wilson and Towne 1978).

Also known as the Southern Maidu (Kroeber 1925), the Nisenan inhabited numerous named villages within the vicinity of the study area. Along the Yuba River were the villages of *Chiemvie*, *Onopuma*, and *Panpakan*. Adjacent to the confluence of the Yuba and Feather Rivers were *Yupu* and *Tuisidu*, while along the lower Bear River near the confluence with the Feather River were the villages of *Lelikiun* and *Intanto* (Wilson and Towne 1978:Figure 1). A review of ethnographic data (Kroeber 1925; Tatsch 2006; Wilson and Towne 1978) did not result in the identification of ethnographic locations within the proposed project area.

The language of the Nisenan, which includes several dialects, is classified within the Maiduan family of the Penutian linguistic stock. Kroeber (1925) recognized three Nisenan dialects: Northern Hill, Southern Hill, and Valley. The Nisenan territory included the drainages of the Yuba, Bear, and American Rivers, and the lower drainages of the Feather River, extending from the crest of the Sierra Nevada to the banks of the Sacramento River. According to Bennyhoff (1961:204–209), the southern boundary with the Miwok was probably a few miles south of the American River, bordering a shared area used by both Miwok and Nisenan groups that extended to the Cosumnes River. It appears that the foothills Nisenan distrusted the valley peoples but had a mostly friendly relationship with the Washoe to the east. Elders recall intergroup marriage and trade, primarily involving the exchange of acorns for fish procured by the Washoe (Wilson 1972:33). The northern boundary has not been clearly established due to similarities in language with neighboring tribes (Wilson and Towne 1978:387–389).

Nisenan settlement locations depended primarily on elevation, exposure, and proximity to water and other resources. Permanent villages were usually located on low rises along major watercourses. Houses were domed structures measuring 10 to 15 feet in diameter and covered with earth and tule

reeds or grass. Brush shelters were used in the summer and at temporary camps during food-gathering rounds. Larger villages often had semi-subterranean dance houses that were covered in earth and tule reeds or brush, with a central hole at the top to allow the escape of smoke, and an east-facing entrance. Another common village structure was the granary, which was used for storing acorns.

Several political divisions in the Nisenan territory, constituting tribelets, had headmen in the larger villages. However, the relative levels of influence in these larger population centers are unknown. All of these larger villages were located in the foothills. More substantial and permanent Nisenan villages generally were not established on the valley plain between the Sacramento River and the foothills, although this area was used as a rich hunting and gathering ground. One tribelet consisted of people occupying the territory between the Bear River and the Middle Fork American River (Wilson and Towne 1978). According to Kroeber (1925:831), the larger villages could have had populations exceeding 500 individuals, although small settlements consisting of 15–25 people and extended families were common.

The Nisenan occupied permanent settlements from which specific task groups set out to harvest the seasonal bounty of flora and fauna that the rich valley environment provided. The Valley Nisenan economy involved riparian resources, in contrast to the Hill Nisenan, whose resource base consisted primarily of acorn and game procurement. The only domestic plant was native tobacco (*Nicotiana* sp.), but many wild species were closely husbanded. The acorn crops from the blue oak (*Quercus douglasii*) and black oak (*Q. kelloggii*) were carefully managed resources. Acorns were stored in granaries in anticipation of winter. Deer, rabbit, and salmon were the chief sources of animal protein in the aboriginal diet, but many insect and other animal species were taken when available (Wilson and Towne 1978:389).

The decimation of the Nisenan culture in the nineteenth century as a result of European colonization, coupled with a reluctance to discuss Nisenan spiritual beliefs and practices, makes it difficult to describe these practices in any detail. However, historic records document a number of observances and dances, some of which are still performed today, that were important ceremonies in early historic times. The Kuksu Cult, the basic religious system noted throughout central California, appeared among the Nisenan. Cult membership was restricted to those initiated in its spirit and deity-impersonating rites. However, the Kuksu Cult was only one of several levels of religious practice among the Nisenan. Various dances associated with mourning and the change of seasons were also important. One of the last major additions to Nisenan spiritual life occurred sometime shortly after 1872 with a revival of the Kuksu Cult as an adaptation to the Ghost Dance religion (Wilson and Towne 1978). Today, Nisenan descendants are reinvesting in their traditions, and represent a growing and thriving community.

Following documentation by the Department of Interior for the existence of a separate, cohesive band of Maidu and Miwok Indians, occupying a village on the outskirts of the City of Auburn in Placer County, the United States acquired land in trust for the Auburn Band in 1917 near the City of Auburn and formally established a reservation, known as the Auburn Rancheria. Tribal members continued to live on the reservation as a community despite great adversity.

However, in 1967, the United States terminated federal recognition of the Auburn Band. Finally, in 1970, President Nixon declared the policy of termination a failure. In 1976, both the United States Senate and House of Representatives expressly repudiated this policy in favor of a new federal policy entitled Indian Self-Determination.

In 1991, surviving members of the Auburn Band reorganized their tribal government as the United Auburn Indian Community (UAIC) and requested the United States to formally restore their federal recognition. In 1994, Congress passed the Auburn Indian Restoration Act, which restored the Tribe's

federal recognition. The Act provided that the Tribe may acquire land in Placer County to establish a new reservation.

Today, Nisenan descendants and other tribes are reinvesting in their traditions and represent a growing and thriving community that is actively involved in defining their role as stewards of their ancestors' sites including the identification of TCRs. TCRs provide the backdrop to religious understanding, traditional stories, knowledge of resources such as varying landscapes, bodies of water, animals and plants, and self-identity. Knowledge of place is central to the continuation and persistence of culture, even if former Nisenan and Miwok occupants live removed from their traditional homeland. Consulting tribes view these interconnected sites and places as living entities; their associations and feeling persist and connect with descendant communities.

HISTORIC SETTING

The following discussion summarizes historic-era land use within and in the vicinity of the project area, and provides a basis for historic-era themes that may exist or may be discovered and/or impacted by construction activities.

Early Exploration and Settlement

European influence began in the project vicinity in 1808 when Gabriel Moraga led an expedition from Mission San Jose up to the Cosumnes and Feather Rivers. Narciso Duran and Luis Arguello left San Francisco in 1817 and passed through the region on an exploratory expedition. Arguello is credited with naming the Feather River, his El Rio de Las Plumas (Beck and Haase 1974; McGowan 1961). Following these incursions, this region of California was visited by American fur trappers and traders looking for new areas to exploit. The expeditions of Jedediah Smith, Joseph Walker, and Ewing Young passed through the region on their journeys through California (Beck and Haase 1974).

Captain John Sutter was granted his "New Helvetia" ranch at present-day Sacramento in 1839. In 1841, Sutter acquired additional lands in what is now Yuba County. It was from Sutter's Mill, near present-day Coloma, that John Marshall discovered gold in 1848. The initial discovery of gold in what is now Yuba County was made by Jonas Specht on June 2, 1848, at Rose's Bar, a sand and gravel bar within the Yuba River approximately 18 miles east of Marysville. Nearly simultaneous with Specht's strike, Michael Nye and William Foster found gold-bearing areas on Dry Creek near its confluence with the Yuba River (Hoover et al. 1990:540). After June 1848, miners began working the ravines below Albion Hill, a small hummock within the eastern portion of Beale Air Force Base (Bal 1993).

In 1844, a Mexican, Don Pablo Gutiérrez, who had been employed by Sutter, obtained a grant of 5 leagues on the north side of Bear River, which is now known as the Johnson grant (Thompson & West 1879:34 in Lindstrom 1996); Hoover et al. 1990) The grant was first known as Rancho De Pablo. The town of Wheatland is located within this grant. Gutiérrez built an adobe house at Johnson's Cross approximately 3 miles east of Wheatland. Gutiérrez was killed during the Micheltorena campaign and the grant was purchased for $150 by William Johnson and Sebastian Kyser. They split the grant with Johnson owning the eastern half and Kyser the western portion. In 1846, they built an adobe house a short distance below the crossing (Lindstrom 1996:12)

Johnson's Rancho (Figure 3) was well known as the first settlement reached by the overland immigrants crossing the Sierra (Gudde 1998:158) and is considered to be the end of the Emigrant Trail (State of California 1976:139, 1982:159). In 1847, it was the base from which survivors of the Donner party were rescued. Among those rescued was Mary Murphy, who met Johnson and married him that June. They were divorced within a year and she married Charles Covillaud, another immigrant who visited the Rancho. The new town of Marysville, which was laid out by Covillaud in 1849–50 was

named after her (Lindstrom 1996:12) A number of trappers and explorers visited the Rancho until 1854, and included John C. Fremont, Kit Carson, and General Stephan Watts Kearney and his troops (Lindstrom 1996:13).

There was an unsuccessful attempt in 1849 to establish the community of Kearney on Johnson's Rancho; however, the efforts never got beyond the "laying out of the lots" (Thompson & West 1879:78 in Lindstrom 1996). Many other camps were established in the vicinity, settlements generally occurring every 1 or 2 miles along the gold-bearing streams (Hoover et al. 1990:35–40). As the shallow placers played out in the early 1850s, many prospectors turned to mining the deeper deposits with hydraulic equipment. These operations flourished until they were outlawed in 1884 due to the damage they were doing to the watercourses. The amount of debris flushed into the Yuba River was of such a magnitude that the mining camps situated upon the river bars were ultimately buried.

Source: Wheatland Historical Society

Figure 3. 1861 Map of Johnson's Rancho

Mining

The project area is located within the Wheatland Placer mining district (or Bear River District) (Gudde 1975:368); however, geologically, the Wheatland area is west of the Mother Lode, well away from the major gold mining region. After June 1848, miners began working the ravines east of Wheatland (Nilsson et al. 1994:16). By about 1851, a number of miners were working small bars on the Bear River

downstream from Camp Far West (Thompson & West 1879:77). In 1876, there was some dry washing of gold at Camp Far West, but little production (Gudde 1975:57).

Prior to hydraulic mining, the banks of the Bear River were once 25 to 30 feet high; however, hydraulic mining debris has filled in the channel and the course of the river has been altered approximately ½ mile south of the historic channel. The only bottom land that survived was a small section near Wheatland that was protected by a levee constructed by A. W. VonSchmidt (Thompson & West 1879:130 and 137).

In addition to hydraulic mining, many prospectors turned to the pursuit of the gold-bearing quartz veins found in the region. The Smartville District, located near the eastern periphery of Beale Air force Base, contained numerous mines. Among the most successful of these was the Lone Tree Mine, which had a two-stamp mill by 1879. Other mines in the vicinity included the Munroe, Oro Grandes, Good Hope, Bismarck, Albion King, Witney, and Golden West. Some of these mines remained in operation well into the twentieth century (Raven et al. 1987:45). In 1862, there was also a brief copper-rush in the region. Among the many communities to spring out of this period was Spenceville, approximately 3 miles east of the base. Established in 1865, Spenceville housed a smelter, which processed the ore from the San Francisco Copper Mine (Hoover et al. 1990:242; Raven et al. 1987:46).

Bucketline and dragline dredging was carried on to a limited degree in the creek channels east of Wheatland in the early 1900s. Wendel Hammond operated an unprofitable and short-lived operation along the Bear River east of Wheatland (Wells, personal communication, 1996 in Lindstrom 1996:14), and in some of the ravines during the 1930s (Clark 1970:130; Gudde 1975:368), and on the Horst Ranch in the 1930s until 1942 (Neyens, personal communication, 1996 in Lindstrom 1996:14).

Placer gravels along the lower Bear River did not contain sufficient gold deposits; however, the area surrounding Wheatland quickly became a center for farming and ranching. Claude Chana invested his mining profits into vineyards and orchards along the river, and erected the earliest grist mill in Yuba County, using the river for water power. His holdings were subsequently wiped out by hydraulic mining induced floods along the river in the late 1800s.

TRANSPORTATION

Roads

Early travel routes are depicted on early maps of Johnson's Rancho and early General Land Office (GLO) Survey Plats. The Sacramento and Nevada Road shown on the 1856 GLO plat map trends northeast-southwest through the Wheatland area, the Spenceville Road (Wheatland-Smartville Road) provided access to Johnson's Rancho and Camp Far West, and the Wheatland Road provided access to communities west of Wheatland.

Railroads

The original line of the California Central Railroad (also known as the California and Oregon Railroad and now Southern Pacific's line, SPRR), transects through Wheatland and bisects Dry Creek and Bear River. Construction of the route began in 1858 and reached the Wheatland terminus in 1866. By 1879, the name was changed to the Oregon Division of the Central Pacific Railroad (Hoover et al. 1990). Freight was brought to Wheatland by railroad and then by wagon to Spenceville, Smartsville, Rough and Ready, Grass Valley, and other foothill and mountain towns.

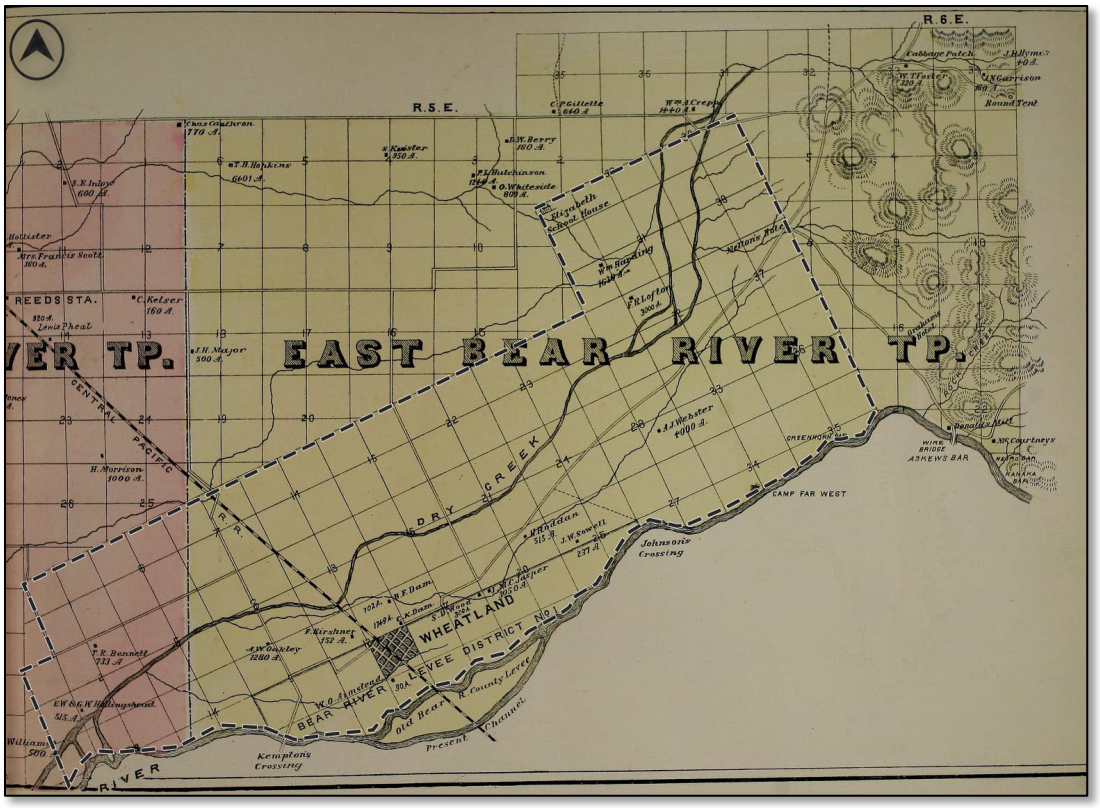
AGRICULTURE AND RANCHING

After 1852, many failed miners turned to agriculture (Thompson & West 1879:130). Lands surrounding the present-day Wheatland proved to be fertile ground for early agricultural and ranching pursuits for vineyards, orchards, grain, and beef stock (Thompson & West 1879:77, p. 130 in Lindstrom 1996).

Hops were the chief crop between the 1890s and 1920s, when Wheatland was known for having the largest independently owned hop ranch in the world. D.P. Durst planted the first hops in the Wheatland area in 1874. Another large hop operation was that of Emil Clemens Horst. In the mid-1880s, he purchased a small plot of land along Bear River, and began cultivating hops, and soon bought out two other hop growers, Hugh Roddan and Joseph M.C. Jasper. By 1898, his operation had 10 hop drying kilns and a company town (Horstville) large enough to have its own post office, and employed thousands of migrant workers (https://en.wikipedia.org/wiki/Emil_Clemens_Horst). This town is located between the Dry Creek Levee and Bear River Levee, which are part of the proposed project. Horstville is also the home of Horst Fellner's Hannes Ranch, which was once owned by Bing Crosby (https://en.wikipedia.org/wiki/Horstville,_California). Soon the hops industry caused Wheatland to be known as the "Hop Center" (Delay 1924:199 in Lindstrom 1996).

WHEATLAND

The city of Wheatland was developed within the Johnson Rancho on the north bank of Bear River in what is now Yuba County (see Figure 4). William Johnson obtained the five-Spanish-league rancho in 1845 after the original owner, Don Pablo Gutiérrez was killed earlier that year. In 1866, Wheatland was surveyed; the Central Pacific Railroad was completed to the settlement; and building quickly commenced for a post office, saloon, store, blacksmith shop, hotel, and a few residences the first year. Wheatland grew slowly until 1871–72 when sales of lots quickened, and the city incorporated in 1874. By 1879, the population was 800 and Wheatland had become an important shipping point on the rail line for agricultural goods grown in the area. Wheatland also provided grain, flour, hay, potatoes, and other produce by wagon into the mountains to supply the mining regions in Nevada County (Thompson & West 1879:80).



(Source: Thompson & West 1879)

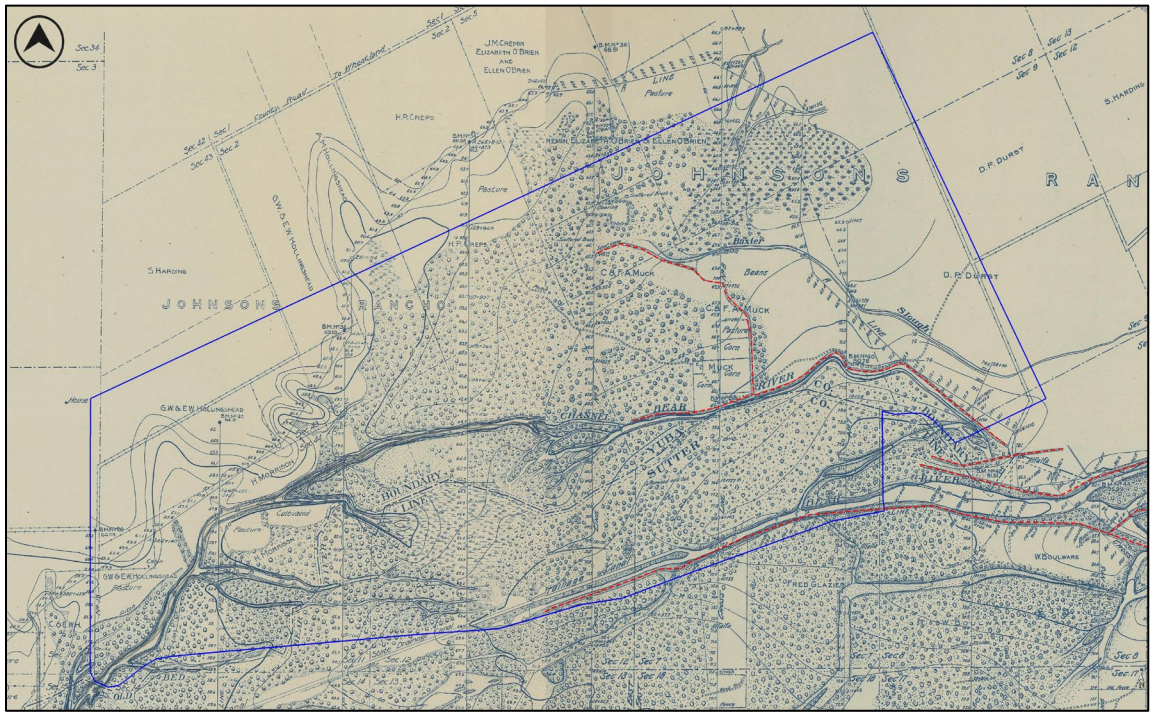
Figure 4. Johnson Rancho in dashed line (added by AECOM), Bear River Levee District No. 1 at bottom left; note relocation of Bear River channel south of original course.

Hydraulic mining debris from mining operations upriver in Nevada County from the 1850s to 1870s wreaked havoc on Bear, Feather, and Yuba Rivers as the channels filled with sediment and mud runoff. The Bear River was once navigable by steamers and sailing vessels, but by the late 1870s much of the bottomlands along Bear River had been destroyed with 5 to 10 feet of sediment. The banks of Bear River were once 25 to 30 feet high but had been completely filled in with silt, and water flows were reduced to barely a stream in the summers from 1866–1869 (Thompson & West 1879:114).

The exception was a small strip of land near Wheatland that was protected by Bear River Levee District No. 1. The reclamation district incorporated in 1878 with 15 landowners and 2,140 acres of land. By 1879, Bear River Levee District No. 1. levee was 29,400 feet long; however, most of the levee was built at different times before incorporation by private parties to protect their own property against flooding. The levee was constructed of sandy sediment and brush was placed along the riverbank side to prevent erosion; however, during high water events the levee required constant repairs. The district was short lived and was disorganized by 1891 (Thompson & West 1879:114; U.S. House of Representatives 1891:111).

From 1863 to 1891, over $145,000 was spent by private individuals for construction and maintenance of approximately 6 miles of levees on the north bank of Bear River in the Wheatland area. The average dimension of levees was 18 feet tall, a crown of 6 feet, and slopes from 3:1 and 2:1 (House of Representatives 1891:116). Despite these efforts, the portion of Bear River in Yuba County near Wheatland was estimated to have had 2,220 acres of land destroyed by mining debris and flooding. Agricultural land in the area was valued at $100 an acre, but the land along the river was only valued at $4 an acre (U.S. House of Representatives 1891:111).

These nineteenth-century private levees were mapped in 1905 by the California Debris Commission along Bear River from its mouth to Greenhorn Creek, noting areas of private levee construction, limited agriculture endeavors, and property ownership in the silted bottomlands (see Figure 5). By the next decade, the area would be completely transformed with the creation of Reclamation District No. 817 (RD 817) and its combined efforts with the Natomas Consolidated Company (RD 1001) and Reclamation District No. 784.

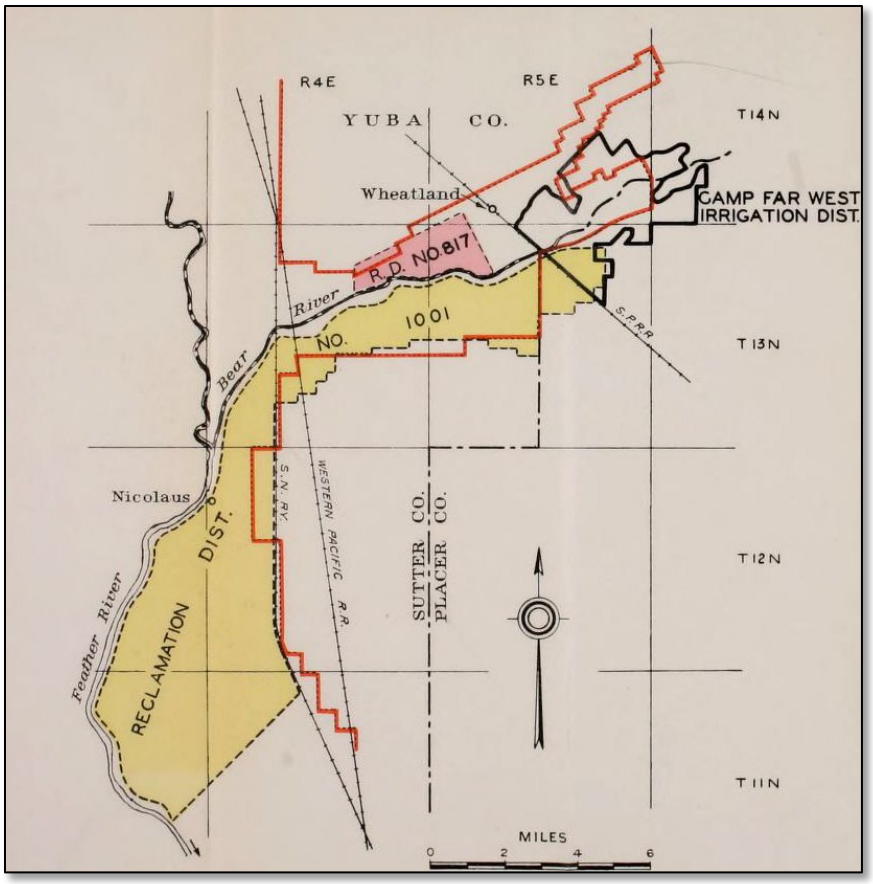


(Source: U.S. Army Corps of Engineers, U.S. Engineer Office, Sacramento, California 1905a and 1905b).

Figure 5. 1905 map of silted bottomlands of Bear River, pre-RD 817 privately constructed levees highlighted as dashed lines and current boundary of RD 817 solid line (added by AECOM). Note minimal agriculture endeavors

RECLAMATION DISTRICT 817

Property owners in Bear River section west of Wheatland and directors of the various districts along the river held a meeting in late October 1910 and decided to join forces to build a levee system to protect and reclaim lands on the north bank of Bear River as RD 817. The plan was to construct a 5- to 6-mile-long levee on the north side of Bear River to connect to the levee already under construction by the Farm Investment Company, sometimes referred to as the Bull Levee after company president Cline Bull. Once completed, thousands of acres of fertile river bottomlands would be reclaimed and opened up for settlement. The Natomas Consolidated Company was constructing their own levees on the south side of Bear River to reclaim 60,000 acres in anticipation of subdividing the area for small farms (see Figure 6). The combined reclamation efforts on both sides of Bear River were anticipated to be a boom for the town of Wheatland as hundreds of families were expected to settle in “one of the best fruit districts in California” (*Sacramento Union* 1910 Oct 30). The consensus at the meeting was that “this body of land has been permitted to remain in its present unclaimed condition for so many years is a problem… to solve by those who are now engaged in the work of reclamation” (*Sacramento Union* 1910 Oct 30).



(Source: Bonte 1930, Plate XIII)

Figure 6. Reclamation District No. 817 and Reclamation District No. 10001, also known as the Natomas Consolidated Company, flanking Bear River

The Natomas Consolidated reclamation district began construction of their levees on the south side of Bear River before RD 817. The Natomas Consolidated started construction on their levee in winter 1910 and widened the base and increased the height in fall 1911 resulting in "one of the strongest levees in the state" (*Sacramento Union* 1911 Sep 29). Because the stream in Bear River channel was scouring deeper over the last 3 years, the Natomas Consolidated was confident their levees would hold Bear River even at its highest recorded water mark. In fall 1911, RD 817 was working on the north side of the river "putting up a levee of equal size and strength" as crews of surveyors were laying out plans and construction teams were throwing up the embankment and strengthening the work done the previous year. The goal was to complete the levee to the Western Pacific railroad bridge to join the existing levee built by the owners of the Ball tract. Once completed, the system of levees would reclaim thousands of acres of fertile farmland in Wheatland for subdivision as early as winter 1911. In anticipation of the upcoming real estate subdivisions, the economy of Wheatland was already seeing a boost (*Sacramento Union* 1911 Sep 29).

Representatives from the Farm Lands Investment Company, Natomas Consolidated Company, and RD 817 met again in summer 1911 to discuss their reclamation and drainage efforts for their own tracts in order to "work together for the benefit for all, rather than independently and to the injury of each other" (*Sacramento Bee* 1911 Jun 22). In September 1911, RD 817 landowners including the Durst Brothers, A.G. Oakley, M.F. Hollingsead, S.G. Russell, J.S. La Rue, Charley Sing, the Muck Brothers, and W.F. O'Brien of San Francisco held a meeting to complete the financial and construction arrangements to start construction of the levees that fall (*Sacramento Union* 1911 Sept 28).

As of November 1911, the Natomas Consolidated on the south side of Bear River and RD 817 on the north side were rushing to complete their respective levees before the flood season. Directors of RD 817 hired additional men and horses from Chico to work on the levee until rain would halt their work. The Natomas Consolidated had six work camps on their south levee and was confident they would close the gap in the levee by the new year (*Sacramento Union* 1911 Nov 1).

In July 1912, work on the north bank Bear River Levee was resumed and a drainage canal that was under consideration would be completed by the fall. A large portion of land within the reclamation district had been recently sold for subdivision, and the levee and canal work was to be rushed and was "good news to this section as it means a number of new settlers" (*Sacramento Union* 1912 July 11). Later that month, trustees of RD 817 approved to spend an additional $60,000 for another levee and canal on the north side of Bear River that was expected to be completed by November 1912 (*Sacramento Union* 1912 July 26). A.D. Cesson of Broderick, California, was awarded a $20,000 contract to build 3 miles of levee on the north side of Bear River. The construction of this section of the levee was to create a continuous levee to the Bull Levee on the Bear River (*Sacramento Union* 1912 Aug 23). Once completed, the lands below Wheatland that were "practically worthless except for timber," would be reclaimed (*Sacramento Bee* 1912 Sep 10). As of July 1913, 5 miles of the levee were completed, and two additional miles were almost built to join the levee of the Natomas Consolidated to the west (*Sacramento Union* 1913 July 23).

During the ongoing construction of the RD 817 levee, in 1912 over 300 acres of new hops were planted in Yuba County, much of which was planted on newly reclaimed lands in RD 817, which was valued at $400 per acre. In comparison, other areas for good hop cultivation were valued at $200–300 per acre and the bottomlands in 1891 were previously valued at only $4 an acre (U.S. House of Representatives 1891:116). Daniel P. Hurst began growing hops in Wheatland in 1883 and his sons Ralph and Murray continued the hop operation after their father's death. In 1906, Wheatland-grown hops were known worldwide for their quality and 34 boxcars of baled hops were purchased from a buyer from England. By the early 1910s, hops were the most important agricultural product in Yuba County, and Wheatland had "the largest individual hop fields in the world" covering approximately 580 acres (*Sacramento Union* 1912 Aug 11). The Durst Ranch, which spanned the south side of Wheatland long the north bank of Bear River, is infamous for the Wheatland Hop Riot that occurred on August 3, 1913, in their ranch about 1 mile east of Wheatland. Approximately 4,000 migrant workers arrived in Wheatland for the annual hop harvest, far more than the 2,800 workers the Durst Brother advertised for. The International Workers of the World (IWW) sent representatives from Chicago to organize the hop pickers to protest against the abysmal living and working conditions on the Durst Ranch, and Ralph Durst responded to the list of grievances with their offer to improve working conditions; however, the gathered laborers at the ranch attempted to protect IWW representative Richard "Blackie" Ford from deputies who arrived during his speech rejecting the Durst Brother's offer to arrest him. A fight broke out, shots were fired and four people died, including two migrant workers, county district attorney E.T. Manwell, and Deputy Sheriff Eugene Reardon. Governor Hiram Johnson deployed National Guard troops to restore order in Wheatland. The event was one of the most well-known California labor events focused on the plight of agricultural workers in the state. The site of the Wheatland Hop Riot is memorialized as California Historical Landmark Number 1003 in the town of Wheatland at the corner of 6th and A Streets (OHP 2020; Wheatland Historical Society 2009:8–9, 91, 103).

The anticipated hundreds of families that would move into RD 817 after the reclaimed lands were subdivided failed to come to fruition. Instead, the large landholders in the area acquired the reclaimed bottomlands and further increased their farming operations. The U.S. Census recorded 481 persons in Wheatland in 1910, and the town actually experienced a drop in population in 1920 to 435. The overall population gain in Yuba County from 1910 to 1920 was only approximately 300 persons, and the

county did not see a large increase in population until the 1930 to 1940 decade. Agriculture continued to be the main economic force in the area in the 1930s and RD 817 was predominately planted with orchards with some alfalfa and grain crops. During Prohibition, fruit trees were planted between the hop trellises. After Prohibition ended, hops were no longer the major crop in the area and was replaced by fruit and nut orchards, specifically almonds and walnuts in the subsequent decades (see Figure 7). In the post-World War II era, Wheatland's population did not surpass over 500 until 1950 (Bonte 1930:175; California Department of Finance 2012U.S. Army Corps of Engineers, U.S. Engineer Office, Sacramento, California 1936a, 1936b, 1936c; Wheatland Historical Society 2009:71).

(Source: U.S. Army Corps of Engineers, U.S. Engineer Office, Sacramento, California. 1936a, 1936b, 1936c)

Figure 7. Composite of three 1936 maps of reclaimed bottomlands transformed into agriculture

The Bear River Levee has required ongoing maintenance and upgrades over the years. In 1935, Fred Knoop of Live Oak was awarded a contract to repair two breaks in the levee west of Wheatland that occurred during highwater events in winter 1934 and flooded 2,000 acres of farmland (*Sacramento Bee* 1935 Sep 5). The following year, 20 miles of Bear River Levee system were improved with $310,000 worth of state and federal funds as part of a larger undertaking by the state reclamation board (*Sacramento Bee* 1936 Oct 3). Devastating floods in winter 1955 breached several levees along Bear, Feather, and Yuba Rivers. In 1957, the California Department of Water Resources declared that the RD 817 Bear River Levee was the worst rated in Yuba County and if they did not undertake improvements, the state would be required to do so and assess the landowners according for the cost (*Sacramento Bee* 1958 Feb 6). Other major flooding events have caused breaks in the Bear River Levee and, in 2006, a portion of an older levee near the river and prone to erosion problems was removed and a new 2-mile-long setback Bear River Levee was constructed. At the time of construction, it was the biggest setback levee in the state (*Sacramento Bee* 2006 Nov 2). The levee patrol roads were repaired with funds provided in May 2018 for RD 817 and RD 784 (*Territorial Dispatch* 2018 May 17).

As of 2015, management of RD 817 is overseen by volunteers who maintain the levee system along the farms that are protected. The farmers provide labor, crews, and equipment and are reimbursed for labor costs. The area within RD 817 is projected for future residential growth; however, the City of Wheatland has restricted future use there because of the potential for future flooding (City of Wheatland 2015:18).

ARCHIVAL LITERATURE REVIEW

Archival and literature review included the following documents, maps, and listings, and a records search conducted by the North Central (NCIC) and Northeastern Information Centers (NEIC) of the California Historical Resources Information System (CHRIS). A summary of the research is provided in Appendix A. The search area included the APE) and the surrounding vicinity.

- National Register of Historic Places
- California Register of Historical Resources
- Historic Property Data File for Placer, Sutter and Yuba Counties (OHP 2012)
- California State Historical Landmarks (OHP 1996)
- California Inventory of Historic Resources (State of California Department of Parks and Recreation 1976)
- California Points of Historical Interest (OHP 1992)
- Camp Far West, California 7.5-minute topographic quadrangle maps (USGS 1915, 1949a, 1951)
- Nicholas, California 7.5-minute topographic quadrangle map (USGS 1952)
- Sheridan, California 7.5-minute topographic quadrangle map (USGS 1953)
- Wheatland, California 7.5-minute topographic quadrangle map (USGS 1947, 1949b)
- Sheridan, California 15-minute topographic quadrangle map (USGS 1910a)
- Nicholas, California 15-minute topographic quadrangle map (USGS 1910b)
- Camp Far West (Spenceville), California 15-minute topographic quadrangle map (USGS 1910c)
- California Place Names (Gudde 1998)
- Historic Spots in California (Kyle et al. 2002)
- Historical Atlas of California (Beck and Haase 1974)

The archival records search consisted of an archaeological and historical records and literature review. This research provides a background of cultural resources investigations that have been conducted and the types of cultural resources that have been identified and would be expected.

AECOM performed this records search for the existing Bear River north levee and the Dry Creek south levee for the Wheatland Feasibility Study in August of 2019. The results of this search are presented in Appendix A. For this study, AECOM requested an updated search from the NEIC and NCIC. Both institutions indicated that there have been no additional studies or documented resources within 0.5 mile of the current project since 2019. The records search revealed that 25 previous cultural resources investigations had been conducted within and in the vicinity of the study area. The majority of the

studies consisted of small levee repair projects, bridge repair and transportation improvement projects, residential and commercial development, and the installation of telecommunications facilities.

An additional study consisted of a review and summary of existing information conducted for the Wheatland General Plan (Lindstrom 1996). This study noted that six sites within the plan area have been listed as California Points of Historic Interest:

1. Johnson's Crossing, Yub-005 (1117/75), Samuel Mills Damon Ranch on Spenceville Road, 4 miles from Wheatland; 2. Camp Far West Cemetery, Yub-006 (1117/75), vicinity of Wheatland; 3. Grace Episcopal Church, Yub-007 (1117/75), 610 3rd Street, Wheatland; 4. Muck Home, Yub-008 (1/17/75), 512 Main Street, Wheatland; 5. Masonic Temple, Yub-009 (1 /17/75), Front and Fourth Streets, Wheatland; and 6. Chinese Cemetery and Funeral Pyre, Yub-011 (12/22/1975), Vicinity of Wheatland (marker placed by Wheatland Historical Society).

Seven sites have qualified for the California Inventory of Historic Resources: 1. Camp Far West Cemetery, Yub-006 (1/17/75), vicinity of Wheatland; 2. Durst House, Wheatland; 3. Grace Episcopal Church, Yub-007 (1/17/75), 610 3rd Street, Wheatland; 4. Johnson's Crossing, Yub-005 (1/17/75), Samuel Mills Damon Ranch on Spenceville Road, 4 miles from Wheatland; 5. Johnson's Ranch; 6. Masonic Temple, Yub-009 (1117/75), Front and Fourth Streets, Wheatland; and 7. Muck Home, Yub-008 (1/17/75), 512 Main Street, Wheatland.

In addition, Lindstrom noted Neyens (1994) lists 43 historic landmarks within or surrounding the City of Wheatland; 1. Wheatland Union High School, built 1961; 2. Wheatland Cemetery, founded 1870s; 3. Virginia School; 4. Elementary School Administration offices (former W.H.U.S. Shop/Agriculture and Library/Home Economics buildings); 5. Bear River School (Westside), built 1955; 6. Old Highway-Hooper to D; east on 4th across railroad tracks; down Front to Main; west on Main to Malone A venue; over the old Bear River bridge; 7. First house in Wheatland, corner Main and C, C. Holland, owner; 8. First store in Wheatland (Ziegebein & Co.); 9. Site of E.W. Sheets Blacksmith shop, 400 Main, built 1866; 10. First hotel, built by Asa Raymond; 11. Site of City Hall and Hook & Ladder Co.; 12. Chinatown after the 1898 fire; site of the Southern Pacific Cattle Corral, 2nd Street; 13. Chinatown before the 1898 fire, now Sohrakoff Warehouse, 3rd Street; 14. E.E. Roddan house and lumber company; 15. Site of American Hotel, W.J. Carney Sr., proprietor; purchased 1886; destroyed in 1903 fire; rebuilt as Hotel Carney, 1904, and operated by the Carney family until 1958, 500 4th Street; 16. Rochdale Co-op; original owner, Dr., Melton, now Wheatland Food Market; 17. Prior to 1898 fire, Bray Hotel, Capitol Hotel; reopened as Elwood Hotel, 1902; purchased by W.J. Carney Jr. and operated as Hotel Wheatland, 1924–1957; present site of Bank of America; 18. Baun home, first electrically supplied house; now Rose home; 19. Miniature golf course, 1920s and early 1930s; 20. Site of City-owned tennis courts; 21. Muck's Hall and Opera House, 4th and State Streets; moved to State Street behind Smith's Garage; 22. Oldest business in continuous operation, established 1888 as Duplex's Barber Shop, Edward Duplex, Proprietor, first Black mayor west of the Mississippi; now George's Barber Shop, 410 Main Street; 23. St. Daniel's Catholic Church, first built 1872–73; 24. First Christian Church, established 1880; 25. Grace Episcopal Church, established 1874; 26. Second High School, Hooper and Olive streets, established 1924–25 on L.W. McCurry property; 27. Armstead Field, town baseball diamond and rodeo grounds on Roddan property; 28. Dr. D.P. Durst home; 29. Site of 1913 Hop Riot, a major dispute in early U.S. labor history (monument dedicated 8/31/1988 by the Camp Far West Parlor No. 218, Native Daughters of the Golden West, Wheatland Historical Society); 30. Site of the hop pickers camp; 31. Site of Claude Chana Winery; 32. Alexander's Dairy; John Furneaux's Dairy; now Webb's Mobile Home Park; 33. Flour Mill site; 34. Durst Ranch; E.E. Roddan Ranch; now owned by Keyes and Gene Roddan; 35. Northeast of Olive Street; Dam Ranch; Nichols Ranch; 36. Site of Harding Ranch; later Waltz property; Settlers' Village; 37. Jones property; 38. First church, the Southern Methodist, built 1872; now Assembly of God; 39. Grammar school built 1902; high school

added to second floor, 1907; demolished 1935 to erect Eastside School; 40. First Baptist Church, built 1914; Wheatland Civic Club dedicated February 1931; now Pioneer Hall, 4th and B streets; 41. Odd Fellows Hall, destroyed in 1898 fire, rebuilt May, 1899; bought out by the Masons in 1948 and renamed the Masonic Temple; 42. Site of Farmers' Bank, incorporated October 10, 1874; later Bank of Italy, 1924; Bank of America, 1930; now Wheatland Auto Parts; and 43. Moore's Theater, burned early 1950s.

Sixteen previous investigations have been conducted in the vicinity of the current project (Table 1). The location of the investigations are depicted in Appendix B, Figure B-1).

Table 1. Summary of Previous Investigations

NCIC or NEIC Report No.	Title	Author and Publication Year	Documented Resources within Study Area
Previous Studies within Project Area			
000986	Archaeological Survey of the Nichols Ranch Development, Yuba County, California	Douglas M. Davy 1990	None
Previous Studies in the Vicinity of Project Area			
849	Report of Archaeological Site Survey	Coburn L. Miller 1961	None
905	Cultural Resource Assessment of the Yuba County Water Agency's South County Irrigation Project	Ann S. Peak 1981	None
1042	Cultural Resource Inventory of the Cottonwood-Elverta #3 Transmission Line	Bouey 1990	None
4051	Finding of Effect for the Proposed Route 65 Modification Study near Lincoln, Placer County, California	California Department of Transportation 1994	None
4052	An Archaeological Survey for the Proposed Lincoln Bypass (Alternate A) of State Route 65 in Placer County, California	Janice Offermann 1990	None
005872	City of Wheatland, General Plan Update, Heritage Resource Inventory, Wheatland, Placer, Sutter Counties, California	Lindstrom 1996	None
(7586)	Report on the Archaeological Survey of the Bear River	Stoll, M. and S. Thompson 1961	None
8093	Historical Property Survey Report for the Proposed Replacement of Oakley Lane Bridge on Dry Creek in Yuba County, CA	Ken Harper 1979	None
(8361)	Cultural Resources Evaluation for the Emergency Levee-Banks Repairs of 16 Critical Erosion Sites	URS Corporation 2016	
008619	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project, State of California	Cindy Arrington et al. 2006	None
8955	Cultural Resources Evaluation for the Emergency Levee-Banks Repairs of 16 Critical Erosion Sites	URS Corporation 2006	None
009761 (9865)	Archaeological Survey Report for the Bear River Erosion Sites Repair Project	Denise Jurich and Jesse Martinez 2008	None
009879	Proposed Roddan Ranch Development Project	Sean Michael Jensen 2008	None

NCIC or NEIC Report No.	Title	Author and Publication Year	Documented Resources within Study Area
10870	Final Cultural Resources Technical Report Levee Geotechnical Evaluation Program Dry Creek Left Bank Wheatland, Yuba County, California	URS Corporation 2010	None
12441	Archeological & Historic Architecture Records Review for the UP PTC Valley Subdivision, Mileposts 106.70, 108.20, 109.92, 111.50, 114.60, 118.50, 120.40, 124.80, 127.00, Placer County	Jana Morehouse and Quality Services, Inc. 2015	None
12760	Cultural Resources Assessment for Union Pacific Railroad Bridge, Valley Subdivision, Placer County, California: Milepost 126.77	Mary Nell and Nolan-Wheatley2015	Union Pacific Railroad Bridge
Notes: NCIC = North Central Information Center; NEIC = Northeast information Center All reports are on file at the NCIC or NEIC. Source: NCIC and NEIC compiled by AECOM 2019			

No resources have been identified within the project area and only two previously identified cultural resources have been formerly documented in the vicinity of or within the APE. These consist of one site that reflects prehistoric land use located north of the proposed buttress, and the Southern Pacific Railroad, which is located directly west, adjacent to Borrow Site 2 (Table 2, and Appendix B, Map B-1).

Table 2. Documented Sites in the Vicinity of the Project Area

Primary Number	Trinomial	Description	NRHP Eligibility
P-58-001275		Prehistoric	Not evaluated
P-31-003593/P-58-001354	CA-PLA-002607H/CA-YUB-001910H	Southern Pacific Railroad	Unevaluated; Bear River bridge determined not eligible

P-58-001275

This prehistoric site with unknown constituents was documented in 1960 by Stoll and Thompson. The exact location is not known and is only described as between Grasshopper Slough and Bear River, approximately ¼ to ½ mile west of the county road to Marysville. The document also notes that the site was leveled and is buried with sediments. Therefore, subsurface investigations would be required to determine the exact location.

P-31-003593/P-58-001354 – Southern Pacific Railroad (Valley Division)

The Union Pacific Railroad Valley Subdivision (UPRR) runs from Roseville, California, north to Dunsmuir. It was constructed between 1870 and 1887 as part of the Southern Pacific line from California to Oregon, which was begun in 1869. The plan was for the Southern Pacific to build northward while the Oregon & California Railroad Company (O&C) built southward from Portland, Oregon. The O&C suffered financial difficulties and was acquired by Southern Pacific in 1887, and the two routes were connected at Ashland, Oregon, in December 1887. Southern Pacific merged with UPRR in 1996.

Neither the Valley Subdivision as a whole nor the north segment of the Southern Pacific Railroad that passes through the project area has been previously evaluated. Other segments have been determined eligible for listing in the NRHP under Criterion A because of their significance as an important transportation route in the west. However, the segment that passes through the project area most likely contributes to the overall significance of the resource under Criterion A. CH2M Hill conducted an NRHP assessment of the bridge spanning Bear River. They recommended that the structure was not eligible

for inclusion in the NRHP under all four criteria. The SHPO concurred with their recommendation (Nolan-Wheatley 2015).

NATIVE AMERICAN CONSULTATION

The NAHC indicated that RD 817 should implement best practices for the AB52 process and in accordance with PRC Section 21080.3.1(d), and do the following:

> Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section.

The NAHC also recommended that RD 817 include in the notification letters, information regarding any cultural resources assessment that have been completed in the APE, such as

- The results of any records search that may have been conducted at an Information Center of the CHRIS,
- The results of any archaeological inventory survey that was conducted, including:
  - Any ethnographic studies conducted for any area including all or part of the potential APE; and
  - Any geotechnical reports regarding all or part of the potential APE.

The NAHC also provided a list of local tribes that should be contacted. The result of the Sacred Lands File check conducted through the NAHC was negative.

Governor Newsom's April 22 Executive Order N-54-20 included an amendment to the timeframe set forth in PRC Sections 21080.3.1 and 21082.3 relating to California Native American tribal consultation requests and corresponding lead agency consultation as it relates to environmental impact reports, negative declarations, or mitigated negative declarations under CEQA. This amendment stated that the timeframes defined under the PRCs are to be suspended for 60 days and the deadlines do not restart until June 22, 2020.

In accordance with Executive Order and pursuant to PRC 21090.3.1(b)(1), tribal notifications were sent out to participating tribes on June 22, 2020. These groups consisted of Mechoopda Indian Tribe, Dennis Ramirez, Chairperson; Mooretown Rancheria of Maidu Indians, Benjamin Clark, Chairperson; Mooretown Rancheria of Maidu Indians, Guy Taylor; Tsi Akim Maidu, Grayson Coney, Cultural Director; and United Auburn Indian Community of the Auburn Rancheria, Gene Whitehouse, Chairperson.

Matthew Hatcher, Tribal Historic Preservation Officer with the Mooretown Rancheria, responded in a letter dated July 29, 2020. He stated that, based upon the information provided, they are not aware of any cultural resources or tribal cultural resources within the project area. However, as the Project proceeds, if new information or human remains are found, the Rancheria has a process for protecting such sacred information and artifacts, especially those found near streams and rivers.

The letter to Grayson Coney with the Tsi Akim Maidu was returned as undeliverable. AECOM contacted the NAHC, which indicated that they have no other address on file for Mr. Coney.

An email message was received from Ana Starkey, UAIC Cultural Regulatory Specialist, on August 12. She stated that their records indicate that there are tribal village sites in the vicinity that may extend into the project area, and Bear River itself is culturally significant. She also stated that consultation must occur as part of the identification efforts and prior to conducting any subsurface explorations. She requested a copy of the cultural report, geoarchaeological testing report, and photos of the project area.

Thomas Egler, MBK Project Manager, responded on August 13, thanking Ms. Starkey for the notification regarding likely tribal resources, advising her that copies of cultural documents and photos would be provided. He also requested scheduling an in-person field visit with UAIC representatives.

In an email message Ms. Starkey suggested that the following text be included in the IS-MND document

> *If interested Native American tribes provide information demonstrating the significance of the project location and tangible evidence supporting the determination that the site is highly sensitive for tribal cultural resources, RD 817 shall retain a tribal monitor from a culturally and geographically affiliated California Native American Tribe to (1) monitor for potential tribal cultural resources during initial ground-disturbing activities, (2) prepare a worker awareness brochure, and (3) invite archaeologists and lead agency to review the worker awareness brochure*

On September 28, 2020 Ms. Starkey emailed mitigation measures for unanticipated finds that UAIC would like to have incorporated into the IS-MND. This text and the above were included in the IS-MND.

Consultation with tribal organizations is ongoing. Copies of all correspondence are provided in Appendix C.

PEDESTRIAN SURVEY

On Wednesday, April 1, 2020, and Thursday, April 2, 2020, AECOM archaeologist Diana Ewing conducted pedestrian survey of Borrow Areas 1, 2, and 3, and the proposed footprints for the proposed setback levee and buttresses depicted in Appendix B, Figure B-1, both linear work areas beside the levee. All areas were covered by pedestrian transects of approximately 10 to 15 meters apart.

No archaeological cultural material was observed within the proposed footprint for the setback levee and buttress locations beside the levee, nor were any cultural materials observed at Borrow Area 2 or Borrow Area 3. Both Borrow Area 2 and Borrow Area 3 consisted of highly manicured walnut orchards.

Widely dispersed historic-era cultural material was observed at Borrow Area 1, which consisted of a field planted with feed hay with wheat and oats. The crop was 3 to 3.5 feet tall in some locations. Soil was only visible around the edges of the field and where a vehicle had driven across the near center of the field at a point in the germination of the hay to stop growth. The artifacts were observed in this vehicle path devoid of growth. They consist of a horseshoe (Figure 8), a broken brick (Figure 9), and historic-era glass fragments (amethyst glass [Figures 10 and 11]) and olive-green glass (Figure 12) located on the site in proximity to one another (see photos). Because of a lack of association, the artifacts do not qualify as an archaeological site.

One architectural resource, the existing Bear River north levee, is located within the APE and is addressed in the following section.

Figure 8. Horseshoe

Figure 9. Broken brick

Figure 10. Glass fragment

Figure 11. Amethyst glass

Figure 12. Olive-green glass

NEWLY DOCUMENTED RESOURCE

The newly documented resource consists of an approximately 3,000-foot-long segment of the RD 817 Bear River Levee along the north bank of Bear River west of the city of Wheatland in southern Yuba County (see DPR for Appendix D). The trapezoidal earthen levee is approximately 12 feet above the landside levee toe and the crown/crest width varies between 12 to 15 feet with a gravel levee road (Figure 13). The bottom width of the levee varies from 60 to 70 feet. The north and south slopes are approximately 22 feet. The landside levee slope varies between 1.5:1 and 2:1 and the waterside levee slope ranges from 2:1 to 3:1. The north side of the levee is characterized by orchards (Figure 13) and the south side is a heavily vegetated Bear River (Figure 14).

Figure 13. North bank Bear River Levee, camera facing west, April 23, 2020

Figure 14. North bank Bear River Levee, camera facing northeast, April 23, 2020.

Evaluation

NRHP A / CRHR 1

Within that context, the levees in Yuba, Sutter, and Placer Counties, the RD 817 Bear River Levee is not significant for association with early twentieth-century reclamation (NRHP Criterion A/ NRHP Criterion 1). Compared with other levee systems, such as the massive and elaborate levee system constructed by the Natomas Consolidated Company (RD 1001) just south of Bear River, the RD 817 Bear River Levee on the north bank did not support significant new agricultural and economic development in Wheatland as a result of the reclamation. When in the planning stage and under construction, the levee was anticipated to draw in hundreds of new settlers and their families to grow

fruit orchards, hops, and other crops in the new reclaimed bottomlands along the north side of Bear River. This did not occur, and the Wheatland area actually experienced a loss in population in the 1910 to 1920 decade. While the bottomland region was transformed into agricultural fields and orchards, it appears that large landholders in the area acquired the reclaimed lands and further expanded their farming operations. Although Wheatland continues as an agricultural growing region, it does not appear the RD 817 Bear River Levee is significant within that context.

NRHP B / CRHR 2

The RD 817 Bear River Levee is not associated with significant individuals (NRHP Criterion B/ CRHR Criterion 2). Multiple private individuals constructed the early levees along the north bank to protect their landholdings from flooding, including members of the Durst Brothers and the Muck Brothers, who were also founding members of RD 817 along with A.G. Oakley, M.F. Hollingsead, S.G. Russell, J.S. La Rue, Charley Sing, and W.F. O'Brien of San Francisco. Prominent among them were the Durst Brothers whose farm on the east side of Wheatland was the site of the Wheatland Hop Riot in 1913. Involvement with levees was a minor part of their careers as farmers in the Wheatland area, and the hops grown on their properties were already well known by the time the reclamation district was formed. A.D. Cesson of Broderick and Fred Knoop of Live Oak, who were hired to build and repair portions of the levees at different times, are not historically significant individuals.

NRHP C / CRHR 3

The RD 817 Bear River Levee does not embody distinctive characteristics of a type, period, or method of construction (NRHP Criterion C/ CRHR Criterion 3). It does not appear to be the work of a master. The levee was built using standard techniques and materials.

NRHP D / CRHR 4

In rare instances, structures may yield historical information about historic construction materials and technologies not available through other sources (NRHP Criterion D/ CRHR Criterion 4). Levee construction materials and technology are well documented in other sources, and the RD 817 Bear River Levee is not significant in this regard.

Integrity

The RD 817 Bear River Levee was originally constructed 1910–1913, more than 100 years ago, and has been regularly repaired, enlarged, and modified. The levee has retained its original location, setting, feeling, and association as an early twentieth-century levee for agricultural land reclamation; however, the design and workmanship have been minimally altered through ongoing maintenance and repair activities, including the levee road work. Although the RD 817 Bear River Levee generally retains historic integrity to its potential period of significance from 1910 when the reclamation district was incorporated to the completion of the levee in 1913, it does not meet any of the significance criteria necessary for eligibility for listing in either the NRHP or CRHR.

GEOARCHAEOLOGICAL CONTEXT

The majority of near-surface deposition within the APE is related to the dramatic climate change that occurred since the last glacial maximum (approximately 19,000 years ago) and the response of watercourses to rising sea levels; as well as more recent historic period human-induced landscape changes. Uplift, glaciations, and weathering throughout the Pleistocene caused extensive erosion of the

bedrock and older glacial deposits. Most of the material that eroded from the northern Sierra Nevada during the Pleistocene and subsequent Holocene periods was deposited on the floor of the Sacramento Valley. Around 6500 B.P., the rising sea level began to inundate the lowermost parts of the ancestral Central Valley, resulting in the formation of extensive brackish and freshwater wetlands (the Delta). Concomitantly, the rising base level of the Delta caused the lower reaches of many channels to migrate laterally as they became filled with sediments, and additional sediment to be deposited farther upstream (Brown and Pasternack 2004). This pattern of deposition was exacerbated during the historic period as a result of hydraulic strip mining in the northern Sierra Nevada. During the height of the Gold Rush, nearly 1 billion cubic meters of sediment was released into channels draining the western slope (Gilbert 1917). The intensive mining caused rapid channel aggradation in the lower reaches of the major drainages—temporarily raising many channel beds 3.0 to 4.5 meters (10 to 15 feet) or more above their former elevations—resulting in extensive flooding, channel migration, and widespread sediment deposition throughout the lower portions of the Sacramento Valley. According to James (1989) as much as 5.1 meters (16.7 feet) of mining sediment now covers the pre-mining surface in the lower Bear River.

Geomorphically, the APE is situated on higher elevation portions of the Pliocene-age Laguna Formation and Pleistocene-age Riverbank Formation that are bisected on the north by Dry Creek and on the south by Bear River. Surficial historic and Holocene-age sediments from both creeks mantle these older geomorphic units within the APE (Figures 15, 16, and 17). The younger surficial geomorphic units within the APE, associated with Dry Creek and Bear River, consist of various channel deposits, crevasse splay deposits, natural levee deposits, overbank deposits, and general alluvial deposits. Each of these geomorphic units has a variable potential for harboring buried archaeological resources.

Age designations for the geomorphic mapping in Figures 15, 16, and 17 are generally supported by comparison with United States Department of Agriculture (USDA) soils mapping for the area (Soil Survey Staff 2019). Those areas mapped as Pleistocene Riverbank formation north of Dry Creek are mapped as San Joaquin series soils, which have been demonstrated through radiocarbon dating to have been formed during the Pleistocene (Meyer and Rosenthal 2008). Those areas south of Dry Creek, and on both banks of Bear River, mapped as various recent and Holocene alluvial deposits, are mapped by the USDA primarily as Xerofluvents, Columbia, Holillipah, Conejo, and Shanghai series soils, all of which have been radiocarbon dated to be latest Holocene to modern in age (Meyer and Rosenthal 2008).

In general, due to the young age of the surficial alluvial landforms, the majority of the APE was considered highly sensitive for buried archaeological resources. Although no buried archaeological sites have been previously identified within the vicinity of the Project, the presence of extensive buried archaeological deposits within the alluvial floodplain of the Sacramento Valley has been well established (e.g., Meyer and Rosenthal 2008). In addition, it has been well established that buried archaeological sites do not occur randomly across the landscape, but are correlated with certain environmental and geomorphic factors, including proximity to water, landform slope (flatter being more sensitive), and the relative age of the landform (generally, younger being more sensitive).

Pleistocene-age landforms have little potential for harboring buried archaeological resources as they almost exclusively developed prior to human migration into North America (ca. 15,000 B.P.). However, Pleistocene surfaces buried below younger Holocene sediments do have a potential for containing archaeological deposits. Holocene and historic-era alluvial deposits may also contain paleosols that represent periods of landform stability prior to renewed deposition. The identification of buried soils within Holocene-age landforms is of particular interest because they represent formerly stable surfaces that have an increased potential for preserving archaeological deposits.

GEOARCHAEOLOGICAL FIELD METHODS

Trenching is generally considered the most effective method of exploration for identifying buried landforms and archaeological sites (Byrd et al. 2016; Monaghan et al. 2006). A total of 13 trenches were excavated between April 20 and April 23, 2020—six in the Bear River Levee Setback area, four in Borrow Area 3, and three in the Buttress Extension area (Table 3) (see Figures 15, 16, and 17). The trenches were excavated using a backhoe with a 2-foot toothed bucket and each trench was approximately 11 feet long. Borrow sites 1 and 2 are on Laguna Formation and Riverbank Formation (respectively) and therefore have a very low sensitivity for buried archaeology.

Table 3. Trench Locations and Depths

Trench Number	Trench Location	Final Depth (cm)
Geoarch_TP01	Setback Levee	360
Geoarch_TP02	Setback Levee	320
Geoarch_TP03	Setback Levee	360
Geoarch_TP04	Setback Levee	420
Geoarch_TP05	Setback Levee	420
Geoarch_TP06	Setback Levee	330
Geoarch_TP07	Borrow Area 3	150
Geoarch_TP08	Borrow Area 3	150
Geoarch_TP09	Borrow Area 3	150
Geoarch_TP10	Borrow Area 3	150
RD817_TP18	Buttress Extension	120
RD817_TP19	Buttress Extension	120
RD817_TP20	Buttress Extension	120

STRATIGRAPHIC IDENTIFICATION AND SOIL DESCRIPTION

Each trench was described using standard soils and geomorphological techniques (Appendix E). Natural stratigraphy was identified whenever possible by carefully examining trench sidewalls. Stratigraphic units (strata) and soil horizons were identified based on physical characteristics such as composition, color, superposition, textural transitions, and pedogenic properties (i.e., relative soil development). Master soil horizons were defined using standard USDA soil taxonomy (Soil Survey Staff 2006). This organizational system uses uppercase letters (A, B, and C) to describe in-place weathering horizons. Most horizons and layers are given a single capital letter symbol:

- “A” is the organic-rich upper horizon developed at or near the original ground surface;
- “B” is the horizon formed in the middle of a profile, with concentrations of illuviated clays, iron, etc., and general changes in soil structure; and
- “C” is the relatively unweathered parent material on which the other soil horizons formed.

These master horizons are preceded by Arabic numerals (2, 3, etc.) when the horizon is associated with a different stratum; where number 1 is understood but not shown, and lower numbers indicate superposition over larger numbers. Lowercase letters are used to designate subordinate soil horizons (Table 4). Combinations of these numbers and letters indicate the important characteristics of each major unit and soil horizon, from which inferences can be drawn. Various soil characteristics—such as blocky structure associated with silicate clay accumulation, carbonate accumulation, or the

accumulation of other minerals in the soil horizon—are indications of the amount of time that a landform was exposed at the surface prior to burial (i.e., its stability) and the environmental conditions to which the landform was subject prior to and after burial. Strata in each excavation, consisting of pedogenically or processually related horizons, are assigned a Roman numeral beginning with the oldest (lowest) unit.

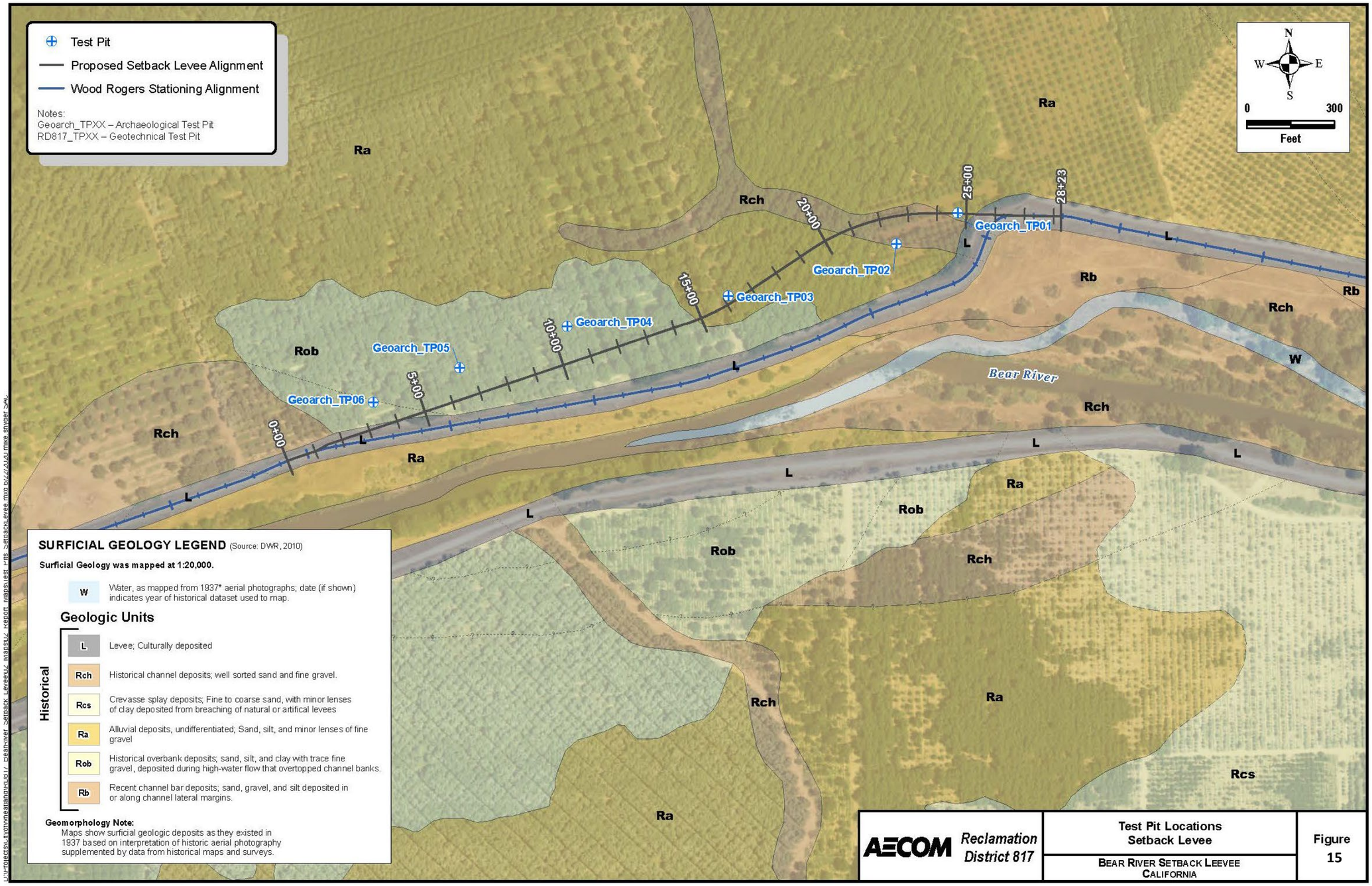
Table 4. Subordinate Distinctions within Master Soil Horizons

Subordinate Horizon	Description
ox	Oxidized iron and other minerals in parent material
p	Disturbed or artificial fill (including plow-zone)
w	Weak or poorly developed color/structure

STUDY RESULTS

All 13 trenches exhibited similar stratigraphic profiles, each containing a thin plow zone underlain by minimally weathered, sandy sediments (see Appendix F, Geoarchaeological Photographs). No archaeological resources or buried soils were identified by this investigation. The absence of soil development indicates that the APE was subject to consistent aggradation at least throughout the late Holocene—likely as a result of hydraulic mining in the Sierra Nevada. Prior subsurface geomorphic investigations by James (1989; 1999) indicate that surficial historic-era and modern sediments, mobilized by hydraulic gold mining, are approximately 3 to 5 meters deep in the portion of the Project vicinity adjacent to Bear River. As such, the profiles observed in the trenches (which reached a maximum depth of 4.2 meters) in this part of the project area are likely exclusively composed of these recent historic-era and modern sediments. James' work did identify a buried landform below the redeposited mining sediments. As such, although no archaeological resources were observed in the trenches, the possibility remains that unidentified paleosols and associated archaeological resources could be present in deeper portions of the setback levee APE where impacts (e.g., deep soil mixing) extend below the depth of this geoarchaeological investigation.

For the portion of the investigation within Borrow Area 3, slightly more soil development was observed in the profiles compared to the area of the new setback levee directly adjacent to Bear River. Sediments in the vertical APE of the borrow site may represent recent mining debris and/or Holocene alluvium. These young sediments presumably mantle the adjacent mapped Laguna Formation. However, no indication of a buried landform or paleosol was observed in the trenches, which were extended deep enough to account for the entire proposed vertical APE in this area. Additionally, the occupant of the property reported that the entire area was disturbed to a depth of 1.5 meters (5 feet) below surface during the installation of irrigation piping. As such, the lack of paleosols and archaeological deposits within the Borrow Area 3 trenches indicates that here is a low potential that unanticipated buried archaeological resources could be impacted in this portion of the project area.



Source: AECOM 2020

Figure 15. Trench Locations

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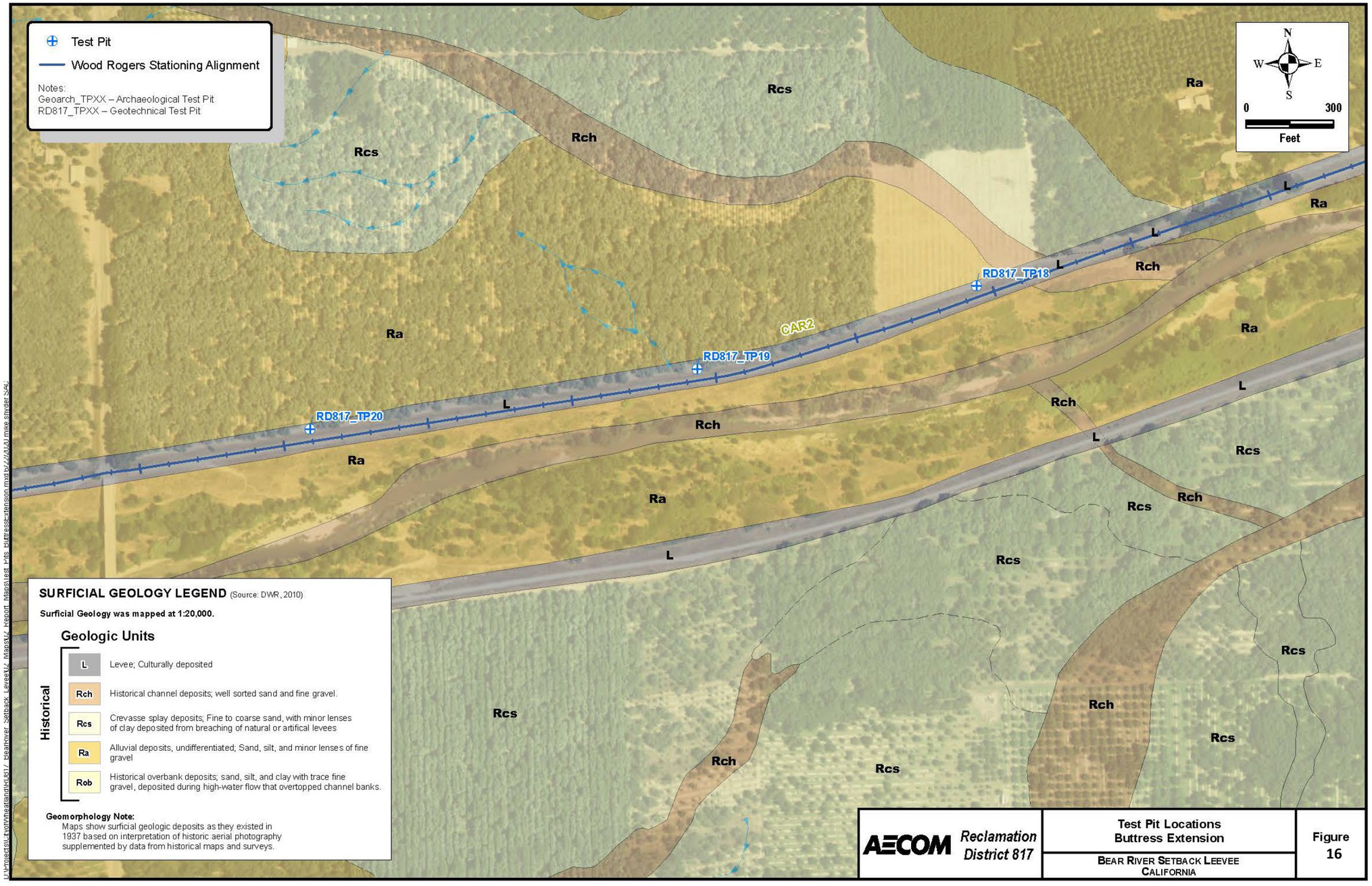

Source: AECOM 2020

Figure 16. Trench Locations

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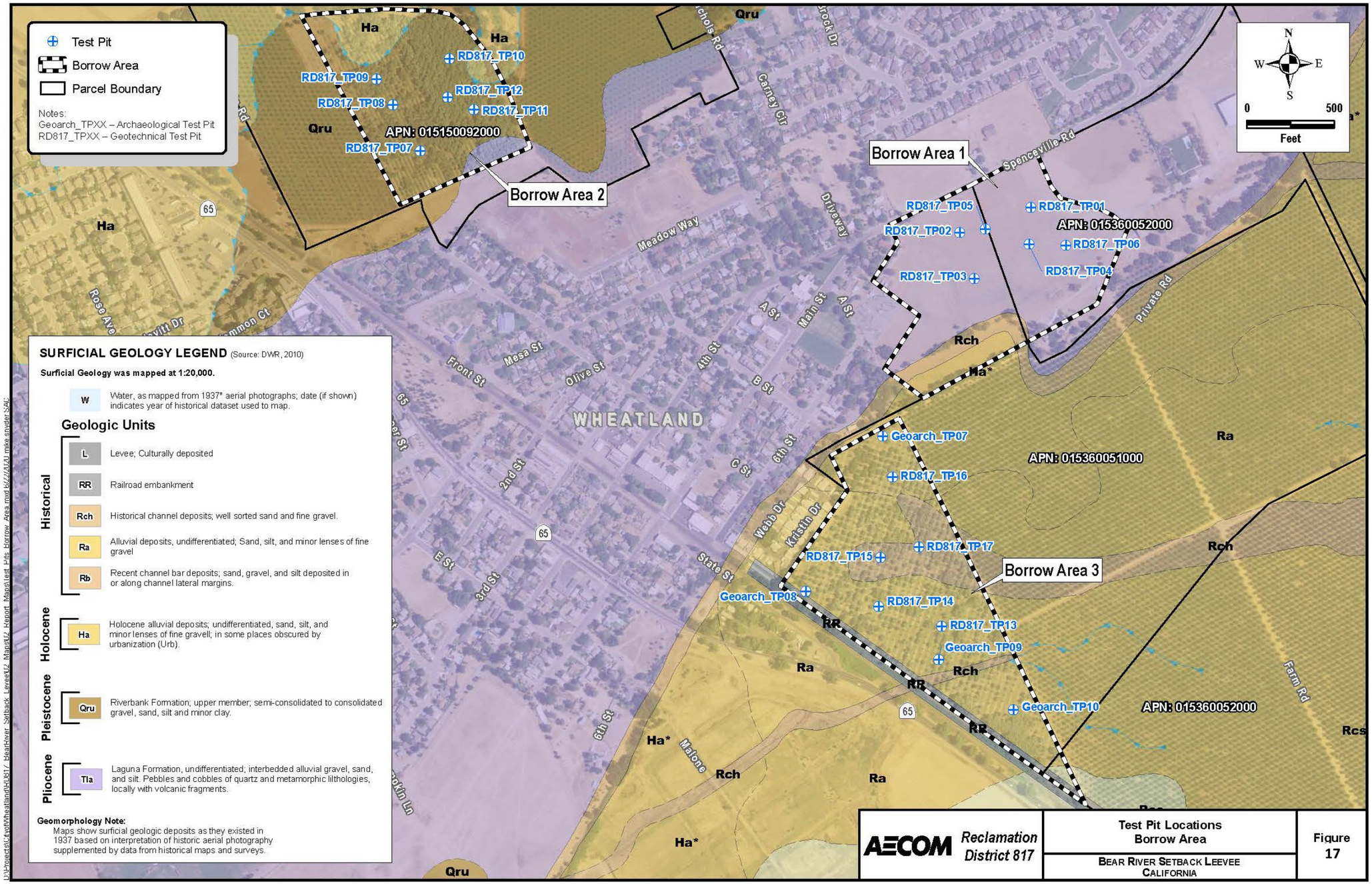

AECOM 2020

Figure 17. Trench Locations

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CONCLUSION AND RECOMMENDATIONS

This report concludes that no properties within the APE for this undertaking are potentially significant for listing in the NRHP as historic properties. Therefore, no historic properties would be adversely affected by project implementation. Background research, intensive field survey, and formal geoarchaeological investigations that failed to reveal the presence of buried paleosols indicate that there is a low potential for the presence of prehistoric and historic-era archaeological resources.

Although no archaeological sites were identified, widely scattered isolated artifacts and a segment of the RD817 Bear River north levee will be removed and was evaluated for NRHP eligibility.

The RD 817 Bear River Levee was originally constructed 1910–1913, more than 100 years ago, and has been regularly repaired, enlarged, and modified. The levee has retained its original location, setting, feeling, and association as an early twentieth-century levee for agricultural land reclamation; however, the design and workmanship have been minimally altered through ongoing maintenance and repair activities, including the levee road work. Although the RD 817 Bear River Levee generally retains historic integrity to its potential period of significance from 1910 when the reclamation district was incorporated to the completion of the levee in 1913, it does not meet any of the significance criteria necessary for eligibility for listing in either the NRHP or CRHR.

If interested Native American tribes provide information demonstrating the significance of the project location and tangible evidence supporting the determination that the site is highly sensitive for prehistoric archaeological resources, RD817 shall retain a qualified archaeologist to (1) monitor for potential prehistoric archaeological resources during initial ground-disturbing activities, (2) prepare a worker awareness brochure, and (3) invite tribal representatives to review the worker awareness brochure.

If buried or previously unidentified historic properties or archaeological resources are discovered during Project construction, all work within a 100-foot radius of the find will cease. RD 817 shall retain a professional archaeologist who meets the Secretary of the Interior's Professional Standards for Archaeologists to assess the discovery and recommend for what, if any, further treatment or investigation will be necessary for the find. Any necessary treatment/investigation will be developed, with interested Native American tribes providing recommendations in coordination with the SHPO and USACE, if necessary, and will be completed before construction continues in the vicinity of the find.

In accordance with the California Health and Safety Code, if human remains are uncovered during ground-disturbing activities, all potentially damaging ground disturbance in the area of the burial and a 100-foot radius will be halted and the El Dorado County Coroner will be notified immediately. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, then federal laws governing the disposition of those remains will come into effect. Specifically, the Native American Graves Protection and Repatriation Act (NAGPRA), Public Law 101-601, 25 U.S. Code 3001 et seq., 104 Statute 3048 requires federal agencies and institutions that receive federal funding to return Native American cultural items to lineal descendants and culturally affiliated Indian tribes and native Hawaiian organizations. Cultural items include human remains, funerary objects, sacred objects, and objects of cultural patrimony. NAGPRA also has established procedures for the inadvertent discovery of Native American cultural items on federal or tribal lands, which includes consultation with potential lineal descendants or tribal officials as part of their compliance responsibilities.

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1910c. Camp Far West (Spenceville), California 15-minute topographic quadrangle map on file at the North Central Information Center, California State University, Sacramento and the North East Information Center, California State University Chico

1915. Camp Far West, California 7.5-minute topographic quadrangle map Resources on file at the North Central Information Center, California State University, Sacramento and the North East Information Center, California State University Chico

1947. Wheatland, California 7.5-minute topographic quadrangle map on file at the North Central Information Center, California State University, Sacramento and the North East Information Center, California State University Chico

1949a. Camp Far West, California 7.5-minute topographic quadrangle map Resources on file at the North Central Information Center, California State University, Sacramento and the North East Information Center, California State University Chico

1949b. Wheatland, California 7.5-minute topographic quadrangle map on file at the North Central Information Center, California State University, Sacramento and the North East Information Center, California State University Chico

1951. Camp Far West, California 7.5-minute topographic quadrangle map Resources on file at the North Central Information Center, California State University, Sacramento and the North East Information Center, California State University Chico

1952. Nicholas, California 7.5-minute topographic quadrangle maps

1953. Sheridan, California 7.5-minute topographic quadrangle map on file at the North Central Information Center, California State University, Sacramento and the North East Information Center, California State University Chico

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APPENDIX A

NCIC and NEIC Records Search

Northeast Center of the
California Historical Resources
Information System

BUTTE
GLENN
LASSEN
MODOC
PLUMAS
SHASTA
SIERRA
SISKIYOU
SUTTER
TEHAMA
TRINITY

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August 21, 2019

Mr. Richard Deis
AECOM
2020 L Street, Suite 400
Sacramento, CA 95811

I.C. File # D19-113
Records Search

RE: Wheatland Feasibility Study 60515445
T13N, R4E, Sections 1, 2, 11-15; T13N, R5E, Sections 2-10;
T14N, R5E, Sections 25-29, 31-36; MDBM
USGS Camp Far West 7.5', Nicolaus 7.5', Wheatland 7.5',
Sheridan 7.5', Knights Landing 15', and Lincoln 15' quadrangles
Approximately 1,300 acres, estimated from project map (Sutter County)

Dear Mr. Deis,

In response to your request, a records search for the project cited above was conducted by examining the official maps and records for archaeological sites in Sutter County. Please note that this record search includes the requested ¼-mile radius surrounding the project area.

RESULTS:

Prehistoric Resources: According to our records, no prehistoric sites are known to be located in the project area. However, one prehistoric site has been recorded in the 1/4-mile project radius. The site, CA-SUT-00023, consists of burials. Shapefiles, a Resource List, and a copy of the resource record are attached. The project is located in a 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 in the project area or ¼-mile project radius. Unrecorded historic cultural resources may be located in the project area.

The USGS Camp Far West 7.5', Nicolaus 7.5', Wheatland 7.5', Sheridan 7.5', Lincoln 15' (1953), and Knights Landing 15' (1952) quadrangle maps indicate that Bear River, levee, Johnson Rancho, Pump, Sutter County Line, Yuba County Line, Placer County Line, Dry Creek, State Route 65, Grasshopper Slough, orchards, roads, and structures are located within the project area or ¼-mile radius, while the community of Wheatland, Bench Mark 88, wells, Bear River Drive, Yankee Slough, Warren Road, orchards, roads, and structures are located in the general project vicinity.

Previous Archaeological Investigations: According to our records, the project area and portions of the ¼-mile project radius have been previously surveyed for cultural resources. Shapefiles and a Report List are enclosed. PDF copies of the reports, with the exclusion of NEIC Report 009865, are also attached. The studies are listed below.

Bouey, Paul (Far Western Anthropological Research Group, Inc.)
1990 *Cultural Resource Inventory of the Cottonwood-Elverta #3 Transmission Line.*
NEIC Report 001042
Resources:
P-04-001119 (CA-BUT-001119)
P-04-001120 (CA-BUT-001120H)
P-04-001121 (CA-BUT-001121)
P-04-001122 (CA-BUT-001122)

Grant, Joanne S. (URS Corporation)
2006 *Cultural Resources Evaluation for the Emergency Levee-Banks Repairs of 16 Critical Erosion Sites.*
NEIC Report 008361

Jurich, Denise (PBS&J)
2008 *Archaeological Survey Report for the Bear River Erosion Sites Repair Project.*
NEIC Report 009865

Lindstrom, Susan
1996 *City of Wheatland, General Plan Update, Heritage Resource Inventory, Wheatland, Placer, Sutter and California.*
NEIC Report 005872

Stoll, M. and S. Thompson (Sacramento State College and the California State Indian Museum)

1961 *Report on the Archaeological Survey of the Bear River.*
NEIC Report 007586
Resources:
P-51-000023 (CA-SUT-000023)
P-51-000132

Storm, Donald J.

1977 *Cultural Resource Investigations Involving the City of Wheatland and the Bear River,Sutter County, California.*
NEIC Report 001138

Literature Review: 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); **California Register of Historical Resources** (2012); **California Points of Historical Interest** (2012); **California Inventory of Historic Resources** (1976); and **California Historical Landmarks** (2012); **Directory of Properties in the Historic Property Data Files for Sutter County** (2012).

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 record search is **$413.10** (please refer to the following page for more information). An invoice will follow from Chico State Enterprises for billing purposes. Thank you for your concern in preserving California's cultural heritage, and please feel free to contact us if you have any questions or need any further information or assistance.

Sincerely,

Ryan Bradshaw, B.A.
Assistant Coordinator

Record Search Charge for I.C. File # D19-113

The charge for this record search is **$413.10.** Please see the table below for an itemization.

THIS IS NOT AN INVOICE *		
Factor	**Charge**	**Your Charge**
Time (research, GIS query time, letter, and copy time)	$150/hour	$300.00 (2 hours)
Shapefiles	$12 per shape	$48.00 (4 shapes)
Quads (crossed into)	Up to 2 quads = No charge 3-4 quads = $200 5-6 quads = $400 7 and over requires a contract or negotiated price.	$0.00 (4 quads, fee waived)
Copies	$0.15 per copy	$65.10 (434 copies)
Total Charge		**$413.10**

*An invoice will follow from Chico State Enterprises for billing purposes.

California Historical Resources Information System

NORTH CENTRAL INFORMATION CENTER

AMADOR
EL DORADO
NEVADA
PLACER
SACRAMENTO
YUBA

California State University, Sacramento
6000 J Street, Folsom Hall, Suite 2042
Sacramento, California 95819-6100
phone: (916) 278-6217
fax: (916) 278-5162
email: ncic@csus.edu

7/25/2019 NCIC File No.: YUB-19-20

Richard Deis
AECOM
2020 L Street, Suite 400
Sacramento, CA 95811

Re: Wheatland Feasibility Study 60515445

The North Central Information Center received your record search request for the project area referenced above, located on the Camp Far West, Nicolaus, Wheatland, and Sheridan USGS 7.5' quads. The following reflects the results of the records search for the project area and a ¼-mi radius.

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

Resources within project area: Resources outside project area, within radius:	P-31-3593 P-58-1354 P-58-1213 P-58-1275
Reports within project area: Reports outside project area, within radius:	511 849 986 8093 8619 8955 9326 9761 10870 12441 12760 455 905 1698 4051 4052 6683 8094 9879 10974 12417

Resource Database Printout (list): ☒ enclosed ☐ not requested ☐ nothing listed/NA

Resource Database Printout (details): ☐ enclosed ☒ not requested ☐ nothing listed/NA

Resource Digital Database Records: ☐ enclosed ☒ not requested ☐ nothing listed/NA

Report Database Printout (list): ☒ enclosed ☐ not requested ☐ nothing listed/NA

Report Database Printout (details): ☐ enclosed ☒ not requested ☐ nothing listed/NA

Report Digital Database Records: ☐ enclosed ☒ not requested ☐ nothing listed/NA

Resource Record Copies: ☒ enclosed ☐ not requested ☐ nothing listed/NA

Report Copies: ☒ enclosed ☐ not requested ☐ nothing listed/NA

OHP Historic Properties Directory:	☒ enclosed	☐ not requested	☐ nothing listed/NA
Archaeological Determinations of Eligibility:	☒ enclosed	☐ not requested	☐ nothing listed/NA
CA Inventory of Historic Resources (1976):	☒ enclosed	☐ not requested	☐ nothing listed/NA
Caltrans Bridge Survey:	☐ enclosed	☒ not requested	☐ nothing listed/NA
Ethnographic Information:	☐ enclosed	☒ not requested	☐ nothing listed/NA
Historical Literature:	☐ enclosed	☒ not requested	☐ nothing listed/NA
Historical Maps:	☒ enclosed	☐ not requested	☐ nothing listed/NA
Local Inventories:	☐ enclosed	☐ not requested	☒ nothing listed/NA
GLO and/or Rancho Plat Maps:	☒ enclosed	☐ not requested	☐ nothing listed/NA
Shipwreck Inventory:	☐ enclosed	☒ not requested	☐ nothing listed/NA
Soil Survey Maps:	☐ enclosed	☒ not requested	☐ nothing listed/NA

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

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

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

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Sincerely,

Paul Rendes, Assistant Coordinator
North Central Information Center

APPENDIX B – CONFIDENTIAL

Map

APPENDIX C – CONFIDENTIAL

Native American Consultation

APPENDIX D

Department of Parks and Recreation Forms

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary#
HRI#
Trinomial
NRHP Status Code 6Z

Other Listings _____
Review Code _____ **Reviewer** _____ **Date** _____

***Resource Name or #: (Assigned by recorder)** Reclamation District No. 817 Bear River Levee

P1. Other Identifier: Bear River Levee (north bank)

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County:** Yuba

***b. USGS 7.5' Quad** Wheatland, CA and Sherdian CA **Date** 2018 **T** 13N; **R** 4E,5E; ___¼ **of** ___¼ **of Sec** __; **B.M.** Mount Diablo

c. Address n/a **City** Wheatland **Zip** 95692

d. UTM: 10 S, 63101.757 mE, 4316275.75 mN to 10 S, 631968.07 mE, 4316487.49 mN (segment recorded on this form, see Sketch Map)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

Approximately 7-mile long levee system along the north bank of the Bear River southwest of the city of Wheatland. Approximately 3,000-foot-long segment of levee recorded for this form (see Sketch Map).

***P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)**

This form records an approximately 3,000-foot-long segment of Reclamation District No. 817 (RD 817) Bear River levee along the north bank of the Bear River west of the city of Wheatland in southern Yuba County (see Sketch Map and Photo Key). The trapezoidal earthen levee is approximately 12 feet above the landside levee toe and the crown/crest width varies between 12 to 15 feet with a gravel levee road (Photograph 1). The bottom width of the levee varies from 60 to 70 feet. The north and south slopes are approximately 22 feet. The landside levee slope varies between 1.5: 1 and 2:1 and the waterside levee slope ranges from 2:1 to 3:1. The north side of the levee is characterized by orchards (Photograph 2) and the south side is a heavily vegetated Bear River (Photograph 3).

***P3b. Resource Attributes: (List attributes and codes)** HP11 – Engineering Structure

***P4. Resources Present:** ☐Building ☒Structure ☐Object ☐Site ☐District ☐Element of District ☐Other **(Isolates, etc.)**

P5a. Photo or Drawing

P5b. Description of Photo: (view, date, accession #) Photograph 1. North bank Bear River Levee, camera facing west, April 23, 2020,

***P6. Date Constructed/Age and Source:**
☒**Historic** ☐**Prehistoric** ☐**Both**
1911-13 (*Sacramento Union*)

***P7. Owner and Address:**
Reclamation District 817
P.O Box 261
Wheatland, CA 95692

***P8. Recorded by: (Name, affiliation, address)**
Kat Kubal and Chandra Miller, AECOM
2020 L Street, Suite 400
Sacramento, CA 95811

***P9. Date Recorded:** April 21-23, 2020

***P10. Survey Type:** Intensive

***P11. Report Citation:** AECOM, 2020, Reclamation District 817 Bear River Setback Levee Project.

***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): Building History**

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code 6Z

*Resource Name or # (Assigned by recorder) Reclamation District No. 817 Bear River Levee

B1. Historic Name: _____
B2. Common Name: _____
B3. Original Use: Flood control
B4. Present Use: Flood control
***B5. Architectural Style:** none
***B6. Construction History:** (Construction date, alterations, and date of alterations) Segments of levee constructed between 1911-13 (*Sacramento Union*); repaired and maintained over the subsequent decades.

***B7. Moved?** X No ___Yes ___Unknown **Date:** _____ **Original Location:** _____

***B8. Related Features:** None

B9a. Architect: Undetermined **b. Builder:** 1912 three-mile segment: A.D. Cesson (Broderick)

***B10. Significance:** **Theme** Early twentieth century reclamation **Area** Wheatland
Period of Significance 1910-13 **Property Type** Levee **Applicable** n/a

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Reclamation District No. 817 Bear River Levee along the north bank of the Bear River does not meet the criteria for listing in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR), and does not appear to be an historical resource for purposes of the California Environmental Quality Act (CEQA) or a historic property under Section 106 of the National Historic Preservation Act (NHPA). The property has been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, using the criteria outlined in Section 5024.1 of the California Public Resources Code. (See Continuation Sheet).

B11. Additional Resource Attributes: **(List attributes and codes)**

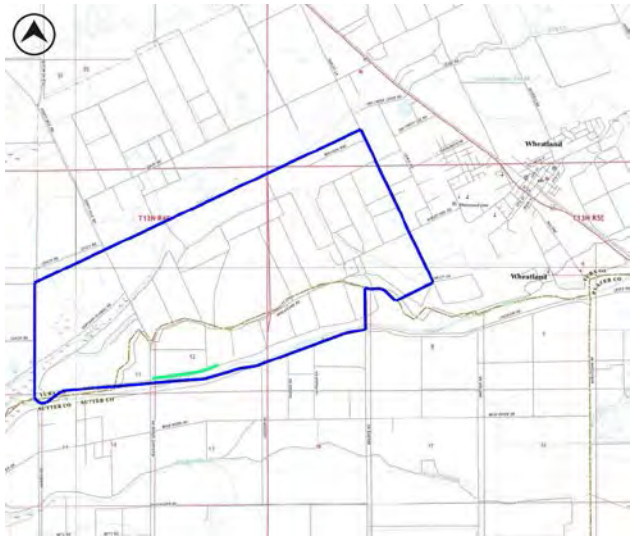
***B12. References:** SEE CONTINUATION SHEET

B13. Remarks:

***B14. Evaluator:** C. Miller, AECOM

***Date of Evaluation:** June 2020

(Sketch Map with north arrow required.)



(This space reserved for official comments.)

P5a. Photographs (continued):

Photograph 2. North bank Bear River Levee, camera facing northeast, April 23, 2020.

Photograph 3. View of heavily vegetated Bear River along south side of RD 817 Bear River Levee, camera facing south, April 23, 2020.

Photo Key:

3,000-foot long segment of RD 817 Bear River Levee in green, photo numbers and directions indicated.

***B10. Significance (continued):**

HISTORICAL CONTEXT

Wheatland

The city of Wheatland was developed within the Johnson Rancho on the north bank of the Bear River in what is now Yuba County (see Plate 1). William Johnson obtained the five-Spanish-league rancho in 1845 after the original owner, Don Pablo Gutteirez was killed earlier that year. In 1866, Wheatland was surveyed, the Central Pacific Railroad was completed to the settlement, and building quickly commenced for a post office, saloon, store, blacksmith shop, hotel, and a few residences the first year. Wheatland grew slowly until 1871-72 when sales of lots quickened, and the city incorporated in 1874. By 1879, the population was 800 and Wheatland had become an important shipping point on the rail line for agricultural goods grown in the area. Wheatland also provided grain, flour, hay, potatoes, and other produce by wagon into the mountains to supply the mining regions in Nevada County (Thompson & West 1879: 80).

Plate 1. Johnson Ranch in dashed line (added by AECOM), Bear River Levee District No. 1 at bottom left, note relocation of Bear River channel south of original course. (Source: Thompson & West 1879)

Hydraulic mining debris from mining operations upriver in Nevada County from the 1850s to 1870s wreaked havoc on the Bear, Feather, and Yuba rivers as the channels filled with sediment and mud runoff. The Bear River was once navigable by steamers and sailing vessels, but by the late 1870s much of the bottomlands along the Bear River had been destroyed with five to ten feet of sediment. The banks of the Bear River were once 25- to 30-feet high but had been completely filled in with silt and water flows were reduced to barely a stream in the summers from 1866-69 (Thompson & West 1879: 114)

The exception was a small strip of land near Wheatland that was protected by the Bear River Levee District No. 1. The reclamation district incorporated in 1878 with fifteen landowners and 2,140 acres of land. By 1879, the Bear River Levee District No. 1. levee was 29,400 feet long; however, most of the levee was built at different times before incorporation by private parties to protect their own property against flooding. The levee was constructed of sandy sediment and brush was placed along the riverbank side to prevent erosion; however, during high water events the levee required constant repairs. The district was short lived and was disorganized by 1891 (Thompson & West 1879: 114; U.S. House of Representatives 1891:111).

Between 1863 to 1891, over $145,000 was spent by private individuals for construction and maintenance of approximately six miles of levees on the north bank of the Bear River in the Wheatland area. The average dimension of levees was 18 feet tall, a crown of six feet, and slopes from 3 to 1 and 2 to 1. (House of Representatives 1891:116). Despite these efforts, the portion of the Bear River in Yuba County near Wheatland was estimated to have had 2,220-acres of land destroyed by mining debris and flooding. Agricultural land in the area was valued at $100 an acre, but the land along the river was only valued at $4 an acre (U.S. House of Representatives 1891:111).

These nineteenth century private levees were mapped in 1905 by the California Debris Commission along the Bear River from its mouth to Greenhorn Creek, noting areas of private levee construction, limited agriculture endeavors, and property ownership in the silted bottomlands (see Plate 2). By the next decade, the area would be completely transformed with the creation of Reclamation District No. 817 (RD 817) and its combined efforts with the Natomas Consolidated Company (RD 1001) and Reclamation District No. 784.

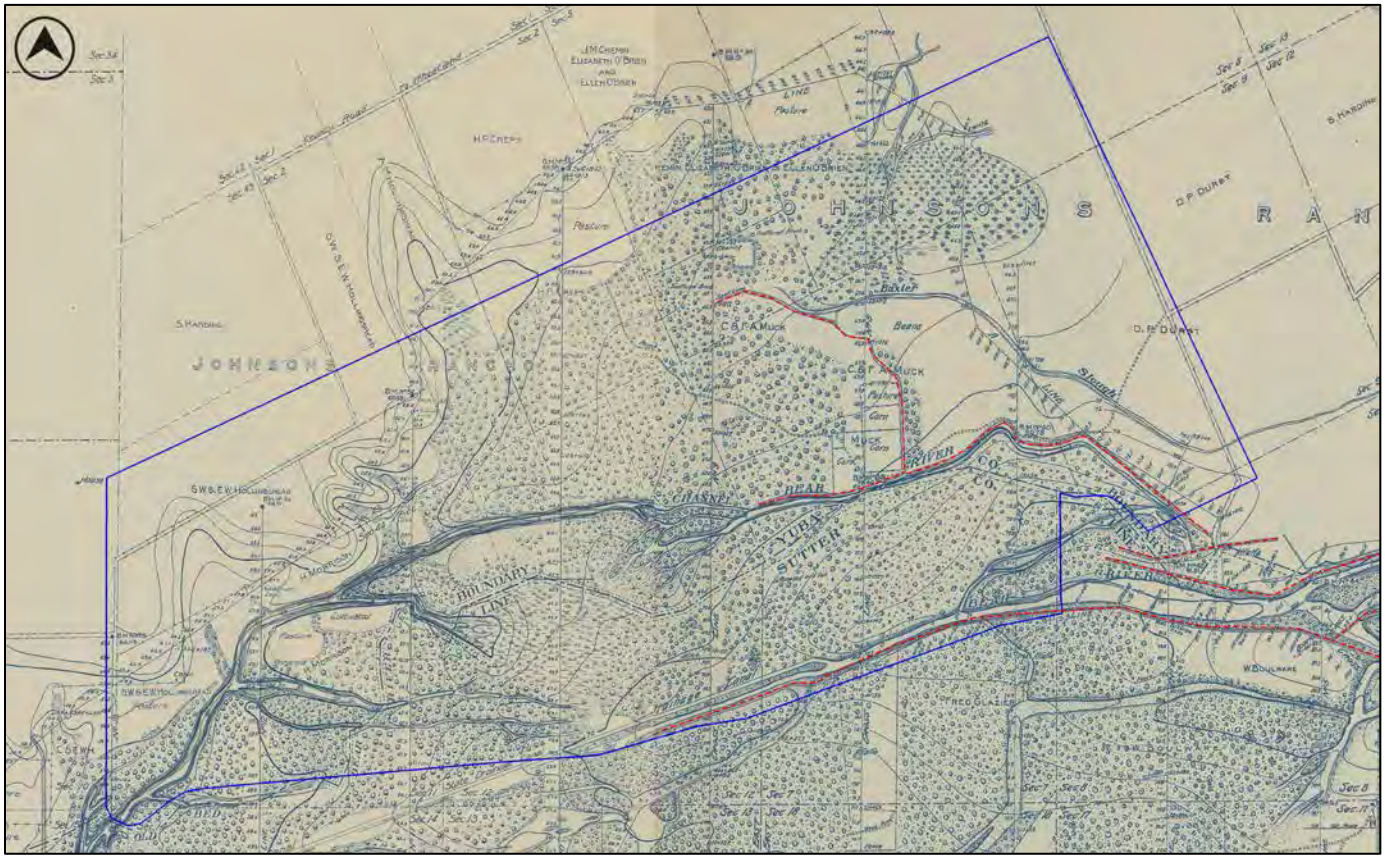


Plate 2. 1905 map of silted bottomlands of the Bear River, pre-RD 817 privately constructed levees highlighted as dashed lines and current boundary of RD 817 solid line (added by AECOM). Note minimal agriculture endeavors (Source: U.S. Army Corps of Engineers, U.S. Engineer Office, Sacramento, California 1905a and 1905b).

RD 817

Property owners in the Bear River section west of Wheatland and directors of the various districts along the river, held a meeting in late October 1910 and decided to join forces to build a levee system to protect and reclaim lands on the north bank of the Bear River as Reclamation District No. 817. The plan was to construct a five- to six-mile-long levee on the north side of the Bear River to connect to the levee already under construction by the Farm Investment Company, sometimes referred to as the Bull Levee after company president Cline Bull. Once completed, thousands of acres fertile river bottomlands would be reclaimed and opened up for settlement. The Natomas Consolidated Company was constructing their own levees on the south side of the Bear River to reclaim 60,000 acres in anticipation of subdividing the area for small farms (see Plate 3). The combined reclamation efforts on both sides of the Bear River were anticipated to be a boom for the town of Wheatland as hundreds of families were expected to settle in "one of the best fruit districts in California," (*Sacramento Union* 1910 Oct 30). The consensus at the meeting was that "this body of land has been permitted to remain in its present unclaimed condition for so many years is a problem… to solve by those who are now engaged in the work of reclamation," (*Sacramento Union* 1910 Oct 30).

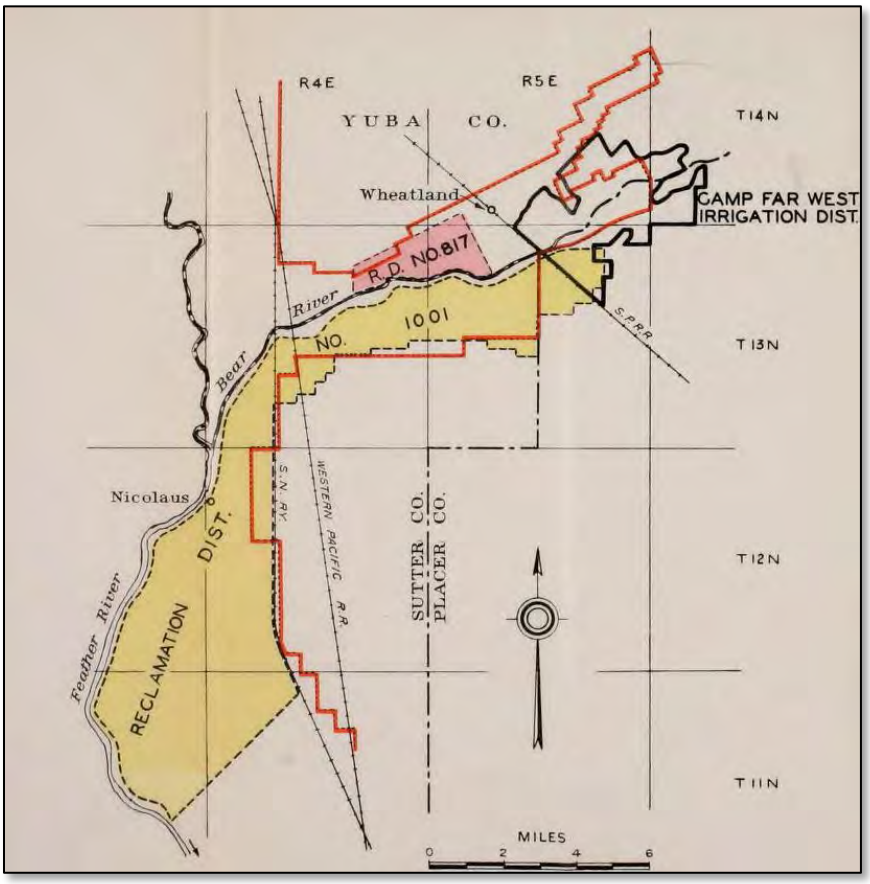


Plate 3. Reclamation District No. 817 and Reclamation District No. 10001, also known as the Natomas Consolidated Company, flanking the Bear River (Source: Bonte 1930, Plate XIII)

The Natomas Consolidated reclamation district began construction of their levees on the south side of the Bear River before RD 817. The Natomas Consolidated stared construction on their levee in winter 1910 and widened the based and increased the height in fall 1911 resulting in "one of the strongest levees in the state," (*Sacramento Union* 1911 Sep 29). Because the stream in the Bear River channel was scouring deeper over the last three years, the Natomas Consolidated was confident their levees would hold the Bear River even at its highest recorded water mark. In fall 1911, RD 817 was working on the north side of the river "putting up a levee of equal size and strength" as crews of surveyors were laying out plans and construction teams were throwing up the embankment and strengthening the work done the previous year. The goal was to complete the levee to the Western Pacific railroad bridge to join the existing levee built by the owners of the Ball tract. Once completed, the system of levees would reclaim thousands of acres of fertile farmland in Wheatland for subdivision as early as winter 1911. In anticipation of the upcoming real estate subdivisions, the economy of Wheatland was already seeing a boost (*Sacramento Union* 1911 Sep 29).

Representatives from the Farm Lands Investment Company, Natomas Consolidated Company, and RD 817 met again in summer 1911 to discuss their reclamation and drainage efforts for their own tracts in order to "work together for the benefit for all, rather than independently and to the injury of each other," (*Sacramento Bee* 1911 Jun 22). In September 1911, RD 817 landowners including the Durst Brothers, A.G. Oakley, M.F. Hollingsead, S.G. Russell, J.S. La Rue, Charley Sing, the Muck Brothers, and W.F. O'Brien of San Francisco held a meeting to complete the financial and construction arrangements to start construction of the levees that fall (*Sacramento Union* 1911 Sept 28).

As of November 1911, the Natomas Consolidated on the south side of the Bear River and RD 817 on the north side were rushing to complete their respective levees before the flood season. Directors of RD 817 hired additional men and horses from Chico to work on the levee until rain would halt their work. The Natomas Consolidated had six work camps on their south levee and was confident they would close the gap in the levee by the new year (*Sacramento Union* 1911 Nov 1).

In July 1912, work on the north bank Bear River levee was resumed and a drainage canal that was under consideration would be completed by the fall. A large portion of land within the reclamation district had been recently sold for subdivision, and the levee and canal work was to be rushed and was "good news to this section as it means a number of new settlers," (*Sacramento Union* 1912 July 11). Later that month, trustees of RD 817 approved to spend an additional $60,000 for anther levee and canal on the north side of the Bear River that was expected to be completed by November 1912 (*Sacramento Union* 1912 July 26). A.D. Cesson of Broderick, California was awarded a $20,000 contract to build three miles of levee on the north side of the Bear River. The construction of this section of the levee was to create a continuous levee to the Bull Levee on the Bear River (*Sacramento Union* 1912 Aug 23). Once completed, the lands below Wheatland that were "practically worthless except for timber," would be reclaimed (*Sacramento Bee* 1912 Sep 10). As of July 1913, five miles of the levee was completed and two additional miles were almost built to join the levee of the Natomas Consolidated to the west (*Sacramento Union* 1913 July 23).

During the ongoing construction of the RD 817 levee, in 1912 over 300 acres of new hops were planted in Yuba County, much of which was planted on newly reclaimed lands in RD 817, which was valued at $400 per acre. In comparison, other areas for good hop cultivation were valued at $200-300 per acre and the bottomlands in 1891 were previously valued at only $4 an acre (U.S. House of Representatives 1891: 116). Daniel P. Hurst began growing hops in Wheatland in 1883 and his sons Ralph and Murray continued the hop operation after their father's death. In 1906, Wheatland-grown hops were known worldwide for their quality and 34 boxcars of baled hops were purchased from a buyer from England. By the early 1910s, hops were the most important agricultural product in Yuba County, and Wheatland had "the largest individual hop fields in the world" covering approximately 580 acres (*Sacramento Union* 1912 Aug 11). The Durst Ranch, which spanned the south side of Wheatland long the north bank of the Bear River, is infamous for the Wheatland Hop Riot that occurred on August 3, 1913 in their ranch about one mile east of Wheatland. Approximately 4,000 migrant workers arrived in Wheatland for the annual hop harvest, far more than the 2,800 workers the Durst Brother advertised for. The International Workers of the World (IWW) sent representatives from Chicago to organize the hop pickers to protest against the abysmal living and working conditions on the Durst Ranch, and Ralph Durst responded to the list of grievances with their offer to improve working conditions; however, the gathered laborers at the ranch attempted to protect IWW representative Richard "Blackie" Ford from deputies who arrived during his speech rejecting the Durst Brother's offer to arrest him. A fight broke out, shots were fired and four people died, including two migrant workers, county district attorney E.T. Manwell, and Deputy Sheriff Eugene Reardon. Governor Hiram Johnson deployed National Guard troops to restore order in Wheatland. The event was one of the most well-known California labor events focused the plight of agricultural worker conditions in the state. The site of the Wheatland Hop Riot is memorialized as California Historical Landmark Number 1003 in the town of Wheatland at the corner of 6th and A streets (Wheatland Historical Society 2009:8-9, 91, 103: OHP 2020).

The anticipated hundreds of families that would move into RD 817 after the reclaimed lands were subdivided failed to come to fruition. Instead, the large landholders in the area acquired the reclaimed bottomlands and further increased their farming operations. The U.S. Census recorded 481 persons in Wheatland in 1910, and the town actually experienced a drop in population in 1920 to 435. The overall population gain in Yuba County from 1910 to 1920 was only approximate 300 persons, and the county did not see a large increase in population until the 1930 to 1940 decade. Agriculture continued to be the main economic force in the area in the 1930s and RD 817 was predominately planted with orchards with some alfalfa and grain crops. During Prohibition, fruit trees were planted between the hop trellises. After Prohibition ended, hops were no longer the major crop in the area and was replaced by fruit and nut orchards, specifically almonds and walnuts in the subsequent decades (see Plate 4). In the post-World War II-era, Wheatland's population did not surpass over 500 until 1950. (California Department of Finance 2012; Bonte 1930: 175; U.S. Army Corps of Engineers, U.S. Engineer Office, Sacramento, California. 1936a, 1936b, 1936c; Wheatland Historical Society 2009: 71).

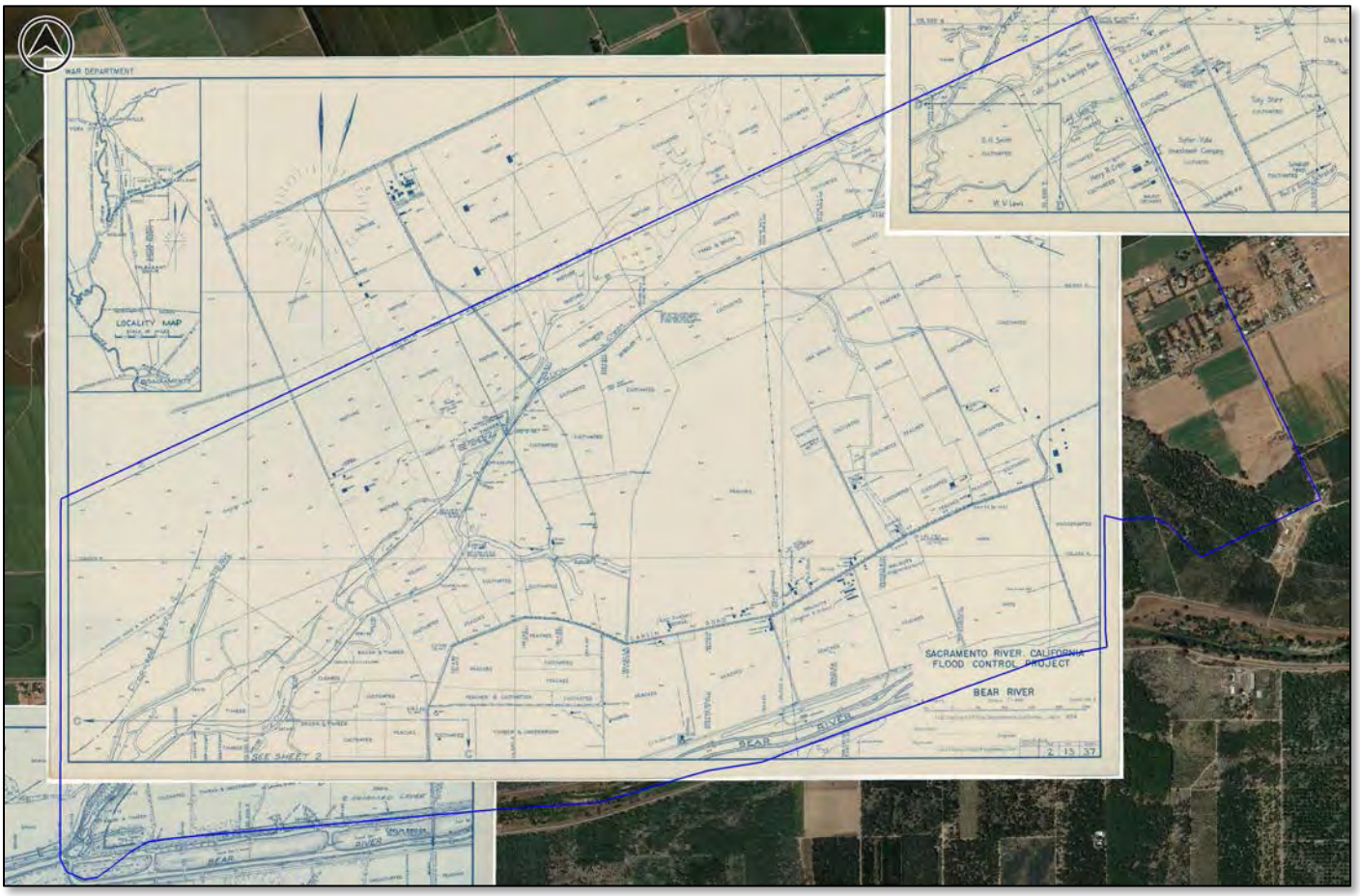


Plate 4. Composite of three 1936 maps of reclaimed bottomlands transformed into agriculture
(U.S. Army Corps of Engineers, U.S. Engineer Office, Sacramento, California. 1936a, 1936b, 1936c)

The Bear River Levee has required ongoing maintenance and upgrades over the years. In 1935, Fred Knoop of Live Oak was awarded a contract to repair two breaks in the levee west of Wheatland that occurred during highwater events in winter 1934 and flooded 2,000 acres of farmland (*Sacramento Bee* 1935 Sep 5). The following year, twenty miles of the Bear River levee system were improved with $310,000 worth of state and federal funds as part of a larger undertaking by the state reclamation board (*Sacramento Bee* 1936 Oct 3). Devastating floods in winter 1955 breached several levees along the Bear, Feather, and Yuba rivers. In 1957, the California Department of Water Resources declared the RD 817 Bear River levee was the worst rated in Yuba County and if they did not undertake improvements, the state would be required to do so and assess the landowners according for the cost (*Sacramento Bee* 1957 Feb 6). Other major flooding events have cause breaks in the Bear River levees and in 2006 a portion of older levee near the river and prone to erosion problems was removed and a new two-mile long setback Bear River Levee. At the time of construction, it was the biggest setback levee in the state (*Sacramento Bee* 2006 Nov 2). The levee patrol roads were repaired with funds provided in May 2018 for RD 817 and RD 784 (*Territorial Dispatch* 2018 May 17).

As of 2015, management of RD 817 is overseen by volunteers who maintain the levee system along the farms that are protected. The farmers provide labor, crews, and equipment and are reimbursed for labor costs. The area within RD 817 is projected for future residential growth; however, the City of Wheatland has restricted future use there because of the potential for future flooding(City of Wheatland 2015:18).

EVALUATION

NRHP A / CRHR 1

Within that context the levees in Yuba, Sutter, and Placer counties, the RD 817 Bear River Levee is not significant for association with early twentieth century reclamation (NRHP Criterion A/ NRHP Criterion 1). Compared with other levee systems, such as the massive and elaborate levee system constructed by the Natomas Consolidated Company (RD 1001) just south of the Bear River, the RD 817 Bear River Levee on the north bank did not support significant new agricultural and economic development in Wheatland as a result of the reclamation. When under the planning stage and under construction, the levee was anticipated to draw in hundreds of new settlers and their families to grow fruit orchards, hops, and other crops in the new reclaimed bottomlands along the north side of the Bear River. This did not occur, and the Wheatland area actually experienced a loss in population in the 1910 to 1920 decade. While the bottomland region was transformed into agricultural fields and orchards, it appears that large landholders in the area acquired the reclaimed lands and further expanded their farming operations. Although Wheatland continues as an agricultural growing region, it does not appear the RD 817 Bear River Levee is significant within that context.

NRHP B / CRHR 2

The RD 817 Bear River Levee is not associated with significant individuals (NRHP Criterion B/ CRHR Criterion 2). Multiple private individuals constructed the early levees along the north bank to protect their landholdings from flooding including members of the Durst Brothers and the Muck Brothers, who were also founding members of RD 817 along with A.G. Oakley, M.F. Hollingsead, S.G. Russell, J.S. La Rue, Charley Sing, and W.F. O'Brien of San Francisco. Prominent among them were the Durst Brothers whose farm on the east side of Wheatland was the site of the Wheatland Hop Riot in 1913. Involvement with levees was a minor part of their careers as farmers in the Wheatland area, and the hops grown on their properties were already well-known by the time the reclamation district was formed. A.D. Cesson of Broderick and Fred Knoop of Live Oak, who were hired to build and repair portions of the levees at different times, are not historically significant individuals.

NRHP C / CRHR 3

The RD 817 Bear River Levee does not embody distinctive characteristics of a type, period, or method of construction (NRHP Criterion C/ CRHR Criterion 3). It does not appear to be the work of a master. The levee was built using standard techniques and materials.

NRHP D / CRHR 4

In rare instances structures may yield historical information about historic construction materials and technologies not available through other sources (NRHP Criterion D/ CRHR Criterion 4). Levee construction materials and technology is well documented in other sources, and the RD 817 Bear River Levee is not significant in this regard.

Integrity

The RD 817 Bear River Levee was originally constructed between 1910-13, more than 100 years ago, and has been regularly repaired, enlarged, and modified. The levee has retained its original location, setting, feeling, and association as an early twentieth century levee for agricultural land reclamation; however, the design and workmanship have been minimally altered through ongoing maintenance and repair activities, including the levee road work. Although the RD 817 Bear River Levee generally retains historic integrity to its potential period of significance from 1910 when the reclamation district was incorporated to the completion of the levee in 1913, it does not meet any of the significance criteria necessary for eligibility for listing in either the NRHP or CRHR.

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APPENDIX E

Geoarchaeological Notes

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description. Location Bear Creek Levee Setback

Site No. TP1 Date 4/21/20 Time 10:30 Vegetation Former orchard - some non-native grasses

Elevation ________ Slope ________ Aspect ________ Geomorphic Surface Floodplain

Parent Material(s) ________ Described by ________

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet / Moist / Dry	Texture	pH	Clay films	Boundaries	notes
0-10	Ap	10YR 7/4 V. pale brown	**m** vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	**0** 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh (crossed out)	S SiCL **LS** SiL **SL** Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr (crossed out)	**a** s c w g i d b	V. thin plow zone indurated sand
10-80	C1	7.5YR 4/3 Brown	**m** vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	**0** 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh (crossed out)	S SiCL **LS** SiL **SL** Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr (crossed out)	**a** s c w g i d b	
80-300	C2	10YR 6/2 L. brownish gray	m vf gr **sg** f pl 1 m pr 2 c cpr 3 vc abk sbk	**0** 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh (crossed out)	**S** SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr (crossed out)	a s **c** w g i d b	White sand (Clean)
300-360	Cox	10YR 5/4 Yellowish Brown	**m** vf gr **sg** f pl 1 m pr 2 c cpr 3 vc abk sbk	**0** 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh (crossed out)	**S** SiCL LS SiL SL Si **SCL** SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr (crossed out)	a s c w g i d b (crossed out)	Increase in clay common ox But still v. sandy clay increase w/ depth
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	There is likely clay below ↳ Geotechs looking for this clay
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	There is mica in the Cox - shiny!
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Former orchard

7' wide, 11' long, 12' deep

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear River Levee Set back
Site No TP2 Date 4/21/20 Time 12:30 Vegetation Former orchard
Elevation ________ Slope — Aspect ________ Geomorphic Surface Floodplain
Parent Material(s) ________________ Described by Kat Kubal

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Boundaries	notes
0-20	Ap	10YR 7/4	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
20-70	C1	7.5YR 4/3	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
70-260	C2	10YR 6/2	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	Clean sands
260-320	Cox	10YR 5/4	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	Still v. sandy, but an increase in clay content At first the structure looks platey, but it doesn't hold its shape
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Same as TP1

7' x 10' x 10.5' (deep)

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear Creek Levee setback
Site No. TP3 Date 4/22/20 Time 1:30 Vegetation ____
Elevation ____ Slope ____ Aspect ____ Geomorphic Surface ____
Parent Material(s) ____ Described by ____

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Boundaries	notes
6-10	Ap	-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
16-300	C1	-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
300-420	C2	-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	No clayic layer
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Same as others

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear Creek Levee Setback
Site No. TP4 Date 4/22/20 Time 12:15 Vegetation orchard
Elevation ________ Slope ________ Aspect ________ Geomorphic Surface floodplain
Parent Material(s) ________ Described by Kat Kubal

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Boundaries	notes
0-10	Ap	10YR 7/4	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
10-70	C1	7.5YR 4/3	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
70-320	C2	10YR 6/2	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	Clean sands
320-420	Cox	10YR 5/4	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	increased clay
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Stopped at 13.5'

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description. Location Bear Creek Levee setback
Site No. TP5 Date 4/22/20 Time 9:40 Vegetation Orchard
Elevation ______ Slope — Aspect ______ Geomorphic Surface flood plain
Parent Material(s) ______ Described by Kat Kubal

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Bound-aries	notes
0-10	Ap	10YR 7/4	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
10-60	C1	7.5YR 4/3	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
60-330	C2	10YR 6/2	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	lens of clayier sand at ~100 cm - 10 cm thick Clean white sand
330-420	Coxw	10YR 5/4	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	Clean brown sand Correlates w/ Cox in T1 & T2, but less clay (almost none)
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Stopped at 14'

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear River Levee setback
Site No. TP6 Date 4/22/20 Time 8:30 Vegetation Orchard
Elevation ______ Slope —— Aspect ______ Geomorphic Surface Flood plain
Parent Material(s) ______ Described by ______

Depth (cm)	Horizon	Color (moist / dry)	Structure	Gravel %	Consistence: Wet	Consistence: Moist	Consistence: Dry	Texture	pH	Clay films	Boundaries	notes
0-10	Ap	10YR 7/4 / V. pale brown	**m** **sg** 1 2 3 vf f m c vc gr pl pr cpr abk sbk	**0** <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S **LS** SL SCL L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	a **c** g d s w i b	
10-30	C_1	7.5YR 4/3 / Brown	**m** **sg** 1 2 3 vf f m c vc gr pl pr cpr abk sbk	**0** <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S **LS** **SL** SCL L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	**a** c g d s w i b	loam Sand
30-240	C_2	10YR 6/2 / L. brownish gray	m **sg** 1 2 3 vf f m c vc gr pl pr cpr abk sbk	**0** <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	**S** LS SL SCL L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	**a** c g d s w i b	Clean sands w/Mica Faint ox
240-300	Cox	10YR 5/4 / Yellowish brown	**m** sg **1** 2 3 **vf** f m c vc gr pl pr cpr abk sbk	**0** <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	**S** LS SL **SCL** L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	a c **g** d s w i b	Not really platy structure b/c it falls apart, but does look platy when first removed
300-330	Coxw	10YR 5/4 / Yellowish brown	m **sg** 1 2 3 vf f m c vc gr pl pr cpr abk sbk	**0** <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	**S** LS SL **SCL** L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	a c g d s w i b	Increased Sand
			m sg 1 2 3 vf f m c vc gr pl pr cpr abk sbk	0 <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S LS SL SCL L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	a c g d s w i b	
			m sg 1 2 3 vf f m c vc gr pl pr cpr abk sbk	0 <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S LS SL SCL L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	a c g d s w i b	
			m sg 1 2 3 vf f m c vc gr pl pr cpr abk sbk	0 <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S LS SL SCL L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	a c g d s w i b	
			m sg 1 2 3 vf f m c vc gr pl pr cpr abk sbk	0 <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S LS SL SCL L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	a c g d s w i b	
			m sg 1 2 3 vf f m c vc gr pl pr cpr abk sbk	0 <10 10 25 50 75 >75	so ss s vs po ps p vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S LS SL SCL L CL SiCL SiL Si SiC C SC		v1 1 2 3 f d p pf po br co cobr	a c g d s w i b	

Same as TP1 & TP2 but clean sand in shallower

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear Creek Levee Borrow area 3
Site No. TP7 Date 4/20/20 Time 10:30 Vegetation walnut orchard
Elevation ________ Slope Ø Aspect ________ Geomorphic Surface alluvial
Parent Material(s) ________ Described by Kat Kubal

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet / Moist / Dry	Texture	pH	Clay films	Boundaries	notes
0-20	Ap	10YR 7/4 / V. pale brown	(m) vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 (<10) 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC (L) C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s (c) w g i d b	Plow Zone
20-90	A	7.5YR 3/3 / Dark brown	(m) vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 (<10) 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S (SiCL) LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i (d) b	organic-rich Few roots
90-150	CA	7.5YR 3/4 / Dark brown	(m) vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 (<10) 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC (L) C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	Slight color change less organics One smooth 2cm pebble in sidewall
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp / lo vfr fr fi vfi efi / lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

2' toothed bucket. Lots of irrigation, stopped at 5', Measured 11' long

Bud, Louie, Ed,

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description. Location Bear Creek Levee Borrow Area 3
Site No. TP8 Date 4/20/20 Time 12:30 Vegetation Walnut orchard
Elevation ______ Slope ——— Aspect ______ Geomorphic Surface flood plain
Parent Material(s) ______ Described by Kat Kubal

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Boundaries	notes
0-30	Ap	10YR 7/4. V. pale Brown	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	Plow Zone
30-110	A	7.5YR 3/3 D. Brown	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	Organic-rich surface soil
110-150	CA	7.5YR 3/4 D. Brown	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		-------------	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

The property superintendent said the orchard was first developed in 1916 for Hops
Irrigation was installed b/t 4' & 5' bgs — twice

Same as TP7 - slightly thicker plow zone young looking soil - Not compacted
12-foot long trench

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear River Levee Borrow Area 3
Site No. TP9 Date 4/21/20 Time 7:30 Vegetation orchard
Elevation ________ Slope — Aspect ________ Geomorphic Surface flood plain
Parent Material(s) ________ Described by Kat Kubal

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Boundaries	notes
0-25	Ap	10YR 7/4 V. Pale brown	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
25-150	AC	7.5YR 3/3 D. Brown	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Homogeneous, fairly organic soil
10' long, 6' wide, 5' deep

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description. Location Bear River Levee Borrow Area 3
Site No. TP10 Date 4/21/20 Time 8:30 Vegetation Orchard
Elevation ________ Slope ________ Aspect ________ Geomorphic Surface alluvial
Parent Material(s) ________________ Described by Kat Kubal

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Boundaries	notes
0-20	Ap	10YR 7/4	m	<10	(crossed out)	(crossed out)	(crossed out)	L		(crossed out)	c	
20-150	AC	7.5YR 3/3	m	<10	(crossed out)	(crossed out)	(crossed out)	L		(crossed out)	(crossed out)	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Homogeneous

11' long, 6.5' wide, 5' deep

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear Creek Buttress
Site No. TP18 Date 4/23/20 Time 8:30 Vegetation orchard
Elevation ________ Slope ________ Aspect ________ Geomorphic Surface floodplain
Parent Material(s) ________ Described by Kat Kilbarf

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Boundaries	notes
0-10	Ap	2.5Y 6/3 L. yellowish Brown	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
10-45	C1	2.5Y 6/3	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	Possibly the same as underlying but moist (plow zone?)
45-120	C2	10YR 6/2 L. Brownish Gray	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
			m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Same as setback area
Stopped at 4'
Landowner says everything's been disturbed to 4' or 5'

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear Creek Levee Buttress
Site No. TP19 Date 4/23/20 Time 10:00 Vegetation Orchard
Elevation ______ Slope ______ Aspect ______ Geomorphic Surface Flood plain
Parent Material(s) ______ Described by ______

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence: Wet	Consistence: Moist	Consistence: Dry	Texture	pH	Clay films	Bound-aries	notes
0-10	Ap	2.5Y 6/3	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
10-45	C1	2.5Y 6/3	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
45-120	C2	10YR 6/2	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

Table A-2.—Work sheet for recording soil properties in the field
[In the note column, one can record properties not universal to all soils. Courtesy of D. Jorgenson, 1989]

Soil Description: Location Bear Creek Levee Buttress
Site No. TP20 Date 4/23/20 Time 11:00 Vegetation orchard
Elevation ______ Slope — Aspect ______ Geomorphic Surface flood plain
Parent Material(s) ______ Described by Kat Kiibal

Depth (cm)	Horizon	Color moist / dry	Structure	Gravel %	Consistence Wet	Consistence Moist	Consistence Dry	Texture	pH	Clay films	Boundaries	notes
0-10	Ap	2.5Y 6/3	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
10-60	C1	2.5Y 6/3	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
60-120	C2	10YR 6/2	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	White sand
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	
		....	m vf gr sg f pl 1 m pr 2 c cpr 3 vc abk sbk	0 50 <10 75 10 >75 25	so po ss ps s p vs vp	lo vfr fr fi vfi efi	lo so sh h vh eh	S SiCL LS SiL SL Si SCL SiC L C CL SC		v1 f pf 1 po 2 d br 3 co p cobr	a s c w g i d b	

APPENDIX F

Geoarchaeological Photographs

Appendix B: Photographs

Geoarch_TP01

Geoarch_TP02

Geoarch_TP03

Appendix B: Photographs

Geoarch_TP04

Geoarch_TP05

Geoarch_TP06

Geoarch_TP07

Geoarch_TP08

Geoarch_TP09

Geoarch_TP10

RD817_TP18

RD817_TP19