KNIGHTS LANDING OUTFALL GATES PROJECT

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION, PROPOSED MITIGATED NEGATIVE DECLARATION, AND INITIAL STUDY

PREPARED FOR:

Reclamation District 108
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June 2015

ICF International. 2015. *Knights Landing Outfall Gates Project, Notice of Intent to Adopt a Mitigated Negative Declaration, Proposed Mitigated Negative Declaration, and Initial Study*. June. (ICF 00315.15.) Sacramento, CA. Prepared for: Reclamation District 108, Grimes, CA.

Notice of Intent to Adopt a Mitigated Negative Declaration for the Knights Landing Outfall Gates Project

Reclamation District (RD 108), acting as the California Environmental Quality Act (CEQA) lead agency, has made available for public review and comment an Initial Study and proposed Mitigated Negative Declaration for the Knights Landing Outfall Gates (KLOG) Project.

The proposed project consists of constructing a positive fish barrier on the downstream side of the existing KLOG structure to prevent adult salmon entry into the Colusa Basin Drain (CBD), as well as repairing an erosion site on the right bank of the CBD on the downstream side of the KLOG structure. The KLOG structure is located on the CBD, approximately one-quarter mile from its confluence with the Sacramento River near the community of Knights Landing, just below River Mile 90, in Yolo County. The KLOG structure is a gated concrete buttress that spans the CBD and protects the lower Colusa Basin from backwater flooding from the Sacramento River and controls water levels in the CBD for irrigation and drainage purposes. Flows coming through the KLOG gates may have the potential to attract salmon when water level differentials between the upstream and downstream sides of the gates are such that downstream flows are attractive to migrating salmonids but not at a velocity that is too great for their passage. While the extent of upstream fish passage at the KLOG has not been fully evaluated, RD 108 has decided to construct the barrier as a more immediate and cost-effective option for aiding anadromous fish populations. The barrier would consist of new concrete wingwalls and picket weirs that would be constructed on an existing concrete apron. The picket weirs would be raised and lowered remotely to prevent adult salmonids from passing through the KLOG.

The erosion site repair would address erosion occurring at the base of the right bank of the CBD, which is a Sacramento River Flood Control Project levee. The erosion site is near the base of the bank, which is bare soil with some scattered fallen trees, and the erosion was caused by a hydraulic eddy effect created by certain flow conditions. The repair would consist of placing riprap along 100 linear feet of the bank and restoring the levee design conditions with a slope between 2.5:1 and 3:1. Rock placement would extend approximately 30 feet up the bank.

Construction of the proposed project would occur over 6 weeks in the late summer/early fall of 2015. No known hazardous waste sites exist in the project area.

The Knights Landing Outfall Gates Project Initial Study and proposed Mitigated Negative Declaration (IS/MND) is available for review from June 2, 2015, to July 2, 2015, and may be viewed at the following locations:

- RD 108: 975 Wilson Bend Road, Grimes, CA 95950
- online at www.rd108.org/klog.

Lead Agency Contact: Questions, comments, or requests for digital or physical copies may be directed to **Mr. Gregg Ellis** by email at **Gregg.Ellis@icfi.com**, at ICF International, 630 K Street, Suite 400, Sacramento, CA 95814, or at **(916) 737-3000**.

Proposed Mitigated Negative Declaration
Knights Landing Outfall Gates Project

Reclamation 108 (RD 108), acting as the California Environmental Quality Act (CEQA) lead agency and project proponent, has reviewed the proposed project described below to determine whether substantial evidence supports a finding that project implementation could have a significant effect on the environment. “Significant effect on the environment” means a substantial, or potentially substantial, adverse change in the any of the physical conditions within the area affected by the project, including land use, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

Name of Project: Knights Landing Outfall Gates Project

Project Location: The project area is located on the downstream side of the Knights Landing Outfall Gates (KLOG) structure, which is located on the Colusa Basin Drain (CBD), approximately one-quarter mile from its confluence with the Sacramento River near the community of Knights Landing, just below River Mile 90, in Yolo County. The project area is adjacent to County Road 108, which runs along the top of the left bank of the CBD.

Project Description: The proposed project consists of constructing a positive fish barrier on the downstream side of the existing KLOG structure to prevent adult salmon entry into the CBD, as well as repairing an erosion site on the right bank of the CBD on the downstream side of the KLOG structure. The KLOG structure is a gated concrete buttress that spans the CBD and protects the lower Colusa Basin from backwater flooding from the Sacramento River and controls water levels in the CBD for irrigation and drainage purposes. Flows coming through the KLOG gates may have the potential to attract salmon when water level differentials between the upstream and downstream sides of the gates are such that downstream flows are attractive to migrating salmonids but not at a velocity that is too great for their passage. While the extent of upstream fish passage at the KLOG has not been fully evaluated, RD 108 has decided to construct the barrier as a more immediate and cost-effective option for aiding anadromous fish populations. The barrier would consist of new concrete wingwalls and picket weirs that would be constructed on an existing concrete apron. The picket weirs would be raised and lowered remotely to prevent adult salmonids from passing through the KLOG.

The erosion site repair would address erosion occurring at the base of the right bank of the CBD, which is a Sacramento River Flood Control Project levee. The erosion site is near the base of the bank, which is bare soil with some scattered fallen trees, and the erosion was caused by a hydraulic eddy effect created by certain flow conditions. The repair would consist of placing riprap along 100 linear feet of the bank and restoring the levee design conditions with a slope between 2.5:1 and 3:1. Rock placement would extend approximately 30 feet up the bank.

Construction of the proposed project would occur over 6 weeks in the late summer/early fall of 2015. No known hazardous waste sites exist in the project area.

Findings: The attached Initial Study identifies one or more potentially significant effects on the environment. After consideration of the analysis contained in the Initial Study, RD 108 finds the

proposed project described above will not have a significant effect on the environment following implementation of mitigation measures described therein and listed below.

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
3.3 HYDROLOGY AND WATER QUALITY			
Impact WQ-1: Introduction of Pollutants to Surface Waters	Significant	Less than significant	Mitigation Measure WQ-MM-1: Implement a Spill Prevention, Control, and Countermeasure Plan Mitigation Measure WQ-MM-2: Implementation of Construction Best Management Practices
3.4 BIOLOGICAL RESOURCES			
Impact BIO-1: Loss of Foraging and Nesting Habitat for Swainson's Hawk and other Migratory Birds and Raptors	Significant	Less than significant	Mitigation Measure BIO-MM-1: Avoid Disturbance of Tree-, Shrub, and Ground-Nesting Special-Status and Non-Special-Status Migratory Birds and Raptors and Conduct Preconstruction Nesting Bird Surveys Mitigation Measure BIO-MM-2: Conduct Mandatory Biological Resources Awareness Training for All Project Personnel and Implement General Protection Measures
Impact BIO-2: Disturbance or Loss of Giant Garter Snakes and Western Pond Turtles and Their Habitat	Significant	Less than significant	Mitigation Measure BIO-MM-3: Conduct Preconstruction Surveys and Monitoring for Giant Garter Snake and Other Sensitive Biological Resources Mitigation Measure BIO-MM-4: Install and Maintain Exclusion and Construction Barrier Fencing around Suitable Giant Garter Snake Habitat and Other Sensitive Biological Resources Mitigation Measure BIO-MM-5: Conduct Construction Activities during the Active Period for Giant Garter Snake Mitigation Measure BIO-MM-6: Minimize Potential Impacts on Giant Garter Snake Habitat Mitigation Measure BIO-MM-7: Implement Additional Protective Measures for Work that Would Occur in Suitable Habitat and during the Giant Garter Snake Dormant Period Mitigation Measure WQ-MM-2: Implementation of Construction Best Management Practices
Impact BIO-3: Disturbance of Special-Status Fish Species and Their Habitat	Significant	Less than significant	Mitigation Measure BIO-MM-2: Conduct Mandatory Biological Resources Awareness Training for All Project Personnel and Implement General Protection Measures Mitigation Measure WQ-MM-2: Implementation of Construction Best Management Practices

Effect	CEQA Finding	Finding with Mitigation	Mitigation Measure
Impact BIO-4: Exposure of Aquatic Organisms to Contaminants	Significant	Less than significant	Mitigation Measure WQ-MM-1: Implement a Spill Prevention, Control, and Countermeasure Plan
Impact BIO-5: Loss of Riparian Habitat	Significant	Less than significant	Mitigation Measure BIO-MM-2: Conduct Mandatory Biological Resources Awareness Training for All Project Personnel and Implement General Protection Measures Mitigation Measure BIO-MM-3: Conduct Preconstruction Surveys and Monitoring for Giant Garter Snake and Other Sensitive Biological Resources Mitigation Measure BIO-MM-4: Install and Maintain Exclusion and Construction Barrier Fencing around Suitable Giant Garter Snake Habitat and Other Sensitive Biological Resources Mitigation Measure BIO-MM-8: Compensate for Loss of Riparian Habitat
Impact BIO-6: Loss of Waters of the United States	Significant	Less than significant	Mitigation Measure BIO-MM-2: Conduct Mandatory Biological Resources Awareness Training for All Project Personnel and Implement General Protection Measures Mitigation Measure BIO-MM-9. Minimize Loss of Perennial Drainage Mitigation Measure WQ-MM-1: Implement a Spill Prevention, Control, and Countermeasure Plan
3.7 NOISE			
Impact NOI-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise	Significant	Less than significant	Mitigation Measure NOI-MM-1: Minimize noises from construction
3.8 CULTURAL RESOURCES			
Impact CUL-1: Change in the Significance of a Unique Archaeological Resource	Significant	Less than significant	Mitigation Measure CUL-MM-1: Implement Measures to Protect Known Archaeological Resources Mitigation Measure CUL-MM-2: Conduct Mandatory Cultural Resources Awareness Training for All Project Personnel Mitigation Measure CUL-MM-3: Implement Measures to Protect Previously Unidentified Cultural Resources
Impact CUL-2: Disturbance of Human Remains			Mitigation Measure CUL-MM-4: Implement Measures if Construction Activities Inadvertently Discover or Disturb Human Remains
3.9 HAZARDS AND HAZARDOUS MATERIALS			
Impact HAZ-1: Incidental release of hazardous materials during construction	Significant	Less than significant	Mitigation Measure WQ-MM-1: Implement a Spill Prevention, Control, and Countermeasure Plan

Public Review Period: The Knights Landing Outfall Gates Project Initial Study and proposed Mitigated Negative Declaration (IS/MND) is available for review and comment from June 2, 2015, to July 2, 2015. No later than **July 2, 2015**, any person may:

1) Review the IS/MND; and

2) Submit written comments regarding the information, analysis, and mitigation measures in the IS/MND by mail or email.

The IS/MND may be viewed at the following locations:

- RD 108: 975 Wilson Bend Road, Grimes, CA 95950

- online at www.rd108.org/klog.

Lead Agency Contact: Questions, comments, or requests for digital or physical copies may be directed to **Mr. Gregg Ellis** by email at **Gregg.Ellis@icfi.com**, at ICF International, 630 K Street, Suite 400, Sacramento, CA 95814, or at **(916) 737-3000**.

Name: _____

Title: _____

Signed: _____

Circulated on: June 2, 2015 _____

Adopted on: _____ _____

KNIGHTS LANDING OUTFALL GATES PROJECT
INITIAL STUDY

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Acronyms and Abbreviations

2012 Plan	Northern Sacramento Valley Planning Area 2012 Triennial Air Quality Attainment Plan
AB	Assembly Bill
af	acre-feet
ARB	California Air Resources Board
asl	above mean sea level
B.P.	before present
Basin Plan	Water Quality Control Plan for the Sacramento River and San Joaquin River Basins
Basin Plans	Water Quality Control Plans
BMPs	Best Management Practices
CAA	federal Clean Air Act
CAAQS	California ambient air quality standards
California CAA	California Clean Air Act
CAP	climate action plan
CBD	Colusa Basin Drain
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDP	census-designated place
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CH_4	methane
CHRIS	California Historical Resources Information System
CHSC	California Health and Safety Code
CNDDB	California Natural Diversity Database
CNEL	Community noise equivalent level
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society's
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
CR	County Road
CRHR	California Register of Historical Resources
CSLC	California State Lands Commission
CVFPB	California Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CWA	Clean Water Act
dB	Decibel

dBA	A-Weighted Decibel
dbh	diameter at breast height
DPM	diesel particulate matter
DPR	California Department of Parks and Recreation
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
ft	feet
GHG	greenhouse gas
GWP	global warming potential
HCP	habitat conservation plan
HFC	hydrofluorocarbons
HUC	Hydrologic Unit Code
ILF	in-lieu fee
IPCC	Intergovernmental Panel on Climate Change
JPA	Yolo County Habitat Conservation Joint Powers Agency
KLOG	Knights Landing Outfall Gates
L_{dn}	Day-Night Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Levels
LOS	level of service
L_{xx}	Percentile-Exceeded Sound Level
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
Mitigation Agreement	Agreement Regarding Mitigation for Impacts to Swainson's Hawk Foraging Habitat in Yolo County
MLD	Most Likely Descendant
N_2O	nitrous oxide
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NAT	no action taken

NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service's
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_X	nitrogen oxides
NTU	Nephelometric Turbidity Unit
NWIC	Northwest Information Center
OHWM	ordinary high water mark
PFCs	perfluorinated carbons
PM	particulate matter
PM10	PM less than or equal to 10 microns in diameter
PM2.5	PM less than or equal to 2.5 microns in diameter
ppm	parts per million
PRC	Public Resources Code
RD 108	Reclamation District 108
Regional Water Board	Central Valley Regional Water Quality Control Board
ROG	reactive organic gases
RSP	rock slope protection
SF_6	sulfur hexafluoride
SFNA	Sacramento Federal Nonattaiment Area
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SPCCP	spill prevention, control, and counter-measure plan
SR	State Route
SRBPP	Sacramento River Bank Protection Project
SRFCP	Sacramento River Flood Control Project
Superfund	Comprehensive Environmental Response, Compensation, and Liability Act
SVAB	Sacramento Valley Air Basin
SWAMP	Surface Water Quality Ambient Monitoring Program
TDS	Total dissolved solids
TMDL	total maximum daily load
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USED	United States Engineering Datum
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

WRDA	Water Resources Development Act
YCCL	Yolo County Central Landfill
YSAQMD	Yolo-Solano Air Quality Management District

Chapter 1
Introduction

1.1 Project Purpose

Reclamation District 108 (RD 108) is proposing to construct a positive fish barrier on the downstream side of the existing Knights Landing Outfall Gates (KLOG) in the Colusa Basin Drain (CBD), as well as place a small amount of riprap on the right bank of the CBD immediately downstream of the KLOG (proposed project). Currently, adult salmon may be able to enter the CBD through the KLOG when certain flow velocities are met that attract migrating salmon. Once salmon enter the CBD, there is no upstream route for salmon to return to the Sacramento River and the fish perish and are lost from production. Construction of the barrier on the downstream side of the KLOG would have the primary purpose of preventing salmon entry into the CBD while maintaining outflows. A secondary purpose for implementing the proposed project is to address an existing erosion site on the right bank of the channel, immediately downstream of the KLOG structure. The erosion site has formed as a result of water eddying after it passes through the gates, which has scoured the soil out from between the KLOG foundation and the right bank. The proposed project would include repairs to the site that would prevent erosion of the structure foundation and further erosion of the bank, which is a federal project levee.

1.2 Document Purpose and Use

This initial study was prepared in accordance with Article 5, Section 15060 et seq. of the California Environmental Quality Act (CEQA) Guidelines (California Code of Regulations [CCR], Title 14, Division 6, Chapter 3). This initial study describes the existing environmental resources in the project area, evaluates the environmental impacts of the proposed project on these resources, and identifies mitigation measures to avoid or reduce any potentially significant impacts to a less-than-significant level.

The CEQA Lead Agency, RD 108, will consider the findings of this initial study in determining whether preparation of an environmental impact report (EIR) is necessary prior to implementation of the proposed project. The initial study will also be used by multiple responsible, trustee, and cooperating agencies, including the California Department of Fish and Wildlife (CDFW), the Central Valley Regional Water Quality Control Board (Regional Water Board), California State Lands Commission (CSLC), and California Central Valley Flood Protection Board (CVFPB), in taking action under CEQA and other regulatory schemes to authorize implementation of the proposed fish barrier and erosion site repairs.

1.3 Project Area and Setting

The KLOG is located on the CBD, approximately one-quarter mile from its confluence with the Sacramento River near the community of Knights Landing, just below River Mile 90, in Yolo County (Figure 1-1). The CBD in the project area is approximately 100 feet wide, at low water, and drains in

a northeasterly direction, and the banks on each side of the KLOG are Sacramento River Flood Control Project (SRFCP) levees. The CBD collects all drainage from the Colusa Basin watershed, which spans areas of Glenn and Yolo Counties. The watershed extends from the Stony Creek watershed in the north to the Cache Creek watershed to the south, and from the Sacramento River in the east to the foothills of the inner Coast Ranges to the west, and covers over one million acres (Colusa County Resources Conservation District 2012). In addition to providing drainage for the Colusa Basin, the KLOG structure also serves to maintain Colusa Basin Drain water elevations for irrigation use in the surrounding agricultural lands. A section of Knights Landing that is designated as a low density residential area is located immediately on the land side of the right bank levee, and land designated for agricultural use is located on the land side of the left bank levee. The CBD at the site of the proposed project is a non-navigable waterway, as there are wooden piles that prevent access approximately 700 feet downstream of the KLOG.

The KLOG structure is managed by the California Department of Water Resources (DWR). The structure was originally constructed by local interests in the early twentieth century, but has been modified twice since then. The existing structure has an 84-foot-wide concrete slab apron with a 6-foot-high wing wall on each side. The structure has a concrete buttress with eight 66-inch and two 42-inch screw-operated slide gates on the Colusa Drain side, and eight 66-inch and two 42-inch combination flap and slide gates on the Sacramento River side. The purpose of the KLOG structure is to protect the lower Colusa Basin from backwater flooding from the Sacramento River and to control water levels in the CBD for irrigation and drainage purposes. Flow calculations at the KLOG are based on flow conditions caused by the gate and flap gate settings of each gate relative to the head difference of the stage of the gage on the CBD upstream of the gates and that of the Sacramento River at Knights Landing gage downstream of the gates.

In 2012, DWR rehabilitated the KLOG structure to replace all gate flaps, seals, and assemblies. Additionally, among other new features, outdated motor controllers and nonfunctional water level sensors were replaced. The new control system provides greater flexibility in the operation of the gates to protect CBD from the backwater effect of the Sacramento River and maintain the necessary water pool elevation on the CBD side for irrigation. During the 1970s, the California Department of Fish and Game (now CDFW), constructed an electric barrier to prevent salmon entry at KLOG. However, the electric barrier was damaged and never repaired or replaced, and no physical or behavioral fish barrier has been installed since.

1.4 Project Background

Historically, adult salmon have been able to enter the CBD through two routes. The first route is through migrating up Cache Slough into the Yolo Bypass and through the Ridge Cut on the northwestern side of the Yolo Bypass when flows are present. This route of entry is being addressed through other means. The proposed project focuses on the migration through the KLOG under certain flow conditions. Once migrating salmon enter the CBD through the KLOG, there is no upstream route for salmon to return to the Sacramento River. The mechanism for salmon entry into the CBD at the KLOG may occur when water velocity is sufficient to attract the fish but low enough for the fish to overcome when migrating upstream. Factors affecting the ability of salmon to pass through the KLOG include CBD outflow and stage, gate openings, and Sacramento River stage.

Experience at the Red Bluff Diversion Dam and the Tehama-Colusa Fish Facilities has shown that adult salmon readily swim through flows from hydraulic control structures when the hydraulic head

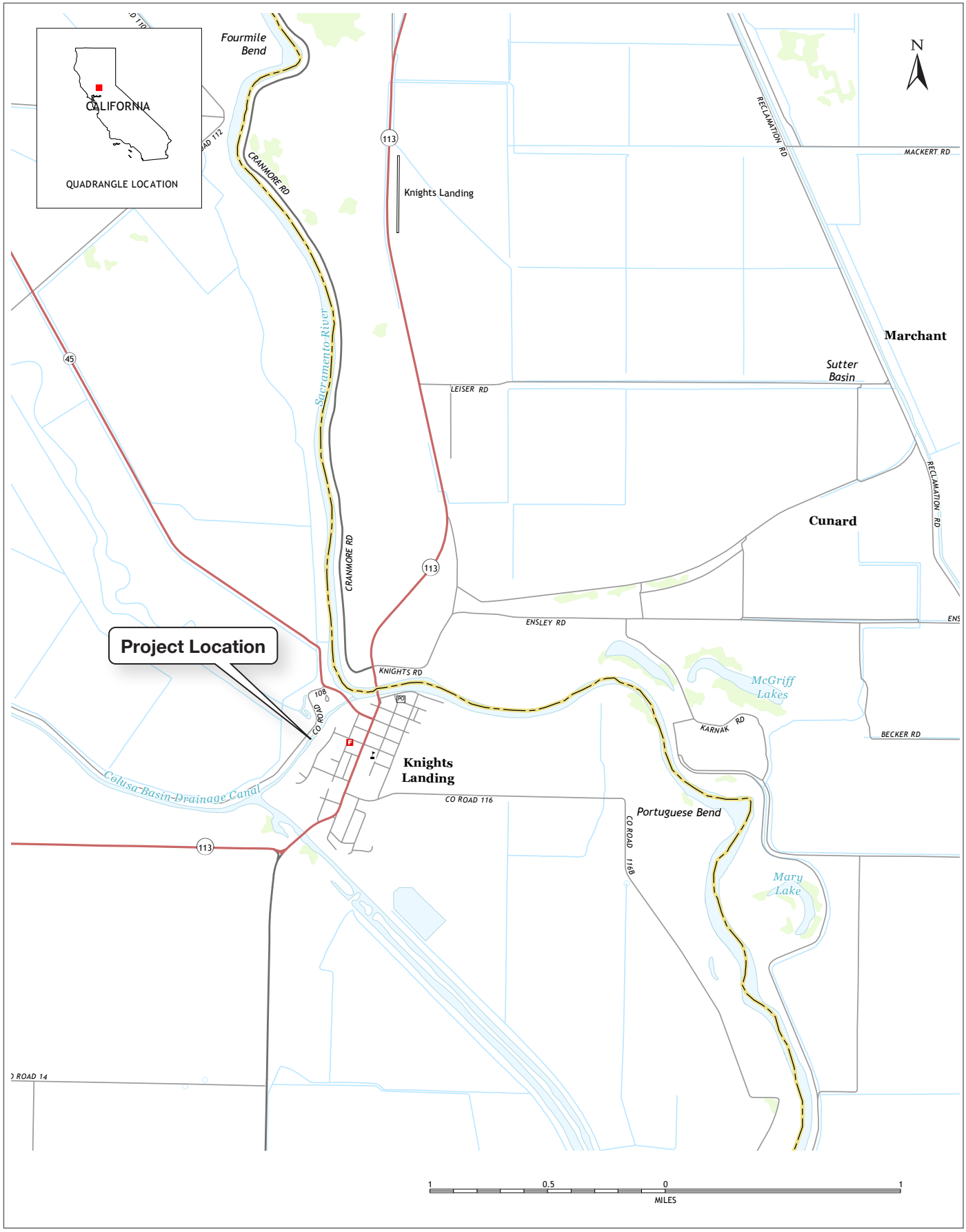

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Figure 1-1
Project Location

differential between the upstream and downstream water bodies is less than about 4 feet (Vogel et al. 1988, U.S. Fish and Wildlife Service 1990). During most periods of the year, adult salmon cannot pass through the KLOG, primarily due to very high water velocities through the gates when the head exceeds 4 feet. Probable conditions for fish passage through the KLOG occur when with the differential between the water surface elevations in the CBD and the Sacramento River is less than 4 feet (with upstream elevations as the higher elevation), one or more gates are open at least 1 foot, and the KLOG gate orifices are submerged at least 1 foot from backwater influence of the Sacramento River (19 feet elevation, USED datum).

1.5 Regulatory Compliance

In implementing the proposed project, RD 108 would seek all necessary permissions, authorizations, concurrences and permits to comply with the following regulatory schemes, as relevant.

- National Environmental Policy Act
- Section 14 of the Rivers and Harbors Appropriation Act (Section 408)
- California Code of Regulations, Title 23, Waters. Division 1
- Clean Water Act Sections 404 and 401
- California Fish and Game Code Section 1602
- National Historic Preservation Act Section 106
- Federal Endangered Species Act
- California Endangered Species Act
- Porter-Cologne Water Quality Control Act
- Federal Clean Air Act
- California Clean Air Act

A lease from the California State Lands Commission is not required, as CSLC has determined that the project area is not within their jurisdiction, per a letter sent on May 13, 2015 (Appendix A).

1.6 Document Organization

This document is organized as follows.

- Chapter 1, *Introduction*, describes the project background, elements, purpose, and regulatory compliance.
- Chapter 2, *Project Description*, describes the project area.
- Chapter 3, *Environmental Setting and Impacts*, describes the environmental resources present in the project area, and analyzes the proposed project's potential to affect such resources.
- Chapter 4, C*umulative Impacts*, discusses the potential for the proposed project's incremental effect to be cumulatively considerable when combined with other projects causing related impacts.

- Chapter 5, *References*, provides a list of all printed references and personal communications used to prepare the initial study.
- Chapter 6, *List of Preparers*, presents a list of all personnel who assisted in the preparation of this document.
- Appendix A, *CSLC letter*, provides statement that CSLC does not require a lease for the proposed project.
- Appendix B, *Environmental Checklist*, contains the Environmental Checklist Form, CEQA Guidelines Appendix G.
- Appendix C, *California Native Plant Society's (CNPS) Inventory Search*, provides a list of rare and endangered plants with potential to occur near the project area.
- Appendix D, *California Natural Diversity Database (CNDDB) Results*, provides the results of the CNDDB search.
- Appendix E, *U.S. Fish and Wildlife (USFWS) Species*, provides a list of endangered, threatened, and proposed species that have the potential to occur near the project area.
- Appendix F, *Modeling Assumptions and Calculations,* provides the assumptions and calculations made for the air quality analysis.

Chapter 2
Project Description

2.1 Introduction

This chapter describes the proposed project, which consists of constructing a positive fish barrier on the downstream side of the existing KLOG structure to prevent adult salmon entry into the CBD. Flows coming through the KLOG gates may have the potential to attract salmon when water level differentials between the upstream and downstream sides of the gates are such that downstream flows are attractive to migrating salmonids but not at a velocity that is too great for their passage. While the extent of upstream fish passage at the KLOG has not been fully evaluated, RD 108 has decided to construct the barrier as a more immediate and cost-effective option for aiding anadromous fish populations.

2.2 Description of Proposed Project

This section includes a discussion of features and construction details, including project features, construction methods and activities, site access and staging, equipment and personnel, schedule, and operation and maintenance for the proposed project. The project area includes the area in which the barrier would be constructed, the erosion site repairs, staging areas, and site access (Figure 2-1).

2.2.1 Project Features

The proposed project consists of the construction of new concrete wing walls, installation of a metal picket weir, installation of rock slope protection, and the removal of vegetation for construction access purposes (Figure 2-2). All project features would be constructed on the downstream side of the KLOG structure. The concrete wing walls and metal picket weir would be constructed on the existing concrete apron, and the metal picket weir would be designed to prevent salmon from entering into the gates at the KLOG.

2.2.2 Construction Methods and Activities

2.2.2.1 Mobilization

The contractor would notify the adjacent property owners at least 30 days in advance of construction activities. Chain-link fencing would be set up to establish the limits of construction to the extent feasible. Site access, staging areas, and environmental controls, as described in Section 2.2.3, *Site Access and Staging*, and Section 2.2.7, *Environmental Commitments*, would be installed. In order to dewater the site, all gates on the structure would be closed, and a temporary water barrier would be installed on the downstream edge of the concrete apron in order to dewater the construction site. Any remaining water would be pumped downstream out of the construction site, and all structure gates would remain closed to keep the site dry through the construction period. All gates on the KLOG structure would be closed during construction to help keep the site dewatered,

and water in the CBD would flow into the Knights Landing Ridge Cut, which is approximately 2,000 feet upstream of the project site. Signage notifying the public of construction activities and temporary pedestrian access closure would be displayed on the land side of both levees. Road 108, which runs along the top of the left bank levee, would be closed between State Route (SR) 45 and Road 112 during construction.

2.2.2.2 Erosion Repair

Prior to the construction of the new wing walls and picket weirs, an existing erosion site immediately downstream of the KLOG on the right bank of the channel would be repaired (Figure 2-2). The erosion site is approximately 100 feet long, extends approximately 30 feet up the bank from the levee toe, and has started to undercut the right bank. The erosion site is bare of vegetation, but above the erosion area are several trees that would be at risk of collapse if the erosion continues. Several dead trees that have been undercut by the erosion site and have fallen would be removed prior to placement of riprap, and one live tree would be removed to provide equipment access. Repair would consist of placing approximately 500 cubic yards of clean rock slope protection by crane using a clamshell, which would return the bank to levee design conditions with a slope between 2.5:1and 3:1. The crane would be positioned on the concrete platform located in the staging area on the right bank of the waterway and adjacent to the KLOG structure (Figure 2-2). Alternatively, the rock may be placed using a long reach excavator from the top of the right bank. Material would be placed directly onto the erosion site, and a bobcat would be used to reposition rock as necessary. Silt fencing/curtains would be set up around the extent of the in-water work area to prevent any sediment that may be disturbed and suspended during construction from increasing turbidity in the CBD and the Sacramento River. The toe of the silt fencing would be trenched so that the downslope face of the trench is flat and perpendicular to the line of flow. The fencing would be inspected daily and repaired as needed, with accumulated silt being removed when it reaches a depth of 6 inches. The erosion site repair would be the only portion of the proposed project that involves the permanent placement of fill material within the natural substrate of the CBD.

2.2.2.3 Barrier Construction

Once the barrier construction site is dewatered and dry, the existing concrete sill immediately downstream of the gates would be removed to the edge of the existing wing walls using a jackhammer to accommodate the five new concrete wingwalls that would house the picket weirs (Figure 2-3). The new wing walls would be approximately 37 feet long (including the existing wingwalls), 14 feet high, and 14 inches thick, and there would be approximately 16 feet between each wall. The new wing walls would be constructed so that they incorporate the existing wing walls. The new wing walls would be formed and constructed in place on the existing dewatered apron slab. Rebar would be dowelled into the existing apron slab and encapsulated by the new wing walls. A total of five 14-inch-thick walls would be built, creating four individual channels extending out from the KLOG structure, with two flap gates draining into each of the four channels (Figure 2-4). As there are two gates in each channel, an existing gate wingwall would remain in the middle of each new channel. The new wingwalls would extend toward the downstream edge of the larger concrete apron, stopping 3 feet short of the end of the slab. This 3-foot-wide section would allow workers to walk between the wing walls and the edge of the slab for future routine maintenance during low-flow conditions. This space would also accommodate the dewatering structure for construction. The existing catwalk would be removed in order to accommodate the new wingwalls, and a new catwalk would be installed approximately 2 feet higher than the existing one.

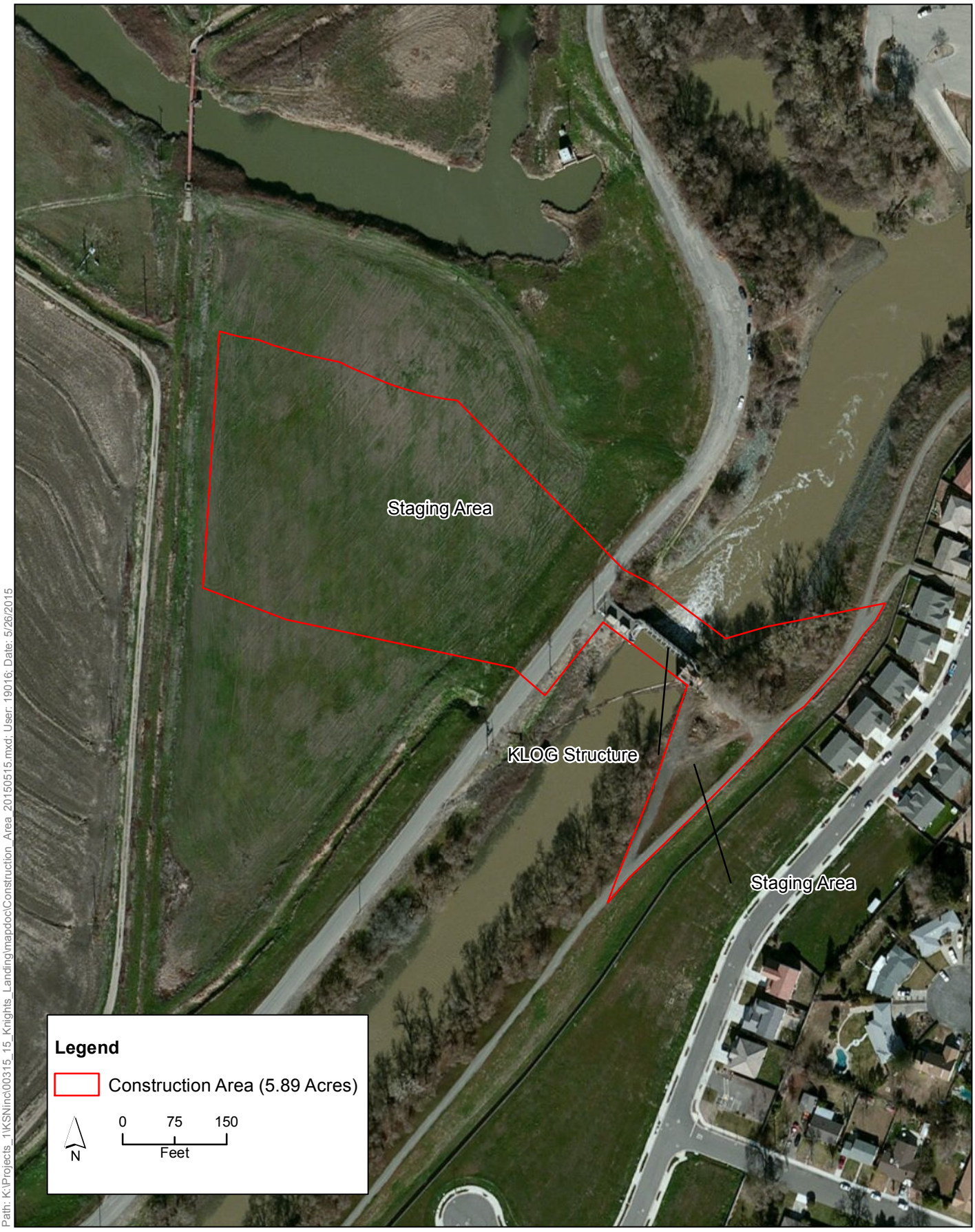

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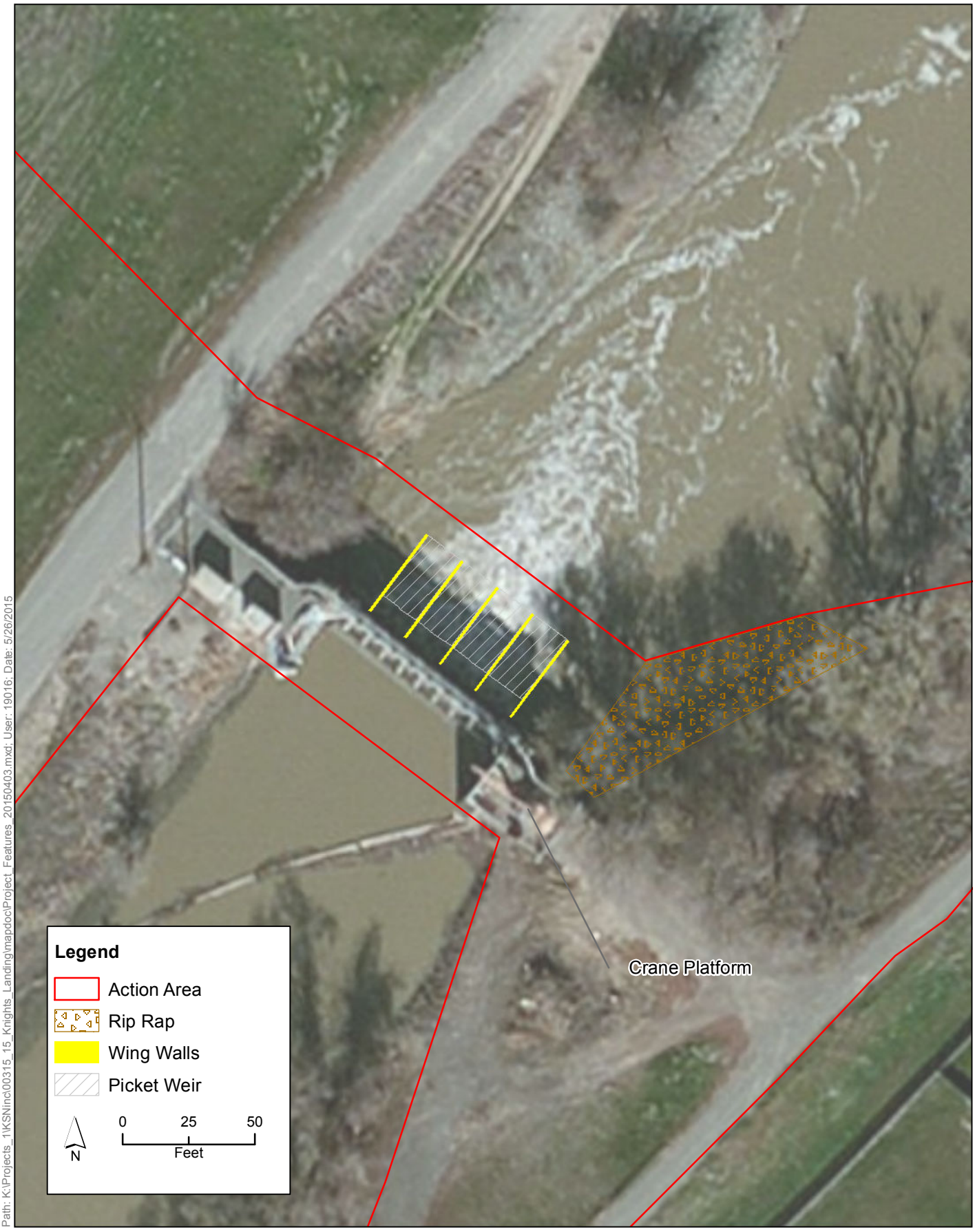
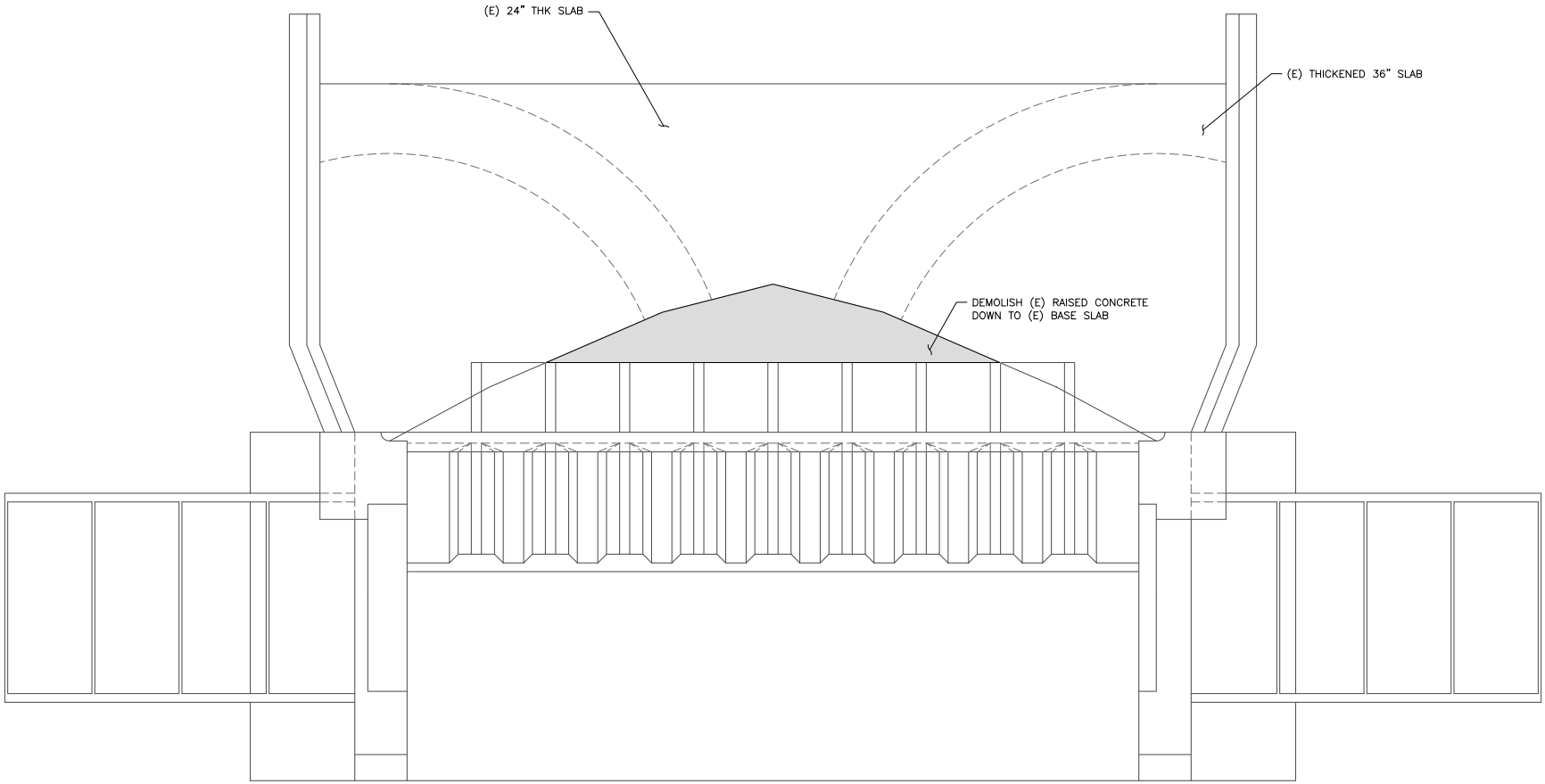
Figure 2-1
Construction Area



Path: K:\Projects_1\KSNinc\00315_15_Knights_Landing\mapdoc\Project_Features_20150403.mxd; User: 19016; Date: 5/26/2015

Figure 2-2
Construction Features

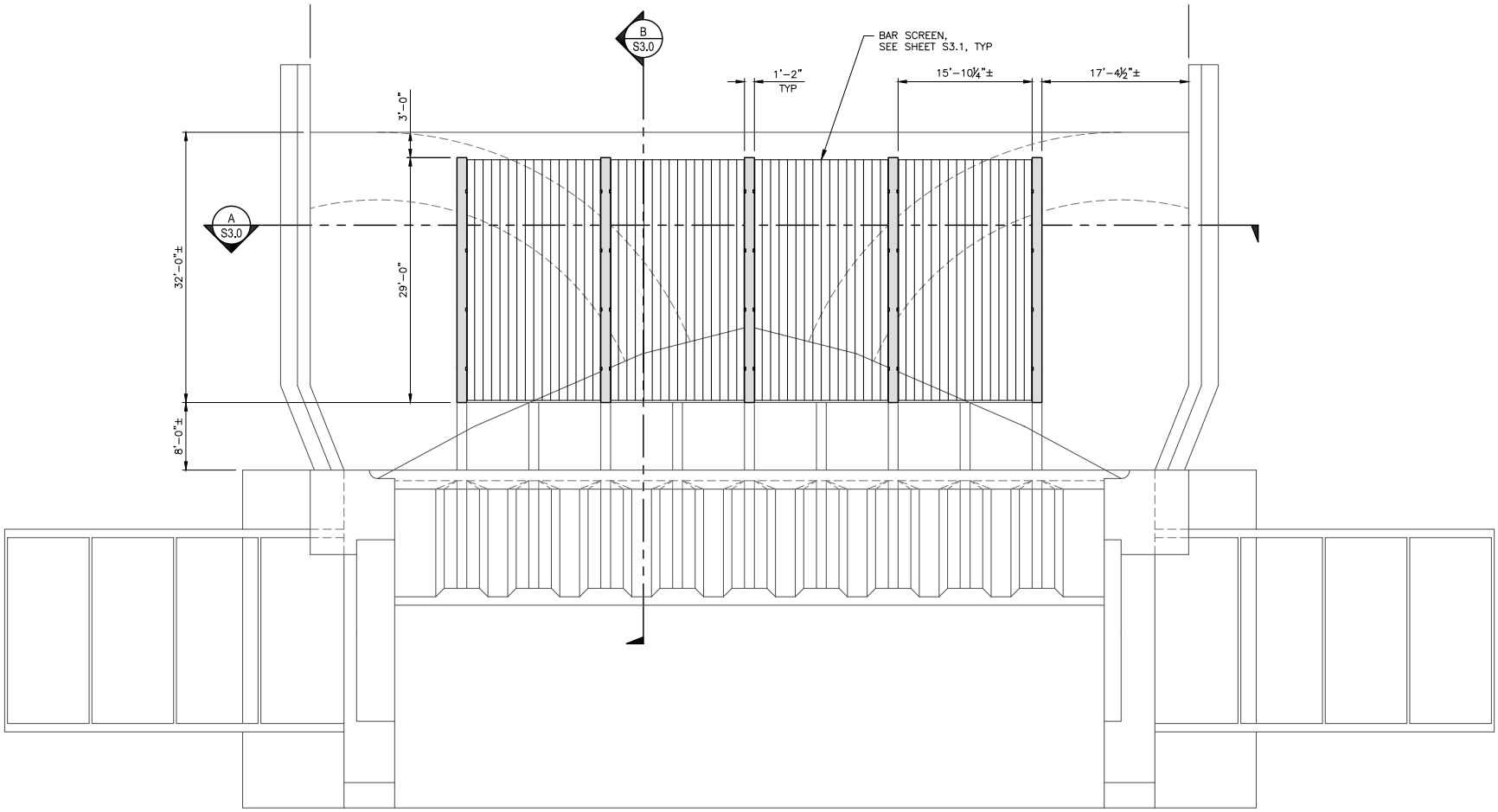


DEMOLITION PLAN
SCALE: ⅛"=1'-0"

P0974.14 001

Source: VE Solutions, Inc.

Figure 2-3
Demolition Plan



Source: VE Solutions, Inc.

P0974.14 001

Figure 2-4
Barrier Design

Once the wing walls are constructed, the metal picket weirs would be installed in each of the four channels. The hinge point of the picket weirs would be placed at the upstream extent of the demolished concrete sill, below the edge of the existing wingwalls, and the picket weirs would extend out approximately 29 feet (Figure 2-4). The bars of the picket weirs would have an outside diameter of 1.5 inches, and there would be 1 inch of space in between each of the bars. The picket weirs would be made of stainless steel and would be negatively buoyant. Cable winches would be installed at the top of the KLOG structure and used to raise and lower the picket weirs, and stilling wells would be installed to monitor water surface elevations and inform operation of the picket weirs. The picket weirs would be designed with a maximum picket angle of 30 degrees from horizontal when the water surface is up to the top of the 14-foot high wing walls. At very low flows, the downstream end of the pickets would not exceed the length of the wingwalls, maintaining the 3-foot clearance that would allow maintenance access. The picket weirs would allow water from the KLOG to continue to flow through the weir, but as the pickets rise during periods when salmon could be present, the pickets would prevent them from reaching the gates and continuing upstream through the gates. In addition, the picket weir would be designed, constructed, and operated to meet National Marine Fisheries Service's (NMFS) requirements in the Anadromous Salmonid Passage Facility Design guide. Finally, cameras would be installed on the KLOG structure so debris loading would be monitored remotely.

2.2.3 Site Access and Staging

Equipment and materials would be transported from SR 45 on local roadways and levee-top roads to the construction site. Road 108, which runs along the top of the left bank levee and would provide access to the left bank, would be closed for the full duration of construction, but would maintain local, levee maintainer, and emergency access. The site would be accessed from both sides of the structure (Figure 2-1). The right bank would be accessed using the gravel road that begins at SR 45 and runs along the right bank levee top. Access for construction equipment would require the removal of small amounts of scrub vegetation, and pruning of additional trees may be necessary. An approximately 4.2-acre staging area would be established on the landside of the left bank levee, and another approximately 1-acre staging area would be established on the top and landside of the right bank levee. Access for erosion site repairs on the right bank would be from the top of the levee, and workers would walk down to the erosion site from the levee top. All waste material, consisting primarily of concrete debris, would be transported by dump truck to the Yolo County Central Landfill.

2.2.4 Construction Equipment and Personnel

Approximately 10 individuals would be expected to be on site daily during construction of the proposed project. Private worker vehicles would be parked along the levee top roads on either side of the channel. Typical equipment used at the project site would include one of each of the following: crane with clamshell or long-reach excavator, bobcat, dump truck, concrete pumping truck, and jackhammers.

2.2.5 Construction Schedule

Construction is expected to occur from 7:00 a.m. to 7:00 p.m. Monday through Friday for 6 weeks, starting as early as September 1, 2015. Cofferdam installation and erosion repair would begin once site access has been established and environmental controls have been installed. Cofferdam

installation is expected to take 2 days and would be immediately followed by barrier construction, which is expected to take 40 days to complete. Erosion repair would take approximately 5 days to complete. However, the construction start date is dependent on water elevations and permit acquisition.

2.2.6 Operation and Maintenance Activities

The fish barrier would be owned by the CVFPB and operated and maintained by DWR's West Sacramento Maintenance personnel. The picket weirs would be raised when the water surface elevations are between 3 feet and 14 feet above the concrete apron. The weirs would be lowered to be flush with the concrete apron once water surface elevations at the concrete apron drop below 3 feet or rise above 14 feet. Water level sensors in the stilling wells would record water surface elevations every 15 minutes, and the actuator motor for the cable winches would be programmed to raise and lower the picket weirs remotely according to recorded water surface elevations so that the picket weirs maintain 2 feet of freeboard at their outboard end. The picket weirs would be lowered only after water levels persist below 3 feet for more than 3 days. This would minimize initial raising of the weir, which has the potential to trap upmigrating salmon.

The picket weirs would be checked annually for damage or more frequently if heavy debris loading is observed via the monitoring cameras. Accumulated debris would be removed by temporarily lowering the pickets, which would allow the debris to flush downstream, and the pickets would then be raised again. Debris may also be removed by raising the pickets to a vertical position and raked or power washed. Maintenance and inspection activities would occur between July 1 and October 31 when water levels are typically low. The gates on the KLOG structure would be closed to allow workers to access the picket weirs. The picket weirs would be inspected for damage and the actuator motors would be serviced. Extra picket weirs would be constructed so damaged picket weirs could be readily replaced if necessary. Any damaged picket weirs would be replaced by crane, and the damaged picket weirs would then be repaired offsite. No dewatering would be necessary as part of operations and maintenance, and the crane would be the only machinery needed. Some pruning of trees on the right bank may be necessary to provide crane access, but no tree removal would be needed.

2.2.7 Environmental Commitments

Environmental commitments are measures proposed as elements of the proposed project and are considered in conducting the environmental analysis and determining effects and findings. The purpose of environmental commitments is to reflect and incorporate best practices into the proposed project that would avoid, minimize, or offset potential environmental effects. These best practices tend to be standardized and compulsory; they represent sound and proven methods to reduce the potential effects of an action. Environmental commitments demonstrate that the project proponent commits, in good faith, to undertake and implement measures as part of the proposed project in advance of impact findings and determinations with the intent to improve the quality and integrity of the proposed project, streamline the environmental analysis, and demonstrate responsiveness and sensitivity to environmental quality.

To avoid and minimize construction-related effects, RD 108 would implement the environmental commitments listed below to reduce or offset short-term, construction-related effects.

2.2.7.1 Protection of Fish in Dewatered Construction Zone

A qualified fish biologist will be on site during the installation of water barriers and during the dewatering process to remove any trapped salmonids and other fish from the dewatered area. The fish will be relocated to suitable habitat downstream of the work area. Protocols for the capture, handling, and release of fish will be developed in cooperation with National Oceanic and Atmospheric Administration (NOAA) Fisheries, DFW, and RD 108. Fish biologists will contact NOAA Fisheries and DFW immediately if any steelhead, Chinook salmon, white sturgeon, or green sturgeon are found alive, dead, or injured.

2.2.7.2 Turbidity Monitoring

RD 108 or its contractor would monitor turbidity in the CBD during construction to determine whether turbidity is being affected by construction and ensure that construction does not affect turbidity levels, which ultimately increase the sediment loads.

The *Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (Fourth Edition)* (Central Valley Regional Water Quality Control Board 2011) contains turbidity objectives for the CBD. Specifically, the plan states that where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2 NTUs; where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU; where natural turbidity is between 5 and 50 NTUs, turbidity levels may not be elevated by 20% above ambient conditions; where ambient conditions are between 50 and 100 NTUs, conditions may not be increased by more than 10 NTUs; and where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

RD 108 or its contractor would adhere to the Surface Water Quality Ambient Monitoring Program (SWAMP) requirements for turbidity monitoring. Monitoring would continue approximately 1000 feet downstream of construction activities to determine whether turbidity is being affected by construction. Grab samples would be collected at a downstream location that is representative of the flow near the construction site. If there is a visible sediment plume being created from construction, the sample would represent this plume. Monitoring would occur hourly during the placement of riprap and dewatering, and once a week on a random basis during the remaining construction period.

If turbidity limits exceed Basin Plan standards, construction-related earth-disturbing activities would slow to a point that would alleviate the problem. RD 108 would notify the Regional Water Board of the issue and provide an explanation of the cause.

Chapter 3
Environmental Setting and Impacts

3.1 Introduction

This chapter provides an overview of the existing physical environment and regulatory requirements for each of the resources that may be affected by the proposed project. For each resource, there is a discussion of the environmental setting, followed by an evaluation of the environmental impacts on the resource. The chapter is organized by resource topic and corresponds to the Environmental Checklist Form of the State CEQA Guidelines. A complete environmental checklist for each potentially affected resource is provided in Appendix B.

Implementation of the mitigation measures specified in the impact analysis would either avoid adverse impacts completely or reduce the impacts to a less-than-significant level. RD 108 would adopt a mitigation and monitoring plan at the time it adopts the mitigated negative declaration. The purpose of the plan is to ensure that the mitigation measures adopted as part of the project approval would be implemented when the project is constructed. Some impacts have been avoided by including certain measures in the project description.

The following terminology is used to describe the level of significance of impacts.

- A finding of *no impact* is appropriate if the analysis concludes that the project would not affect the particular topic area in any adverse way.
- An impact is considered *less than significant* if the analysis concludes that it would cause no substantial adverse change to the environment and requires no mitigation.
- An impact is considered *less than significant with mitigation incorporated* if the analysis concludes that it would cause no substantial adverse change to the environment with the inclusion of mitigation measures that have been agreed to by the applicant.
- An impact is considered *significant and unavoidable* if the analysis concludes that it could have a substantial adverse effect on the environment and mitigation to a less-than-significant level of impact is not possible

3.2 Resources Not Likely to Be Affected

Initial evaluation of the impacts of the proposed project indicated that there likely would be little to no impact on several resources. These resources are discussed below to add to the overall understanding of the project.

3.2.1 Aesthetics

The proposed project consists of modifications to the downstream face of the KLOG structure (Figure 2-1), and all construction would take place between the banks of the CBD. Rock slope protection would be placed along the right bank of the CBD, requiring minimal vegetation removal, between the existing rock slope protection and the edge of the existing KLOG structure. Agricultural lands are located to the north of the project area, a small portion of which would be used as a staging area. Residential land uses are located to the south of the project site, but the CBD levee, trees along the CBD, and residential privacy fencing prevent direct views of the project site. Most direct views of the site are available to land-based roadway users and recreationists using the CBD levees and water-based recreationists on the CBD.

Scenic vista views are available from local roadways that consist of mid- to long-range views out and over agricultural fields that sometimes extend to the Blue and Rocky Ridges and the Coast Ranges, west of Interstate 5. These scenic vista views are available toward the northwest from RD 108, which is directly adjacent to and northwest of the project site; however, scenic vista views toward the southeast are not available because views from RD 108 are prevented due to trees along the CBD and development within Knights Landing. Because the staging areas would be reverted back to their original uses once construction is complete, the project would not impact scenic vista views that are available to the northwest.

The County of Yolo *2030 Countywide General Plan* Conservation and Open Space Element identifies that there are no federal or state scenic routes in the county (County of Yolo 2009: CO-6). However, the *Land Use Element*, identifies that County Road (CR) 116 and 116B from Knights Landing to CR 16 is a County-designated scenic roadway (County of Yolo 2009: LU-30). While in close proximity to CR 116/116B, the project site is not visible from the roadway because development and trees within Knights Landing prevent views of the site and, therefore, the project would not impact available views from this scenic route.

In addition, construction would take place between the hours of 7:00 a.m. to 7:00 p.m. and not require the use of high-intensity lighting for nighttime construction and the project does not include the introduction of any light sources. Changes to the KLOG structure and placing rock slope protection would not increase glare because the new concrete and rock slope protection would be in keeping with existing materials at the project site, they would have relatively small surface areas and low reflectivity, and they would weather within one season, further reducing the potential for glare. Therefore, there would be little to no impacts resulting from light and glare.

The proposed project would also not result in a substantial change in the existing visual character or quality of the site. As previously described, the new concrete and rock slope protection would be in keeping with existing materials at the project site. Changes to the KLOG structure would be visually in keeping with the existing structure and would not be out of place or alter conditions at the site in

a notable manner. Similarly, the area to receive rock slope protection is small and would tie into the KLOG structure and existing rock slope protection that is immediately adjacent to the erosion site. Therefore, the new rock slope protection would be a visual extension of existing conditions at the site and not result in notable visual changes at the project site. Vegetation removal would be minimal and would be mitigated offsite.

Overall, the proposed project would have little to no impact on aesthetic resources, and these resources are not considered further in this document.

3.2.2 Agriculture and Forestry Resources

The proposed project consists of modifications to the KLOG structure, and construction would take place between the banks of the CBD. The project site is adjacent to agricultural lands that are located to the north of the project area and may use a small portion of land as a staging area. However, using the agricultural lands would not convert any lands to a non-agricultural use, or conflict with any existing zoning for agricultural use. In addition, the proposed project would not conflict with existing zoning for forestland or timberland and would not result in the loss or conversion of forest land. The proposed project would accordingly have no impact on agriculture and forestry resources, and these resources are not considered further in this document.

3.2.3 Geology and Soils

The proposed project is located in water, with soil map units on each side of stream identified by the U.S. Department of Agriculture Natural Resources Conservation Service as Sacramento clay on the north side of the stream and Sycamore silt loam (drained) on the south side of the stream (Andrews 1972). The Sacramento clay soil type has high shrink-swell potential and the erosion hazard is considered none to slight.[1] The Sycamore silt loam soil type has moderate shrink-swell potential and the erosion hazard is considered none to slight.

The proposed project would not expose people to the rupture of an earthquake fault or other seismic ground shaking, as there are no faults running through or adjacent to the project site. The active fault nearest to the study area is the Dunnigan Hills fault, which is 10 miles to the west of the project area.

Part of the proposed project is designed to stabilize and protect the soils on the riverbank and would involve the placement of riprap. No structures would be placed on top of the repaired erosion site, and the remaining work would be conducted on an existing concrete pad. The proposed project would not expose people or structures to substantial adverse effects related to fault rupture, groundshaking, liquefaction, or landslides. Construction would occur on unstable or expansive soil, but the only structure that would be built would be on an existing concrete pad and would not pose a risk of offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. The proposed project is not located in an area that requires the disposal of wastewater, or where it would destroy a paleontological resource or geologic feature. The erosion site repairs would prevent future erosion and would stabilize soils in the area, and would therefore be beneficial. Consequently, impacts related to geology and soils are not considered further in this document.

[1] Some or all of the project site soils have been altered due to nearby levee construction/ modification and other anthropogenic activities as a result of its urban setting.

3.2.4 Land Use and Planning

The proposed project consists of constructing a passive fish barrier on an existing concrete pad in the CBD, as well as repairing an erosion site at the base of the right bank of the CBD. Land uses adjacent to the project site are classified as agricultural and residential (County of Yolo 2009: LU-8, LU-38)). The proposed project would not change the land use in the project area. Modifications to the KLOG structure and erosion site repair would not physically divide an established community or conflict with any applicable land use plan, policy, or regulation, including the *County of Yolo General Plan*. Implementation of the project would therefore not result in any changes to existing land uses, and land use resources are not discussed further in this document.

3.2.5 Mineral Resources

The project site is not located in or near a mineral extraction site; accordingly, the proposed project would not result in the loss of availability of mineral resources nor otherwise prevent the extraction of important mineral resources. The proposed project would have no impact on mineral resources, and these resources are not considered further in this document.

3.2.6 Population and Housing

The proposed project would not involve the construction of any new housing, businesses, roads, or infrastructure. Implementation of the proposed project would not displace any existing housing units or residents and therefore would not necessitate the construction of replacement housing units elsewhere. The project would have no impact on population and housing and population and house is not considered further in this document.

3.2.7 Public Services

Public services in the project area consist of law enforcement, fire protection, and emergency medical assistance. The Yolo County Sheriff's Department provides law enforcement services, and the Knights Landing Fire Department provides fire and emergency medical services. While Road 108 would be closed to the public during construction, the proposed project would not result in any loss of service ratios, response times, or other performance objectives as emergency access would be maintained. Construction vehicles accessing the project site could potentially slow traffic during construction hours; however, the number of vehicles and vehicle trips needed for construction would be minimal and they would not disrupt public access, including access for parks and schools. Accordingly, impacts on public services are not considered further in this document.

3.2.8 Recreation

Construction of the proposed project would not increase the use of existing recreational facilities and, therefore, would not cause physical deterioration of any recreational facilities. A levee-top access road that is used for recreation runs adjacent to a proposed staging area and may experience temporary closure while construction vehicles access the project site, but access would be restored once construction is complete. Also, the proposed project would not have any impact on the boat ramp located downstream of the site, as an in-water barrier prevents access to the CBD just upstream of the ramp. The proposed project would not require the construction or expansion of recreation facilities. Furthermore, construction activities would be short-term and limited in scope.

The project would have no impact on recreational facilities, and recreation resources are not considered further in this document.

3.2.9 Transportation/Traffic

Construction of the proposed project would involve minimal vehicle trips due to the small amount of construction involved. A total of 10 personnel would be onsite on any given day, and only one dump truck and one concrete pumping truck would be needed to haul material to and from the site. Construction vehicles accessing the site may temporarily slow traffic as they turn onto Road 108 or the levee-top road on the right bank, but the proposed project would not conflict with any applicable plan, ordinance, or policy related to the performance of the circulation system or with any congestion management program. There would be no change to air traffic patterns and no increase in hazards because of design features; implementation of the proposed project would not result in inadequate emergency access. There are no public transit or bicycle facilities that would be affected by the proposed project. The levee-top access road that is open to pedestrian use may have temporary closures while construction vehicles enter or exit the project area, but the closures would be brief and would not reduce the performance or safety of the road. Therefore, impacts related to transportation and traffic are not considered further in this document.

3.2.10 Utilities and Service Systems

Wastewater treatment would not be part of the proposed project, and the proposed project would not require or result in the construction or expansion of stormwater drainage facilities. No additional water supply would be needed. The proposed project would comply with statutes and regulations related to solid waste and would be served by a landfill with sufficient capacity to accommodate solid waste disposal needs. Accordingly, impacts related to utilities and service systems are not considered further in this document.

3.2.11 Growth Inducement

The proposed project would construct a passive fish barrier and repair an erosion site. Land use designations, growth rates, employment, and housing values would continue to be determined by local government regulations and economic conditions and would not be affected by the proposed project. Accordingly, the proposed project is not growth-inducing.

3.3 Hydrology and Water Quality

3.3.1 Introduction

This section analyzes the proposed project's potential impacts related to hydrology and water quality. It describes existing conditions in the project area and summarizes the overall federal, state, and local regulatory framework for hydrology and water quality, and it analyzes the potential for the proposed project to affect these resources.

3.3.2 Existing Conditions

The proposed project is within the Sacramento River Hydrologic Region. The Sacramento River Hydrologic Region encompasses an area of approximately 17.4 million acres (27,200 square miles) and contains all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa Counties (California Department of Water Resources 2003a). Most of northern California is located in the Sacramento River Hydrologic Region, which encompasses several watersheds of various sizes.

According to the U.S. Geological Survey (USGS), the project area is within the Sacramento-Stone Corral watershed (USGS Hydrologic Unit Code [HUC] #18020104) (U.S. Geological Survey 1978).

3.3.2.1 Surface Water Hydrology

The existing KLOG structure is located in the CBD, approximately 0.25 mile from its confluence with the Sacramento River near the community of Knights Landing, just below River Mile 90, in Yolo County (Figure 1-1). The CBD in the project area is approximately 100 feet (ft) wide (at low water) and drains in a northeasterly direction. The CBD collects all drainage from the Colusa Basin watershed, which spans areas of Glenn and Yolo Counties. The watershed extends from the Stony Creek watershed in the north to the Cache Creek watershed to the south, and from the Sacramento River in the east to the Inner Coast range foothills to the west, and covers approximately 1,045,445 acres (1,635 square miles) (H.T. Harvey & Associates et al. 2008).

Stream flow through the KLOG structure is controlled by eight 66-inch and two 42-inch screw operated slide gates on the CBD side and by eight 66-inch and two 42-inch combination flap and slide gates on the Sacramento River side. The configuration allows for control of stream flows in either direction and allows automatic outflows from the CBD at lower stages in the Sacramento River.

The KLOG structure protects the lower Colusa Basin from backwater of the Sacramento River during floods and helps control water levels in the CBD for irrigation and drainage. The riverside slide gates are closed year round with the flap gates active. The flap gates discharge water to the Sacramento River if the river stage in the CBD is higher than the Sacramento River stage, and they prevent reverse flow when the Sacramento River stage is higher. The volume of discharge depends on the number of open gates as well as the height of the gate openings. The riverside slide gates are opened only when maintenance activities are required. Screw-operated gates at the upstream end are operated to maintain required pool elevation, currently at 25.5 ft United States Engineering Datum

(USED) (23.73 ft, NAVD88), during irrigation season based on local interests. (cbec in preparation: 1.)

In brief, streamflows at the KLOG are based on flow conditions caused by the slide gate and flap gate settings relative to the head difference of 1) the stage of the gage on the CBD, which is upstream of the gates and 2) the stage of the gage on the Sacramento River at Knights Landing, which is downstream of the gates.

3.3.2.2 Groundwater Hydrology

DWR delineates groundwater basins throughout California under the state's Groundwater Bulletin 118. The proposed project is located in the Sacramento Valley Groundwater Basin, Colusa Subbasin (Basin No. 5-021.52). The Colusa Subbasin has a total surface area of 918,380 acres (1,434 square miles). It is bounded on the east by the Sacramento River, on the west by the Coast Range and foothills, on the north by Stony Creek, and on the south by Cache Creek.

Groundwater level data show an average seasonal fluctuation of approximately 5 ft for normal and dry years, and there does not appear to be any increasing or decreasing trend in groundwater levels in the Colusa subbasin. Based on available information, DWR calculated groundwater storage capacity in the subbasin at 13,025,887 acre-feet (af) to a depth of 200 ft (California Department of Water Resources 2003b).

3.3.2.3 Surface Water Quality

The Basin Plan (Central Valley Regional Water Quality Control Board 2011) describes beneficial uses for the CBD and the Sacramento River (Table 3.3-1). Clean Water Act (CWA) Section 303(d) establishes the total maximum daily load (TMDL) process to assist in guiding the application of state water quality standards. Section 303(d) requires states to identify streams in which water quality is impaired (i.e., affected by the presence of pollutants or contaminants) and to establish the TMDL—the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects. Table 3.3-2 shows 303(d) listed impairments for the CBD and the Sacramento River in the vicinity of the project area based on the 2010 California Integrated Report (California State Water Resources Control Board 2011).

Table 3.3-1. Designated Beneficial Uses for Surface Water Bodies within the Project Vicinity

Water Body	Designated Beneficial Uses
Colusa Basin Drain	Irrigation; stock watering; water contact recreation; warm freshwater habitat; cold freshwater habitat[a]; warm fish migration; warm fish spawning; wildlife habitat.
Sacramento River (from the Colusa Basin Drain to the I Street Bridge in Sacramento)	Municipal and domestic supply; irrigation; water contact recreation; non-contact water recreation; warm and cold freshwater habitat; warm and cold fish migration; warm and cold fish spawning; wildlife habitat; navigation.

Source: Central Valley Regional Water Quality Control Board 2011.

[a] Potential beneficial use.

Table 3.3-2. 303(d) Listed Impaired Waters with Potential to be Affected by the Proposed Project

Water Body	Pollutant Stressors	Potential Sources	TMDL Completion Date
Colusa Basin Drain	Azinphos-methyl (Guthion)	Unknown	Est. 2019
	Carbofuran	Unknown	Est. 2021
	DDT (Dichlorodiphenyltrichloroethane)	Unknown	Est. 2021
	Diazinon	Unknown	Est. 2008
	Dieldrin	Unknown	Est. 2021
	Escherichia coli (E. coli)	Unknown	Est. 2021
	Group A Pesticides	Unknown	Est. 2019
	Low Dissolved Oxygen	Unknown	Est. 2021
	Malathion	Unknown	Est. 2010
	Mercury	Unknown	Est. 2021
	Unknown Toxicity	Unknown	Est. 2019
Sacramento River (Red Bluff to Knights Landing)	DDT (Dichlorodiphenyltrichloroethane)	Unknown	Est. 2021
	Dieldrin	Unknown	Est. 2021
	Mercury	Unknown	Est. 2021
	PCBs (Polychlorinated biphenyls)	Unknown	Est. 2021
	Unknown Toxicity	Unknown	Est. 2019
Sacramento River (Knights Landing to the Delta)	Chlordane	Unknown	Est. 2021
	DDT (Dichlorodiphenyltrichloroethane)	Unknown	Est. 2021
	Dieldrin	Unknown	Est. 2022
	Mercury	Unknown	Est. 2012
	PCBs (Polychlorinated biphenyls)	Unknown	Est. 2021
	Unknown Toxicity	Unknown	Est. 2019

Source: California State Water Resources Control Board 2011.
Est. = Estimated.
TMDL = total maximum daily load.

Overall, the water quality of the CBD has been historically affected by pesticides associated with rice farming. A management program was enacted in the 1980s to reduce the levels of rice pesticides in surface water, which led to numerous improvements including significant declines in rice pesticides in both the CBD and the Sacramento River. Other (non-rice) pesticides are abundant in the CBD (Table 3.3-2); however, the surface water quality in the Colusa Basin watershed is generally adequate to support existing uses (which are predominantly agricultural). (H.T Harvey & Associates et al. 2008)

The water quality of the Sacramento River is good to excellent, with relatively cool water temperatures, low biochemical oxygen demand, medium to high dissolved oxygen, and low mineral and nutrient content. In general, the surface water quality of the Sacramento River is representative of agricultural return flows, urban runoff, and natural sedimentation from scouring. The quality of surface water appears to be largely unaffected by the presence of pesticides and other constituents in the CBD (H.T Harvey & Associates et al. 2008).

3.3.2.4 Groundwater Water Quality

Groundwater quality in the subbasin is characterized as a calcium magnesium or magnesium bicarbonate type (California Department of Water Resources 2003b). Total dissolved solids (TDS) values range from 120 to 1,220 milligrams per liter (mg/L), averaging 391 mg/L. Local (in the vicinity of Knights Landing) impairments include high TDS, boron, and nitrates (California Department of Water Resources 2003b).

Groundwater quality in the Colusa Basin watershed is generally acceptable for agricultural purposes—with the exception of boron, no naturally occurring groundwater constituent prevents the use of groundwater for irrigation (H.T Harvey & Associates et al. 2008).

3.3.2.5 Flooding and Flood Management

During the flood events of 1986, 1997, 2006, and 2011, the stage of the Sacramento River was consistently higher than the CBD at the peak of the flood wave, resulting in no stream flow through the KLOG structure. However, at the far ends of the rising and/or receding limbs of the hydrographs, there are occasions where the CBD water levels are higher than the stage in Sacramento River, resulting in stream flow (up to 1,370 cfs during the four historic floods) through the KLOG structure. Based on historic record, the maximum flow through the KLOG structure is 2,220 cfs. (cbec in preparation: 1.)

The banks on each side of the KLOG structure are Sacramento River Flood Control Project levees. The Knights Landing Ridge Drainage District maintains the south levee upstream of the KLOG, and Yolo County Service Area 6 maintains the south levee downstream of the KLOG. Reclamation District 787 maintains the north levee upstream of the KLOG, and the Sacramento River Westside Levee District maintains the north levee downstream of the KLOG.

The proposed project is considered to be within a 100-year floodplain (Zone A) as designated by the Federal Emergency Management Agency (FEMA) (Federal Emergency Management Agency 2010).

3.3.3 Regulatory Setting

3.3.3.1 Federal

The following federal regulations related to hydrology and water quality may apply to implementation of the proposed project.

Clean Water Act Sections 404, 401, and 303(d)

Section 404

CWA Section 404 regulates the discharge of dredged and fill materials into "waters of the United States," which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Project proponents must obtain a permit from the U.S. Army Corps of Engineers (USACE) for all discharges of dredged or fill material into waters of the United States before proceeding with a proposed activity. Before any actions that may affect surface waters are implemented, a delineation of jurisdictional waters of the United States must be completed, following USACE protocols, to determine whether the project area contains wetlands or other waters of the United States that qualify for CWA protection.

Section 401

Under federal CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval [such as issuance of a Section 404 permit]) also must comply with CWA Section 401. In California, the authority to grant water quality certification has been delegated to the State Water Board, and applications for water quality certification under CWA Section 401 typically are processed by the Regional Water Boards with local jurisdiction. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States.

Section 303(d) and Total Maximum Daily Loads

In California, the State Water Board develops the list of water quality–limited segments; the U.S. Environmental Protection Agency approves each state's list. Waters on the list do not meet water quality standards, even after point sources of pollution have installed required pollution control technology. Section 303(d) also establishes the TMDL process to improve water quality in listed waterways.

Rivers and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, and other structures across any navigable water, or that place obstructions to navigation outside established federal lines and excavate from or deposit material in such waters. Such activities require permits from USACE.

Section 14

Section 14 (33 USC 408) requires approval from the USACE Chief of Engineers, or designee, for alterations to certain public works, including federal project levees, so long as the alteration would not be injurious to the public interest and does not impair the usefulness of the work. Section 408 alterations would include actions that could change the hydraulic capacity of the floodway or change the authorized geometry of the federal project. As described in Chapter 1, RD 108 is seeking approval under 33 USC Section 408, supported by the Environmental Assessment prepared for this document under the National Environmental Policy Act (NEPA).

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were intended to reduce the need for large, publicly funded flood risk management structures and disaster relief by restricting development on floodplains. FEMA administers the National Flood Insurance Program (NFIP) to subsidize flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA issues Flood Insurance Rate Maps (FIRMs) for communities participating in the NFIP. These maps delineate flood hazard zones in the community. These maps are designed for flood insurance purposes only and do not necessarily show all areas subject to flooding. The maps designate lands likely to be inundated during a 100-

year storm event and elevations of the base flood. They also depict areas between the limits affected by 100-year and 500-year events and areas of minimal flooding. These maps often are used to establish building pad elevations to protect new development from flooding effects.

Requirements for Federal Emergency Management Agency Certification

For guidance on floodplain management and floodplain hazard identification, communities turn to FEMA guidelines, as defined in 44 Code of Federal Regulations (CFR) 59 through 77. In order for a levee to be recognized by FEMA under the NFIP, the community must provide evidence demonstrating that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood (1% or 100-year flood) exists. These specific requirements are outlined in 44 CFR 65.10, Mapping of Areas Protected by Levee Systems.

U.S. Army Corps of Engineers Levee Design Criteria

All levees included in the proposed project area are federally authorized and fall within the jurisdiction of USACE. The levee evaluation for the proposed project area conforms to the engineering criteria established by USACE for the assessment and repair of levees.

Executive Order 11988 Floodplain Management

Executive Order 11988 addresses floodplain issues related to public safety, conservation, and economics. The order generally requires federal agencies constructing, permitting, or funding actions meet the following requirements.

- Avoid incompatible floodplain development.
- Be consistent with the standards and criteria of the NFIP.
- Restore and preserve natural and beneficial floodplain values.

3.3.3.2 State

The following state regulations related to hydrology and water quality may apply to implementation of the proposed project.

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act established the State Water Board and nine Regional Water Boards as the primary state agencies with regulatory authority over California water quality and appropriative surface water rights allocations. Under this act (and the CWA), the state is required to adopt a water quality control policy and waste discharge requirements to be implemented by the State Water Board and nine Regional Water Boards. The State Water Board also establishes Water Quality Control Plans (Basin Plans) and statewide plans. The Regional Water Boards carry out State Water Board policies and procedures throughout the state. Basin Plans designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses.

Central Valley Regional Water Quality Control Board

The Regional Water Board is responsible for implementing its Basin Plan (2011) for the Sacramento River and its tributaries. The Basin Plan identifies beneficial uses of the river and its tributaries and

water quality objectives to protect those uses. Numerical and narrative criteria are contained in the Basin Plan for several key water quality constituents, including dissolved oxygen, water temperature, trace metals, turbidity, suspended material, pesticides, salinity, radioactivity, and other related constituents.

California Fish and Game Code Section 1602 Streambed Alteration Agreement

Under Chapter 6 of the California Fish and Game Code, CDFW is responsible for the protection and conservation of the state's fish and wildlife resources. Section 1602 et seq. of the code defines the responsibilities of CDFW and requires that public and private applicants obtain an agreement to "divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the CDFW in which there is at any time an existing fish or wildlife resource or from which those resources derive benefit, or will use material from the streambeds designated by the department." A streambed alteration agreement is required under Section 1602 of the California Fish and Game Code for all activities that involve temporary or permanent activities within state jurisdictional waters.

Central Valley Flood Protection Plan

According to California Government Code Sections 65302.9 and 65860.1, every jurisdiction located within the Sacramento–San Joaquin Valley is required to update its general plan and zoning ordinance in a manner consistent with the Central Valley Flood Protection Plan (CVFPP) within 24 months after the CVFPP's adoption, which occurred on June 29, 2012. In addition, the locations of the state and local flood management facilities, locations of flood hazard zones, and the properties located in these areas must be mapped and consistent with the CVFPP.

Central Valley Flood Protection Board

The CVFPB (formerly the California Reclamation Board) of the State of California regulates the modification and construction of levees and floodways in the Central Valley defined as part of the Sacramento Valley and San Joaquin Valley flood control projects. Rules promulgated in Title 23 of the CCR (Title 23, Division 1, Article 8 [Sections 111–137]) regulate the modification and construction of levees to ensure public safety. The rules state that existing levees may not be excavated or left partially excavated during the flood season, which is generally November 1 through April 15 for the Sacramento River and Sacramento Bypass.

Title 23, CCR Sections 6 and 7 stipulate permitting authority to the CVFPB. Section 6(a) outlines the need to obtain a permit from the CVFPB for "Every proposal or plan of work, including the placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduct fence, projection, fill, embankment, building….that involves cutting into the levee wholly or in part within any area for which there is an adopted plan of flood control, must be approved by the board prior to the commencement of work." Section 7(a) requires that "Prior to submitting an encroachment permit application to the board, the application must be endorsed by the agency responsible for maintenance of levees within the area of the proposed work…."

The following CVFPB guidance has been followed during the levee evaluation:

> The California Reclamation Board has primary jurisdiction approval of levee design and construction. The Reclamation Board standards are found in Title 23, Division 1, Article 8 (Sections 111 through 137) of the California Code of Regulations (CCR), and constitute the primary state standard. Section 120 of the CCR directs that levee design and construction be in

accordance with the USACE's Engineer Manual EM 1110-2-1913, Design and Construction of Levees. This document is the primary federal standard applicable to this project, as supplemented by additional prescriptive standards contained in Section 120 of the CCR. These additional standards prescribe minimum levee cross-sectional dimensions, construction material types, and compaction levels.

3.3.3.3 Local

The following local regulations related to hydrology and water quality may apply to implementation of the proposed project.

Yolo County General Plan

The Conservation and Open Space Element and the Health and Safety Element of the *2030 Countywide General Plan* (Yolo County 2009) contain a number of goals and policies related to water quality and flooding. The following goals and policies from the general plan could apply to the proposed project.

Conservation and Open Space Element

Goals

Goal CO-5: Water Resources. Ensure an abundant, safe, and sustainable water supply to support the needs of existing and future generations.

Policies

Policy CO-5.6. Improve and protect water quality for municipal, agricultural, and environmental uses.

Policy CO-5.13. Ensure that regional, State, and federal water projects protect local water rights and areas of origin.

Policy CO-5.17. Require new development to be designed such that nitrates, lawn chemicals, oil, and other pollutants of concern do not impair groundwater quality.

Policy CO-5.23. Support efforts to meet applicable water quality standards for all surface and groundwater resources.

Health and Safety Element

Goals

GOAL HS-2: Flood Hazards. Protect the public and reduce damage to property from flood hazards.

Policies

Policy HS-2.2: Ensure and enhance the maintenance and integrity of flood control levees.

Policy HS-2.3: Actively update and maintain policies and programs to ensure consistency with state and Federal requirements.

Colusa Basin Watershed Management Plan

The following goals and objectives from the *Colusa Basin Watershed Management Plan* (Colusa County Resource Conservation District 2012) could apply to the proposed project.

Goal 1. Protect, maintain and improve water quality

Objective #3: Encourage and implement measures to protect groundwater from contaminants

Objective #4: Recommend Best Management Practices (BMPs) for agricultural and rangeland areas to reduce soil erosion and associated sediment loading into drainages

Goal 6. Enhance soil quality and reduce erosion

Objective #1: Reduce channel instability and stream bank erosion

Objective #2: Advocate alternatives to non-vegetated streambanks and irrigation ditches

Objective #3: Provide natural soil protection measures to reduce soil erosion and improve soil quality on farm land and range land

Objective #4: Assist land managers with soil erosion reduction measures and soil quality improvements

3.3.4 Environmental Effects

Potential impacts of the proposed project on hydrology and water quality are discussed in the context of State CEQA Guidelines Appendix G checklist items.

a. Violate any water quality standards or waste discharge requirements?

Impact WQ-1: Introduction of Pollutants to Surface Waters (less than significant with mitigation)

Erosion site repair and equipment staging during project construction would result in moderate ground disturbance in the project area, and heavy machinery would be used within the confines of the CBD. Contamination of riverbank soils could result from construction activities because heavy machinery would be used within the ordinary high water mark (OHWM) of the CBD. Spills of petroleum products and other pollutants related to machinery could occur during vehicle operation, refueling, parking, and maintenance. Improper handling, storage, or disposal of these materials in the vicinity of the CBD could cause degradation of surface water quality if they are eventually washed into the CBD (or ultimately the Sacramento River). Placement of riprap below the waterline would stir up sediment and contribute to downstream sedimentation and would increase turbidity. However, silt fencing would be set up around the extent of the inwater work to prevent any sediment that may be stirred up during construction from increasing turbidity in the CBD, which would also prevent downstream sedimentation. The toe of the silt fencing would be trenched so that the downslope face of the trench is flat and perpendicular to the line of flow. The fencing would be inspected weekly and repaired as needed, and accumulated silt would be removed when it reaches a depth of 6 inches.

It would still be possible that soil could be washed downstream during riprap placement if the silt fencing were to be damaged or displaced, and therefore this impact would be potentially significant. However, RD 108 or its contractor would monitor turbidity in the CBD during construction, as described in Section 2.2.7.2, *Turbidity Monitoring*, and as required by the Central Valley Regional Water Board. In addition, implementation of Mitigation Measures WQ-MM-1 and WQ-MM-2 would ensure that the risk of accidental spills and turbidity increases would be minimized and that this impact would be less-than-significant.

Mitigation Measure WQ-MM-1: Implement a Spill Prevention, Control, and Countermeasure Plan

RD 108 or its contractor will develop and implement a spill prevention, control, and countermeasure plan (SPCCP) to minimize the potential for and effects from spills of hazardous, toxic, and petroleum substances during construction and operation activities, as well as minimize the effects of unearthing previously undocumented hazardous materials. The SPCCP will be completed before any construction activities begin. Implementation of this measure will comply with state and federal water quality regulations. The SPCCP will describe spill sources and spill pathways in addition to the actions that will be taken in the event of a spill (e.g., an oil spill from engine refueling will be cleaned up immediately with oil absorbents) or the exposure of an undocumented hazard. The SPCCP will outline descriptions of containment facilities and practices such as double-walled tanks, containment berms, emergency shut-offs, drip pans, fueling procedures, and spill response kits. It also will describe how and when employees are trained in proper handling procedure and spill prevention and response procedures.

RD 108 will review and approve the SPCCP before onset of construction activities and routinely inspect the construction area to verify that the measures specified in the SPCCP are properly implemented and maintained. RD 108 will notify its contractors immediately if there is a non-compliance issue and will require compliance.

If a spill is reportable, the contractor's superintendent will notify RD 108, and RD 108 will take action to contact the appropriate safety and cleanup crews to ensure that the SPCCP is followed. A written description of reportable releases must be submitted to the Central Valley Regional Water Board and the Department of Toxic Substances Control (DTSC). This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases will be documented on a spill report form.

Mitigation Measure WQ-MM-2: Implementation of Construction Best Management Practices

RD 108 will require the construction contractor to implement appropriate BMPs that would be utilized to avoid or minimize impacts on water quality. Such BMPs will include, but not be limited to, the following.

- **Staging of construction equipment and materials**. To the extent possible, equipment and materials would be staged in areas that have already been disturbed.
- **Minimize soil and vegetation disturbance**. The construction contractor would minimize ground disturbance and the disturbance/destruction of existing vegetation. This would be accomplished, in part, through establishing designated equipment staging areas, ingress and egress corridors, equipment exclusion zones prior to the commencement of any grading operations, and protection of existing trees.
- **Install silt fences**. The construction contractor will install silt fences to prevent sediment-laden water from leaving the construction area.

b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater

table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?

No excavation would be required to repair the erosion site nor the barrier site; as such, the groundwater table would not be exposed. Dewatering would be necessary in the vicinity of the concrete pad upstream of the cofferdam; however, this localized dewatering would not affect the local groundwater table. The proposed project activities would not involve groundwater extraction or the lowering of the local groundwater table. In addition, construction activities are not likely to interfere substantially with groundwater recharge because construction would occur during the dry season. Therefore, there would be no impact.

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?

d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?

Ground-disturbing activities that would occur during project construction would result in minor alterations to the right (south) bank of the CBD. However, these changes are designed to repair an erosion site and prevent future erosion by protecting the bank. The contours of the site would be restored to return the bank to levee design conditions with a slope between 2.5:1and 3:1, which would diffuse the erosive power of sheet flows running off the upland slope and further reduce the potential for erosion. The course of the CBD waterway would not be changed. Therefore, there would be no impact.

e. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

The proposed project would not alter the capacity of existing or planned stormwater drainage systems. In addition, the proposed project would not provide substantial additional sources of polluted runoff, and all disturbed areas would be revegetated to prevent soil erosion. Therefore, there would be no impact.

f. Otherwise substantially degrade water quality?

As discussed under checklist item *a*, implementation of the *Turbidity Monitoring* Environmental Commitment and Mitigation Measures WQ-MM-1 and WQ-MM-2 would prevent impacts on water quality. In addition, RD 108 would follow the terms and conditions of a Section 401 Water Quality Certification, which would substantially reduce the potential for construction-related erosion and sedimentation to adversely affect water quality in the CBD or Sacramento River. Therefore, there would be no impact.

g. Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

The proposed project would not involve the construction of houses. There would be no impact.

h. Place within a 100-year flood hazard area structures that would impede or redirect floodflows?

The proposed project would involve the placement of structures (concrete wingwalls and metal picket weirs) within the 100-year flood hazard area. It would also place riprap within the 100-year flood hazard area. For the former, when the stage of the Sacramento River is higher than the stage of the Colusa Drain—which is typical of four historic observations as documented by cbec (in preparation)—there is no flow through the KLOG. Therefore, the proposed project would have an insignificant impact on flow and stage in the Sacramento River and the Yolo Bypass. However, when flow passes through the KLOG facility, the proposed project could result in additional head loss given that it is located in the turbulent zone of KLOG, which provides an opportunity for small additional flow into the Yolo Bypass through Knights Landing Ridge Cut (KLRC). A preliminary modeling effort (cbec in preparation) determined that the additional flow to the KLRC due to the proposed project is a small portion (< 5%) of flow through the KLOG facility (the head loss through the weir is 0.30 ft under maximum flow of 1,658 cfs through the KLOG facility on February 5, 2010). Based on this assessment, the volume of flow diverted to Yolo Bypass is insignificant and should not affect peak stages during a flood.

For the latter (riprap placement), potential downstream impacts, such as induced scouring from placement of riprap at the site, would be minimal because the contours of the erosion site would be restored to return the bank to levee design conditions with a slope between 2.5:1and 3:1, the approximate slope of the downstream banks. Furthermore, the project site and the downstream banks are located on a reach with a straight planform where erosion rates are generally lower than on meander bends.

Therefore, the proposed project would have a less than significant impact related to impeding floodflows or redirecting floodflows.

j. Contribute to inundation by seiche, tsunami, or mudflow?

The proposed project would slightly alter the contours of the riverbank at the project site, but would not involve alterations that would increase susceptibility of surrounding communities to inundation by seiches, tsunamis, or mudflows. Therefore, there would be no impact.

i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?

The proposed project would not increase the present potential for failure of any levee, dam, or instream structure. All improvements would occur on the downstream side of the KLOG facility. No people or structures would be exposed to a significant risk of loss, injury, or death involving flooding. Therefore, there would be no impact.

3.4 Biological Resources

3.4.1 Introduction

This section provides an analysis of potential impacts on biological resources, including impacts on vegetation and wetland resources, wildlife, and fisheries, resulting from the proposed KLOG project on the CBD.

3.4.2 Existing Conditions

3.4.2.1 Study Area

The 6-acre study area for the biological resources analysis encompasses the proposed project construction area, including access and staging areas, which includes the CBD approximately 100 feet downstream of the existing KLOG (Figure 3.4-1).

For purposes of assessing impacts on fisheries resources (e.g., elevated turbidity and noise), the study area also consists of the CBD water column, canal bottom, and levee banks within the footprint of the proposed KLOG construction and erosion repair (up to the OHWM) and adjacent aquatic habitat to 1,000 feet below the in-water construction area.

The study area is located at the northeast edge of the community of Knights Landing in Yolo County near the Sacramento River. The area is relatively flat, with elevations ranging from approximately 2 to 48 feet above mean sea level (asl).

3.4.2.2 Land Cover Types

The land cover types identified during field surveys of the study area are Great Valley valley oak riparian forest, perennial drainage, nonnative annual grassland, and unvegetated/developed areas. Each of these land cover types is discussed below and shown in Figure 3.4-1. A list of the plant species observed during the January 27, 2015, reconnaissance site visit is included in Appendix C.

Great Valley Valley Oak Riparian Forest

Great Valley valley oak riparian forest occurs in a narrow band along the CBD and has an overstory of mature, well-established trees—predominantly valley oak with Oregon ash, Fremont's cottonwood, and black willow (Figure 3.4-1). In the study area, the understory consists primarily of nonnative grasses and ruderal herbaceous species with few shrubs, including buttonbush on the northeast bank and poison oak on the southwest bank downstream of the KLOG. Great Valley valley oak riparian forest is recognized as a sensitive natural community by CNDDB (California Natural Diversity Database 2015).

Perennial Drainage—Colusa Basin Drain

Within the study area, perennial drainage includes the open water of the CBD and the portion of the riverbank located below the OHWM. The average width of the CBD in the study area is approximately 250 feet. The CBD banks downstream of the KLOG are mostly covered with rock

slope protection, except for the area within 166 feet of the KLOG. The CBD drains to the northeast, and the banks on each side of the KLOG are federal project levees. The CBD intercepts all drainage in the Colusa Basin on the west side of the Sacramento River between the communities of Colusa and Knights Landing. The confluence with the Sacramento River is approximately 1,300 feet downstream of the KLOG.

Nonnative Annual Grassland

The CBD levee banks and fallow agricultural field that occur along the northeastern boundary of the study area support nonnative annual grassland species. Grass and forb species observed in this cover type during the site visit included field mustard, soft chess, shepherd's purse, yellow star thistle, bull thistle, field bindweed, whitestem filaree, alkali mallow, Johnsongrass, milk thistle, and newly emerging grasses.

Unvegetated/Developed

The unvegetated/developed portions of the study area consist of the KLOG structure, County Road 108, and graveled roads on top of the levees on both sides of the CBD (Figure 3.4-1).

3.4.2.3 Sensitive Biological Resources

Special-Status Species

Special-status species are species that are legally protected under the California Endangered Species Act (CESA), federal Endangered Species Act (ESA), or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. For the purposes of this analysis, sensitive species include those listed below.

- Species listed or proposed for listing as threatened or endangered under ESA (50 CFR 17.12 [listed plants] and various notices in the *Federal Register* [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under ESA (79 Federal Register 72450 December 5, 2014).
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5).
- Species that meet the definitions of rare or endangered under the State CEQA Guidelines Section 15380.
- Animals that are identified as California species of special concern or fully protected species on California Department of Fish and Game's Special Animals List (California Department of Fish and Game 2011).
- Plants listed as rare under the California Native Plant Protection Act (California Fish and Game Code [CFGC] Section 1900 et seq.).
- Plants considered by CNPS to be "rare, threatened, or endangered in California" (Lists 1B and 2, California Native Plant Society 2015).
- Plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4, California Native Plant Society 2015),

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Figure 3.4-1
Impacts on Land Cover Types and Trees in the Biological Study Area

which may be included as special-status species on the basis of local significance or recent biological information.

Special-Status Plants

Special-status plant species identified with potential to occur in the study area were based on the presence of suitable habitat and microhabitat. Species presumed absent from the study area are those without suitable habitat or microhabitat.

Ten special-status plant species were identified as occurring within a 10-mile radius of the study area (California Natural Diversity Database 2015; California Native Plant Society 2015) (Appendices C and D). The status, distribution, habitat requirements, and identification period of the 10 species are shown in Table 3.4-1.

- Three species occur in habitats that are not present in the study area: woolly rose-mallow and Sanford's arrowhead in freshwater marsh and saline clover in mesic grasslands and vernal pools.
- Seven species have habitat present in the study area, but no suitable microhabitat (alkaline grassland, adobe clay soils, alkaline riparian forest) and/or the habitat is too disturbed by riprap or cultivation: alkali milk-vetch, brittlescale, San Joaquin spearscale, palmate-bracted bird's-beak, Heckard's pepper-grass, woolly-headed lessingia, and Wright's trichocoronis.

Blooming-period surveys have not been conducted in the study area to verify presence or absence of special-status plants; however, the lack of suitable habitat in the study area makes presence of special-status plants very unlikely.

Table 3.4-1. Special-Status Plants with Potential to Occur in the Vicinity of the Study Area

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution	Habitat Requirements	Identification Period	Potential for Occurrence in Study Area
Alkali milk vetch *Astragalus tener* var. *tener*	–/–/1B.2	Southern Sacramento Valley, northern San Joaquin Valley, eastern San Francisco Bay.	Playas, on adobe clay in valley and foothill grassland, vernal pools on alkali soils; below 197 feet.	Mar–Jun	Habitat present in nonnative annual grassland but suitable microhabitat (adobe clay) is not present. Nearest recorded occurrence is ~10.5 miles south of the study area.
Brittlescale *Atriplex depressa*	–/–/1B.2	Western and eastern Central Valley and adjacent foothills on west side of Central Valley.	Alkaline or clay soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools; below 1,050 feet.	Apr–Oct	Habitat present in nonnative annual grassland but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is ~7.5 miles south of the study area.
San Joaquin spearscale *Atriplex joaquiniana*	–/–/1B.2	Western edge of the Central Valley from Glenn to Tulare Counties.	Alkaline soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland; below 2,739 feet.	Apr–Oct	Habitat present in nonnative annual grassland but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is ~10 miles south of the study area.
Palmate-bracted bird's-beak *Chloropyron palmatum* [*Cordylanthus palmatus*]	E/E/1B.1	Livermore Valley and scattered locations in the Central Valley from Colusa to Fresno Counties.	Alkaline grassland, alkali meadow, chenopod scrub 50–1,670 feet.	May–Oct	Habitat present in nonnative annual grassland but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is ~7.5 miles south of the study area.
Rose-mallow *Hibiscus lasiocarpus* var. *occidentalis*	–/–/1B.2	Central and southern Sacramento Valley, deltaic Central Valley, and elsewhere in the U.S.	Freshwater marsh along rivers and sloughs; below 394 feet.	Jun–Sep	Nearest marsh habitat is in Sycamore Slough, which is 200 feet outside of the project disturbance area. Nearest recorded occurrence is ~4 miles southwest of the study area. No special-status species surveys have been conducted.

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution	Habitat Requirements	Identification Period	Potential for Occurrence in Study Area
Heckard's pepper-grass *Lepidium latipes* var. *heckardii*	–/–/1B.2	Southern Sacramento Valley.	Alkaline flats in valley and foothill grassland; 32–656 feet.	Mar–May	Habitat present in nonnative annual grassland but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is approximately 8.5 miles west of the study area.
Woolly-headed lessingia *Lessingia holoeuca*	–/–/3	Southern north Coast Ranges, southern Sacramento Valley, northern San Francisco Bay region, Alameda, Monterey, Marin, Napa, Santa Clara, San Mateo, Solano, Sonoma, and Yolo Counties.	Clay or serpentinite soils of broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland; 50–1,000 feet.	Jun-Oct	No suitable habitat in area within the Sacramento clay soil map unit, due to ongoing cultivation and discing. Nearest recorded occurrence is an historic occurrence ~9 miles southwest of the study area near Woodland. No special-status species surveys have been conducted.
Sanford's arrowhead *Sagittaria sanfordii*	–/–/1B.2	Scattered locations in Central Valley and Coast Ranges from Del North to Fresno Counties.	Freshwater marshes, sloughs, canals, and other slow-moving water habitats; below 2,132 feet.	May–Oct	Nearest marsh habitat is in Sycamore Slough, which is outside of the project disturbance area. Nearest recorded occurrence is ~15.5 miles northeast of the study area. No special-status species surveys have been conducted.
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	–/–/2B.1	Scattered locations in the Central Valley and Southern Coast; Texas.	On alkaline soils in floodplains, meadows and seeps, marshes and swamps, riparian forest, vernal pools; 15–1,425 feet.	May–Sep	Marginal habitat present in riparian area but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is ~14 miles northwest of the study area.
Saline clover *Trifolium hydrophilum*	–/–/1B.2	Sacramento Valley, central western California.	Salt marsh, mesic alkaline areas in valley and foothill grasslands, vernal pools, marshes and swamps; below 1,000 feet.	Apr–Jun	No wetland habitat present in study area. Nearest recorded occurrence is ~10.8 miles south of the study area.

Common and Scientific Name	Legal Status[a] Federal/ State/CNPS	Geographic Distribution	Habitat Requirements	Identification Period	Potential for Occurrence in Study Area

Sources: California Native Plant Society 2015; California Natural Diversity Database 2015; Consortium of California Herbaria 2015.

[a] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

– = no listing.

California Native Plant Society (CNPS) California Rare Plant Rank

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

2B = List 2B species: rare, threatened, or endangered in California but more common elsewhere.

3 = List 3 species: more information is needed about this plant.

0.1= seriously endangered in California.

0.2= fairly endangered in California.

Special-Status Wildlife

Of the 30 special-status wildlife species listed in Table 3.4-2, 7 species were eliminated from further consideration because suitable habitat for these species is not present in the study area or because the species range does not extend into the study area. A brief explanation for the absence of these species is included in Table 3.4-2. The remaining 23 species were determined to have low to high potential to occur in the study area on the basis of existing habitat conditions observed during the field surveys. No special-status wildlife species were observed during the 2015 field survey conducted for the proposed project.

In addition to special-status species, non-special-status migratory birds and raptors could nest in or adjacent to the study area and their occupied nests and eggs are protected by CFGC Sections 3503 and 3503.5 and the federal Migratory Bird Treaty Act (MBTA).

Table 3.4-2. Special-Status Wildlife with Potential to Occur in the Vicinity of the Study Area

Common and Scientific Names	Status[a] Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Invertebrates				
Antioch Dunes anthicid beetle *Anthicus antiochensis*	–/–/–	Population in Antioch Dunes believed extinct. Present in several localities along the Sacramento and Feather Rivers.	Loose sand on sand bars and sand dunes.	Moderate—small amount of potentially suitable habitat present; no occurrences within 5 miles of the study area.
Sacramento anthicid beetle *Anthicus sacramento*	–/–/–	Dune areas at mouth of Sacramento River; western tip of Grand Island, Sacramento County; upper Putah Creek and dunes near Rio Vista, Solano County; Ord Ferry Bridge, Butte County.	Found in sand slip-faces among willows; associated with riparian and other aquatic habitats.	Moderate—small amount of potentially suitable habitat present; no occurrences within 5 miles of the study area.
Sacramento Valley tiger beetle *Cicindela hirticollis abrupta*	–/–/–	Lower Sacramento Valley (i.e., Sacramento River, lower American River, and Cache Creek).	Found in sandy areas among willows in riverine and riparian habitats.	Moderate—small amount of potentially suitable habitat present; no occurrences within 5 miles of the study area.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/–/–	Streamside habitats below 3,000 feet throughout the Central Valley.	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant.	None—no suitable habitat (elderberry shrubs) present in or adjacent to the study area.
Vernal pool fairy shrimp *Branchinecta lynchi*	T/–/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County.	Common in vernal pools; also found in sandstone rock outcrop pools.	None—no suitable habitat present in the study area.
Vernal pool tadpole shrimp *Lepidurus packardi*	E/–/–	Shasta County south to Merced County.	Vernal pools and ephemeral stock ponds.	None—no suitable habitat present in the study area.

Common and Scientific Names	Status[a] Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Amphibians				
California tiger salamander *Ambystoma californiense*	T/T/–	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County.	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.	None—no suitable habitat present. No occurrences within 10 miles of the study area and no suitable breeding ponds are present within 1.24 miles (typical dispersal distance) of the study area.
California red-legged frog *Rana draytonii*	T/SSC/–	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County.	Permanent and semi-permanent aquatic habitats, such as creeks and coldwater ponds, with emergent and submergent vegetation. May estivate in rodent burrows or cracks during dry periods.	None—no suitable habitat present. Species considered extirpated from the valley floor (U.S. Fish and Wildlife Service 2002).
Reptiles				
Western pond turtle *Emys marmorata*	–/SSC/–	Occurs from the Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of Sierra Nevada.	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests.	Moderate—suitable habitat present in Sycamore Slough, north of the study area; not observed during field reconnaissance survey; one occurrence approximately 8 miles from the study area on the Sacramento River.
Giant garter snake *Thamnophis gigas*	T/T/–	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.	High—suitable habitat present; no occurrences in study area but numerous occurrences within 5 miles of the study area, some of which are in water bodies connected to the study area.

Common and Scientific Names	Status[a] Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Birds				
Great blue heron *Ardea Herodias*	–/–/CFGC, rookeries (nesting colony)	Year-round range spans most of California except the eastern portion of the State and the highest elevations; winter range expands to include eastern California.	Nests colonially in tall trees; forages in freshwater and saline marshes, shallow open water, and occasionally cropland or low, open upland habitats, such as pastures.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
Great egret *Ardea alba*	–/–/CFGC, rookeries (nesting colony)	Year-round range spans the Central Valley, central coast, and portions of southern California; winter range expands to include the remainder of the coast.	Nests colonially in tall trees; forages in freshwater and saline marshes, shallow open water, and occasionally cropland or low, open upland habitats, such as pastures.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
Snowy egret *Egretta thula*	–/–/CFGC, rookeries (nesting colony)	Year-round range spans the Central Valley, Delta, entire coast, central Coast Ranges, and southeastern California; winter range expands to include northeastern California.	Nests colonially in dense marshes and low trees; forages in freshwater and saline marshes, shallow open water, and occasionally irrigated cropland or wet upland habitats.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
Black-crowned night-heron *Nycticorax nycticorax*	–/–/CFGC, rookeries (nesting colony)	Year-round range includes much of lowland California.	Nests colonially in dense marshes, groves of low trees, and dense shrubs; forages in freshwater and saline marshes and in shallow open water at the edge of marsh vegetation.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
White-faced ibis *Plegadis chihi*	–/WL/CFGC, rookeries (nesting colony)	Year-round resident in scattered locations in the Central Valley and southern California; also nests in northeastern California.	Forages in wetlands and irrigated or flooded croplands and pastures; breeds colonially in dense freshwater marsh.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
Merlin *Falco columbarius*	–/–/WL	Does not breed in California. Winter range encompasses most of California except the highest elevations.	Forages in a wide variety of habitats, but in the Central Valley is most common around agricultural fields and grasslands.	Moderate—suitable foraging habitat in fallow field in and adjacent to the study area; no occurrences within 5 miles of the study area.

Common and Scientific Names	Status[a] Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Swainson's hawk *Buteo swainsoni*	–/T/–	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 and foraging habitat; two occurrences within 1 mile of the study area.
Western snowy plover *Charadrius alexandrinus nivosus*	T/–/SSC	Breeds in coastal California and near alkali lakes in eastern California and remnant alkali playas in the southern San Joaquin Valley	Nests and forages on sandy and gravelly beaches along the coast and the shores of inland alkali lakes.	None—no suitable habitat in the study area.
Mountain plover *Charadrius montanus*	–/–/SSC	Does not breed in California. Winter range spans the western Central Valley, including areas of the Delta east of Suisun Marsh, and portions of southern California.	Forages in short grasslands and plowed agricultural fields where vegetation is sparse and trees are absent.	Moderate—suitable winter foraging habitat in and adjacent to the study area.
Western yellow-billed cuckoo *Coccyzus americanus*	T/E/–	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers.	Wide, dense riparian forests with a thick understory of willows for nesting; Large patch sizes (20–40 hectares [49–99 acres], with a minimum width of 100 meters [328 feet]), are typically required for cuckoo occupancy (Laymon 1998; Riparian Habitat Joint Venture 2004). Sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley-oak riparian habitats where scrub jays are abundant.	Low—riparian trees are not of sufficient patch size to support cuckoos (0.15 hectares); nearest occurrence approximately 8 miles from the study area.
Western burrowing owl *Athene cunicularia hypogea*	–/SSC/–	Lowlands throughout California, including the 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.	Low—suitable foraging habitat; no suitable nesting habitat; no occurrences in the study area. Nearest occurrence approximately 9 miles from the study area.

Common and Scientific Names	Status[a] Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Bank swallow *Riparia riparia*	–/T/–	Occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American Rivers, in the Owens Valley, 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 bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam.	Low—no suitable nesting habitat in the study area.
Tricolored blackbird *Agelaius tricolor*	–/E/–	Permanent resident in the Central Valley from Butte County to Kern County; breeds at scattered coastal locations from Marin County south to San Diego County and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties.	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony.	Moderate—suitable foraging habitat present; no suitable nesting habitat present in the study area; two colonies within 3 miles of the study area.
Song sparrow ("Modesto" population) *Melospiza melodia*	–/–/SSC	Year-round range includes the Delta east of Suisun Marsh, the Sacramento Valley, and the northern San Joaquin Valley.	Nests and forages primarily in emergent marsh, riparian scrub, and early successional riparian forest habitats, and infrequently in mature riparian forest and sparsely vegetated ditches and levees.	High—suitable nesting and foraging habitat in riparian and emergent vegetation in and adjacent to the study area; no occurrences within 5 miles of the study area.
Mammals				
Western red bat *Lasiurus blossevillii*	–/SSC/ WBWG: High priority	Scattered throughout much of California at lower elevations.	Found primarily in riparian and wooded habitats. Occurs at least seasonally in urban areas. Day roosts in trees in the foliage. Found in fruit orchards and sycamore riparian habitats in the Central Valley.	Moderate—suitable roosting and foraging habitat; there is one occurrence within 1 mile of the study area.

Common and Scientific Names	Status[a] Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Hoary bat *Lasiurus cinereus*	–/–/ WBWG: Moderate priority	Occurs throughout California from sea level to 13,200 feet.	Found primarily in forested habitats. Also found in riparian areas and in park and garden settings in urban areas. Day roosts in foliage of trees.	Moderate—suitable roosting and foraging habitat; there is one occurrence within 1 mile of the study area.
Silver-haired bat *Lasionycteris noctivagans*	–/–/WBWG: Moderate priority	Found from the Oregon border south along the coast to San Francisco Bay and along the Sierra Nevada and Great Basin region to Inyo County. Also occurs in southern California from Ventura and San Bernardino Counties south to Mexico. Has been recorded in Sacramento, Stanislaus, Monterey, and Yolo Counties.	During spring and fall migrations, may be found anywhere in California. Summer habitats include coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. Roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark.	Moderate—suitable roosting and foraging habitat; no occurrences have been recorded within 5 miles of the study area (possibly due to the lack of bat surveys in this area).
Pallid bat *Antrozous pallidus*	–/SSC/ WBWG: High priority	Occurs throughout California, except the high Sierra, from Shasta to Kern County and the northwest coast, primarily at lower and mid elevations.	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts.	Moderate—suitable roosting and foraging habitat; no occurrences have been recorded within 5 miles of the study area (possibly due to the lack of bat surveys in this area).

Common and Scientific Names	Status[a] Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
American badger *Taxidea taxus*	–/SSC	In California, occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties.	Wide variety of open, arid habitats but most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	None— no suitable habitat in the study area..

[a] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

C = candidate species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no listing.

Other

WBWG = Western Bat Working Group 2007. Available: http://www.wbwg.org/spp_matrix.html.

Moderate priority = species status is unclear because of a lack of data; this designation indicates a level of concern that should warrant (1) closer evaluation and more research of the species and possible threats and (2) conservation actions benefiting the species.

High priority = species are imperiled or at high risk of imperilment.

Special-Status Fish

Eight special-status fish species have the potential to occur in the project area determined by their critical habitat and life histories of the species. The potential to occur within the project area was rated high for all species, although the extent of occurrence depends on the timing of fish presence in the project area and their ability to successfully avoid the affected areas.

Table 3.4-3. Special-Status Fish with Potential to Occur in the Vicinity of the Study Area

Common and Scientific Name	Legal Status[a] Federal/ State	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Study Area
Chinook salmon—winter-run *Oncorhynchus tshawytscha*	E/E	Adults occur in the main-stem Sacramento River from Keswick Dam to Red Bluff Diversion Dam. Juveniles occur from the Upper Sacramento River through the Delta and the SF Estuary.	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High—during adult migration and juvenile rearing/migration.
Chinook salmon—spring-run *Oncorhynchus tshawytscha*	T/T	The Sacramento River, Feather River, Yuba River, Butte Creek, Mill Creek, Deer Creek, Antelope Creek, Battle Creek, Clear Creek, and Beegum Creek tributary to Cottonwood Creek.	Occurs in tributaries of the Sacramento River that maintain well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High—during adult migration and juvenile rearing/migration.
Chinook salmon—fall and late fall-run *Oncorhynchus tshawytscha*	SSC/–	The main stem Sacramento River and tributaries. The San Joaquin River tributaries.	Occurs in streams and rivers within the Sacramento and San Joaquin River drainage that well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High—during adult migration into Sacramento River and tributaries.
Steelhead—Central Valley DPS *Oncorhynchus mykiss*	T/–	Riverine and stream habitat within the Sacramento-San Joaquin River drainages that contain suitable habitat needed for steelhead survival.	Occurs in streams and rivers within the Sacramento River drainage that are well-oxygenated, cool, riverine habitat with water temperatures from 7.8 to 18°C (Moyle 2002). Habitat types are riffles, runs, and pools.	High—during adult migration and juvenile rearing/migration.

Common and Scientific Name	Legal Status[a] Federal/ State	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Study Area
Green sturgeon (Southern DPS) *Acipenser medirostris*	T/SSC	The Sacramento River, the Yolo and Sutter bypasses, the lower Feather River, and the lower Yuba River. The lower San Joaquin River and the Delta. SF Estuary and coastal waters.	Habitat that is free of migratory obstructions, with water quantity and quality that support migratory movements, enhance juvenile growth and provide cover. Need well-oxygenated water, with temperatures from 8.0 to 14°C.	High—during adult migration and juvenile rearing/migration.
Sacramento Splittail *Pogonichthyes macrolipidotus*	–/SSC	The Sacramento river, sloughs, backwaters and oxbow lakes to RBDD.	Backwater habitat that is shallow, low velocity, suitable temperature, and food availability.	High—during adult migration and juvenile rearing/migration.
River lamprey *Lampetra ayresi*	–/SSC	Sacramento, San Joaquin, and Napa Rivers; tributaries of San Francisco Bay (Moyle 2002; Moyle et al. 1995).	Adults live in the SF Estuary and migrate into fresh water to spawn.	High—during adult migration and juvenile rearing/migration.
Hardhead *Mylopharodon conocephalus*	–/SSC	Sacramento, San Joaquin, and Russian Rivers and tributaries (Moyle 2002; Moyle et al. 1995).	Typically occur in undisturbed, low- to mid-elevation streams and main stem Sacramento River and tributaries.	High. Encountered in Glenn Colusa Irrigation District sampling upstream of site area.

DPS = distinct population segment.
Status explanations:
Federal
E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
C = candidate for listing as threatened or endangered under the federal Endangered Species Act.
– = no listing.
State
E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
FP = fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
– = no listing.

Waters of the United States, Including Wetlands

The CBD is a water of the United States. No wetlands were identified in the study area. A preliminary delineation of the OHWM of the CBD was conducted on January 23, 2015, and submitted in a letter to the USACE on May 7, 2015, in support of a preliminary jurisdictional determination.

3.4.3 Regulatory Setting

3.4.3.1 Federal

The following federal regulations related to biological resources apply to implementation of the proposed project.

Federal Endangered Species Act

The ESA protects fish and wildlife species and their habitats that have been identified by NMFS or USFWS as threatened or endangered. *Endangered* refers to species, subspecies, or DPSs that are in danger of extinction through all or a significant portion of their range. *Threatened* refers to species, subspecies, or DPSs that are likely to become endangered in the near future.

The ESA is administered by USFWS and NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fish, and USFWS is responsible for other listed species. Provisions of Sections 7 and 9 of the ESA are relevant to this proposed project and summarized below.

Section 7: Endangered Species Act Authorization Process for Federal Actions

Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by federal agencies. Under Section 7, the federal agency conducting, funding, or permitting an action (for this project, USACE) must consult with NMFS or USFWS, as appropriate, to ensure that the proposed project would not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. The study area supports potential habitat for federally listed giant garter snake, Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and southern DPS green sturgeon that could be adversely affected by the proposed project. Therefore, the proposed project has the potential to result in take of a federally listed species, and consultation would be initiated with NMFS and USFWS.

Section 9: Endangered Species Act Prohibitions

Section 9 of the ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by federal regulations.[1] *Take*, as defined by ESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Harm* is defined as "any act that kills or injures the species, including significant habitat modification." In addition, Section 9 prohibits removing, digging up, cutting, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction.

[1] In some cases, exceptions may be made for threatened species under ESA Section 4(d); in such cases, USFWS or NMFS issues a "4(d) rule" describing protections for the threatened species and specifying the circumstances under which take is allowed.

Critical Habitat

Critical habitat, as defined in ESA Section 3, is the specific area within the geographic area occupied by a species, at the time it is listed in accordance with ESA, on which are found those biological features essential to the conservation of the species, and may require special management considerations or protection. It also includes specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. No critical habitat has been designated for giant garter snake. The study area is within the critical habitat designated for Central Valley steelhead, Central Valley spring-run chinook salmon, winter-run chinook salmon, and southern DPS green sturgeon.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires all federal agencies to consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect Essential Fish Habitat (EFH). EFH is defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

Migratory Bird Treaty Act

The MBTA (16 U.S. Code [USC] 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union (now Russia). The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11). Executive Order 13186 (January 10, 2001) directs each federal agency taking actions that have or may have a negative effect on migratory bird populations to work with USFWS to develop a memorandum of understanding that will promote the conservation of migratory bird populations. The study area supports known migratory bird nests and potential nesting habitat that could be affected by implementation of the proposed project.

Clean Water Act

The CWA was enacted as an amendment to the federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

The CWA empowers the U.S. Environmental Protection Agency (EPA) to set national water-quality standards and effluent limitations and includes programs addressing both point-source and non-point-source pollution. *Point-source pollution* is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. *Non-point-source pollution* originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. The following sections provide additional details on pertinent sections of the CWA.

Section 404 of the Clean Water Act

USACE and EPA regulate the discharge of dredged and fill material into "waters of the United States" under Section 404 of the CWA. USACE's jurisdiction over nontidal waters of the United States extends to the OHWM, provided the jurisdiction is not extended by the presence of wetlands (33 CFR Part 328 Section 328.4). The OHWM is defined in the federal regulations as follows.

> [T]hat line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. (33 CFR Part 328 Section 328.3[e].)

USACE typically will exert jurisdiction over that portion of the study area that contains waters of the United States and adjacent wetlands. This jurisdiction equals approximately the bank-to-bank portion of a creek along its entire length up to the OHWM and adjacent wetlands areas that would be directly or indirectly adversely affected by the proposed project. The OHWM area of the CBD is under USACE jurisdiction, and placement of project structures and erosion control within the OHWM would require a CWA Section 404 permit.

Section 401 of the Clean Water Act

Under CWA Section 401, applicants for a federal license or permit to conduct activities that might result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. A CWA Section 401 water quality certification from the Central Valley Regional Water Board would be required for construction in the CBD.

3.4.3.2 State

The following state regulations related to biological resources apply to implementation of the proposed project.

California Endangered Species Act

CESA (CFGC Sections 2050 through 2116) states that all native species or subspecies of a fish, amphibian, reptile, mammal, or plant and their habitats that are threatened with extinction and those experiencing a significant decline that, if not halted, would lead to a threatened or endangered designation will be protected or preserved.

Under Section 2081 of the CFGC, a permit from CDFW is required for projects that could result in the take of a species that is state-listed as threatened or endangered. Under CESA, *take* is defined as an activity that would directly or indirectly kill an individual of a species. The definition does not include *harm* or *harass*, as the definition of take under ESA does. As a result, the threshold for take under CESA is higher than that under ESA. For example, habitat modification is not necessarily considered take under CESA.

Section 2090 of CFGC requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. CDFW administers the act and authorizes take through CFGC Section 2081 incidental take agreements (except for species designated as fully protected) and Section 2080.1 consistency determinations. If it is determined that the proposed

project will result in take of a state-listed species, an incidental take permit or consistency determination will be obtained through consultation with CDFW. The study area supports state listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and potential nesting habitat for the state-listed Swainson's hawk.

For Swainson's hawks, CDFW has developed survey guidance, conservation strategies, and best practices for avoiding, minimizing, and mitigating project impacts on the species. The most recent guidance published by CDFW is the *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California* (California Energy Commission and California Department of Fish and Game 2010). Although this guidance is not specific to the project area, it provides the most up-to-date information on Swainson's hawk survey recommendations and protection measures.

California Fully Protected Species

CFGC Sections 3511, 3513, 4700, and 5050 pertain to fully protected wildlife species (birds in Sections 3511 and 3513, mammals in Section 4700, and reptiles and amphibians in Section 5050) and strictly prohibit the take of these species. CDFW cannot issue a take permit for fully protected species, except under narrow conditions for scientific research or the protection of livestock, or if a Natural Community Conservation Plan (NCCP) has been adopted. The study area supports potential nesting habitat for the fully protected white-tailed kite that could be affected by implementation of the proposed project.

Sections 3503, 3503.5, and 3513 of the California Fish and Game Code

CFGC Sections 3503, 3503.5, and 3513 protect all native birds, birds of prey, and all nongame birds, including eggs and nests, that are not already listed as fully protected and that occur naturally within the state. Eggs and nests of all birds are protected under Section 3503, while Section 3503.5 protects all birds of prey as well as their eggs and nests. Migratory non-game birds are protected under Section 3513. Except for take related to scientific research, take as described above is prohibited. Many bird species potentially could nest in the project area or vicinity. These birds, their nests, and eggs would be protected under these sections of the CFGC. The study area supports known bird nests and potential nesting habitat that could be affected by implementation of the proposed project.

California Native Plant Protection Act

CESA defers to the California Native Plant Protection Act (CNPPA) to ensure that state-listed plant species are protected when state agencies are involved in projects subject to CEQA. Plants listed as rare under CNPPA are not protected under CESA but rather under CEQA. One state-listed endangered species, palmate-bracted bird's-beak, occurs in the project region.

Sections 1600–1603 of the California Fish and Game Code

CFGC Sections 1600–1603 state that it is unlawful for any person or agency to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources, or to use any material from the streambeds, without first notifying CDFW. A Lake and Streambed Alteration Agreement must be obtained if effects are expected to occur. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks, and that supports

wildlife, fish, or other aquatic life. This definition includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife extending to the tops of banks and often including the outer edge of riparian vegetation canopy cover. The CBD and associated riparian habitat within the study area are within CDFW jurisdiction, and construction activities in the CBD and riparian habitat would require a Section 1602 streambed alteration agreement.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, the State of California, through the Regional Water Boards, regulates discharges of waste into any waters of the state, regardless of whether USACE has concurrent jurisdiction under CWA Section 404. *Waters of the state* include all surface water or groundwater within the state. The CBD is a water of the state that would be affected by implementation of the project. Because the CBD is also a water of the United States, regulation by the Regional Water Board would occur under CWA Section 401, as described above.

3.4.3.3 Local

The following local policies related to biological resources apply to implementation of the proposed project.

Yolo County 2030 Countywide General Plan

The Conservation Element of Yolo County's *2030 Countywide General Plan* (Yolo County 2009) includes policies to protect biological resources in the study area. These policies include preservation and restoration of open space, native vegetation and plant communities, ecological functions in the watershed, wildlife movement corridors, and special-status species. The proposed project would be in compliance with Yolo County policies.

Draft Yolo County Natural Heritage Program

The draft Yolo County Natural Heritage Program is a countywide NCCP/habitat conservation plan (HCP) to conserve the natural open space and agricultural landscapes that provide habitat for many special-status species in the county (Yolo County Natural Heritage Program 2009). The Yolo County Natural Heritage Program will describe the measures that will be undertaken to conserve important biological resources and obtain permits for urban growth and public infrastructure projects. The study area supports important biological resources to be conserved under the NCCP/HCP that would be affected by implementation of the proposed project. Project impacts on special-status species should be evaluated with consideration of measures in the draft NCCP/HCP.

Yolo County Habitat Conservation Joint Powers Agency

The Yolo County Habitat Conservation Joint Powers Agency (JPA) was formed in August 2002 for the purpose of acquiring habitat conservation easements and to serve as the lead agency for the preparation of a NCCP/HCP for Yolo County and the Cities of Davis, Woodland, Winters, and West Sacramento. The JPA is responsible for the facilitation of mitigation for effects on foraging habitat of the state-threatened Swainson's hawk by assisting in the acquisition of conservation easements. The JPA and CDFW have entered into an *Agreement Regarding Mitigation for Impacts to Swainson's Hawk Foraging Habitat in Yolo County* (Mitigation Agreement).

The Mitigation Agreement allows for the establishment of a mitigation fee program to fund the acquisition, enhancement, and long-term management of Swainson's hawk foraging habitat conservation lands. As of January 2006, the JPA has issued a Revised Swainson's Hawk Interim Mitigation Fee Program that requires a 1:1 compensation ratio (1 acre of Swainson's hawk foraging habitat preserved for every 1 acre of foraging habitat lost). Projects of fewer than 40 acres could contribute to a fund for purchase of suitable conservation lands. Projects of more than 40 acres would require the developer, in coordination with the JPA, to locate and negotiate a conservation easement on an appropriate property that would contribute to the JPA's preserve design. The Mitigation Agreement does not authorize the incidental take of Swainson's hawk.

3.4.4 Methods

The methods used to identify biological resources consisted of a prefield investigation and field survey. These methods and additional information obtained for the study area are described below.

3.4.4.1 Prefield Investigation

Prior to conducting the site visits for the proposed project, ICF International biologists reviewed information pertaining to vegetation and wetland resources in the project area or vicinity from the following sources.

- A search of the CNPS online Inventory of Rare and Endangered Plants of California for the 7.5-minute Knights Landing, Taylor Monument, Grays Bend, Eldorado Bend, Kirkville, Woodland, Verona, Nicolaus, and Sutter Causeway quadrangles (California Native Plant Society 2015) (Appendix C).
- A CNDDB records search of the USGS 7.5-minute Knights Landing, Taylor Monument, Grays Bend, Eldorado Bend, Kirkville, Woodland, Verona, Nicolaus, and Sutter Causeway quadrangles (California Natural Diversity Database 2015) (Appendix D).
- USFWS list of endangered, threatened, and proposed species for the USGS 7.5-minute Knights Landing quadrangle and Yolo County obtained from the USFWS web site (U.S. Fish and Wildlife Service 2015) (Appendix E).

3.4.4.2 Field Surveys

An ICF International wildlife biologist and botanist/wetland ecologist conducted a reconnaissance-level site visit on January 27, 2015, to document existing conditions within the study area, including the land cover types, including waters of the United States; wildlife habitats; and trees.

3.4.5 Environmental Effects

Potential impacts of the proposed project on biological resources are discussed in the context of State CEQA Guidelines Appendix G checklist items.

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

Special-Status Plants

No suitable habitat for special-status plants is present in the study area for the project; accordingly, there would be no impacts on special-status plants as a result of project construction or operation.

Special-Status Wildlife

Impact BIO-1: Loss of Foraging and Nesting Habitat for Swainson's Hawk and other Migratory Birds and Raptors (less than significant with mitigation)

The study area supports riparian vegetation and large trees that could provide nesting habitat for birds and raptors including the state-listed Swainson's hawk. If project construction occurs during the breeding season (generally February 15 through August 30), then tree trimming and removal, increased noise, and ground disturbance from large equipment could result in the removal of active nests, abandonment of an active nest, or forced fledging of young. This impact is potentially significant because it could result in an appreciable reduction in the reproductive success of a sensitive species (i.e. Swainson's hawk). The proposed project will not affect nesting migratory birds and raptors based on a construction schedule from September through October. If construction activities are necessary during the nesting season (February 15 through August 30), preconstruction surveys will be required to identify the location of active special-status and non–special status migratory bird or raptor nests, and appropriate buffers will be implemented according to Mitigation Measure BIO-MM-1 to reduce this impact to a less-than-significant level. Conducting mandatory biological awareness training for all project personnel and implementing general protection measures, as required under Mitigation Measure BIO-MM-2, would further reduce this impact to a less-than-significant level.

Mitigation Measure BIO-MM-1: Avoid Disturbance of Tree-, Shrub, and Ground-Nesting Special-Status and Non-Special-Status Migratory Birds and Raptors and Conduct Preconstruction Nesting Bird Surveys

To avoid and minimize effects on nesting special-status and non–special status migratory birds and raptors, RD 108 will implement the appropriate surveys and restrictions, as follows.

- To avoid removing or disturbing any active Swainson's hawk or other migratory bird and raptor nests, construction activities (vegetation removal) will be conducted during the nonbreeding season (generally between September 1 and February 14) or after a qualified biologist determines that fledglings have left an active nest. If construction activities cannot be postponed, preconstruction surveys and no-disturbance will be required, as described below.
- If construction or tree-removal activities will occur during the breeding season (February 15 through August 31), a qualified wildlife biologist (with knowledge of the species to be surveyed) will be retained to conduct a preconstruction survey for nesting birds and raptors in all trees, shrubs, and ground-nesting habitat within 500 feet (0.25 mile for Swainson's

hawk) of construction activities, including vegetation removal and staging areas. The nesting survey will be conducted no more than 14 days prior to the start of construction.

- If the biologist determines that the area surveyed does not contain any active nests, then construction activities—including removal or pruning of trees and shrubs—can commence without any further mitigation.
- If an active nest is located in the survey area, an appropriate no-disturbance buffer will be established by the biologist. The buffer distance should be determined based on the species, nature of construction activities, and line of sight from the work area. At a minimum, all work will be conducted no less than 250 feet from an active raptor nest, 100 feet from an active migratory bird nest, or another distance as determined during informal consultation with CDFW and/or USFWS. A qualified wildlife biologist will monitor the nest to determine when the young have fledged. The biological monitor will have the authority to halt construction if there is any sign of distress to any raptor or migratory bird. Reference to this requirement and the MBTA will be included in the construction specifications.

Mitigation Measure BIO-MM-2: Conduct Mandatory Biological Resources Awareness Training for All Project Personnel and Implement General Protection Measures

Before any ground-disturbing work (including vegetation clearing, grading, and equipment staging) occurs in the study area, a USFWS-approved biologist will conduct a mandatory biological resources awareness training for all construction personnel about sensitive biological resources (e.g., nesting birds, riparian trees, giant garter snakes, and western pond turtles). The training will cover the natural history, appearance (using representative photographs), and legal status of species as well as the avoidance and minimization measures to be implemented. Proof of personnel attendance will be provided to USFWS, CDFW, or other overseeing agencies as appropriate. If new construction personnel are added to the proposed project, the contractor will ensure that the new personnel receive the mandatory training before starting work.

RD 108 will clearly delineate the construction limits through the use of survey tape, pin flags, orange barrier fencing, or other means, and prohibit any construction-related traffic outside these boundaries. Requirements that will be followed by construction personnel are listed below.

- Construction vehicles will observe the posted speed limit on hard-surfaced roads and a 10-mile-per-hour speed limit on unpaved roads during travel in the construction area.
- Construction vehicles and equipment will restrict off-road travel to the designated construction areas.
- Construction vehicles left onsite overnight will be thoroughly inspected each day for snakes (both underneath the vehicle and in open cabs) before they are moved.
- All food-related trash will be disposed of in closed containers and removed from the construction area at least once per week during the construction period. Construction personnel will not feed or otherwise attract fish or wildlife to the construction site.
- No pets or firearms will be allowed in the construction area.
- To avoid entrapment of wildlife, all excavated steep-walled holes or trenches more than 1 foot deep will either be properly covered or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each workday.

- To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service vehicles or construction equipment outside designated staging areas.
- Any worker who inadvertently injures or kills a special-status species or finds one dead, injured, or entrapped will immediately report the incident to the biological monitor and construction foreman. The biological monitor will immediately notify RD 108, who will provide verbal notification to the USFWS Sacramento Endangered Species Office and/or the local CDFW warden or biologist within 1 working day. RD 108 will follow up with written notification to USFWS or CDFW within 5 working days. The biological monitor will follow up with RD 108 to ensure that the wildlife agencies were notified.

Impact BIO-2: Disturbance or Loss of Giant Garter Snakes and Western Pond Turtles and Their Habitat (less than significant with mitigation)

No suitable aquatic giant garter snake or western pond turtle habitat exists in the study area. The CBD directly downstream of the existing KLOG structure (within approximately 300 feet) does not provide suitable aquatic habitat for giant garter snake or western pond turtle because of the high-flow waters coming out of the gates. However, suitable aquatic habitat for both species does occur in the vicinity of the study area, consisting of Sycamore Slough and the CDB upstream (and potentially more than 300 feet downstream) of the KLOG structure.

Suitable upland giant garter snake and western pond turtle habitat in the study area is limited to the banks of the CBD upstream of the existing KLOG structure, the annual grassland within the staging area on the east bank of the CBD, and a portion of the staging area (consisting of a fallowed field) west of the CBD. Giant garter snakes and western pond turtles (if present) are expected to be primarily associated with aquatic habitat upstream or downstream of the study area and in uplands within 200 feet of these aquatic features. There are three CNDDB-recorded occurrences of giant garter snake within 5 miles of the study area (California Department of Fish and Wildlife 2015). In addition, there are 12 records of occurrences within 5 miles of the study area from surveys conducted by USGS (Wylie and Amarello 2006). The closest known occurrence was documented within the CBD approximately 2.9 miles east of the study area (Wylie and Amarello 2006). There are no CNDDB records of western pond turtle within 5 miles of the study area.

Construction of the proposed project would not result in the permanent loss of aquatic or upland giant garter snake or western pond turtle habitat because the areas proposed for the fish barrier and erosion repairs do not provide suitable habitat for either species. A small amount of potential upland habitat for giant garter snake and western pond turtle (up to 1.21 acres) located within 200 feet of suitable aquatic habitat would be temporarily disturbed during equipment access and staging (Figure 3.4-2). Impacts would be temporary (approximately 2 months) and are not expected to substantially limit the availability of upland habitat for giant garter snake or western pond turtle in the vicinity of the study area. Disturbance or degradation of suitable aquatic habitat for giant garter snake and western pond turtle in or adjacent to the study area could occur from fuel or oil leaks or spills during construction activities adjacent to aquatic habitat.

Construction activities in and adjacent to suitable habitat could result in the injury, mortality, or disturbance of giant garter snakes. Giant garter snakes could be injured or crushed by construction equipment in or near suitable aquatic and upland habitat. Snakes could also be killed by construction vehicles traveling though the study area. Fuel or oil spills from construction equipment into aquatic habitat could also cause illness or mortality of giant garter snakes and western pond

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Figure 3.4-2
Temporary Impacts on Suitable Giant Garter Snake Upland Habitat

turtle. Noise and vibrations from construction equipment and presence of humans during construction activities may also disturb giant garter snakes or western pond turtle if present within the study area.

Most construction activities would be limited to the snake's active period (May 1 through October 1) when the potential for direct mortality is reduced because snakes can actively move and avoid danger. However, construction of the fish barrier would require construction during both September and October when agricultural fields are not draining irrigation water into the CBD. Giant garter snakes are not expected to be present in the CBD where the fish gate construction and the bank stabilization would occur (downstream and within approximately 300 feet of the existing KLOG structure) because the regular, high water flows through the gates make the habitat unsuitable for snakes, which prefer low-flow waterbodies. In addition, dewatering of the fish gate structure work area would occur prior to October 1 and would encourage any resident giant garter snakes (if present) to leave the aquatic portion of the construction area. If present, giant garter snakes in the upland ruderal grassland adjacent to the canal could be injured or killed during work within the snake's dormant period.

Potential impacts on habitat for giant garter snake and western pond turtle would be considered significant. Implementation of Mitigation Measures BIO-MM-3 through BIO-MM-7, and WQ-MM-1, described in Section 3.3, *Hydrology and Water Quality*, would reduce potential impacts on giant garter snake and western pond turtle to a less-than-significant level.

Mitigation Measure BIO-MM-3: Conduct Preconstruction Surveys and Monitoring for Giant Garter Snake and Other Sensitive Biological Resources

- RD 108 will retain a qualified biologist to monitor construction activities adjacent to sensitive biological resources (detailed surveys and monitoring requirements for giant garter snake are described below). The biologist will assist the construction crew, as needed, to comply with all project implementation restrictions and guidelines. In addition, the biologist will be responsible for ensuring that RD 108 or its contractors maintain the construction barrier fencing adjacent to sensitive biological resources.
- Prior to ground-disturbing activities within suitable giant garter snake aquatic and upland habitat (undeveloped areas within 200 feet of suitable aquatic habitat), a USFWS-approved biologist will conduct a preconstruction survey for giant garter snake and inspect construction barrier and/or exclusion fencing to ensure they are intact at the beginning of each work day. A USFWS-approved biologist will be onsite during all ground disturbing activities within suitable aquatic and upland habitat to monitor construction activities and ensure that giant garter snake protection measures are being implemented properly. If any snakes are observed within the construction area during construction, the biological monitor will be notified immediately so that they can make a positive identification of the snake. If practical, photographs will be taken of any snake found dead or alive in the construction area. If a giant garter snake is found within the construction area, the biological monitor will have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake will not be harmed. Giant garter snakes encountered during construction activities will be allowed to move away from construction activities on their own. If unable to move away on their own, trapped or injured giant garter snakes will only be removed by a USFWS-approved biologist authorized to conduct relocation activities. The captured snake will be placed in the nearest suitable

habitat that is outside of the construction area. RD 108 will provide verbal notification of relocation activities to USFWS within 1 working day and will follow up with a written account of the details of the incident within 5 working days.

- The biological monitor will prepare daily monitoring logs that include a description of construction activities; areas surveyed and monitored; communication with construction personnel, RD 108, and wildlife agencies; noncompliance issues and resolutions; and a list of all wildlife species observed during monitoring activities. The biological monitor will also record all observations of state and federally listed species on CNDDB field sheets and submit to CDFW.

Mitigation Measure BIO-MM-4: Install and Maintain Exclusion and Construction Barrier Fencing around Suitable Giant Garter Snake Habitat and Other Sensitive Biological Resources

To clearly demarcate the project boundary and protect sensitive natural communities, RD 108 or its contractor will install temporary exclusion fencing around sensitive biological resource areas (e.g. riparian trees, giant garter snake habitat) 1 week prior to the start of construction activities. RD 108 will ensure that the temporary fencing is continuously maintained until all construction activities are completed and that construction equipment is confined to the designated work areas. Additional areas of silt fencing to prevent sediment from entering perennial drainage in the CBD will be installed where construction activities are occurring on the levees. The exclusion and silt fencing will be removed only after construction is entirely completed.

- Signage will be placed on the exclusion fencing that will explain the nature of the sensitive resource and warn that no effect on the resource is allowed. The fencing will include a buffer zone of at least 20 feet between the resource and construction activities, where feasible. All exclusion and silt fencing will be maintained in good condition throughout the construction period.
- To reduce the likelihood of giant garter snakes entering the construction area, RD 108 will install exclusion fencing and orange construction barrier fencing along the portions of the construction area that are within 200 feet of suitable aquatic habitat and provide suitable upland habitat. The exclusion and construction barrier fencing will be installed during the active period for giant garter snakes (May 1–October 1) to reduce the potential for injury and mortality during this activity.
- The construction specifications will require that RD 108 or its contractor retain a qualified biologist to identify the suitable giant garter snake aquatic and upland habitat that are to be avoided during construction. Sensitive habitat areas adjacent to the construction area, including staging and access, will be fenced off to avoid inadvertent disturbance in these areas. Before construction, the contractor will work with the qualified biologist to identify the locations for the barrier fencing and will place flags or flagging around the areas to be protected to indicate the locations of the barrier fences. The location of the barrier fencing and sensitive habitat areas will be clearly identified on the construction drawings. The fencing will be installed the maximum distance practicable from the aquatic habitat areas and will be in place before construction activities (including vegetation removal, grading, or equipment staging) are initiated.

- The exclusion fencing will consist of 3-foot-tall silt fencing buried 4–6 inches below ground level. The exclusion fencing will ensure that giant garter snakes are excluded from the construction area and that suitable upland and aquatic habitat is protected throughout construction. The construction barrier fencing will be commercial-quality, woven polypropylene, orange in color, and 4 feet high (Tensor Polygrid or equivalent). The fencing will be tightly strung on posts with a maximum of 10-foot spacing. The construction barrier fencing can be attached to the exclusion fencing or the exclusion fencing can double as construction barrier fencing if it is orange in color and is a minimum of 4 feet tall.
- Barrier and/or exclusion fences will be inspected daily by a USFWS-approved biological monitor during ground-disturbing activities and weekly after ground-disturbing activities until construction is complete or until the fences are removed, as approved by the biological monitor. The biological monitor will be responsible for ensuring that the contractor maintains the protective fencing around giant garter snake habitat throughout construction. Weekly monitoring summary reports will be provided to RD 108 and USFWS, as necessary.

Mitigation Measure BIO-MM-5: Conduct Construction Activities during the Active Period for Giant Garter Snake

- To the maximum extent possible, all construction activity within suitable giant garter snake aquatic and upland habitat (undeveloped areas within 200 feet of aquatic habitat) will be conducted during the snake's active period (May 1 through October 1). During this timeframe, potential for injury and mortality are lessened because snakes are actively moving and avoiding danger. Water barrier installation and dewatering, and erosion repairs will occur during this timeframe. Construction is scheduled from September 1 to October 15 to take advantage of the low-flow period in order to minimize in-water work, as well as to fit the approval timeline for associated permits. Because construction of the fish barrier cannot occur during the high flows caused by runoff from the agricultural fields upstream of the existing KLOG structure, the fish barrier construction must be conducted after October 1. Additional protective measures will be implemented for this construction and associated staging areas (see Mitigation Measure BIO-MM-7).

Mitigation Measure BIO-MM-6: Minimize Potential Impacts on Giant Garter Snake Habitat

RD 108 will implement the following measures to minimize potential impacts on giant garter snake habitat.

- Staging areas will be located more than 200 feet from suitable giant garter snake aquatic habitat or will be fenced with exclusion fencing prior to the start of construction and between May 1 and October 1.
- Any dewatered habitat will be sufficiently dry (no standing water) prior to excavating or filling of the dewatered habitat.
- Vegetation clearing within 200 feet of the banks of suitable giant garter snake aquatic habitat will be limited to the minimum area necessary.
- The movement of heavy equipment within 200 feet of the banks of suitable giant garter snake aquatic habitat will be confined to designated haul routes to minimize habitat disturbance.

Mitigation Measure BIO-MM-7: Implement Additional Protective Measures for Work that Would Occur in Suitable Habitat and during the Giant Garter Snake Dormant Period

RD 108 will implement additional protective measures during time periods when work must occur during the giant garter snake dormant period (October 2 through April 30), when snakes are more vulnerable to injury and mortality.

- A full-time USFWS-approved biological monitor will be onsite for the duration of construction activities after October 1.
- All vegetation within 200 feet of aquatic habitat will be cleared prior to the giant garter snake hibernation period (i.e., vegetation clearing must be completed by October 1 for following winter work).
- No new excavation will be conducted within suitable upland habitat for giant garter snakes between October 2 and April 30.
- Piles of side-cast soil or debris will be removed from the construction area prior to October 1 to avoid attracting snakes to the construction area.
- Exclusion fencing will be installed around the perimeter of the work area where construction activities associated with fish barrier installation activities would take place. The fencing will enclose the work area to the maximum extent possible to prevent giant garter snakes from entering the work area. Fencing will be installed during the active period for giant garter snakes (May 1 through October 1) to reduce the potential for injury and mortality during fence installation. The USFWS-approved biological monitor will work with the contractor to determine where fencing should be placed and will monitor fence installation. The exclusion fencing will consist of 3-foot-tall erosion fencing buried 4–6 inches below ground level. The exclusion fencing will minimize opportunities for giant garter snake hibernation in the adjacent upland area (Sycamore Slough and associated uplands, and between the CBD and associated uplands).

Special-Status Fish

Impact BIO-3: Disturbance of Special-Status Fish Species and Their Habitat (less than significant with mitigation)

The displacement of fish from the placement of riprap and the temporary water barrier (to allow dewatering of the construction area) could result in localized, temporary disturbance of aquatic habitat that may alter natural behavior patterns of adult and juvenile fish and potentially result in physical injury and death of individuals. Potential behavioral impacts include displacement and temporary disruption of feeding, migration, and other essential behaviors from noise, suspended sediment, turbidity, and sediment deposition generated during in-water construction activities. These impacts could extend beyond the project site because noise and sediment may be propagated downstream of the construction area while construction is taking place.

The extent of construction-related impacts depends on the timing, duration, and in-water extent of these activities; the timing of fish presence in the project area; and their ability to successfully avoid the affected areas. Construction activities, including potential in-water activities, are scheduled for a 6-week period starting as early as September 1 and lasting into the first weeks of October. This construction timing would avoid the primary adult and juvenile migration periods of winter-run Chinook salmon, spring-run Chinook salmon, green sturgeon, and splittail. Although historical

records indicate that steelhead and fall/late-fall adults may migrate past the construction site as early as August, adult salmonids in general are not expected to be adversely affected by proposed in-water construction activities because of their large size, rapid migration rates, and mobility, which allows them to readily avoid in-water disturbances.

Upstream migrating adult winter-run Chinook salmon occur in the project area primarily from November through July (Yoshiyama et al. 1998; Moyle 2002), and downstream migrating juveniles occur primarily from November through February, judging from rotary screw trap catches at Knights Landing (California Department of Fish and Wildlife unpublished data 1999–2011). Spring-run Chinook salmon adults generally occur in the project area from January through August, with peak migration from March through July (Yoshiyama et al. 1998; Moyle 2002), and juveniles occur primarily from November through May (Snider and Titus 2000). The numbers of juvenile winter- and spring-run Chinook salmon that may occur in the project area and the timing of their movements are highly variable, but peak numbers generally occur following the onset of major fall or winter storm events and resulting high flows and turbidity (Williams 2006). Adult fall-run Chinook salmon migrate through the Delta and into Central Valley rivers from June through December and spawn from September through December. Peak spawning activity usually occurs in October and November. The life history characteristics of late fall–run Chinook salmon are not well understood. Adult late fall–run Chinook salmon migrate through the Delta and into the Sacramento River from October through April and may wait 1–3 months before spawning from December through April. Peak spawning activity occurs in February and March. Most fall-run Chinook salmon fry rear in fresh water from December through June, with smolt emigration occurring primarily from April through June. Late fall fry rear in fresh water from April through the following April and emigrate as smolts from October through February (Snider and Titus 2000).

Historical records indicate that California Central Valley steelhead adults migrate into the Sacramento River from June through March with a peak in August through October (Hallock 1957). Rotary screw trap catches of juvenile steelhead in the Sacramento River at Knights Landing indicate that juveniles generally migrate downstream from November through June, with a peak in January and February (CDFW unpublished data 1999–2011).

Upstream migrating adult green sturgeon may occur in the project area from February through April, although some adults may migrate as late as June or July (Heublein et al. 2009). Some post-spawning adults may be present during outmigration, which has been observed during summer (June through August) and late fall or winter (November through December) coincident with increases in flow from the first significant rain events (Heublein et al. 2009). Juvenile green sturgeon appear to rear for 1–2 months in the Sacramento River before entering the Delta and estuary (California Department of Fish and Game 2002) and therefore may be present in the project area from May through August based on spawning time.

Adult splittail migrate up the Sacramento River primarily in April through June to spawn in backwaters and adjacent sloughs to the Sacramento River (Feyrer 2005). Young-of-the-year splittail could drift downstream as larvae or rear upstream for 30–60 days before emigrating downstream. This would exclude both adult and juvenile splittail from the project area during the construction period.

Adult river lamprey and juvenile and adult hardhead may be present in the project area during the proposed construction period but are not likely to be adversely affected by construction activities

because of their large size, preference for deeper water, and ability to readily avoid areas of disturbance.

In addition to construction-related habitat disturbances, operation and maintenance of the picket weirs could result in direct impacts on special-status fish. Potential exists for adult and juvenile salmonids and green sturgeon to enter the area behind the picket weir and become trapped once the picket weirs are raised, although the probability is very low because the weirs would be raised only when river stage and flows through the gates are starting to reach levels that are known to attract salmon. Juvenile fish may move back and forth through the picket weir at will, so raising the weir would not change the existing condition. The possibility of take during operation exists, although it is considered very low and the operation of the picket weirs would result in a net benefit, as fewer salmon and sturgeon would be lost from production when compared to the existing conditions.

The general maintenance requirements of the picket weir structure will require in-water activities that may disturb fish and move fish away from the immediate area around the structure. This would be short term, and the habitat would become available immediately after maintenance activities have been performed, thus there would be no permanent loss of habitat related to operation and maintenance of the picket weirs.

As there is potential for special-status fish species to be in the project area during construction, this impact would be significant. Implementation of Mitigation Measures BIO-MM-2, WQ-MM-2, described in Section 3.3, *Hydrology and Water Quality*, and the Protection of Fish in Dewatered Construction Zone Environmental Commitment, described in Chapter 2, *Project Description*, would reduce this impact to a less-than-significant level.

Impact BIO-4: Exposure of Aquatic Organisms to Contaminants (less than significant with mitigation)

Potential contamination could occur from leakage or accidental spills of petroleum products or contact of uncured concrete with flowing water. Toxic substances such as gasoline, lubricants, and other petroleum-based products can kill salmonids and other aquatic organisms through exposure to lethal concentrations or exposure to nonlethal levels that cause physiological stress and increased susceptibility to other sources of mortality. Exposure of uncured concrete to surface water can cause localized increases in pH that can cause physiological stress in fish and other aquatic organisms. This impact would be potentially significant. Implementation of Mitigation Measure WQ-MM-1, described in Section 3.3, *Hydrology and Water Quality*, would ensure that the risk of exposing aquatic organisms to accidental spills would be minimized and that this impact would be less-than-significant.

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

Impact BIO-5: Loss of Riparian Habitat (less than significant with mitigation)

Construction activities for the rock slope protection would cause the permanent loss of up to 0.01 acre of Great Valley valley oak riparian habitat on the southwest bank of the CBD. Project construction would require access to the southwest bank for placement of rock slope protection. Equipment access to the southwest bank erosion site would require the removal of riparian vegetation, specifically one Oregon ash tree with two trunks (diameter at breast height [dbh] of 12

inches and 8 inches) and associated understory vegetation. One cottonwood tree (dbh 36 inches) would require trimming for access. Because the levees are federally regulated, tree replacement on the levee would not be permitted without a variance for the USACE's standard levee vegetation guidelines (U.S. Army Corps of Engineers 2014). Therefore, the loss of riparian habitat at the access location on the southwest bank would be permanent. If the long-reach excavator is used to install the rock slope protection, this impact would be avoided.

Additional temporary impacts on adjacent riparian habitat could occur during construction. Movement of construction equipment through the riparian vegetation from the access point to the erosion control site could cause damage to riparian trees and understory vegetation.

Riparian habitat is regulated by CDFW, and Great Valley valley oak riparian forest is considered a sensitive natural community and is tracked in the CNDDB. The permanent loss of riparian habitat would be considered significant because the removal of mature woody vegetation would adversely affect the small amount of existing riparian habitat in this area. The temporary impacts would be considered significant because of the potential for additional loss of the riparian habitat. The loss of riparian habitat would also affect special-status fish species, as the tree removal (if necessary) would reduce the riparian habitat function for juvenile salmonids and other fishes. Implementation of Mitigation Measures BIO-MM-2, BIO-MM-3, BIO-MM-4, and BIO-MM-8 would reduce the permanent and temporary impacts on riparian habitat to less-than-significant levels. Mitigation Measure BIO-MM-8 would not be implemented if the long-reach excavator is used to install rock slope protection and the loss of riparian habitat is avoided.

Mitigation Measure BIO-MM-8: Compensate for Loss of Riparian Habitat

RD 108 will compensate for the permanent loss of up to 0.01 acre of riparian habitat by purchasing credits at an approved mitigation bank. For the mitigation bank option, mitigation will be at a minimum ratio of 2:1 (2 acres of mitigation for each acre of riparian habitat removed) if credits are for preservation of riparian habitat, or at a ratio of 1:1 (1 acre of mitigation for each acre of riparian habitat removed) if credits are for creation of riparian habitat. The final compensation ratio will be approved by CDFW in order to result in no net loss of riparian habitat. The riparian habitat to be removed provides riparian habitat functions, such as shading of riverine habitat and nesting and roosting sites. RD 108 will compensate for the loss of riparian habitat by purchasing riparian habitat credits from an approved mitigation bank near the project, such as Wildlands' Sacramento River Ranch Mitigation Bank.

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

Impact BIO-6: Loss of Waters of the United States (less than significant with mitigation)

Filling of the CBD, which is a perennial drainage and water of the United States, would occur as a result of the barrier construction and erosion repairs.

Barrier Construction

Barrier construction would include the installation of five new wing walls, each with a footprint of approximately 32.5 square feet for a total of 162.7 square feet (0.004 acre) of fill. Because this fill would be placed on top of existing permitted fill, which is a concrete apron on the downstream side of the KLOG, installation of the wing walls would not result in the loss of additional waters of the

United States, and no compensatory mitigation would be required. However, the construction would be regulated under Section 404 of the CWA and would require a permit, most likely Nationwide Permit #'s 7 and 13 (for modifications to outfall structures and for bank stabilization). In addition, construction would require Section 401 water quality certification from the Central Valley Water Board, and the CDFW could impose additional requirements as part of the streambed alteration agreement under Section 1602 of the CFGC.

A temporary water barrier would be installed on the downstream edge of the concrete apron in order to dewater the construction site and would temporarily affect 0.007 acre of perennial drainage in the CBD. Because the water barrier would be entirely on top of the concrete, which is previously permitted fill, it would not be considered a temporary loss of waters of the United States. However, the temporary placement of additional fill would be included in the CWA Section 404 NWP.

Erosion Repairs

Direct impacts would occur as a result of the erosion repairs on the southwest bank of the CBD, which would involve placement of rock slope protection (RSP) by crane. All of the RSP would be placed below the OHWM of the CBD. The extent of the RSP would be 100 linear feet of the channel and a total area of up to 0.07 acre (3,000 square feet) within the OHWM of the CBD. Because the affected bank and channel bed in this area is currently native soil, the RSP would be considered fill in a non-wetland water of the United States. The placement of RSP would be included in the CWA Section 404 NWP and Section 401 water quality certification, and in the CFGC Section 1602 streambed alteration agreement. The loss of perennial drainage as a result of RSP placement would also be considered a long-term degradation of critical habitat for special-status fish species.

Temporary impacts on the surrounding channel bank could occur as a result of construction access to the erosion repair site. However, the crane used to place the RSP would be on a platform outside of the OHWM of the CBD, and no additional areas of the CBD outside of the erosion repair site would be affected during construction.

Indirect impacts on the part of the perennial drainage outside of the RSP area could occur as a result of disturbing sediment on the channel bed and bank during placement of the RSP. This impact would be avoided by the installation of silt fencing/curtains around the extent of the in-water work area to prevent any sediment that may be disturbed and suspended during construction from increasing turbidity in the CBD. Impacts on water quality and mitigation measures are described further in Section 3.3, *Hydrology*.

Direct, temporary, and indirect impacts on the CBD as a result of barrier construction and erosion repair would be considered significant because these activities would place permanent and temporary fill in a federally protected water of the United States and could indirectly affect water quality in the CBD. Implementation of Mitigation Measures BIO-MM-2, BIO-MM-9, and WQ-MM-1 (described in Section 3.3, *Hydrology and Water Quality*) and the Turbidity Monitoring Environmental Commitment (described in Chapter 2, *Project Description*) would reduce this impact to a less-than-significant level. Mitigation would include avoidance and minimization to the extent feasible and compensation for the erosion repair site only if required by USACE.

Mitigation Measure BIO-MM-9. Minimize Loss of Perennial Drainage

Placement of RSP in the CBD will be limited to the smallest area necessary to prevent additional erosion of the levee bank. Due to the minor extent of fill in a perennial drainage, no compensatory mitigation is likely to be required. However, if USACE requires compensatory mitigation for the loss of up to 0.07 acre of perennial drainage at the erosion repair site, RD 108 will either purchase mitigation bank credits at an accredited bank, such as Wildlands' Fremont Landing conservation bank, or pay into the National Fish and Wildlife Foundation Sacramento District in-lieu fee (ILF) program. The mitigation ratio would be a minimum of 1:1 (1 acre mitigation for each acre of loss), or as determined by USACE during the permitting process.

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?

The project does not interfere substantially with the movement of any wildlife species including giant garter snake. The picket weir that would be constructed under the proposed project is designed such that flows would be sufficient to allow for the movement of fish from the CBD to the Sacramento River. If giant garter snakes were to be present directly upstream of the KLOG, individual snakes would also be able to pass above the fish screens through the existing gates.

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

Yolo County does not have a tree preservation policy or ordinance. Through compliance with state and federal regulations protecting other sensitive biological resources—including waters of the United States and special-status species—the project would not conflict with any of the Countywide General Plan policies. The proposed project would have no impact.

f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?

Project impacts and mitigation measures would be in compliance with Yolo County policies under the Countywide General Plan and do not conflict with the provisions of the draft Yolo County Natural Heritage Program. No mitigation for Swainson's hawk foraging habitat would be required as a result of the project and would therefore not conflict with conservation easement acquisition through the Yolo County Habitat Conservation JPA.

3.5 Air Quality

3.5.1 Introduction

This section analyzes the proposed project's potential effects related to air quality. It describes existing air quality conditions in the project area, identifies sensitive land uses, and summarizes the overall regulatory framework for air quality management in California and the region. Air-quality related environmental impacts also are discussed, and applicable mitigation is proposed. . Please refer to Section 3.6, *Greenhouse Gases*, for a discussion of greenhouse gas (GHG) emission and climate change.

3.5.2 Existing Conditions

The primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted from those sources. Meteorological and topographical conditions are also important factors. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Air quality is indicated by ambient concentrations of criteria pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead, and particulate matter (PM), which consists of PM less than or equal to 10 microns in diameter (PM10) and PM less than or equal to 2.5 microns in diameter (PM2.5).

3.5.2.1 Climate and Topography

The project area is in Yolo County, which is located in the Sacramento Valley Air Basin (SVAB). The SVAB has a Mediterranean climate characterized by hot, dry summers and cool, rainy winters. During the year, the temperature may range from 20 to 115°F, with summer highs usually in the 90s and winter lows occasionally below freezing. Average annual rainfall is about 20 inches, with about 75% of the total falling during the rainy season (generally from November through March). The prevailing winds are moderate in strength and vary from moist, clean breezes from the south to dry land flows from the north.

The mountains surrounding the SVAB create a barrier to airflow, which can trap air pollutants under certain meteorological conditions. The highest frequency of air stagnation occurs in autumn and early winter when large high-pressure cells lie over the Sacramento Valley. The lack of surface wind during these periods and the reduced vertical flow caused by less surface heating reduce the influx of outside air and allow air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with smoke or when temperature inversions trap cool air, fog, and pollutants near the ground.

The ozone season (May through October) in the Sacramento Valley is characterized by stagnant morning air or light winds with the Delta sea breeze arriving in the afternoon out of the southwest. Usually, the evening breeze transports the airborne pollutants to the north out of the Sacramento Valley. During about half of the days from July to September, however, a phenomenon called the Schultz Eddy prevents this from occurring. Instead of allowing the prevailing wind patterns to move north carrying the pollutants out, the Schultz Eddy causes the wind pattern to circle back south. Essentially, this phenomenon causes the air pollutants to be blown south toward the Sacramento

area. This phenomenon exacerbates the pollution levels in the area and increases the likelihood of violating federal or state standards. The eddy normally dissipates around noon, when the Delta sea breeze arrives. (Yolo-Solano Air Quality Management District 2007)

3.5.2.2 Existing Air Quality Conditions

Existing air quality conditions in the project area can be characterized in terms of the federal and state air quality standards by monitoring data collected in the region. The EPA and California Air Resources Board (ARB) maintain an extensive network of monitoring stations throughout California. Table 3.5-1 presents pollutant concentrations measured at the Woodland Gibson Road monitoring station for which complete data are available (2011–2013). The Woodland Gibson Road monitoring station is located approximately 11 miles south of the project.

As shown in Table 3.5-1, the monitoring station has experienced exceedances of the state and federal 8-hour ozone standards and the state PM10 standard.

Table 3.5-1. Pollutant Concentrations Measured at the Woodland Gibson Road Monitoring Station

Pollutant	2011	2012	2013
1-Hour Ozone			
Maximum 1-hour concentration (ppm)	0.088	0.101	0.080
1-hour California designation value (ppm)	0.09	0.09	0.09
1-hour expected peak day concentration (ppm)	0.090	0.087	0.086
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	0	1	0
8-Hour Ozone			
National maximum 8-hour concentration (ppm)	0.072	0.080	0.067
National second-highest 8-hour concentration (ppm)	0.070	0.076	0.066
State maximum 8-hour concentration (ppm)	0.073	0.080	0.067
State second-highest 8-hour concentration (ppm)	0.071	0.076	0.067
8-hour national designation value (ppm)	0.069	0.069	0.069
8-hour California designation value (ppm)	0.082	0.080	0.080
8-hour expected peak day concentration (ppm)	0.083	0.081	0.080
Number of days standard exceeded[a]			
NAAQS 8-hour (>0.075 ppm)	0	2	0
CAAQS 8-hour (>0.070 ppm)	2	9	0
Carbon Monoxide			
No stations monitor CO in Yolo County.			
PM10[b]			
National maximum 24-hour concentration (μg/m^3)[c]	53.2	56.4	60.3
National second-highest 24-hour concentration (μg/m^3)[c]	47.4	42.7	59.2
California maximum 24-hour concentration (μg/m^3)[d]	56.6	56.8	61.5
California second-highest 24-hour concentration (μg/m^3)[d]	48.8	42.9	61.1
California annual average concentration (μg/m^3)[e]	19.1	18.1	22.9
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 μg/m^3)[f]	0	0	0
CAAQS 24-hour (>50 μg/m^3)[f]	7	6	23
PM2.5			

Pollutant	2011	2012	2013
National maximum 24-hour concentration (μg/m³)[c]	39.4	14.6	22.0
National second-highest 24-hour concentration (μg/m³)[c]	25.8	14.2	22.0
California maximum 24-hour concentration (μg/m³)[d]	39.4	14.6	22.0
California second-highest 24-hour concentration (μg/m³)[d]	25.8	14.2	22.0
National annual designation value (μg/m³)	-	-	-
National annual average concentration (μg/m³)	-	6.4	7.4
California annual designation value (μg/m³)	6	6	6
California annual average concentration (μg/m³) [e]	-	6.4	-
Number of days standard exceeded[a]			
NAAQS 24-hour (>35 μg/m³)[f]	–	0	0

Source: California Air Resources Board 2015.

[a] An exceedance is not necessarily a violation.

[b] Usually, measurements are collected every 6 days.

[c] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[d] State statistics are based on local conditions data. In addition, state statistics are based on California-approved samplers.

[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[f] Mathematical estimate of how many days' concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been truncated.

CAAQS = California ambient air quality standards; NAAQS = national ambient air quality standards; ppm = parts per million; μg/m³ = micrograms per cubic meter; – = insufficient data available to determine the value.

3.5.2.3 Attainment Status

Local monitoring data (Table 3.5-1) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the national ambient air quality standards (NAAQS) and California ambient air quality standards (CAAQS) (discussed in Section 3.5.3.1). The four designations are further defined as follows.

- Nonattainment—Assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- Maintenance—Assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.
- Attainment—Assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- Unclassified—Assigned to areas were data are insufficient to determine whether a pollutant is violating the standard in question.

Table 3.5-2 summarizes the attainment status of Yolo County with regard to the NAAQS and CAAQS.

Table 3.5-2. Federal and State Attainment Status of Yolo County

Pollutant	National Ambient Air Quality Standards	California Ambient Air Quality Standards
8-hour ozone	Severe nonattainment	Nonattainment
CO	Moderate Maintenance (P)	Attainment
PM2.5	Nonattainment	Attainment
PM10	Attainment	Nonattainment

Sources: California Air Resources Board 2014; U.S. Environmental Protection Agency 2015.
CO = carbon monoxide; PM2.5 = particulate matter less than or equal to 2.5 microns; PM10 = particulate matter less than or equal to 10 microns;
(P) designation applies to a portion of the county

3.5.2.4 Sensitive Receptors

Sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (i.e., 24-hour, 8-hour, and 1-hour). Typical sensitive receptors are residences, hospitals, and schools. The nearest sensitive receptors are residential land uses on Reed Street (130 feet east of the riverbank). Knights Landing United Methodist Church is approximately 1,375 feet east of the project site.

3.5.3 Regulatory Setting

This section summarizes federal, state, and local regulations that apply to air quality. The air quality management agencies of direct importance in the project area are EPA, ARB, and Yolo-Solano Air Quality Management District (YSAQMD). EPA has established federal air quality standards for which ARB and YSAQMD have primary implementation responsibility. ARB and YSAQMD are also responsible for ensuring that state air quality standards are met.

3.5.3.1 Federal

Clean Air Act

The federal Clean Air Act (CAA) was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as NAAQS, and specifies future dates for achieving compliance. The CAA also mandates that the state submit and implement a State Implementation Plan for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

3.5.3.2 State

California Clean Air Act

At the state level, the California Clean Air Act (California CAA) establishes a statewide air pollution control program. The California CAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the CAA, the California CAA does not set precise attainment deadlines. Instead, the California CAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent

than the NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride.

The CAAQS and NAAQS are listed together in Table 3.5-3.

Table 3.5-3. National and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None	None
	8–hour	0.070 ppm	0.075 ppm	0.075 ppm
Particulate matter (PM10)	24-hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
	Annual mean	20 μg/m^3	None	None
Fine particulate matter (PM2.5)	24-hour	None	35 μg/m^3	35 μg/m^3
	Annual mean	12 μg/m^3	12.0 μg/m^3	15 μg/m^3
Carbon monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur dioxide[b]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.014 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day average	1.5 μg/m^3	None	None
	Calendar quarter	None	1.5 μg/m^3	1.5 μg/m^3
	3-month average	None	0.15 μg/m^3	0.15 μg/m^3
Sulfates	24-hour	25 μg/m^3	None	None
Hydrogen sulfide	1-hour	0.03 ppm	None	None
Vinyl chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2013.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The final 1-hour sulfur dioxide rule was signed June 2, 2010. The annual and 24-hour standards were revoked in that same rulemaking. However, these standards remain in effect until 1 year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

μg/m^3 = micrograms per cubic meter; ppm = parts per million.

3.5.3.3 Local

Yolo-Solano Air Quality Management District Attainment Plans

YSAQMD has local jurisdiction over air quality in Yolo County. Under the California CAA, YSAQMD is required to develop an air quality plan for nonattainment criteria pollutants in the air district. The *1994 Sacramento Area Regional Ozone Attainment Plan* was prepared to address reactive organic gases (ROG) and nitrogen oxides (NO_X) emissions following the region's serious nonattainment designation for the 1-hour ozone NAAQS in November 1991. The *Sacramento Regional 8-Hour Attainment and Reasonable Further Progress Plan* has also been adopted to address the region's nonattainment status for the 8-hour ozone NAAQS. Air districts within the Sacramento Federal

Nonattainment Area (SFNA) have submitted the ozone plan to EPA and are currently waiting for the agency to approve the document. Counties in the SFNA (Sacramento, Yolo, Placer, El Dorado, Solano, Sutter, and Butte) have also adopted the *Northern Sacramento Valley Planning Area 2012 Triennial Air Quality Attainment Plan* (2012 Plan). This plan outlines strategies to achieve the health-based ozone standard. The Sacramento region is also in the process of developing a plan to address PM.

All activities located in Yolo County are subject to the YSAQMD regulations in effect at the time of construction. The following YSAQMD rules may apply to the proposed project. This list of rules may not be all encompassing as additional YSAQMD rules may apply to the alternatives as specific components are identified.

- Rule 2.5 (Nuisance). This rule prevents dust emissions from creating a nuisance to surrounding properties.
- Rule 2.11 (Particulate Matter Concentration). This rule restricts emissions of PM greater than 0.1 grain per cubic foot of gas at dry standard conditions.
- Rule 2.32 (Stationary Internal Combustion Engines). This rule requires portable equipment greater than 50 horsepower, other than vehicles, to be registered with either ARB Portable Equipment Registration Program or with YSAQMD.

3.5.4 Environmental Effects

According to the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make significance determinations for potential impacts on environmental resources. As discussed earlier in this section, YSAQMD is responsible for ensuring that state and federal ambient air quality standards are not violated within Yolo County. Analysis requirements for construction- and operational-related pollutant emissions are contained in YSAQMD's CEQA Handbook (Yolo-Solano Air Quality Management District 2007). The YSAQMD CEQA Handbook also contains thresholds of significance for regional ozone, CO, and PM10, as shown in Table 3.5-4.

Table 3.5-4. Yolo-Solano Air Quality Management Regional Thresholds of Significance

Pollutant	Threshold
ROG	10 tons per year
NO_X	10 tons per year
PM10	80 pounds per day

Source: Yolo-Solano Air Quality Management District 2007.
ROG = reactive organic gas; NO_X = oxides of nitrogen; PM10 = particulate matter less than or equal to 10 microns

With respect to potential health effects from project-generated emissions, the analysis focuses on those pollutants with the greatest potential to result a significant, material impact on human health, which are 1) diesel particulate matter (DPM) and 2) locally concentrated CO (i.e., CO hot-spots).[1] The following criteria were used to determine whether project generated emissions would result in a significant impact to sensitive receptors.

[1] Please refer to Appendix F for additional information on the relationship between project-generated emissions and the potential human health impacts.

- Result in exposure to DPM resulting in a maximum incremental cancer risk greater than 10 in 1 million, or a health hazard index greater than 1 (Yolo-Solano Air Quality Management District 2007).
- Creates CO "hotspots" near sensitive receptors that exceed the CAAQS. YSAQMD has a screening-level criteria to determine the need for dispersion modeling. Projects that do not meet this criterion are presumed to not result in a CO hotspot and CO impacts are considered less than significant (Yolo-Solano Air Quality Management District 2007). The YSAQMD's CO screening criteria are as follows.
    - Peak-hour level of service (LOS) on one or more streets or intersections in the project vicinity reduced to LOS E or F as a result of the project.
    - A 10-second or greater increase in delay due to the project at one or more streets or intersections currently at LOS F.

Potential impacts of the proposed project on noise are also discussed in the context of State CEQA Guidelines Appendix G checklist items.

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

Impact AQ-1: Conflict with Applicable Air Quality Plans (less than significant)

A project is deemed inconsistent with air quality plans if it would result in either population or employment growth that exceeds growth estimates included in the applicable air quality plan. Such growth would generate emissions not accounted for in the applicable air quality plan emissions budget. Therefore, proposed projects need to be evaluated to determine whether they would generate population and employment growth and, if so, whether that growth would exceed the growth rates included in the relevant air plans.

The purpose of the proposed project is to construct a positive fish barrier on the downstream side of the existing KLOG structure to prevent adult salmon entry into the CBD. As discussed in Section 3.2, *Resources Not Likely to be Affected*, the project would not permanently change the existing or planned transportation network or traffic patterns in the area. The project would also not add any additional capacity to existing roadways. Likewise, the project would not conflict with any applicable land use plan or contribute to regional employment or population growth. Implementation of the project would generate emissions (discussed below), but these emissions are not expected to impede attainment or maintenance of the NAAQS or CAAQS.

Based on the above analysis, the project is consistent with recent growth projections for the region and would not conflict with the current YSAQMD air quality plans. This impact would be less than significant.

b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Impact AQ-2: Violate an Air Quality Standard (less than significant)

Construction

Project construction has the potential to affect ambient air quality through the use of heavy-duty construction equipment, construction worker vehicle trips, and truck hauling trips. Criteria pollutant emissions generated by these sources were quantified using information provided by the

project proponent and emission factors from the CalEEMod (version 2013.2.2) and EMFAC2014 emissions models. . It was assumed that construction would require three phases between September and October 2015.

Table 3.5-5 summarizes estimated maximum daily and annual emissions that would be generated by project construction. Although emissions are presented in different units (pounds and tons), the amounts of emissions are identical (i.e., 2,000 pounds is identical to 1 ton). Summarizing emissions in both pounds per day and tons per year is necessary to evaluate project-level effects against YSAQMD thresholds, which are given in both pounds and tons. Please refer to Appendix F for modeling assumptions and calculations.

Table 3.5-5. Maximum Daily (pounds) and Annual (tons) Criteria Pollutant Emissions from Project Construction

Period	ROG	NOX	CO	PM10	PM2.5
Maximum Daily (pounds)[a]	1	14	8	2	1
Annual (tons)[b]	0.01	0.10	0.06	0.02	0.01
YSAQMD threshold[c]	10 tons/year	10 tons/year	–	80 pounds/day	–

[a] Assumes concurrent activity during coffer dam installation and erosion repairs, and barrier construction and erosion repair. Refer to Appendix F for additional detail on the construction schedule.

[b] All emissions would occur in 2015.

[c] YSAQMD has adopted annual (tons/year) thresholds for ROG and NOX and a daily (pounds/day) threshold for PM10.

ROG = reactive organic gases; NOX = nitrogen oxides; CO = carbon monoxide; PM10 = particulate matter less than 10 microns in diameter; PM2.5 = particulate matter less than 2.5 microns in diameter.

Please refer to Appendix F for modeling assumptions and calculations.

As shown in Table 3.5-5, construction of the proposed project would not generate criteria pollutant emissions in excess of the YSAQMD thresholds of significance. Accordingly, construction-related emissions would be less than significant.

Operation

Operation of the project would require routine inspections. These inspections would take place annually over a period of one day and require one crane and six truck trips. Emissions generated by these sources were quantified using emission factors from the CalEEMod (version 2013.2.2) and EMFAC2014 emissions models.

Table 3.5-6 summarizes estimated operational emissions in pounds per day and tons per year. Emissions would be generated annually until project decommissioning. Please refer to Appendix F for modeling assumptions and calculations.

Table 3.5-6. Daily (pounds) and Annual (tons) Criteria Pollutant Emissions from Project Operation

Period	ROG	NOX	CO	PM10	PM2.5
Daily (pounds)	1	10	4	1	1
Annual (tons)	<0.01	<0.01	<0.01	<0.01	<0.01
YSAQMD threshold[a]	10 tons/year	10 tons/year	–	80 pounds/day	–

[a] YSAQMD has adopted annual (tons/year) thresholds for ROG and NOX and a daily (pounds/day) threshold for PM10.

ROG = reactive organic gases; NOX = nitrogen oxides; CO = carbon monoxide; PM10 = particulate matter less than 10 microns in diameter; PM2.5 = particulate matter less than 2.5 microns in diameter.

Please refer to Appendix F for modeling assumptions and calculations.

As shown in Table 3.5-6, operation of the proposed project would not generate criteria pollutant emissions in excess of the YSAQMD thresholds of significance. Accordingly, operational-related emissions would be less than significant.

c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?

YSAQMD has identified project-level thresholds to evaluate criteria pollutant impacts (see Table 3.5-4). In developing these thresholds, YSAQMD considered levels at which project emissions would be cumulatively considerable. As noted in the YSAQMD CEQA Guidelines (2007),

> Any proposed project that would individually have a significant air quality impact (see above for project-level Thresholds of Significance) would also be considered to have a significant cumulative impact.

The criteria pollutant thresholds presented in Table 3.5-4 therefore represent the maximum emissions a project may generate before contributing to a cumulative impact on regional air quality. Exceedances of the project-level thresholds would therefore be cumulatively considerable.

As discussed under item "b", construction and operation of would result in minor increases of all criteria pollutants, which could contribute to cumulative air quality impacts and corresponding regional human health effects. For example, increases in ROG and NO_X could increase photochemical reactions and the formation of tropospheric ozone. However, cumulative ozone concentrations depend on ROG and NO_X emissions throughout the SVAB and complex photochemistry. Moreover, an increase in ozone concentration does not guarantee an increase in respiratory ailments because individuals may be exposed and experience no symptoms at varying concentrations.

The minor increase in criteria pollutant emissions associated with project construction and operation (see Tables 3.5-5 and 3.5-6) would not exceed air district thresholds. YSAQMD's thresholds were established to assist the SVAB reach regional attainment with the federal and state ambient air quality standards. Accordingly, neither construction nor operation of the proposed project would result in a cumulatively considerable or cumulative air quality impact.

d. Expose sensitive receptors to substantial pollutant concentrations?

Impact AQ-3: Exposure of Sensitive Receptors (less than significant)

Diesel Particulate Matter

Diesel-fueled engines used during construction could expose adjacent residential receptors to DPM, which is considered carcinogen. However, DPM generated during construction is expected to be minor and would not exceed 2 pounds per day (see Table 3.5-5). These emissions would dissipate as a function of distance and would be lower at the nearest sensitive receptor (130 feet east of the project). Moreover, emissions would only occur for 2 months, which is significantly lower than the 70-year exposure period typically associated with chronic cancer health risks. Similarly, while a diesel-powered crane and haul trucks would be required during operational inspections, emissions would only occur 1 day per year. . Consequently, neither construction- nor operational-related DPM is expected to expose sensitive populations to substantial pollutant concentrations or exceed YSAQMD thresholds. This impact would be less than significant.

Localized Carbon Monoxide

Implementation of the proposed project would not alter or worsen the current congestion (i.e., no changes in LOS) on any streets in the project vicinity (see Section 3.2, *Resources Not Likely to be Affected*). Likewise, the project would not alter the design of any roadways or generate a significant number of new vehicles trips. Temporary construction vehicles would not reduce the LOS at affected intersections to unacceptable levels. Accordingly, the project would not exceed YSAQMD's (2007) screening criteria, where a less-than-significant impact to localized CO concentrations would occur for traffic volumes that do not negatively affect or degrade intersections to unacceptable LOS. Thus, the project would not contribute to or worsen localized CO concentrations within the study area from construction traffic. This impact would be less than significant.

e. Create objectionable odors affecting a substantial number of people?

Impact AQ-4: Creation of Objectionable Odors (less than significant)

While offensive odors rarely cause any physical harm, they can be unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and air districts. Project-related odor emissions related to the proposed project would primarily occur during the construction period, when emissions from equipment may be evident in the immediately surrounding area. These activities would be short term and are not likely to result in nuisance odors that would violate YSAQMD nuisance standards. Similarly, the limited diesel-powered equipment required for the once yearly operational inspection would not result in substantial odor emissions. This impact would be less than significant.

3.6 Greenhouse Gases

3.6.1 Introduction

This section provides an analysis of climate change impacts resulting from the proposed project. It describes commonly generated GHG emissions and summarizes the current regulatory framework related to GHG emissions and climate change. Environmental impacts related to climate change also are discussed. Please refer to Section 3.5, *Air Quality*, for an analysis of criteria pollutants and air quality impacts.

3.6.2 Existing Conditions

Rising atmospheric concentrations of GHGs in excess of natural levels result in increasing global surface temperatures and shifts in the global climate. Assembly Bill (AB) 32 identifies the following compounds as the major GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorinated carbons (PFCs), sulfur hexafluoride (SF_6), and hydrofluorocarbons (HFCs). The primary sources of GHGs are vehicles (including planes and trains), energy generation plants, and industrial and agricultural operations (such as dairies and hog farms). Because construction equipment and heavy duty trucks generate primarily GHG emissions consisting of CO_2, CH_4, and N_2O, the following discussion focuses on these pollutants.

CO_2 is the most important anthropogenic GHG, followed by CH_4 and N_2O. It is estimated that CO_2 accounts for more than 75% of all anthropogenic GHG emissions. Three quarters of anthropogenic CO_2 emissions are the result of fossil fuel burning (and to a very small extent, cement production), and approximately 25% of emissions are the result of land use change (Intergovernmental Panel on Climate Change 2007). CH_4 is the second largest contributor of anthropogenic GHG emissions and is the result of growing rice, raising cattle, fuel combustion, and mining coal (National Oceanic and Atmospheric Administration 2005). N_2O, while not as abundant as CO_2 or CH_4, is a powerful GHG. Sources of N_2O include agricultural processes, nylon production, fuel-fired power plants, nitric acid production, and fuel combustion.

In order to simplify reporting and analysis, methods have been set forth to describe emissions of GHGs in terms of a single gas. The most commonly accepted method to compare GHG emissions is the global warming potential (GWP) method defined in the Intergovernmental Panel on Climate Change (IPCC) reference documents. The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO_2 equivalents (CO_2e), which compares the gas in question to that of the same mass of CO_2 (CO_2 has a GWP of 1 by definition). Table 3.6-1 lists the GWP of CO_2, CH_4, and N_2O; their lifetimes; and abundances in the atmosphere in parts per million (ppm).

Table 3.6-1. Lifetimes and Global Warming Potentials of Principal Greenhouse Gases

Greenhouse Gas	Global Warming Potential (100 years)	Lifetime (years)	2014 Atmospheric Abundance
Carbon dioxide	1	50–200	402
Methane	28	9–15	1,893
Nitrous oxide	265	120	326

Sources: Myhre et al. 2013, Blasing 2014; National Oceanic and Atmospheric Administration 2015.

3.6.3 Regulatory Setting

Climate change only recently has been widely recognized as an imminent threat to the global climate, economy, and population. Thus, the climate change regulatory setting—nationally, statewide, and locally—is complex and evolving. The following section identifies key legislation relevant to the environmental assessment of project GHG emissions.

3.6.3.1 Federal

Endangerment and Cause or Contribute Findings

On December 7, 2009, the EPA signed the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the federal CAA. Under the Endangerment Finding, EPA finds that the current and projected concentrations of the six key well-mixed GHGs—CO_2, CH_4, N_2O, SF_6, PFCs, and HFCs—in the atmosphere threaten the public health and welfare of current and future generations. Under the Cause or Contribute Finding, EPA finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action was a prerequisite to finalizing EPA's proposed new corporate average fuel economy standards for light-duty vehicles, which EPA proposed in conjunction with the U.S. Department of Transportation.

Regulation of GHG Emissions under the Clean Air Act (ongoing)

Under the authority of the federal CAA, EPA is beginning to regulate GHG emissions, starting with large stationary sources. In 2010, EPA set GHG thresholds to define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. In 2012, EPA proposed a carbon pollution standard for new power plants.

3.6.3.2 State

California has adopted legislation, and regulatory agencies have enacted policies, addressing various aspects of climate change and GHG emissions mitigation. Much of this legislation and policy activity is not directed at citizens or jurisdictions but rather establishes a broad framework for the state's long-term GHG mitigation and climate change adaptation program. The following key legislation is applicable to the proposed project.

Assembly Bill 32, Global Warming Solutions Act (2006)

AB 32 codified the state's GHG emissions target by requiring that the state's global warming emissions be reduced to 1990 levels by 2020. Since being adopted, ARB, California Energy Commission, California Public Utilities Commission, and the Building Standards Commission have been developing regulations that will help meet the goals of AB 32. The Scoping Plan for AB 32 identifies specific measures to reduce GHG emissions to 1990 levels by 2020, and requires ARB and other state agencies to develop and enforce regulations and other initiatives for reducing GHGs. Specifically, the Scoping Plan articulates a key role for local governments, recommending they establish GHG reduction goals for both their municipal operations and the community consistent with those of the state.

On December 11, 2008, pursuant to AB 32, ARB adopted the AB 32 Scoping Plan. This plan outlines how emissions reductions from significant sources of GHGs will be achieved via regulations, market mechanisms, and other actions. The Scoping Plan also describes recommended measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately affect low-income and minority communities. The first update to the scoping plan was released in 2014.

State CEQA Guidelines, As Amended in 2010

The State CEQA Guidelines require lead agencies to describe, calculate, or estimate the amount of GHG emissions that would result from a project. Moreover, the guidelines emphasize the necessity to determine potential climate change effects of a project and propose mitigation as necessary. The guidelines confirm the discretion of lead agencies to determine appropriate significance thresholds, but require the preparation of an EIR if "there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with adopted regulations or requirements" (Section 15064.4).

State CEQA Guidelines Section 15126.4 includes considerations for lead agencies related to feasible mitigation measures to reduce GHG emissions, which may include, among others, measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision; implementation of project features, project design, or other measures that are incorporated into the project to substantially reduce energy consumption or GHG emissions; offsite measures, including offsets that are not otherwise required, to mitigate a project's emissions; and measures that sequester carbon or carbon-equivalent emissions.

3.6.3.3 Local

Yolo-Solano Air Quality Management District

YSAQMD, along with a committee of air districts in the Sacramento Region,[1] have developed draft thresholds for evaluating GHG emissions from new stationary source and land development projects. While the Sacramento Metropolitan Air Quality Management District (SMAQMD) formally

[1] Air districts in the region include YSAQMD, Sacramento Metropolitan Air Quality Management District, El Dorado County Air Quality Management District, Feather River Air Quality Management District, and the Placer County Air Pollution Control District.

adopted the GHG thresholds in October 2014, they are still considered draft in YSAQMD.[2] The GHG thresholds include project categories and emission levels. Construction activities would result in a significant and unavoidable impact if emissions exceed 1,100 metric tons CO_2e per year. Projects with operational emissions in excess of the threshold must mitigate to 1,100 metric tons CO_2e or demonstrate a 21.7% reduction from a projected no action taken (NAT) scenario to show consistency with AB 32 reduction goals.

Yolo County

Yolo County adopted a climate action plan (CAP) in 2011. The plan outlines a variety of strategies to reduce GHG emissions generated by community activities by 80% by 2050.

3.6.4 Environmental Effects

According to the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make significance determinations for potential impacts on environmental resources. As discussed earlier in this section, YSAQMD has issued draft GHG thresholds. Yolo County has also adopted a CAP, which outlines GHG reduction targets for projects seeking to tier from the programmatic environmental document completed for the CAP. As discussed further below, strategies identified in the County's CAP target sources with the greatest GHG emissions potential, including transportation, building energy consumption, and waste generation. Accordingly, the CAP reduction framework does not apply to the proposed project. CEQA tiering benefits are, therefore, not pursued, and project-generated GHG emissions are analyzed against YSAQMD's draft threshold of 1,100 metric tons CO_2e per year. A qualitative discussion of potential climate change impacts on the proposed project has also been provided for informational purposes at the conclusion of this section.

a. Generate a significant amount of GHG emissions, either directly or indirectly?

Impact GHG-1: Generation of Significant GHG Emissions (less than significant)

Construction

Project construction would generate emissions of CO_2, CH_4, and N_2O from mobile and stationary construction equipment exhaust and employee and haul truck vehicle exhaust. Indirect emissions would also be generated by electricity consumption and concrete batching. Emissions from equipment and vehicles were quantified using information provided by the project applicant and emission factors from the CalEEMod (version 2013.2.2) and EMFAC2014 emissions models. Electricity-related emissions were quantified using emission factors published by Pacific Gas & Electric (2013) and EPA (2014); CO_2 emissions generated during concrete batching were estimated using emission factors from Nisbet et al. (2002).

Estimated construction emissions are summarized in Table 3.6-2. All emissions would occur in 2015. Please refer to Appendix F for modeling assumptions and calculations.

[2] The YSAQMD current CEQA Guidelines recommend that lead agencies include at least a qualitative discussion of potential climate change impacts in the air quality analyses of sizable projects. YSAQMD further advises that the lead agency can require mitigation measures such as building code restrictions, increased public transportation, alternative fuels, or other actions that reduce CO_2 (Yolo Solano Air Quality Management District 2007).

Table 3.6-2. Estimated Greenhouse Gas Emissions from Project Construction (metric tons)

Source	CO_2	CH_4	N_2O	Other[a]	CO_2e[b]
Equipment and vehicles	13	<0.01	<0.01	0.26	13
Electricity consumption	<1	<0.01	<0.01	-	<1
Concrete batching	30	0.00	0.00	-	30
Total emissions	43	<0.01	<0.01	0.26	44
YSAQMD draft threshold	-	-	-	-	1,100

[a] From construction worker commutes (mix of fuels). Other GHGs include CH_4, N_2O, and HFCs, which represent 5% of total GHG emissions from on-road sources (calculated by diving CO_2 emissions by 0.95 and multiplying the resulting number by 0.05).

[b] Refers to carbon dioxide equivalent, which includes the relative warming capacity (i.e., GWP) of each GHG.

As shown in Table 3.6-2, project construction would generate 44 metric tons of CO_2e. This is equivalent to adding about 10 typical passenger vehicles to the road during the construction period (U.S. Environmental Protection Agency 2015). These emissions would not exceed YSAQMD's draft GHG threshold of 1,100 metric tons CO_2e per year. Accordingly, this impact would be less than significant.

Operations

Operation of the project would require routine inspections. These inspections would occur annually over a period of one day and require one crane and six truck trips. Operation of the flood gates would also consume approximately 600 kilowatt-hours of electricity per year. Emissions generated by equipment and vehicles were quantified using emission factors from the CalEEMod (version 2013.2.2) and EMFAC2014 emissions models. Electricity-related emissions were quantified using emission factors published by Pacific Gas & Electric (2013) and EPA (2014).

Table 3.6-3 summarizes estimated operational GHG emissions in metric tons per year. Emissions would be generated annually until project decommissioning. Please refer to Appendix F for modeling assumptions and calculations.

Table 3.6-3. Estimated Greenhouse Gas Emissions from Project Operation (metric tons per year)

Source	CO_2	CH_4	N_2O	Other[a]	CO_2e[b]
Equipment and vehicles	1	<0.01	<0.01	0.01	1
Electricity consumption	<1	<0.01	<0.01	-	<1
Total emissions	1	<0.01	<0.01	0.01	1
YSAQMD draft threshold	-	-	-	-	1,100

[a] From construction worker commutes (mix of fuels). Other GHGs include CH_4, N_2O, and HFCs, which represent 5% of total GHG emissions from on-road sources (calculated by diving CO_2 emissions by 0.95 and multiplying the resulting number by 0.05).

[b] Refers to carbon dioxide equivalent, which includes the relative warming capacity (i.e., GWP) of each GHG.

As shown in Table 3.6-3, operation of the project would generate 1 metric ton of CO_2e per year. This is well below YSAQMD's draft GHG threshold of 1,100 metric tons CO_2e. Accordingly, this impact would be less than significant.

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

Impact GHG-2: Conflict with and Applicable Plan, Policy, or Regulation (less than significant)

AB 32 establishes a statewide goal to reduce GHG emissions back to 1990 levels by 2020. The ARB adopted the AB 32 Scoping Plan as a framework for achieving AB 32 goals. The Scoping Plan outlines a series of technologically feasible and cost-effective measures to reduce statewide GHG emissions. Similarly, the Yolo County CAP identifies several implementation actions to guide the County in reducing communitywide GHG emissions.

Both the AB 32 Scoping Plan and Yolo CAP target sources with the greatest GHG emissions potential, including transportation, building energy consumption, and waste generation. Neither construction nor operational activities associated with the project are considered by either plan as significant emissions sources and, as such, none of the measures outlined in the AB 32 Scoping Plan or Yolo CAP is directly applicable to the project. Accordingly, implementation of the project would not conflict with adopted plans for reducing GHG emissions. This impact would be less than significant.

Informational Item: Would the project place people or structures at substantial risk of harm as a result of predicted climate change effects?

Unavoidable climate change may result in a range of potential impacts on the project and adjacent areas. The extent of these effects is still being defined as climate modeling tools become more refined. Regardless of the uncertainty in precise predictions, it is widely understood that substantial climate change is expected to occur in the future. Potential climate change impacts in California and the Sacramento Valley could include extreme heat events, increased energy consumption, increase in infectious diseases and respiratory illnesses, reduced snowpack and water supplies, increased water consumption, and potential increase in wildfires.

While the Knights Landing area may experience unavoidable climate shifts, the project does not involve construction of any residential or commercial structures that would attract or otherwise house people. The new flood gates would be constructed of concrete and capable of withstanding seasonal changes in temperatures, which fluctuate by more than the estimated 4–6 degree increase in annual average temperatures for Knights Landing (California Energy Commission 2015). Increased wildfire risk for the project area is also classified as low. Therefore, the project is not anticipated to place people or structures at substantial risk of harm as a result of predicted climate change effects.

3.7 Noise

3.7.1 Introduction

This section analyzes the proposed project's potential impacts related to noise. It describes existing noise and vibration conditions in the project area in a regional and site-specific context and summarized the overall regulatory framework for noise management in the region. Noise- and vibration-related environmental impacts on the proposed project also are discussed, and applicable mitigation is proposed.

3.7.1.1 Noise Terminology

The following are brief definitions of noise terminology used in this evaluation.

- **Sound.** A vibratory disturbance transmitted by pressure waves through a medium such as air and capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB)**. A measure of sound based on a logarithmic scale that indicates the squared ratio of actual sound pressure level to a reference sound pressure level (20 micropascals).
- **A-Weighted Decibel (dBA).** A measure of sound that is weighted to take into account the varying sensitivity of the human ear to different frequencies of sound. The dBA scale is the most widely used for environmental noise assessments. Typical A-weighted noise levels for various types of sound sources are summarized in Table 1.
- **Equivalent Sound Level (L_{eq})**. L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level that would contain the same acoustical energy as the time-varying sound that actually occurs during the monitoring period. The 1-hour A-weighted equivalent sound level (L_{eq} 1h) is the energy average of A-weighted sound levels occurring during a 1-hour period.
- **Maximum Sound Levels (L_{max}).** The maximum (L_{max}) sound levels measured during a monitoring period.
- **Day-Night Level (L_{dn}).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10 p.m. and 7 a.m.
- **Percentile-Exceeded Sound Level (L_{xx}).** The sound level exceeded some percentage of the time during a monitoring period. For example L_{50} is the sound level exceeded 50% of the time, and L_{10} is the sound level exceeded 10% of the time.
- **Community noise equivalent level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

Table 3.7-1. Typical A-Weighted Sound Levels

Common Outdoor Activities	Sound Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 mph at 50 feet		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower at 100 feet	70	Vacuum cleaner at 3 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban area, daytime	50	Dishwasher in next room
Quiet urban area, nighttime	40	Theater, large conference room (background)
Quiet suburban area, nighttime		
	30	Library
Quiet rural area, nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
Rustling of leaves	10	
	0	

Source California Department of Transportation 2013.

Sound from multiple sources operating in the same area such a multiple pieces of construction equipment will result in a combined sound level that is greater than any individual source. The individual sound levels for different noise sources cannot be added directly to give the sound level for the combined noise sources. Rather, the combined noise level produced by multiple noise sources is calculated using logarithmic summation. For example, if one bulldozer produces a noise level of 80 dBA, then two bulldozers operating side by side would generate a combined noise level of 83 dBA (only 3 dBA louder than the single bulldozer).

Human sound perception, in general, is such that a change in sound level of 3 dB is just noticeable; a change of 5 dB is clearly noticeable; and a change of 10 dB is perceived as doubling or halving the sound level. A doubling of actual sound energy is required to result in a 3 dB (i.e., barely noticeable) increase in noise; in practice, for example, this means that the volume of traffic on a roadway typically needs to double to result in a noticeable increase in noise.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dB for every doubling of distance from the noise source. When the noise source is a continuous line, such as vehicle traffic on a highway, sound levels decrease by about 3 dB for every doubling of distance. Noise levels can also be affected by several factors other than the distance from the noise source. Topographic features and structural barriers that absorb,

reflect, or scatter sound waves can affect the reduction of noise levels over distance. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) and the presence of dense vegetation can also affect the degree of sound attenuation.

3.7.2 Existing Conditions

The project site is located in the CDP (census-designated place) of Knights Landing, California, in Yolo County. The area is surrounded by the Sacramento River on the north, agricultural areas to the west, and a residential neighborhood on the east. The nearest residence is located 130 feet from the project site. Noise in the project area is governed primarily by motor vehicle traffic, residential noise, and the existing KLOG facility. Given the rural nature of the project area, ambient noise levels are expected to be in the range of 40 to 50 dBA L_{dn}.

3.7.3 Regulatory Setting

3.7.3.1 Federal

There are no federal noise regulations that are applicable to the proposed action.

3.7.3.2 State

There are no state noise regulations that are applicable to this project.

3.7.3.3 Local

Yolo County Noise Ordinance

Yolo County does not have an adopted noise ordinance.

Yolo County 2030 Countywide General Plan

The noise section of the Health and Safety Element of the *Yolo County 2030 Countywide General Plan* (Yolo County 2009) establishes interior and exterior noise level standards for planning purposes to ensure land use compatibility for new developments as it relates to noise exposure. Sound levels in the range of 60 to 65 L_{dn} are identified as being "normally acceptable" for residential uses.

Knights Landing Comprehensive General Plan

The statements of goals and policies which follow supplement those of the Noise Element of the *Yolo County 2030 Countywide General Plan*. The goals of the Noise Element of the general plan are to protect citizens from the harmful effects of exposure to excessive noise, and to protect the economic base of the town by preventing the encroachment of incompatible land uses near noise-producing roadways, industries, and other sources. For example, exterior noise levels in the range of 50–60 dB CNEL are generally considered to be acceptable for residential land uses, allowing normal indoor and outdoor residential activities to occur without interruption. In contrast, industrial activities relatively insensitive to noise may be located in a noise environment up to 75 dB CNEL without adverse effects. The following policies reflect the commitment of Yolo County to the above noise-related goals.

1. Areas within the Town shall be designated as noise-impacted if exposed to existing or projected future noise levels exterior to buildings exceeding 60 dB CNEL or the performance standards described in Table Vl-1.
2. New development of residential or other noise· sensitive land uses will not be permitted in noise impacted areas unless effective mitigation measures are incorporated into project designs to reduce noise levels to the following levels:
    a. For noise sources preempted from local control, such as street and highway traffic: 60 dB CNEL or less in outdoor activity areas; 45 dB CNEL within interior living spaces or other noise-sensitive interior spaces. Where it is not possible to achieve reductions of exterior noise to 60 dB CNEL or less by using the best available and practical noise reduction technology, an exterior noise level up to 65 dB CNEL will be allowed. Under no circumstances will interior noise levels be allowed to exceed 45 dB CNEL with windows and doors closed.
    b. For noise from other sources, such as local industries: 60 dB CNEL or less in outdoor activity areas; 45 dB CNEL or less within interior living spaces, plus the performance standards contained in Table Vl-1.
3. New development of industrial, commercial or other noise generating land uses will not be permitted if resulting noise levels will exceed 60 dB CNEL in areas containing residential or other noise-sensitive land uses. Additionally, new noise generating land uses which are not preempted from local noise regulation will not be permitted if resulting noise levels will exceed the performance standards contained in Table Vl-1 in areas containing residential or other noise-sensitive land uses.
4. Noise level criteria applied to land uses other than residential or other noise-sensitive uses shall be consistent with the recommendations of the California Office of Noise Control.
5. New equipment and vehicles purchased by the County, Community Services District and School District for use in Knights Landing shall comply with noise level performance standards consistent with the best available noise reduction technology.

Table 3.7-2. Exterior Noise Level Performance Standards[a]

Decibels	Minutes in any 1-Hr. Time Period	Daytime 7:00 a.m.–10:00 p.m.	Nighttime 10:00 p.m.–7:00 a.m.
45	1	30	55
50	2	15	60
55	3	5	55
60	4	1	70
65	5	0	75

[a] Each of the noise level standards specified in this table shall be reduced by five (5) dBA for pure tone noises, noise consisting primarily of speech or music, or for recurring impulsive noises. The standards should be applied at a residential or other noise-sensitive land use and not on the property of a noise-generating land use.

2005 Yolo County Central Landfill Permit Revision EIR

The Yolo County Central Landfill (YCCL) Permit Revision Project provides guidance in terms of noise levels that the county considers to be acceptable.

The YCCL Permit Revision Project proposed a variety of changes to the design and operation of the YCCL, including the purchase of additional land for the development of a soil borrow site. The noise

section of the EIR analyzed the potential noise and vibration impacts that could result from the exposure of sensitive receptors to noise generated by activities at a soil borrow site. The following mitigation measures were identified to reduce the potential impacts to a less-than-significant level.

Mitigation Measure 3.7.2a: As stated in the siting criteria for the soil borrow operation in Chapter 2, Project Description, "Soil-borrow" activities shall be located in areas with a buffer zone of 2,000 feet to the nearest sensitive receptors.

Mitigation Measure 3.7.2b: Soil borrow activities will be limited to achieve an hourly average noise level that does not exceed 65 dBA at the nearest sensitive receptor.

Mitigation Measure 3.7.2c: If haul routes pass sensitive noise receptors that are within approximately 50 feet of the roadway, hourly heavy truck trips should be limited to no more than 25 passbys of the sensitive receptor per hour.

Mitigation Measure 3.7.2d: To avoid noise effects of nighttime operations, haul trips leaving the soil-borrow area shall be limited to 7 a.m. to 5 p.m.

3.7.4 Environmental Effects

Potential impacts of the proposed project on noise are discussed in the context of State CEQA Guidelines Appendix G checklist items.

a. ***Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?***

Construction

Impact NOI-1: Exposure of Sensitive Receptors to Temporary Construction-Related Noise (less than significant with mitigation)

As stated in Chapter 2, *Project Description*, construction staff is expected to work from 7 a.m. to 7 p.m., 5 days per week. Construction of the proposed new concrete wing walls, installation of a metal picket weir, installation of rock slope protection, and the removal of vegetation for construction purposes is anticipated to begin in September of 2015 and continue for approximately 2 months. Construction of these project elements would temporarily increase the noise levels at the project site for the entirety of the construction period.

Table 3.5-3 lists equipment that is expected to be used along with typical noise levels reported in the Federal Highway Administration's Roadway Construction Noise Model (Federal Highway Administration 2006). L_{max} sound levels at 50 feet are shown along with the typical acoustical use factors. The acoustical use factor is the percentage of time each piece of construction equipment is assumed to be operating at full power (i.e., its noisiest condition) during construction and is used to estimate L_{eq} values from L_{max} values. For example, the L_{eq} value for a piece of equipment that operates at full power 50% of the time (acoustical use factor of 50) is 3 dB less than the L_{max} value for that piece of equipment.

Table 3.7-3. Typical Construction Noise Emission Levels

Equipment	Typical L_{max} Noise Level (dBA) at 50 feet	Acoustical Use Factor (%)	L_{eq} Noise Level at 50 feet (dBA)
Crane	81	16	73
Pump	81	50	78
Tractor	84	40	80
Jackhammer	89	20	82
Long reach excavator	81	40	77

Source: Federal Highway Administration 2006.
dBA= A-weighted decibel
L_{eq} = equivalent sound level
L_{max} = maximum sound levels

A reasonable worst-case construction noise level scenario assumes that the three loudest pieces of equipment operate concurrently (tractor, jackhammer, and pump). The combined L_{max} level for these three pieces of equipment is 91 dBA at 50 feet and the L_{eq} level is 85 dBA at 50 feet. The nearest residence is located approximately 130 feet from the project site. At this distance, this construction noise level would reduce to about 80 dBA L_{max} and 75 dBA L_{eq}. Construction noise at the nearest noise sensitive use is assessed using the sound level threshold of 65 dBA (one-hour Leq) as described above in the 2005 YCCL Permit Revision EIR Mitigation Measure 3.7.2b. Because the predicted L_{eq} noise level is more than 65 dBA, the exposure of existing residents to construction noise would be a significant impact. Mitigation Measure NOI-MM-1 would reduce this impact to a less-than-significant level at existing residents.

As described in Chapter 2, *Project Description*, during construction there would be increased traffic on SR 45 to reach Road 108 for access to the left bank, and SR 45 to reach the levee-top road on the right bank as a result of material delivery and worker trips. A staging area would be established on the landside of the north levee. However, this increased traffic would be a small percentage of the existing traffic volume on the local roadways and is expected to result in an increase in noise that is less than 3 dB (i.e., less than perceptible).

Mitigation Measure NOI-MM-1: Minimize noises from construction

The County will implement construction practices to limit construction noise to 65 dBA (one-hour L_{eq}) at nearby residences. Measures to be employed may include the following.

- Limit onsite truck speed to 5 mph to reduce truck-generated noise.
- Comply with manufacturers' muffler requirements on all construction equipment engines.
- Turn off construction equipment when not in use, where applicable.
- Locate stationary equipment as far as practical from receiving properties.
- Use temporary sound barriers or sound curtain around loud stationary equipment if the other noise reduction methods are not effective or possible.
- Provide advance written notification of construction activities to residences around the construction site.

Operation

Operation of the proposed project would generate similar levels of noise as the existing KLOG facility. Therefore, there would be no impact related to an increase in noise associated with project operation.

b. Expose persons to or generate excessive groundborne vibration or groundborne noise levels?

Typical outdoor sources of perceptible groundborne vibration and noise are construction equipment, steel-wheeled trains, and heavy vehicles over bumps. If the roadways in use are smooth, the groundborne vibration and noise from traffic is rarely perceptible.

The operation of heavy construction equipment can generate localized groundborne vibration at buildings adjacent to the construction site, especially during the operation of high-impact equipment, such as pile drivers. Vibration from nonimpact construction activity and truck traffic is typically below the threshold of residential annoyance when the activity is more than about 50 feet from the noise-sensitive land uses (Federal Transit Administration 2006). The nearest residential uses are located more than 130 feet from the project site. Additionally, project construction would not involve high-impact equipment, such as a pile driver. Therefore, groundborne vibration and noise impacts associated with project construction would be less than significant.

c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

As discussed in Environmental Impact a., operation of the proposed project would generate similar levels of noise as the existing KLOG facility. Therefore, there would be no impact related to ambient noise levels associated with project operation.

***d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?* (less than significant with mitigation incorporated)**

As discussed under Environmental Impact a., construction noise could be as high as about 77 dBA L_{max} and 72 dBA L_{eq} at the nearest residences. This would cause an increase in noise above existing conditions. This increase is predicted to cause noise that would exceed the applicable standard of 65 dBA Le_q and would therefore be considered significant. Implementation of Mitigation Measure NOI-MM-1 would decrease the temporary noise increase associated with construction to a less-than-significant level by reducing noise to less than 65 dBA Le_q.

e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?

The closest public airport to the project site is Sacramento International Airport, which is located about 10 miles to the southeast of the project. Because the proposed project would not expose employees or construction workers to excessive noise levels related to aircraft overflight, there would be no impact.

f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?

The nearest private airstrip is Bobs Flying Service Incorporated Airport, which is over 2 miles north of the project site. Because the proposed project would not expose employees or construction workers to excessive noise levels related to aircraft overflight, there would be no impact.

3.8 Cultural Resources

3.8.1 Introduction

This section analyzes the proposed project's potential impacts related to cultural resources. It describes existing cultural resources in the project area and summarizes the overall federal, state, and local regulatory framework for cultural resources. Cultural resources-related environmental impacts are also discussed and applicable mitigation is proposed. Cultural resources are defined in CEQA as *historical resources* (including buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance) and *unique archaeological resources*. A more detailed definition of these terms is provided in Section 3.8.3, *Regulatory Setting*.

3.8.2 Existing Conditions

This setting section for cultural resources provides an overview of the prehistory and history for the KLOG study area. The following text is from the *Knights Landing Outfall Gate Rehabilitation Project Archaeological Survey Report, Yolo County, California*, prepared by Rebecca H. Gilbert, California Department of Water Resources (Gilbert 2011: 4-7).

3.8.2.1 Prehistory

Very little archaeological work has been conducted in the vicinity of the project area. As a result, a reconstruction of the prehistory must rely on work that has taken place around the city of Sacramento to the south and near the town of Colusa to the north. Although there are suggestions of at least 10,000 years of occupation in Central California, there is no evidence to indicate habitation of the Sacramento Valley before about 3,500 years ago. This is likely due to rapid sedimentation of the valley from flood events

Investigations of the Sacramento Valley sites began during the 1930s when Sacramento Junior College and the University of California, Berkeley worked together on archaeological projects. At that time a number of sites were excavated along the Cosumnes River in the northern Delta and in Colusa County. As a result of those efforts and subsequent studies in the region, a tripartite cultural sequence was established. Three horizons were delineated: Early, Middle, and Late, with respective initial dates of 2,500 B.C., 1,500 B.C., and 500 A.D.

Additional research over the years has led to a refinement of dates and the realization that basic socioeconomic and technical trends or patterns were found over a broad region, but that these patterns could last for different lengths of time in localized areas and were reflected by various expressions of material culture. The revised cultural chronology, with rough dates associated with the project vicinity, is identified by the Windmiller Pattern, the Berkeley Pattern, and the Augustine Pattern.

The Windmiller Pattern dominated the region from approximately 5,000 to 2,500 years before present (B.P.). Relative to subsequent periods, Windmiller subsistence appears to have focused largely on hunting, as evidenced by large quantities of faunal remains and projectile points in the archaeological record. However, there is also evidence of fishing and seed procurement. With regard

to tool technology, both flaked stone and ground stone industries are well represented. Acquisition of raw materials for tool and ornament production was facilitated by a vast trade network, in which obsidian was obtained from North Coast Range and eastern Sierran sources, shell beads from the coast, and quartz and alabaster from the Sierra foothills. The Windmiller Pattern is also characterized by distinctive burial patterns, with bodies typically buried fully extended, face down, with the head oriented toward the west, and the placement of funerary objects in the grave.

The Berkeley Pattern was present in the Central Valley from approximately 3,600 to 1,000 years B.P. This pattern is represented by an apparent increase in the use of pestles and mortars, which is thought indicative of an intensified reliance on acorns as a principal dietary staple. In addition, the Berkeley Pattern exemplifies a well-developed bone industry, distinctive diagonal flaking of large concave-base points, and marked forms of shell beads and ornaments. In contrast to the Windmiller pattern, Berkeley burials are found in a flexed position with variable orientation and fewer funerary artifacts.

The Augustine Pattern occurred in the Central Valley from approximately 2,000 to 250 years B.P. This pattern is distinguished by large populations with complex social systems that depended heavily upon fishing, hunting, and gathering. Tool technology is represented by shaped pestles and mortars, bone awls, the bow and arrow, and in some cases pottery. There was considerable variation in mortuary practices, including flexed burials, cremation, and funerary object differentiation.

3.8.2.2 Ethnography

The project area is an area historically occupied by the Valley Patwin. The Patwin held lands throughout the Sacramento Valley from Suisun and San Pablo Bays in the south to Princeton in the north, including the west bank of the Sacramento River just south of Knights Landing and extending further north. They also held lands in the lower Napa Valley. The Patwin they were closely related linguistically to the Nomlaki and culturally to the Wintu, both of whom resided directly to the north. They were closer still to their Hill Patwin kindred who lived in the Coast Range Mountains to the east.

The Patwin people inhabited large villages, predominately along the Sacramento River. The largest political entity was the tribelet, which consisted of one primary and several satellite villages, each of which was headed by a chief.

3.8.2.3 History

The Sacramento Valley in the project vicinity was visited by the Spanish in the early 1800s. Gabriel Moraga was the first to explore up the Sacramento River in 1808. He was later followed by the companies led by Luis Arguello in 1817 and again in 1821. Euro-American trappers explored the valley during the 1820s and 1830s, which caused diseases to spread to indigenous villages and decimate the native populations.

The Mexican government continued the earlier Spanish practice of granting large land tracts, or rancheros, to loyal Californios. The first ranchos in Yolo County were established in the early 1840s. These included the Rancho Rio de Jesus Maria, which occupied 27,000 acres from Cache Creek to the north and the Sacramento River to the east in the project area, including land directly opposite the confluence of the Feather and Sacramento Rivers. This rancho was granted to Thomas Hardy in 1843. A portion of the rancho was purchased by James Harbin who established the first town, Fremont, in Yolo County in 1849. Fremont was located at the confluence of the Sacramento and

Feather Rivers and became the first county seat in 1850. However, as the result of flood damage, the town was virtually abandoned in less than a decade.

Although the region was prone to flooding and often swampy, agriculture was, and continues to be, the primary economic base for the area. The ability to successfully grow crops in the rich soil was enhanced in the early 1900s as hundreds of miles of levees were constructed to control flooding in the Sacramento Valley. Numerous public works, such as the Knights Landing Ridge Cut, the Fremont and Sacramento Weirs, and the Yolo Bypass, were built as the result of the Sacramento River Flood Control Project.

The KLOG is located on the western border of the town of Knights Landing within the CBD. The CBD provides drainage for flood water and agricultural runoff and is also a water supply for irrigation. The KLOG also prevents Sacramento River floodwater from flooding the CBD when water levels are high. The KLOG structure was originally built by local interests sometime during either 1914 or 1915. It consisted of a concrete slab floor 84 feet wide with abutments at either side, 30 feet high. Two gate leaves constructed of timber and held together with straps and bolts closed the space between the abutments. During 1929 and 1930 the timber gate leaves were replaced with a permanent concrete buttress to support new steel flap gates. New control gates replaced the steel flap gates in 1949. In 1985 the manual gates were replaced with automated actuators to maintain a set water surface elevation on the upstream side of the structure.

3.8.3 Regulatory Setting

3.8.3.1 California Environment Quality Act

Two categories of cultural resources are specifically called out in the State CEQA Guidelines. The categories are historical resources (State CEQA Guidelines Section 15064.5[b]) and unique archaeological sites (State CEQA Guidelines 15064.5[c]; California Public Resources Code [PRC] Section 21083.2). Different legal rules apply to the two different categories of cultural resources. However, the two categories sometimes overlap where "an archaeological historical resource also qualifies as a "unique archaeological resource." In such an instance, the more stringent rules for unique archaeological resources apply, as explained below. In most situations, resources that meet the definition of a *unique archaeological resource* also meet the definition of a *historical resource*. As a result, it is current professional practice to evaluate cultural resources for significance based on their eligibility for listing in the California Register of Historical Resources (CRHR).

Historical resources are those meeting the following requirements.

- Resources listed in or determined eligible for listing in the CRHR (State CEQA Guidelines Section 15064.5[a][1]).
- Resources included in a local register as defined in PRC Section 5020.1(k), "unless the preponderance of evidence demonstrates" that the resource "is not historically or culturally significant" (State CEQA Guidelines Section 15064.5[a][2]).
- Resources that are identified as significant in surveys that meet the standards provided in PRC Section 5024.1[g] (State CEQA Guidelines Section 15064.5[a][3]).
- Resources that the lead agency determines are significant, based on substantial evidence (State CEQA Guidelines Section 15064.5[a][3]).

Unique archaeological resources, on the other hand, are defined in PRC Section 21083.2 as a resource that meets at least one of the following criteria.

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person. (PRC Section 21083.2[g])

The process for identifying historical resources is typically accomplished by applying the criteria for listing in the CRHR (14 CCR Section 4852). This section states that a historical resource must be significant at the local, state, or national level under one or more of the following four criteria.

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

To be considered a historical resource for the purpose of CEQA, the resource must also have *integrity*. Integrity is the authenticity of a resource's physical identity, evidenced by the survival of characteristics that existed during the resource's period of significance.

Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling and association. It must also be judged with reference to the particular criteria under which a resource is eligible for listing in the CRHR (14 CCR 14 Section 4852[c]). Integrity assessments made for CEQA purposes typically follow the National Park Service guidance used for integrity assessments for National Register of Historic Places (NRHP) purposes.

Even if a resource is not listed or eligible for listing in the CRHR, in a local register of historical resources, or identified in an historical resource survey, a lead agency may still determine that the resource is an historical resource as defined in PRC Section 5020.1j or 5024.1 (State CEQA Guidelines Section 15064.5[a][4]).

Resources that meet the significance criteria and integrity considerations must be considered in the impacts analysis under CEQA. Notably, a project that causes a substantial adverse change in the significance of an historical resource is a project that may have significant impact under CEQA (State CEQA Guidelines Section 15064.5[b]). A substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired. The significance of an historical resource is materially impaired if the project demolishes or materially alters any qualities as follows.

- Qualities that justify the inclusion or eligibility for inclusion of a resource on the CRHR (State CEQA Guidelines Section 15064.5[b][2][A],[C]).

- Qualities that justify the inclusion of the resource on a local register (State CEQA Guidelines Section 15064.5[b][2][B]).

3.8.3.2 State Law Governing Human Remains

California law sets forth special rules that apply where human remains are encountered during project construction. As set forth in State CEQA Guidelines Section 15064.5[e], in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, no further excavation or disturbance of the site or any nearby area suspected of overlying adjacent human remains should take place until the following measures are implemented.

1. The coroner of the county in which the remains are discovered is contacted to determine that no investigation of the cause of death is required (as required under California Health and Safety Code [CHSC] Section 7050.5).
2. If the coroner determines the remains to be Native American:
    a. The coroner will contact the Native American Heritage Commission (NAHC) within 24 hours.
    b. The NAHC will identify the person or persons it believes to be the most likely descended from the deceased Native American.
    c. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods (as provided in PRC Section 5097.98).
    d. Where the following conditions occur, the landowner or his authorized representative will rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.
        1) The NAHC is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission.
        2) The descendant identified fails to make a recommendation.
        3) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the NAHC.

3.8.3.3 Local

The following Regulatory Setting context for local conditions is summarized from the 2009 County of Yolo *2030 Countywide General Plan*.

Open Space Element: F. Cultural Resources

1. **Background Information**: Cultural resources include archaeological, paleontological and historic resources, including cemeteries and burials outside of cemeteries. Yolo County has examples of all of these, including prehistoric Native American sites, fossilized dinosaur remains, and historical man-made artifacts, buildings, sites and landmarks.

2. Policy Framework:

Policy CO-4.1 Identify and safeguard important cultural resources.

Policy CO-4.2 Implement the provisions of the State Historical Building Code and Uniform Code for Building Conservation to balance the requirements of the Americans with Disabilities Act with preserving the architectural integrity of historic buildings and structures.

Policy CO-4.3 Encourage owners of historic resources to preserve and rehabilitate their properties.

Policy CO-4.4 Encourage historic resources to remain in their original use whenever possible. The adaptive use of historic resources is preferred when the original use can no longer be sustained. Older residences may be converted to office/retail use in commercial areas and to tourist use in agricultural areas, so long as their historical authenticity is maintained or enhanced.

Policy CO-4.5 Increase knowledge of historic preservation through public education and outreach programs.

Policy CO-4.6 Support historically oriented visitor programs at the local and regional level through the Yolo County Visitor's Bureau and similar efforts.

Policy CO-4.7 Encourage the identification of historic resources through the integrated use of plaques and markers.

Policy CO-4.8 Explore opportunities for promoting heritage tourism, including cooperation with regional and State marketing efforts.

Policy CO-4.9 Promote the use of historic structures as museums, educational facilities, or other visitor-serving uses.

Policy CO-4.10 Encourage voluntary landowner efforts to protect cultural resources consistent with State law.

Policy CO-4.11 Honor and respect local tribal heritage.

Policy CO-4.12 Work with culturally affiliated tribes to identify and appropriately ad- dress cultural resources and tribal sacred sites through the development review process.

Policy CO-4.13 Avoid or mitigate to the maximum extent feasible the impacts of development on Native American archaeological and cultural resources.

Policy CO-4.14 Within the Delta Primary Zone, ensure compatibility of permitted land use activities with applicable cultural resources policies of the Land Use and Resource Management Plan of the Delta Protection Commission.

3. Implementation Program

Action CO-A55 Update the Historic Preservation Ordinance on a regular basis to be consistent with applicable federal, State and local Historic Preservation requirements. (Policy CO-4. Policy CO-4.2)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A56 Update the historic resources surveys (including the Historic Features Inventory), as needed, to reflect changes due to the passage of time, loss of existing historic resources, and the availability of new or reinterpreted information. (Policy CO-4.1)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A57 Identify and establish historic districts, where appropriate, to better preserve individual historical resources and their context. (Policy CO-4.1, Policy CO-4.4)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A58 Establish an inventory and map of known significant historic and cultural resources, as well as sensitive areas where such resources are likely to occur. Work with the Rumsey and Cortina Tribes to identify sacred sites and develop a cultural sensitivity map. This information is protected as confidential under State law. (Policy CO-4.1)

Responsibility: Planning and Public Works Department

Timeframe: 2011/2012

Action CO-A59 Conduct historic resource surveys as a part of community and specific plan preparation to document and identify those resources that meet the criteria for listing at the local level, on the California Register of Historical Resources, and on the National Register of Historic Places. Policy CO-4.1)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A60 Review and monitor demolition permits, grading permits, building permits, and other approval procedures to reinforce preservation goals. (Policy CO-4.1, Policy CO-4.2, Policy CO-4.3)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A61 Establish design guidelines for historic resources based on established federal and State standards and guidelines to address the adaptive reuse and modification of historic resources. (Policy CO-4.1, Policy CO-4.2, Policy CO-4.4)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A62 Preserve historical records and make them accessible to the public by maintaining the Yolo County Archives and Record Center. (Policy CO- 4.1, Policy CO-4.5) Provide additional space for accommodation of the growing Archives collections. Ensure that the collection is housed in an appropriate archival manner

Responsibility: County Library, General Services Department

Timeframe: Ongoing

Action CO-A63 Require cultural resources inventories of all new development projects in areas where a preliminary site survey indicates a medium or high potential for archaeological, historical, or paleontological resources. In addition, require a mitigation plan to protect the resource before the issuance of permits. Mitigation may include:

- Having a qualified archaeologist or paleontologist present during initial grading or trenching;
- Redesign of the project to avoid historic or paleontological re- sources;
- Capping the site with a layer of fill; and/or
- Excavation and removal of the historical or paleontological re- sources and curation in an appropriate facility under the direction of a qualified professional. (Policy CO-4.1, Policy CO-4.13)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A64 Require that discretionary projects which involve earth disturbing activities on previously undisturbed soils in an area determined to be archaeologically sensitive perform the following:

- Enter into a cultural resources treatment agreement with the culturally affiliated tribe.
- Retain a qualified archaeologist to evaluate the site if cultural re- sources are discovered during the project construction. The archaeologist will have the authority to stop and redirect grading activities, in consultation with the culturally affiliated tribe and their designated monitors, to evaluate the significance of any archaeological resources discovered on the property.
- Consult with the culturally-affiliated tribe to determine the extent of impacts to archaeological resources and to create appropriate mitigation to address any impacts.
- Arrange for the monitoring of earth disturbing activities by members of the culturally affiliated tribe, including all archaeological surveys, testing, and studies, to be compensated by the developer.
- Implement the archaeologist's recommendations, subject to County approval.
- Agree to relinquish ownership of all artifacts that are found on the project area to the culturally affiliated tribe for proper treatment and disposition. (Policy CO-4.1, Policy CO-4.13)

  Responsibility: Planning and Public Works Department

  Timeframe: Ongoing

Action CO-A65 Require that when cultural resources (including non-tribal archeological and paleontological artifacts, as well as human remains) are encountered during site preparation or construction, all work within the vicinity of the discovery is immediately halted and the area protected from further disturbance. The project applicant shall immediately notify the County Coroner and the Planning and Public Works Department. Where human remains are determined to be Native American, the project applicant shall consult with the NAHC to determine the person most likely descended from the deceased. The applicant shall confer with the descendant to determine appropriate treatment for the human remains, consistent with State law. (Policy CO-4.1, Policy CO-4.11, Policy CO-4.12, Policy CO-4.13)

Responsibility: Planning and Public Works Department, Sheriff Coroner's Office

Timeframe: Ongoing

Action CO-A66 Prohibit the removal of cultural resources from the project site except by a qualified consultant and after the County planning staff have been notified. Prehistoric resources include chert or obsidian flakes, projectile points, mortars, pestles, dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic re- sources include stone or adobe foundations and walls, structures and features with square nails, and refuse deposits often in old wells and privies. Policy CO-4.1, Policy CO-4.11)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A67 Consult with culturally affiliated tribes prior to amending the General Plan and adopting or amending specific plans, consistent with State law. (Policy CO-4.12, Policy CO-4.13)

Responsibility: County Administrator's Office, Planning and Public Works Department

Timeframe: Ongoing

Action CO-A68 Confer with culturally affiliated tribes prior to designating open space that includes any identified cultural places and develop a treatment and management plan for their preservation. (Policy CO-4.12, Policy CO-4.13)

Responsibility: County Administrator's Office, Planning and Public Works Department

Timeframe: Ongoing

Action CO-A69 Refer all development proposals that may adversely affect cultural resources to the Northwest Information Center (NWIC) at Sonoma State University for review and comments. The NWIC will identify the presence or absence of known cultural resources and/or previously performed studies in or near a given project area and will offer recommendations regarding the need for additional studies, where necessary. If the NWIC recommends further study, the project applicant shall contract with a qualified professional to conduct the study and make recommendations designed to avoid or minimize adverse impacts on cultural or historic resources and indicate whether further investigation is needed. All studies shall be completed and submitted to the County prior to the completion of any environmental document for the project. (Policy CO-4.1, Policy CO-4.11)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

Action CO-A70 Refer draft environmental documents, including any studies and recommended mitigation measures, to the appropriate culturally-affiliated tribes for review and comment as part of the public review process. (Policy CO-4.1, Policy CO-4.11, Policy CO-4.12)

Responsibility: Planning and Public Works Department

Timeframe: Ongoing

3.8.4 Methods

3.8.4.1 Records Search

A California Historical Resources Information System (CHRIS) records search was conducted at the Northwest Information Center (NWIC), Sonoma State University, Rohnert Park, on May 6, 2015. The records search compiled bibliographic references, previous survey reports, historic maps, and archaeological site records pertinent to the proposed project in order to identify prior archaeological studies and known cultural resources within 0.25 mile of the study area.

The records search identified no previously recorded archaeological resources within the study area. The records search identified one historic era resource in the study area: the KLOG structure. The KLOG structure, initially constructed in 1915, has been previously documented in conjunction with studies that addressed the CBD (1911) and the Knight Landing Ridge Cut (1915).

Thirteen previous cultural resources studies have covered portions of the study area and vicinity. The majority of these studies focused on the Sacramento River, CBD, SR 45, County Road 16, and SR 113.

3.8.4.2 Additional Background Research

RD 108 and DWR provided property-specific information, including historic era photographs and as-built plans of the KLOG structure.

3.8.4.3 Field Survey

A field survey of the study area was conducted by an ICF archaeologist and historian on May 13, 2015. The only historic era resource in the study area is the KLOG structure. As part of the field survey process, an ICF historian visually inspected, photographed, and took notes on this structure.

Although the location has been highly affected by travel, farming, construction (levee, gates, and canal), and recreation (fishing), a prehistoric archaeological site (ICF-01) was identified during the survey of the western staging area. The presence of items was identified at the northeast corner of the western staging area, primarily on a gently sloping hill (dietary whole half shell and fragmented freshwater mussel shell, fire affected rock) on the landside levee slope, and on the dirt access road (obsidian flakes, shell beads) sloping down to the south to the outfall gates on the levee waterside.

3.8.4.4 Consultation with Native Americans and Other Interested Parties

On April 28, 2015, ICF sent a letter to NAHC requesting that it consult its sacred lands file and send a list of individuals and organizations that may have knowledge of properties of cultural or religious importance to Native Americans in the area of potential effects and vicinity. A follow-up email to the April 28 fax request was sent to the NAHC on May 4, 2015. As of May 29, 2015, a response had not yet been received. On May 19, 2015, individual consultation letters regarding the project were mailed with certified response preferences to a list of Native American individuals and organizations who may have interest in the project. As of May 29, 2015, responses to these consultation letters had not yet been received.

On May 6, 2015, ICF sent contact letters to the Yolo County Historical Society, Yolo County Historical Museum, and the California Institute for Rural Studies. The letters briefly described the proposed project and requested information about cultural resources near the proposed project area. As of May 29, 2015, ICF had not received any responses.

3.8.5 Findings for Cultural Resources

ICF has prepared a detailed cultural resources technical report that can be made available upon request (ICF International 2015). Below is a summary of findings for cultural resources located in the KLOG study area.

3.8.5.1 Archaeological Resources in the Project Area

ICF-01 is a prehistoric archaeological site identified during the May 13t, 2015 pedestrian survey. The site consists of dietary remains including freshwater mussel and clam shell, fire cracked rock, obsidian flake debitage, and shell bead jewelry. The current site size is approximately 0.5 acre; it is approximately 80 feet wide, east to west, and approximately 340 feet long northeast to southwest, and includes a portion of County Road 108.

3.8.5.2 Historic Architectural Resources in the Project Area

One historic architectural resource, the KLOG, initially constructed in 1915, required evaluation under CRHR criteria as part of this study. The resource has an association with the construction of the CBD (1911), and the Knight Landing Ridge Cut (1915), which were important regional flood control projects. The KLOG was first constructed to serve three essential purposes: 1) prevent water from the Sacramento River from flowing into the Colusa Basin; 2) direct all drainage from the Colusa Basin into the Yolo Bypass through the Knights Landing Ridge Cut: and 3) provide a bridge to cross the nearby slough. Consequently, the KLOG could be considered significant under CRHR Criterion 1 for its association with the construction and implementation of the CBD (1911), and the Knight Landing Ridge Cut (1915). However, the structure has been substantially and irreversibly modified since its initial construction in 1915. By 1929, the original wooden gate leaves were replaced with

permanent concrete buttress to support new steel flap gates. Gates were further modified in 1949 with the addition of steel flap gates. During this period, the KLOG bridge was removed. More recently, in 1985, the manual gates were replaced with automated actuators to maintain a set water surface elevation on the upstream side of the structure. The use of the structure is currently limited to managing the water level in the CBD by RD 108 during the summer season. Combined, physical changes to the structure have resulted in the alternation of its initial purpose and use. Consequently, the resource lacks the historical integrity necessary to meet any CRHR criteria, and it does not appear to be a historical resource for purposes of CEQA.

3.8.6 Environmental Effects

Potential impacts of the proposed project on cultural resources are discussed in the context of State CEQA Guidelines Appendix G checklist items.

a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

The proposed project would not cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 because no historical resources located in or near the project area that qualify as CEQA historical resources would be affected by the proposed project. There would be no impact.

b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?

Impact CUL-1: Change in the Significance of a Unique Archaeological Resource (less than significant with mitigation)

An archaeological inventory identified one prehistoric archaeological site, ICF-01, in the project vicinity. The possibility exists that buried archaeological resources that may meet the definition of historical resource or unique archaeological resource are also present in the project area. If ICF-01 is damaged during construction or if any buried resources are encountered and damaged during construction, the destruction of the archaeological resources would be a potentially significant impact. Implementation of Mitigation Measures CUL-MM-1, CUL-MM-2, and CUL-MM-3 would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-MM-1: Implement Measures to Protect Known Archaeological Resources

- No project related work, including staging or any ground-disturbing activities, shall take place in or within 50-feet of archaeological site ICF-01.
- ESA fencing shall be installed with a 50-foot buffer around the known boundaries of archaeological site ICF-01. Installation shall take place under direct supervision of a qualified archaeologist.
- A qualified archaeologist will intermittently inspect the archaeological site and the integrity of the fence throughout the duration of the project.

Mitigation Measure CUL-MM-2: Conduct Mandatory Cultural Resources Awareness Training for All Project Personnel

Before any ground-disturbing work (including vegetation clearing, grading, and equipment staging) commences, a qualified archaeologist will conduct a mandatory cultural resources awareness training for all construction personnel. The training will cover the cultural history of the area, characteristics of archaeological sites, applicable laws, and the avoidance and minimization measures to be implemented. Proof of personnel attendance will be provided to overseeing agencies as appropriate. If new construction personnel are added to the proposed project, the contractor will ensure that the new personnel receive the mandatory training before starting work.

Mitigation Measure CUL-MM-3: Implement Measures to Protect Previously Unidentified Cultural Resources

Construction shall stop if potential cultural resources are encountered. It is possible that previous activities have obscured surface evidence of cultural resources. If signs of an archeological site, such as any unusual amounts of stone, bone, or shell, are uncovered during grading or other construction activities, work will be halted within 100 feet of the find and the Yolo County Public Works Department will be notified. A qualified archeologist will be consulted for an onsite evaluation. If the site is or appears to be eligible for listing the CRHR or NRHP, additional mitigation, such as further testing for evaluation or data recovery, may be necessary.

In the event resources are discovered, RD 108 will retain a qualified archaeologist to assess the find and to determine whether the resource requires further study. Any previously undiscovered resources found during construction will be recorded on appropriate California Department of Parks and Recreation (DPR) 523 forms and evaluated for significance under all applicable regulatory criteria.

All work will stop in the immediate vicinity of the find. If the find is determined to be an important cultural resource, RD 108 will make available contingency funding and a time allotment sufficient to allow recovery of an archaeological sample or to implement an avoidance measure. Construction work can continue on other parts of the project while archaeological mitigation takes place.

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

Impact CUL-2: Disturbance of Human Remains (less than significant with mitigation)

There are no known formal cemeteries within the project area, and neither the results of the records search nor the pedestrian survey indicate that human remains are present in the project area. However, there is always the possibility that ground-disturbing activities during construction may uncover previously unknown buried human remains, which would be a potentially significant impact. Implementation of Mitigation Measure CUL-MM-4 would reduce this impact to a less-than-significant level.

Mitigation Measure CUL-MM-4: Implement Measures if Construction Activities Inadvertently Discover or Disturb Human Remains

If human remains are discovered during any phase of construction, including disarticulated or cremated remains, the construction contractor will immediately cease all ground-disturbing activities within 100 feet of the remains and notify RD 108.

In accordance with CHSC Section 7050.5, no further disturbance will occur until the following steps have been completed.

- The Yolo County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98.
- If the remains are determined by the County Coroner to be Native American, the Coroner shall notify NAHC within 24 hours.

It is further recommended that a professional archaeologist with Native American burial experience conduct a field investigation of the specific site and consult with the Most Likely Descendant (MLD), if any, identified by NAHC. As necessary and appropriate, a professional archaeologist may provide technical assistance to the MLD, including the excavation and removal of the human remains.

3.9 Hazards and Hazardous Materials

3.9.1 Introduction

This section analyzes the proposed project's potential impacts related to hazardous, toxic, and radiological wastes. It describes existing hazard-related conditions in the project area and summarizes the overall federal, state, and local regulatory framework for hazards and hazardous materials. Hazards-related environmental impacts are also discussed and applicable mitigation is proposed.

Hazardous materials and wastes are those substances that, because of their physical, chemical, or other characteristics, may pose a risk of endangering human health or safety or of endangering the environment (California Health and Safety Code Section 25260). Types of hazardous materials include petroleum hydrocarbons, pesticides, and volatile organic compounds. Hazardous materials that would be used during construction activities for the project include diesel fuel and other liquids in construction equipment.

3.9.2 Existing Conditions

3.9.2.1 Hazardous Materials

While no known hazardous materials sites are located within the project area, two hazardous materials sites are located within 0.25-mile radius (State Water Resources Control Board 2015). The first site, "Plug-n-Jug Market" (T06113922828), is located at the corner of Locust Street and 5th Street in Knights Landing. The site has been cleaned up and its status is "complete—case closed." The second site, "Interstate Oil Knights Landing" (T10000000188), is located at the corner of Locust Street and 6th Street and is considered to be an open case. The site is approximately 1,000 feet from the project area, and is in the process of being assessed for benzene, diesel, and gasoline.

3.9.2.2 Wildland Fires

The area surrounding the project site is not considered a fire-prone area.

3.9.2.3 Emergency Response and Evacuation

The Yolo County sheriff's department provides law enforcement services, and the Knights Landing Fire Department provides fire and emergency medical services.

3.9.2.4 Schools

The Science and Technology Academy charter school is located within 0.25 mile of the proposed project, and is located at 9544 Mill Street in Knights Landing.

3.9.3 Regulatory Setting

3.9.3.1 Federal

The principal federal regulatory agency responsible for the safe use and handling of hazardous materials is the EPA. Two key federal regulations pertaining to hazardous wastes are described below. Other applicable federal regulations are contained primarily in CFR Titles 29, 40, and 49.

The following federal policies related to public health and environmental hazards may apply to the implementation of the project.

Resource Conservation and Recovery Act

The Federal Resource Conservation and Recovery Act enables EPA to administer a regulatory process that extends from the manufacture of hazardous materials to their disposal, thus regulating the generation, transportation, treatment, storage, and disposal of hazardous waste at all facilities and sites in the nation.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (also known as Superfund) was passed to facilitate the cleanup of the nation's toxic waste sites. In 1986, the act was amended by the Superfund Amendment and Reauthorization Act Title III (community right-to-know laws). Title III states that past and present owners of land contaminated with hazardous substances can be held liable for the entire cost of the cleanup, even if the material was dumped illegally when the property was under different ownership.

3.9.3.2 State

California regulations are equal to or more stringent than federal regulations. EPA has granted the State of California primary oversight responsibility to administer and enforce hazardous waste management programs. State regulations require planning and management to ensure that hazardous wastes are handled, stored, and disposed of properly to reduce risks to human and environmental health. Several key state laws pertaining to hazardous wastes are discussed below.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act, also known as the Business Plan Act, requires businesses using hazardous materials to prepare a plan that describes their facilities, inventories, emergency response plans, and training programs. Hazardous materials are defined as unsafe raw or unused material that is part of a process or manufacturing step. They are not considered hazardous waste. Health concerns pertaining to the release of hazardous materials, however, are similar to those relating to hazardous waste.

Hazardous Waste Control Act

The Hazardous Waste Control Act created the state hazardous waste management program, which is similar to but more stringent than the Federal Resource Conservation and Recovery Act program. The act is implemented by regulations contained in Title 26, CCR, which describes the following elements required for the proper management of hazardous waste.

- Identification and classification.
- Generation and transportation.
- Design and permitting of recycling, treatment, storage, and disposal facilities.
- Treatment standards.
- Operation of facilities and staff training.
- Closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the Hazardous Waste Control Act and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator to transporter to the ultimate disposal location. Copies of the manifest must be filed with the California Department of Toxic Substances Control.

3.9.3.3 Local

County of Yolo General Plan

The Health and Safety Element of the County of Yolo *2030 Countywide General Plan* contains goals aimed at reducing the risks associated with natural and human-made hazards within the county (County of Yolo 2009). Any violation of these goals would constitute a significant impact.

Goal HS-3: Protect the public and reduce damage to property from wildfire hazard.

Goal HS-4: Protect the community and the environment from hazardous materials and waste.

Policy HS-4.1: Minimize exposure to the harmful effects of hazardous materials and waste.

3.9.4 Environmental Effects

Potential impacts of the proposed project on hazards and hazardous materials are discussed in the context of State CEQA Guidelines Appendix G checklist items.

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?

Impact HAZ-1: Incidental release of hazardous materials during construction (less than significant with mitigation)

Project implementation would require the use of hazardous materials such as fuels and lubricants to operate construction equipment and vehicles such as an excavator, a cement truck, and dump trucks. Construction contractors would be required to use, store, and transport hazardous materials in compliance with federal, state, and local regulations during project construction. However, fuels and lubricants could be accidentally released into the environment at the construction site and along haul routes, causing environmental or human exposure to these hazards, which would be a significant impact. Implementation of Mitigation Measure WQ-MM-1, described in Section 3.3,

Hydrology and Water Quality, would ensure that the risk of accidental spills and releases into the environment, as well as any potential exposure to wet concrete would be minimized and that this impact would be reduced to a less-than-significant level.

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

The proposed project would not involve hazardous emissions or the handling of acutely hazardous materials, substances, or waste. However, small quantities of hazardous materials (fuel, engine oil, and hydraulic line oil) would be temporarily handled on site during construction. Potential health and safety hazards related to the proposed project include possible accidental spills involving these fuels and lubricants. Because construction activities are temporary in nature, the handling of minor amounts would be in compliance with applicable regulations, and the operation of the project would not generate industrial wastes or toxic substances. Additionally, implementation of WQ-MM-1, Implement a spill prevention, control, and countermeasure plan, described in Section 3.3, Hydrology and Water Quality, would ensure that the effect on public health and the environment would be avoided. The project effects associated with the emission of hazardous materials near an existing or proposed school would be less than significant.

d. Be located on a site that 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?

The project area is not located on a site included on any list of hazardous materials sites. Therefore, there would be no impact.

e. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?

f. Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?

The project area is not located within an airport land use plan are or within 2 miles of a public airport, public use airport, or in the vicinity of a private airstrip. Therefore, there would be no impact.

g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Construction-related activities would not involve temporary or permanent obstruction of any major roadways within the city and would not otherwise interfere with emergency operations or evacuations. Therefore, there would be no impact.

h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The project is not located in a fire-prone area. Therefore, there would be no impact.

3.10 Mandatory Findings of Significance

State CEQA Guidelines Section 15065 requires that a lead agency reach a mandatory finding of significance by preparing an EIR that presents substantial evidence to support a determination that any of the following conditions may result from a proposed project.

1. The project has the potential to substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of an endangered, rare or threatened species; or eliminate important examples of the major periods of California history or prehistory.
2. The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.
3. The project has possible environmental effects that are individually limited but cumulatively considerable.
4. The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

Implementation of the proposed project would not result in any mandatory findings of significance. With the mitigation measures described in Chapter 3, *Environmental Setting and Impacts*, all environmental impacts would be reduced to a less-than-significant level. Please refer to individual resource sections in Chapter 3 for a complete discussion of the environmental impacts and associated mitigation.

Chapter 4
Cumulative Impacts

4.1 Cumulative Projects

The following projects are planned or proposed in the vicinity of the proposed project. These projects have been completed, are in construction, or have been through environmental review, and mitigation or compensation measures have been developed to avoid impacts or reduce any significant impacts to less-than-significant levels.

- **Sacramento River Bank Protection Project**. USACE is responsible for implementation of the Sacramento River Bank Protection Project (SRBPP) in conjunction with its non-federal partner, CVFPB. The SRBPP is a continuing construction project authorized by Section 203 of the Flood Control Act of 1960. The purpose of this project is to provide protection from erosion to the existing levee and flood management facilities of the SRFCP. To date, project work has been carried out in two phases, and a total of about 820,000 feet of riverbank has been stabilized. Phase I consisted of 435,000 feet, and Phase II's original authorization was for 405,000 feet. An additional 80,000 feet (a supplement to Phase II) has been authorized under the Water Resources Development Act (WRDA) of 2007 and is being supported by a Post Authorization Change Report, Engineering Documentation Report, and EIS/EIR under development. This authorization would be applied by USACE to the Sacramento River and other sites within the SRFCP that are identified as critical levee erosion sites. There are no projects under the SRBPP that are presently under construction immediately adjacent to and upstream of the proposed project.
- **Sacramento River Flood Control System Evaluation, Phase III, Mid-Valley, Contract Area 3**. Phase III of the Mid-Valley Project is part of the Sacramento River Flood Control System Evaluation. The project proposes to repair levees at three sites in Yolo County—all northwest of the city of Sacramento—that have previously required flood fighting or have experienced seepage and boils during previous flood events. Ten other sites have been considered for repair but are unfunded and are not likely to be repaired in the foreseeable future. The repairs will provide direct flood protection to the towns of Knights Landing, Verona, and Nicholas, and indirect flood protection to the cities of Sacramento and West Sacramento. The repair sites are located along sections of the Knights Landing Ridge Cut, southeast of Knights Landing. Work to be completed includes installation of cutoff walls and levee rehabilitation work to reinforce the land side of the levees. A Finding of No Significant Impact for the project was released on April 18, 2013, and construction is expected to begin in July 2015.

Impacts on environmental resources resulting from the proposed projects listed above are required to be evaluated. In addition, mitigation and/or compensation measures must be developed to avoid or reduce any significant impacts to less-than-significant levels based on state and local agency criteria. Those impacts that cannot be avoided or reduced to less-than-significant levels are more likely to contribute to cumulative impacts in the area.

4.2 Cumulative Impacts by Resource

The State CEQA guidelines define cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (Section 15355). The following analysis focuses on considering the potential for impacts identified in Chapter 3 to make a considerable contribution to significant cumulative impacts. The proposed project would not cause long-term significant impacts on the resources discussed in Chapter 3, *Environmental Setting and Impacts*. However, some of the resources have the potential to incur temporary, short-term impacts during the construction period. An initial assessment of potential cumulative impacts indicated that impacts on hydrology and water quality, biological resources, air quality, and GHGs have the potential to contribute to cumulative impacts. The potential cumulatively considerable impacts on these resources, in combination with potential impacts from the local projects described above, are discussed below.

4.2.1 Hydrology and Water Quality

Implementation of the proposed project would not alter the course or capacity of the CBD and would not affect the course or capacity of downstream waterways. Proposed project construction could affect water quality in the vicinity of the project area through increases in turbidity and potential spills. However, implementation of the turbidity monitoring environmental commitment and Mitigation Measures WQ-MM-1 and WQ-MM-2 would prevent construction activities from contributing to cumulative impacts when considered in conjunction with other projects in the area. Therefore, the proposed project would not have additional cumulative impacts related to hydrology or water quality.

4.2.2 Biological Resources

Regionally, any losses of riparian habitat and perennial drainages as a result of project construction are cumulatively significant because of the current scarcity of these habitats in comparison with their historical extent, the importance of these habitats to wildlife, the potential habitats they provide for special-status plants and animals, and their roles in maintaining water quality.

Proposed project construction would have minor impacts on riparian habitat and the bank of the CBD, a perennial drainage. Without project-specific mitigation, the losses of the riparian habitat and perennial drainage would contribute to the cumulative impacts on these resources. However, implementation of the Mitigation Measure BIO-MM-8, described in Section 3.3, *Biological Resources*, would result in no net loss of riparian habitat and perennial drainages and their functions, and the incremental contribution of the proposed project to impacts on riparian habitat and perennial drainages would not be cumulatively considerable. In addition, other projects in the area would be required to implement mitigation and compensation measures that would result in no net loss of riparian habitat and perennial drainages.

4.2.3 Air Quality

Proposed project construction is not expected to have any long-term impacts on air quality because the operational activities are expected to be similar to existing conditions. However, construction would result in short-term, construction-related impacts on air quality mainly related to the use of combustion emissions and dust emissions. Implementation of mitigation measures during

construction would reduce these emissions to the extent possible. The proposed project would not require a change in the existing land use designations, and therefore long-term projected emissions of criteria pollutants would be the same with or without the project. Also, the proposed project would not result in a significant impact on air quality. However, all air quality impacts are cumulative, and the thresholds used by YSAQMD assume cumulative existing ongoing and future development. The minor increase in criteria pollutant emissions associated with project construction and operation (see Tables 3.5-5 and 3.5-6 in Section 3.5, *Air Quality*) would not exceed air district thresholds. YSAQMD's thresholds were established to assist the SVAB reach regional attainment with the federal and state ambient air quality standards. Accordingly, neither project construction nor project operation would result in a cumulatively considerable or cumulative air quality impact.

4.2.4 Greenhouse Gases

It is unlikely that a single project would have a significant impact on the environment with respect to GHGs. However, the cumulative impact of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which in turn has been shown to be the primary cause of global climate change (Intergovernmental Panel on Climate Change 2007). While the emissions of a single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact on global climate change.

CO_2 is tracked as a contributor to GHG emissions. YSAQMD emission models calculate air emissions based on construction phase and duration, type of equipment and machinery, project area, and other input criteria. The air quality analysis in Section 3.5, *Air Quality*, includes CO_2 emissions.

GHG impacts are inherently cumulative and are analyzed as such in Section 3.6, *Greenhouse Gases*. Impacts related to GHG emissions were determined to be less-than-significant.

Chapter 5
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Chapter 6
List of Preparers

This chapter lists the individuals who contributed to the preparation of the initial study. This list is consistent with the requirements set forth in CEQA (Public Resources Code §15129).

6.1 Reclamation District 108

Name, Title	Education/Experience	Project Role
Lewis Bair, P.E.	B.S., Agricultural Engineering; 18 years' experience	General Manager, Reclamation District 108

6.2 ICF International

Name	Education/Experience	Project Role
Gregg Ellis	B.A, Geography; 19 years' experience	Project Director
Andrew Humphrey	B.A., History; 7 years' experience	Project Manager
Jeff Peters	M.S. Geography, B.A., Geology; 17 years' experience	Hydrology and Water Quality
Lisa Webber	M.S., Botany, B.A., Biology; 25 years' experience	Biological Resources
Rachel Gardiner	M.S. Candidate, Wildlife Ecology, B.S., Biology; 14 years' experience	Biological Resources
Patrick Crain	B.A., Wildlife, Fish, and Conservation Biology; 20 years' experience	Biological Resources
Laura Yoon	M.S., Environmental Management, B.A. Environmental Studies; 6 years' experience	Air Quality and Greenhouse Gas Emissions
Darren Trageser	M.S., Atmospheric Sciences, B.S., Atmospheric Sciences; 1 year experience	Noise
Christiaan Havelaar	B.A., Anthropology; 18 years' experience	Cultural Resources
Kathryn Haley	M.A., History, B.A., History; 12 years' experience	Cultural Resources
Stephanie Monzon	M.A., English, B.A., English; 15 years' experience	Editor
Teresa Giffen	17 years' experience	Editor
Christine McCrory	Ph.D. Candidate, Germanic Languages and Literatures, M.Phil., European Literature, B.A., Anthropology and German; 13 years' experience	Publications Specialist
Senh Saelee	B.S., Visual Communications Design; 15 years' experience	Graphic Designer

Name	Education/Experience	Project Role
Alex Angier	A.A., Computer-Aided Drafting and Design; 9 years' experience	GIS Technician
Dave Buehler	B.S., Civil Engineering; 33 years' experience	Noise
Shannon Hatcher	B.S., Environmental Science, B.S., Environmental Health and Safety; 14 years' experience	Air Quality and Greenhouse Gas Emissions

6.3 Other Contributors

Name, Title	Education/Experience	Project Role
Barry O'Regan, P.E.	M.S., B.S., Civil Engineering; 29 years' experience	Engineering Lead Designer, KSN Inc. (consultant to RD 108)
Dave Vogel	M.S., Natural Resources (Fisheries), B.S., Biology; 40 years' experience	Fish Scientist, Natural Resource Scientists, Inc. (consultant to RD 108)

Appendix A

California State Lands Commission Letter

STATE OF CALIFORNIA EDMUND G. BROWN JR., *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

JENNIFER LUCCHESI, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
California Relay Service From TDD Phone **1-800-735-2922**
from Voice Phone **1-800-735-2929**

Contact Phone: **(916) 574-0282**
Contact FAX: **(916) 574-1925**

May 13, 2015

File Ref: SD 2015-03-23.3

ICF International
Attn: Andrew Humphrey
630 K Street, Suite 400
Sacramento, CA 95814

SUBJECT: **Fish Barrier, within Colusa Basin Drain, within Section 14, T11N, R2E, MDM, near Knights Landing, Yolo County**

Dear Mr. Humphrey:

This letter is in response to your request for a determination by the California State Lands Commission (CSLC) whether it asserts a sovereign title interest in the property that the above-referenced project will occupy.

The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The CSLC also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (PRC §6301 and §6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust.

As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion or where the boundary has been fixed by agreement or a court decision. On navigable non-tidal waterways, including lakes and rivers, the State holds fee ownership of the bed of the waterway landward to the ordinary low water mark and a Public Trust easement landward to the ordinary high water mark, except where the boundary has been fixed by agreement or a court decision. Such boundaries may not be readily apparent from present day site inspections.

We understand that the Reclamation District 108 is proposing to construct a fish barrier across the bed of Cache Creek Slough (currently known as Colusa Basin Drainage Canal), within Section 14, T11N, R2E, MDM, in Yolo County.

Based upon the information provided and a preliminary review of the records, we have determined that Cache Creek Slough, at the project location, is not located on State-owned sovereign land under the jurisdiction of the CSLC. Therefore, a lease from the CSLC is not required for the project.

The project may lie in an area that is subject to a public navigation easement. This easement provides that members of the public have the right to navigate and exercise the incidences of navigation in a lawful manner on State waters that are capable of being physically navigated by oar or motor-propelled small craft. Such uses may include, but not be limited to, boating, rafting, sailing, rowing, fishing, fowling, bathing, skiing, and other water-related public uses. The proposed project must not restrict or impede the easement right of the public.

This determination is without prejudice to any future assertion of State ownership or public rights, should circumstances change, or should additional information come to our attention. This letter is not intended, nor should it be construed as, a waiver or limitation of any right, title, or interest of the State of California in any lands under its jurisdiction.

Please do not hesitate to contact Sandra Kreutzburg at (916) 574-0282 or by e-mail at sandra.kreutzburg@slc.ca.gov if you have questions concerning the above.

Sincerely,

ORIGINAL SIGNED

Ninette Lee
Public Land Manager

cc: Sandra Kreutzburg

Appendix B

Environmental Checklist

Appendix B
Environmental Checklist

1. **Project Title:** Knights Landing Outfall Gate Project
2. **Lead Agency Name and Address:** Reclamation District 108
3. **Contact Person and Phone Number:** Lewis Bair (530/437-2221)
4. **Project Location:** Knights Landing, CA
5. **Project Sponsor's Name and Address:** Reclamation District 108
6. **General Plan Designation:** Agricultural, Residential
7. **Zoning:** Agricultural, Residential
8. **Description of Project:** The proposed project consists of constructing a positive fish barrier on the downstream side of the existing KLOG structure to prevent adult salmon entry into the Colusa Basin Drain, as well as repairing an erosion site on the right bank of the CBD on the downstream side of the KLOG structure. The KLOG structure is a gated concrete buttress that spans the CBD and protects the lower Colusa Basin from backwater flooding from the Sacramento River and controls water levels in the CBD for irrigation and drainage purposes. Flows coming through the KLOG gates may have the potential to attract salmon when water level differentials between the upstream and downstream sides of the gates are such that downstream flows are attractive to migrating salmonids but not at a velocity that is too great for their passage. While the extent of upstream fish passage at the KLOG has not been fully evaluated, RD 108 has decided to construct the barrier as a more immediate and cost-effective option for aiding anadromous fish populations. The barrier would consist of new concrete wingwalls and picket weirs that would be constructed on an existing concrete apron. The picket weirs would be raised and lowered remotely to prevent adult salmonids from passing through the KLOG.

   The erosion site repair would address erosion occurring at the base of the right bank of the CBD, which is a Sacramento River Flood Control Project levee. The erosion site is near the base of the bank, which is bare soil with some scattered fallen trees, and the erosion was caused by a hydraulic eddy effect created by certain flow conditions. The repair would consist of placing riprap along 100 linear feet of the bank and restoring the levee design conditions with a slope between 2.5:1 and 3:1. Rock placement would extend approximately 30 feet up the bank.
9. **Surrounding Land Uses and Setting:** The proposed project is located on the CBD, approximately one-quarter mile from its confluence with the Sacramento River near the community of Knights Landing, just below River Mile 90, in Yolo County. A section of Knights Landing that is designated as a low density residential area is located immediately on the land side of the right bank levee, and land designated for agricultural use is located on the land side of the left bank levee.
10. **Other Public Agencies Whose Approval is Required:**

    U.S. Army Corps of Engineers

    U.S. Fish and Wildlife Service

    National Marine Fisheries Service

    Central Valley Regional Water Quality Control Board

    California Department of Fish and Wildlife

Central Valley Flood Protection Board
California State Historic Preservation Officer

A.1 Environmental Factors Potentially Affected

The environmental factors checked below would potentially be affected by this project (i.e., the project would involve at least one impact that is a "Potentially Significant Impact"), as indicated by the checklist on the following pages.

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

B.1 Aesthetics

I. Aesthetics	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
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 along a scenic highway?	☐	☐	☐	☒
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.2 Agricultural and Forestry Resources

II. Agricultural and Forestry Resources	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts on forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project, and forest carbon measurement methodology provided in the Forest Protocols adopted by the California Air Resources Board. Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b. Conflict with existing zoning for agricultural use or conflict with 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 that, 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?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.3 Air Quality

III. Air Quality	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒
d. Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e. Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.4 Biological Resources

IV. Biological Resources	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 Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.5 Cultural Resources

V. Cultural Resources	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 as defined in Section 15064.5?	☐	☐	☐	☒
b. Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5?	☐	☐	☒	☐
c. Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.6 Geology and Soils

VI. Geology and Soils	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
2. Strong seismic ground shaking?	☐	☐	☐	☒
3. Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
4. Landslides?	☐	☐	☐	☒
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an onsite or offsite 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 risks to life or property?	☐	☐	☐	☒
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas 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?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.7 Greenhouse Gas Emissions

VII. Greenhouse Gas Emissions	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?	☐	☐	☒	☐

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.8 Hazards and Hazardous Materials

VIII. Hazards and Hazardous Materials	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 involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d. Be located on a site that 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. Be located within an airport land use plan area or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f. Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.9 Hydrology and Water Quality

IX. Hydrology and Water Quality	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?	☐	☒	☐	☐
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?	☐	☐	☐	☒
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?	☐	☐	☐	☒
e. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f. Otherwise substantially degrade water quality?	☐	☐	☐	☒
g. Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h. Place within a 100-year flood hazard area structures that would impede or redirect floodflows?	☐	☐	☐	☒
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j. Contribute to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.10 Land Use and Planning

X. Land Use and Planning		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.	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c.	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.11 Mineral Resources

XI. Mineral Resources	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?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.12 Noise

XII. Noise	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	☐	☒	☐	☐
b. Expose persons to or generate excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c. Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d. Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
e. Be located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.13 Population and Housing

XIII. Population and Housing	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☐	☒
b. Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c. Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.14 Public Services

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

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.15 Recreation

XV. Recreation	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.16 Transportation/Traffic

XVI. Transportation/Traffic	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b. Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d. Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e. Result in inadequate emergency access?	☐	☐	☐	☒
f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.17 Utilities and Service Systems

XVII. Utilities and Service Systems	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
Would the project:				
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?	☐	☐	☐	☒
e. Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g. Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

B.18 Mandatory Findings

XVIII. Mandatory Findings of Significance	Potentially Significant Impact	Less-than-Significant with Mitigation Incorporated	Less-than-Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, 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 that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

Please refer to Chapter 3 for a complete discussion of the environmental impacts.

Appendix C

California Native Plant Society's Inventory Search

Inventory of Rare and Endangered Plants - 7th edition interface

v7-15feb 2-5-15

Status: search results - Wed, Mar. 11, 2015 17:17 ET c

{QUADS_123} =~ m/529C|513A|513B|530D|530A|514A|529D|529A Search

Tip: Want to search by county? Try the **county index**.[all tips and help.][search history]

Your Quad Selection: Knights Landing (529C) 3812176, Taylor Monument (513A) 3812165, Grays Bend (513B) 3812166, Eldorado Bend (530D) 3812177, Kirkville (530A) 3812187, Woodland (514A) 3812167, Verona (529D) 3812175, Nicolaus (529A) 3812185, Sutter Causeway (529B) 3812186

Hits 1 to 10 of 10

Requests that specify topo quads will return only Lists 1-3.

To save selected records for later study, click the ADD button.

ADD checked items to Plant Press | check all | check none

Selections will appear in a new window.

open	save	hits	scientific	common	family	CNPS
	☑	1	**Astragalus tener var. tener**	alkali milk-vetch	Fabaceae	List 1B.2
	☑	1	**Atriplex depressa**	brittlescale	Chenopodiaceae	List 1B.2
	☑	1	**Atriplex joaquinana**	San Joaquin spearscale	Chenopodiaceae	List 1B.2
	☑	1	**Chloropyron palmatum**	palmate-bracted bird's-beak	Orobanchaceae	List 1B.1
	☑	1	**Hibiscus lasiocarpos var. occidentalis**	woolly rose-mallow	Malvaceae	List 1B.2
	☑	1	**Lepidium latipes var. heckardii**	Heckard's pepper-grass	Brassicaceae	List 1B.2
	☑	1	**Lessingia hololeuca**	woolly-headed lessingia	Asteraceae	List 3
	☑	1	**Sagittaria sanfordii**	Sanford's arrowhead	Alismataceae	List 1B.2
	☑	1	**Trichocoronis wrightii var. wrightii**	Wright's trichocoronis	Asteraceae	List 2B.1
	☑	1	**Trifolium hydrophilum**	saline clover	Fabaceae	List 1B.2

To save selected records for later study, click the ADD button.

ADD checked items to Plant Press | check all | check none

Selections will appear in a new window.

No more hits.

Appendix D

California Natural Diversity Database Results

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Taxonomic Group is (Dune or Scrub or Herbaceous or Marsh or Riparian or Woodland or Forest or Alpine or Inland Waters or Marine or Estuarine or Riverine or Palustrine or Fish or Amphibians or Reptiles or Birds or Mammals or Mollusks or Arachnids or Crustaceans or Insects or Ferns or Gymnosperms or Monocots or Dicots or Lichens or Bryophytes) and Quad is (Knights Landing (3812176) or Taylor Monument (3812165) or Grays Bend (3812166) or Eldorado Bend (3812177) or Kirkville (3812187) or Woodland (3812167) or Verona (3812175) or Nicolaus (3812185) or Sutter Causeway (3812186))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Endangered	G2G3	S1S2	SSC
Anthicus antiochensis Antioch Dunes anthicid beetle	IICOL49020	None	None	G1	S1	
Anthicus sacramento Sacramento anthicid beetle	IICOL49010	None	None	G1	S1	
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Ardea alba great egret	ABNGA04040	None	None	G5	S4	
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T2	S2	1B.2
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Atriplex depressa brittlescale	PDCHE042L0	None	None	G2	S2	1B.2
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S2S3	
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Charadrius alexandrinus nivosus western snowy plover	ABNNB03031	Threatened	None	G3T3	S2	SSC
Charadrius montanus mountain plover	ABNNB03100	None	None	G3	S2?	SSC
Chloropyron palmatum palmate-bracted salty bird's-beak	PDSCR0J0J0	Endangered	Endangered	G1	S1	1B.1
Cicindela hirticollis abrupta Sacramento Valley tiger beetle	IICOL02106	None	None	G5TH	SH	
Coastal and Valley Freshwater Marsh Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T3Q	S1	
Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Egretta thula snowy egret	ABNGA06030	None	None	G5	S4	
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Extriplex joaquinana San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
Falco columbarius merlin	ABNKD06030	None	None	G5	S3S4	WL
Great Valley Mixed Riparian Forest Great Valley Mixed Riparian Forest	CTT61420CA	None	None	G2	S2.2	
Hibiscus lasiocarpos var. occidentalis woolly rose-mallow	PDMAL0H0R3	None	None	G5T2	S2	1B.2
Lasionycteris noctivagans silver-haired bat	AMACC02010	None	None	G5	S3S4	
Lasiurus blossevillii western red bat	AMACC05060	None	None	G5	S3	SSC
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Lepidium latipes var. heckardii Heckard's pepper-grass	PDBRA1M0K1	None	None	G4T2	S2	1B.2
Lepidurus packardi vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G3	S2S3	
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Melospiza melodia song sparrow ("Modesto" population)	ABPBXA3010	None	None	G5	S3?	SSC
Nycticorax nycticorax black-crowned night heron	ABNGA11010	None	None	G5	S4	
Oncorhynchus mykiss irideus steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
Plegadis chihi white-faced ibis	ABNGE02020	None	None	G5	S3S4	WL
Pogonichthys macrolepidotus Sacramento splittail	AFCJB34020	None	None	G2	S2	SSC
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Sagittaria sanfordii Sanford's arrowhead	PMALI040Q0	None	None	G3	S3	1B.2
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Thaleichthys pacificus eulachon	AFCHB04010	Threatened	None	G5	S3	SSC
Thamnophis gigas giant garter snake	ARADB36150	Threatened	Threatened	G2	S2	
Trichocoronis wrightii var. wrightii Wright's trichocoronis	PDAST9F031	None	None	G4T3	S1	2B.1
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Valley Oak Woodland Valley Oak Woodland	CTT71130CA	None	None	G3	S2.1	

Record Count: 44

Appendix E

U.S. Fish and Wildlife Species

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the KNIGHTS LANDING (529C) U.S.G.S. 7 1/2 Minute Quad

Report Date: March 12, 2015

Listed Species

Invertebrates

Branchinecta lynchi
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Lepidurus packardi
vernal pool tadpole shrimp (E)

Fish

Acipenser medirostris
green sturgeon (T) (NMFS)

Hypomesus transpacificus
delta smelt (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
Critical habitat, winter-run chinook salmon (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)

Rana draytonii
California red-legged frog (T)

Reptiles
Thamnophis gigas
giant garter snake (T)

Birds
Coccyzus americanus occidentalis
Western yellow-billed cuckoo (T)

Key:

- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- Critical Habitat - Area essential to the conservation of a species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

Appendix F

Modeling Assumptions and Calculations

Appendix F

Supporting Air Quality Data

Project Generated Emissions and Potential Health Effects

The May 27, 2014 Fifth Appellate District Court decision *Sierra Club et al. v. County of Fresno County et al*. concludes that an EIR should disclose and evaluate the public health consequences associated with increasing air pollutants.[1] While all criteria pollutants are associated with some form of health risk (e.g., asthma, asphyxiation), adverse health effects associated with criteria pollutant emissions are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). Moreover, ozone precursors (ROG and NO_X) affect air quality on a regional scale. Health effects related to ozone are therefore the product of emissions generated by numerous sources throughout a region. Existing models have limited sensitivity to small changes in criteria pollutant concentrations, and as such, translating project-generated criteria pollutants to specific health effects would produce meaningless results. In other words, minor increases in regional air pollution from project-generated ROG and NO_X would have nominal or negligible impacts on human health.[2]

As such, an analysis of impacts to human health associated with project-generated regional emissions is not included in the analysis. Increased emissions of ozone precursors (ROG and NO_X) generated by the project could increase photochemical reactions and the formation of tropospheric ozone, which at certain concentrations, could lead to respiratory symptoms (e.g., coughing), decreased lung function, and inflammation of airways. While these health effects are associated with ozone, the impacts are a result of cumulative and regional ROG and NO_X emissions, and that the incremental contribution of the project to specific health outcomes from criteria pollutant emissions would be limited and cannot be solely traced to the project.

Since localized pollutants generated by a project can directly affect adjacent sensitive receptors, the analysis of project-related impacts to human health focuses only on those localized pollutants with the greatest potential to result a significant, material impact on human health. This is consistent with the current state-of-practice and published guidance by YSAQMD (2007), California Air Pollution Control Officers Association (2009), Office of Environmental Health Hazard (2003), and ARB (2000). The pollutants of concern include 1) DPM and 2) locally concentrated CO.

References

California Air Pollution Control Officers Association. 2009. *Health Risk Assessments for Proposed Land Use Projects*. July.

[1] On October 1, 2014, the California Supreme Court granted the Real Party in interest and respondent Friant Ranch, L.P.'s petition for review.

[2] As an example, the Bay Area Air Quality Management District's Multi-Pollutant Evaluation Method (MPEM) requires a 3 to 5 percent increase in regional ozone precursors to produce a material change in modeled human health impacts. Based on 2008 ROG and NO_X emissions in the Bay Area, a 3 to 5 percent increases equates to over 20,000 pounds per day or ROG and NO_X. While the MPEM is specific to the Bay Area, similar results would be expected in the SVAB.

California Air Resources Board. 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. October. Sacramento, CA.

Office of Environmental Health Hazard Assessment. 2003. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*. August.

Yolo-Solano Air Quality Management District. 2007. *Handbook for Assessing and Mitigating Air Quality Impacts*. Davis, CA. Adopted: June 11.

CalEEMod Outputs

Construction

Construction Schedule

Phase	Start	End	Wk Days
Coffer dam installation	9/1/2015	9/2/2015	2
Barrier construction	9/3/2015	10/29/2015	40
Erosion repairs	9/1/2015	9/8/2015	5

Heavy-Duty Offroad Equipment

Phase	CalEEMod Eq Name	#/day	Hrs/day/Eq	HP	LF	Days	Pounds per day													
							2015													
							ROG	NOX	CO	PM10 Ex	PM10 D	PM10 T	PM2.5 Ex	PM2.5 D	PM2.5 T	SOX	CO2	CH4	N2O	Other
Coffer dam installation	Cranes	1	8	226	0.29	2	0.74	8.81	3.07	0.40		0.40	0.37		0.37	0.01	592.35	0.18	0.02	
Barrier construction	Cranes	1	4	226	0.29	30	0.37	4.40	1.53	0.20		0.20	0.19		0.19	0.00	296.18	0.09	0.01	
Barrier construction	Pumps	1	3	84	0.74	5	0.28	1.99	1.46	0.15		0.15	0.15		0.15	0.00	233.64	0.03	0.01	
Erosion repairs	Tractors/Loaders/Backhoes	1	8	98	0.37	3	0.36	3.47	2.45	0.27		0.27	0.25		0.25	0.00	330.86	0.10	0.01	
							Tons													
							2015													
							ROG	NOX	CO	PM10 Ex	PM10 D	PM10 T	PM2.5 Ex	PM2.5 D	PM2.5 T	SOX	CO2	CH4	N2O	Other
							0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.59	0.00	0.00	
							0.01	0.07	0.02	0.00		0.00	0.00		0.00	0.00	4.44	0.00	0.00	
							0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.58	0.00	0.00	
							0.00	0.01	0.00	0.00		0.00	0.00		0.00	0.00	0.50	0.00	0.00	

Employee Commute

Phase	Vehicle Type	Trips/Day	Mi/Day	Days	ROG	NOX	CO	PM10 Ex	PM10 D	PM10 T	PM2.5 Ex	PM2.5 D	PM2.5 T	SOX	CO2	CH4	N2O	Other
					Pounds per day													
					2015													
Coffer dam installation	LDA/LDT/MDV	8	134	2	0.08	0.07	0.65	0.01	0.25	0.26	0.01	0.06	0.07	0.00	120.27			6.01
Barrier construction	LDA/LDT/MDV	16	269	40	0.16	0.14	1.31	0.03	0.49	0.52	0.01	0.12	0.13	0.00	240.53			12.03
Erosion repairs	LDA/LDT/MDV	8	134	5	0.08	0.07	0.65	0.01	0.25	0.26	0.01	0.06	0.07	0.00	120.27			6.01
					Tons													
					2015													
					ROG	**NOX**	**CO**	**PM10 Ex**	**PM10 D**	**PM10 T**	**PM2.5 Ex**	**PM2.5 D**	**PM2.5 T**	**SOX**	**CO2**	**CH4**	**N2O**	**Other**
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12			0.01
					0.00	0.00	0.03	0.00	0.01	0.01	0.00	0.00	0.00	0.00	4.81			0.24
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30			0.02

Haul Trucks

Sch Code	Vehicle Type	Trips/Day	Mi/day	Days	ROG	NOX	CO	PM10 Ex	PM10 D	PM10 T	PM2.5 Ex	PM2.5 D	PM2.5 T	SOX	CO2	CH4	N2O	Other
					Pounds per day													
					2015													
Coffer dam installation	T7 Single	2	24	2	0.02	0.45	0.07	0.01	0.04	0.06	0.01	0.01	0.02	0.00	92.78	0.01	0.00	
Barrier construction	T7 Single	1	12	40	0.01	0.22	0.03	0.01	0.02	0.03	0.00	0.01	0.01	0.00	46.39	0.00	0.00	
Erosion repairs	T7 Single	5	60	5	0.05	1.12	0.17	0.03	0.11	0.14	0.02	0.03	0.05	0.00	231.96	0.01	0.01	
					Tons													
					2015													
					ROG	**NOX**	**CO**	**PM10 Ex**	**PM10 D**	**PM10 T**	**PM2.5 Ex**	**PM2.5 D**	**PM2.5 T**	**SOX**	**CO2**	**CH4**	**N2O**	**Other**
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58	0.00	0.00	

Electricity

	kWh			
Consumption	250			
PG&E 2015 CO2 EF	391	lbs/MWh	Adjusted for RPS	
eGrid 2015 CH4 EF	24.08	lbs/GWh	Adjusted for RPS	
eGrid 2015 N2O EF	5.10	lbs/GWh	Adjusted for RPS	
	CO2	CH4	N2O	CO2e
2015 Emissions (MT)	0.04	0.00	0.00	0.04

Concrete

Cubic yards poured	120	
Assumed compression strength	5000	Highest for ready mix
Pounds CO2/cubic yard	555	Nisbet et. al, 2002
CO2 (MT)	30	

EMFAC2014 Emission Factors

Grams/Mile	ROG	NOx	CO	PM10	PM2_5	SOx	CO2	CH4
LDA/LDT/MDV	0.2701215	0.2348522	2.2051351	0.0473192	0.0201272	0.0040884	405.8945	0.0166496
T7 Single	0.3500516	8.4615222	1.2792218	0.2537567	0.1847274	0.0167302	1753.6043	0.016259

Source: EMFAC2014 (2015 Emission Factors for Yolo County)

Re-entrained Paved Road Dust Emission Factors

Methodology

Calculation Methodology: USEPA AP-42, Paved Roads, Section 13.2.1, Revised January 2011:
http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf
Avg vehicle weight and silt loading on Local Roads within SVAB
http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9.pdf
Precipitation Days greater than 0.254mm (0.01 in)
http://www.wrcc.dri.edu/summary/Climsmcca.html

Pollutant	Variables					SVAB EF (g per mi)
	k	sL	W	P	N	
PM_{10}	0.0022	0.32	2.4	58	365	0.82982
$PM_{2.5}$	0.00054	0.32	2.4	58	365	0.20368

E = particulate emission factor (grams of particulate matter/VMT)
k = particle size multiplier (lb/VMT) *default from AP-42*
sL = local roadway silt loading (g/m2) *ARB Section 7.9, Table 3*
W = average weight of vehicles on the road (tons) *ARB Section 7.9, Table 3*
P = number of wet days with at least 0.254mm of precipitation *from WRCC*
N = number of days in the averaging period *annual days (365)*
g to lb conversion *0.002204623*

Operation

Heavy-Duty Equipment

Phase	CalEEMod Eq Name	#/day	Hrs/day/Eq	HP	LF	Days	Pounds per day												
							2016												
							ROG	NOX	CO	PM10 Ex	PM10 D	PM10 T	PM2.5 Ex	PM2.5 D	PM2.5 T	SOX	CO2	CH4	N2O	Other
Annual Inspection	Cranes	1	8	226	0.29	1	0.72	8.53	2.98	0.39		0.39	0.36		0.36	0.01	586.23	0.18	0.02	
							Tons												
							2016												
							ROG	NOX	CO	PM10 Ex	PM10 D	PM10 T	PM2.5 Ex	PM2.5 D	PM2.5 T	SOX	CO2	CH4	N2O	Other
							0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.29	0.00	0.00	

Employee Commute

Phase	Vehicle Type	Trips/Day	Mi/Day	Days	ROG	NOX	CO	PM10 Ex	PM10 D	PM10 T	PM2.5 Ex	PM2.5 D	PM2.5 T	SOX	CO2	CH4	N2O	Other
					Pounds per day													
					2016													
Annual Inspection	LDA/LDT/MDV	18	294	1	0.16	0.13	1.26	0.03	0.54	0.57	0.01	0.13	0.14	0.00	256.41			12.82
					Tons													
					2016													
					ROG	**NOX**	**CO**	**PM10 Ex**	**PM10 D**	**PM10 T**	**PM2.5 Ex**	**PM2.5 D**	**PM2.5 T**	**SOX**	**CO2**	**CH4**	**N2O**	**Other**
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13			0.01

Haul Trucks

Sch Code	Vehicle Type	Trips/Day	Mi/day	Days	ROG	NOX	CO	PM10 Ex	PM10 D	PM10 T	PM2.5 Ex	PM2.5 D	PM2.5 T	SOX	CO2	CH4	N2O	Other
					Pounds per day													
					2016													
Annual Inspection	T7 Single	6	72	1	0.04	1.15	0.16	0.03	0.13	0.17	0.02	0.03	0.06	0.00	275.50	0.02	0.01	
					Tons													
					2016													
					ROG	**NOX**	**CO**	**PM10 Ex**	**PM10 D**	**PM10 T**	**PM2.5 Ex**	**PM2.5 D**	**PM2.5 T**	**SOX**	**CO2**	**CH4**	**N2O**	**Other**
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	

Electricity

	kWh			
Annual Electricity	400			
PG&E 2016 CO2 EF	370	lbs/MWh	Adjusted for RPS	
eGrid 2016 CH4 EF	23.20	lbs/GWh	Adjusted for RPS	
eGrid 2016 N2O EF	4.91	lbs/GWh	Adjusted for RPS	
	CO2	CH4	N2O	CO2e
2016 Emissions (MT)	0.07	0.00	0.00	0.07

EMFAC2014 Emission Factors

Grams/Mile	ROG	NOx	CO	PM10	PM2_5	SOx	CO2	CH4
LDA/LDT/MDV	0.2404407	0.205897	1.9469264	0.0471721	0.0199895	0.003981	395.59061	0.014638
T7 Single	0.2761119	7.2512141	1.0156832	0.2104199	0.1432654	0.0165586	1735.6157	0.0128247

Source: EMFAC2014 (2016 Emission Factors for Yolo County)

Re-entrained Paved Road Dust Emission Factors

Methodology

Calculation Methodology: USEPA AP-42, Paved Roads, Section 13.2.1, Revised January 2011:
http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf
Avg vehicle weight and silt loading on Local Roads within SVAB
http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9.pdf
Precipitation Days greater than 0.254mm (0.01 in)
http://www.wrcc.dri.edu/summary/Climsmcca.html

Pollutant	Variables					SVAB EF (g per mi)
	k	sL	W	P	N	
PM_{10}	0.0022	0.32	2.4	58	365	0.82982
$PM_{2.5}$	0.00054	0.32	2.4	58	365	0.20368

E = particulate emission factor (grams of particulate matter/VMT)
k = particle size multiplier (lb/VMT) *default from AP-42*
sL = local roadway silt loading (g/m2) *ARB Section 7.9, Table 3*
W = average weight of vehicles on the road (tons) *ARB Section 7.9, Table 3*
P = number of wet days with at least 0.254mm of precipitation *from WRCC*
N = number of days in the averaging period *annual days (365)*
g to lb conversion *0.002204623*