Draft Environmental Impact Statement/Draft Environmental Impact Report on the

Natomas Levee Improvement Program
Phase 4a Landside Improvements Project

State Clearinghouse No. 2009032097

Prepared for:

US Army Corps of Engineers ®
Sacramento District

SAFCA
Sacramento Area Flood Control Agency

FEDERAL AVIATION ADMINISTRATION

August 28, 2009

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DRAFT ENVIRONMENTAL IMPACT STATEMENT/ DRAFT ENVIRONMENTAL IMPACT REPORT ON THE NATOMAS LEVEE IMPROVEMENT PROGRAM, PHASE 4A LANDSIDE IMPROVEMENTS PROJECT

ABSTRACT

Lead Federal Agency: U.S. Army Corps of Engineers (USACE), Sacramento District
Lead State Agency: Sacramento Area Flood Control Agency (SAFCA)
Federal Cooperating Agency: Federal Aviation Administration (FAA)

The Natomas Levee Improvement Program (NLIP), Phase 4a Landside Improvements Project (Phase 4a Project), consists of improvements to the Natomas Basin's perimeter levee system in Sutter and Sacramento Counties, California, and associated landscape and irrigation/drainage infrastructure modifications, as proposed by SAFCA. The overall purpose of the NLIP is to bring the entire 42-mile Natomas Basin perimeter levee system into compliance with applicable Federal and state standards for levees protecting urban areas. This draft environmental impact statement/draft environmental impact report (DEIS/DEIR) has been prepared by USACE and SAFCA in accordance with the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), respectively, and evaluates the significant environmental impacts of the Phase 4a Project.

To implement the Phase 4a Project, SAFCA is requesting permission from USACE pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 United States Code [USC] 408, hereinafter referred to as "Section 408") for alteration of Federal project levees; and Section 404 of the Clean Water Act (33 USC 1344, hereinafter referred to as "Section 404") for the placement of fill in jurisdictional waters of the United States; and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403, hereinafter referred to as "Section 10") for work performed in, over, or under navigable waters of the United States. This decision is a major Federal action with the potential to significantly affect the quality of the human environment; therefore, USACE has determined that an EIS is necessary. The Proposed Action also has the potential to cause significant environmental effects under CEQA; therefore, SAFCA has determined that an EIR is necessary.

The FAA is serving as a cooperating agency under NEPA because, if USACE and SAFCA select an alternative that requires the Airport to seek a release from Federal Airport Improvement Grant assurances, the FAA would use this EIS/EIR in exercising its decision-making authority under 49 USC 47107 regarding whether to approve those actions.

The DEIS/DEIR evaluates the environmental impacts and mitigation measures associated with the Proposed Action and alternatives under consideration. The Proposed Action would result in significant and unavoidable adverse impacts on agricultural resources; land use, socioeconomics, and population and housing; geology, soils, and mineral resources; biological resources; cultural resources; transportation and circulation; air quality; noise; and visual resources.

The DEIS/DEIR does not evaluate the potential impacts resulting from the American River Common Features Project General Re-evaluation Report (GRR); the GRR is scheduled to be completed by USACE for presentation to Congress in 2010 and will be the subject of a separate EIS.

Public Review and Comment:

The public comment period for the DEIS/DEIR begins on August 28, 2009 and closes on October 13, 2009. A public meeting will be held before the SAFCA Board of Directors on September 17, 2009 at 3:00 p.m. in the Sacramento County Board of Supervisors Chambers located at 700 H Street, Sacramento, California. For further information regarding the DEIS/DEIR, please contact Elizabeth Holland, USACE Sacramento District, Planning Division, 1325 J Street, Sacramento, CA, 95814, or email Elizabeth.G.Holland@usace.army.mil; or John Bassett, SAFCA Director of Engineering, 1007 7th Street, 7th Floor, Sacramento, CA 95814, or email BassettJ@saccounty.net.

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ACRONYMS AND ABBREVIATIONS

µg/m3	50 micrograms per cubic meter
AB	Assembly Bill
AC	Advisory Circular
ACHP	Advisory Council on Historic Preservation
ADT	average daily traffic
AEP	annual exceedance probability
afy	acre-feet per year
AG District	General Agriculture District
AG-20	Agriculture–20 Acre Minimum Parcel Size
AG-80	Agriculture–80 Acre Minimum Parcel Size
AG-RC	Agriculture–Rural Community
Airport	Sacramento International Airport
Airport Master Plan	Sacramento International Airport Master Plan
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
APN	Assessor's Parcel Number
APP	Avian Protection Plan
AQAP	air quality attainment plan
AQMD	air quality management district
ARB	California Air Resources Board
ARWI	American River Watershed Investigation
AST	above ground storage tank
ATCM	Airborne Toxics Control Measure
B.P.	Before Present
BA	biological assessment
BACT	Best Available Control Technology
Basin Plan	Water Quality Control Plan for the Sacramento and San Joaquin River Basins
Bay-Delta	San Francisco Bay/Sacramento–San Joaquin Delta
bgs	below ground surface
BMP	best management practice
BO	biological opinion
CAA	Federal Clean Air Act
CAAA	Federal Clean Air Act Amendments of 1990
CAAQS	California ambient air quality standards
California PRC	California Public Resources Code
Cal/EPA	California Environmental Protection Agency
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation

CCAA	California Clean Air Act
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CEQ	Council of Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHP	California Highway Patrol
CLUP	comprehensive airport land use plans
cmbs	centimeters below surface
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
Common Features Project	American River Common Features Project
CRHR	California Register of Historical Resources
CVFPB	California Central Valley Flood Protection Board, formerly called the Reclamation Board
CWA	Clean Water Act of 1972
dB	decibels
dBA	A-weighted decibels
dbh	diameter at breast height
DEIR	draft environmental impact report
DEIS	draft environmental impact statement
DFG	California Department of Fish and Game
DOC	California Department of Conservation
DPF	diesel particulate filters
DPS	Distinct Population Segment
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EFH	essential fish habitat
EIR	environmental impact report
EIS	environmental impact statement
Elkhorn Canal	Elkhorn Main Irrigation Canal
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
ESU	Evolutionarily Significant Unit
FAA	Federal Aviation Administration

Far Western	Far Western Anthropological Research Group
FEIR	final Environmental Impact Report
FEIS	final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
FPP	Federal Farmland Protection Program
FPPA	Federal Farmland Protection Policy Act
FR	Federal Register
FRA	Federal Railroad Administration
FRAQMD	Feather River Air Quality Management District
FTA	Federal Transit Administration
FWCA	Fish and Wildlife Coordination Act
GGS	Giant Garter Snake
GGS/Drainage Canal	new canal designed to provide drainage and associated giant garter snake habitat
GHCA	Garden Highway Community Association
GHG	greenhouse gas
GRR	General Re-evaluation Report
H:V	horizontal to vertical
HAER	Historic American Engineering Record
HCP	habitat conservation plan
hp	horsepower
HPTP	Historic Property Treatment Plan
HRA	health risk assessment
HUD	U.S. Department of Housing and Urban Development
I-5	Interstate 5
I-80	Interstate 80
in/sec	inches per second
ISS	Initial Site Survey
ITE	Institute of Transportation Engineers
Joint Vision	Natomas Joint Vision Plan
kV	kilovolt
L_{50}	noise level exceeded 50% of the time
LAFCo	Local Agency Formation Commission
lb/day	pounds per day
L_{dn}	day-night average noise level
L_{eq}	Equivalent Noise Level
LESA	Land Evaluation and Site Assessment
L_{max}	maximum noise level
L_{min}	minimum noise level
LNWI	Lower Northwest Interceptor

Local Funding EIR	Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area
LOS	level of service
LSCE	Luhdorff & Scalmanini Consulting Engineers
LTMP	Long-Term Management Plan
MBTA	Migratory Bird Treaty Act
MLD	most likely descendent
mm	millimeter
MMP	Mitigation and Monitoring Plan
MMRP	Mitigation Monitoring and Reporting Program
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NALP	North Area Local Project
NBHCP	Natomas Basin Habitat Conservation Plan
NCC	Natomas Cross Canal
NCIC	North Central Information Center
NCMWC	Natomas Central Mutual Water Company
NEIC	Northeast Information Center
NEMDC	Natomas East Main Drainage Canal
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NLAP	North Area Local Project
NLEP	Natomas Levee Evaluation Program
NLIP	Natomas Levee Improvement Program
NMFS	National Marine Fisheries Service
NNCP	North Natomas Community Plan
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NOD	notice of determination
NOI	notice of intent
NOP	notice of preparation
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O&M	operations and maintenance
OES	Governor’s Office of Emergency Services
OHWM	ordinary high-water mark
OPR	Governor’s Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement

PCB	polychlorinated biphenyl
Petition	Petition for Writ of Mandate and Complaint for Injunctive Relief
PGCC	Pleasant Grove Creek Canal
Phase I ESA	Phase I environmental site assessment
Phase II ESA	Phase II environmental site assessment
Phase 2 EIR	Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project
Phase 2 EIS	Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project, Sacramento, CA
Phase 2 SEIR	Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project—Phase 2 Project
Phase 3 DEIS/DEIR	Environmental Impact Statement/Environmental Impact Report on the Natomas Levee Improvement Program, Phase 3 Landside Improvements Project
Phase 3 Project	Phase 3 Landside Improvements Project
Phase 4a Project	Phase 4a Landside Improvements Project
Phase 4b Project	Phase 4b Landside Improvements Project
PL	Public Law
PM	particulate matter
PM_{10}	respirable particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter 5 micrometers or less
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
PPV	peak particle velocity
PRC	Public Resources Code
PUD	Planned Unit Development
RBDD	Red Bluff Diversion Dam
RCRA	Resource Conservation and Recovery Act
RD	Reclamation District
Reclamation	U.S. Bureau of Reclamation
Riverside Canal	Riverside Main Irrigation Canal
RM	river mile
ROD	record of decision
ROG	reactive organic gases
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SAFCA	Sacramento Area Flood Control Agency
SARA	Superfund Amendments and Reauthorization Act of 1986
SCAS	Sacramento County Airport System
SCEMD	Sacramento County Environmental Management Department
SEIR	supplemental environmental impact report
SEIS	supplemental environmental impact statement
SGA	Sacramento Groundwater Authority
SHPO	State Historic Preservation Officer

SIP	State Implementation Plan
SIR	Supplemental Information Report
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act
SMF Master Plan	Sacramento International Airport Master Plan
SO_2	sulfur dioxide
SOI	Sphere of Influence
SR	State Route
SRA	shaded riverine aquatic
SRFCP	Sacramento River Flood Control Project
SSCI/C	South Sutter County Industrial/Commercial
STP	shovel test pit
SVAB	Sacramento Valley Air Basin
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
T-BACT	toxic best available control technology
TCP	Traditional Cultural Properties
TDS	total dissolved solids
TNBC	The Natomas Basin Conservancy
TPD	tons per day
TPY	tons per year
UBC	Uniform Building Code
UCMP	University of California Museum of Paleontology
UNWI	Upper Northwest Interceptor
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VdB	vibration decibels
WDR	waste discharge requirements
WHMP	Wildlife Hazard Management Plan
WRIME	Water Resources and Information Management Engineering, Inc.

GLOSSARY

100-year flood A flood that has a 1% or greater annual probability of occurring. Federal Emergency Management Agency accreditation means that a levee provides protection for the base flood (100-year) event, based on certification provided by a civil engineer.

200-year flood A flood that has a 0.5% or greater annual probability of occurring. Both state policy and recently enacted state legislation (Senate Bill [SB] 5) call for 200-year (0.5% annual chance) flood protection to be the minimum level of protection for urban and urbanizing areas in the Central Valley. SB 5 requires that the 200-year protection be consistent with criteria used or developed by the California Department of Water Resources. SB 5 sets a target date of 2025 for all urban and urbanizing areas protected by state/Federal project levees to achieve 200-year flood protection, and calls for building limitations after 2015 if adequate progress toward achieving this standard is not met.

Design event analysis results, as a measure of system performance, are given as the expected (mean) frequency of the maximum event that can be safely passed through the reservoir, spillway, and downstream leveed system with a set (e.g., 3 feet) "freeboard" above the computed (expected) water surface profile. Design event analysis is not the same as the analysis procedure used by USACE as a basis for determining Federal interest in a project or for USACE certification for FEMA's National Flood Insurance Program. USACE defines system performance as containing a specified frequency event (e.g., 1% event) with a high level of assurance (i.e., Conditional Non-exceedance Probability = 90%) and includes consideration of system uncertainties.

500-year flood A flood that has a 0.2% or greater annual probability of occurring.

adjacent levee A new "adjacent" levee that would widen the existing levee structure on the inland side.

affected environment The existing environment of the area affected (baseline) by the Proposed Action and alternatives under consideration. The "affected environment" also constitutes the "environmental setting," for CEQA purposes.

alternative Alternate actions that could reasonably accomplish the Proposed Action's purpose and need.

borrow Excavation of soil or sediment to provide material for use on the site or elsewhere, including for construction of structures, landscaping, or other land improvements associated with those structures, or for such engineered works as dams, fills, levees, and road cuts.

canal An artificial watercourse cut (or constructed above grade) through a land area for irrigation or drainage.

construction heading A group of construction workers and equipment operating at the same time.

crown The top of a levee.

cutoff wall An engineered low permeability feature constructed underground to reduce the flow of water through permeable soils (sands and gravels) in flood damage reduction facilities. A trench is typically excavated within the levee or levee foundation area using a modified backhoe to reach down to less permeable foundation soils (silts and clays) under the levee footprint. The trench is backfilled by blending the excavated soil with minerals (typically bentonite clay) that increase the length of time for water to travel through the subsurface.

ditch A channel to convey water for irrigation or drainage.

encroachment	Anything that is built or grows within the Federal project levee right-of-way and is not part of the levee system. Encroachments may obstruct visibility or prevent access for inspection of a levee from crown to toe, on both the water side and the land side of a levee.
ecosystem function net gain	An increase in the ability of living organisms and the nonliving environment to thrive in a given area, as measured by the relationships between biological, geochemical, and geophysical systems.
flood hazard area	An area that does not meet the minimum level of flood protection required by Federal or state law, whichever is more stringent.
General Re-evaluation report (GRR)	A report prepared by USACE to evaluate proposed modifications to a Federally authorized project. In this case, the report is a series of technical studies that support decision making by describing the process used to reevaluate the levee system, the evaluation criteria, and the results of the evaluation.
hydraulics	The study and computation of the characteristics (e.g., depth [water surface elevation], velocity, slope) of water flowing in a stream or river.
jurisdictional waters of the United States	Waters under the USACE's jurisdiction, such as wetlands or other navigable waters, as determined when the USACE issues jurisdictional determinations under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.
landside	Describes an area (location) on the land side of the levee.
levee	A large dike or artificial embankment typically constructed of earthen materials, often having an access road along the top, which is designed as part of a system to protect land from floods.
levee height	The height of the levee measured from the surface of the water, on the surface of the adjacent ground, to the top of the levee.
relief wells	All water retention structures are subject to seepage through their foundations and abutments. Relief wells are controlled artificial springs that relieve the confined water pressures to safe values, thus preventing the removal of soil via piping or internal erosion caused by the uplift pressures beneath elements of the levee or beneath landward soil next to the levee.
seepage	The movement of water through, for example, small cracks, pores, or interstices of a material into or out of a body of surface or subsurface water.
toe	Where a levee slope meets the ground.
waterside	Describes an area (location) on the water side of the levee.

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

This environmental impact statement/environmental impact report (EIS/EIR) has been prepared by the U.S. Army Corps of Engineers (USACE), Sacramento District and the Sacramento Area Flood Control Agency (SAFCA) in accordance with the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), respectively. This EIS/EIR evaluates the potential significant environmental impacts of the Natomas Levee Improvement Program (NLIP), Phase 4a Landside Improvements Project (Phase 4a Project).

The Phase 4a Project consists of improvements to a portion of the perimeter levee system protecting the Natomas Basin (Basin) in Sacramento and Sutter Counties and associated landscape and irrigation/drainage infrastructure modifications as proposed by SAFCA. SAFCA has initiated this effort in cooperation with the California Department of Water Resources and the Central Valley Flood Protection Board (hereinafter referred to together as the "State"), and USACE, with the goal of incorporating the NLIP into the Natomas components of the Federally authorized American River Common Features Project (Common Features Project).

The overall purpose of the multi-phase NLIP is to bring the entire 42-mile Natomas Basin perimeter levee system into compliance with applicable Federal and state standards for levees protecting urban areas through a program of proposed levee improvements to address levee height deficiencies, levee seepage potential, and streambank erosion conditions along the Natomas Basin perimeter levee system. The Landside Improvements Project, which is a component of the NLIP, consists of four phases. The Phase 1 Project has been completed. The Phase 2 Project has been analyzed in previous environmental documents and is currently under construction. The Phase 3 Project has been analyzed in previous environmental documents and preliminary construction would begin in late summer/early fall 2009; however, major levee construction would not begin until 2010, assuming receipt of all required environmental clearances and permits. The Phase 4 Project was divided into two sub-phases to provide the flexibility to construct this phase over more than one construction season. Both of the sub-phases has their own independent utility, can be accomplished with or without the other sub-phases, and provide additional flood risk reduction benefits to the Natomas Basin whether implemented individually or collectively. The Phase 4a Project is the subject of this EIS/EIR. The Phase 4b Project was analyzed at a programmatic level in previous environmental documents, and will be the subject of a future, project-level EIS/EIR. See Section ES.5, "Project Background and Phasing," for additional details regarding these project phases and their associated environmental documentation.

To implement the Phase 4a Project, SAFCA is requesting permission from USACE pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 United States Code [USC] 408, hereinafter referred to as "Section 408") for alteration of Federal project levees; Section 404 of the Clean Water Act (33 USC 1344, hereinafter referred to as "Section 404") for the placement of fill in jurisdictional waters of the United States; and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403, hereinafter referred to as "Section 10") for work performed in, over, or under navigable waters of the United States (such as excavation of material from or deposition of material into navigable waters). SAFCA may also need to obtain several state approvals or permits: Central Valley Flood Protection Board encroachment permit, California Surface Mining and Reclamation Act permit, Clean Water Act Section 401 water quality certification, Clean Water Act Section 402 National Pollutant Discharge Elimination System permit, California Fish and Game Code Section 2081 incidental-take authorization, California Fish and Game Code Section 1602 streambed alteration agreement, California Department of Transportation (Caltrans) encroachment permit, and permits from two local air districts, the Sacramento Metropolitan Air Quality Management District and the Feather River Air Quality Management District.

ES.2 PURPOSE AND INTENDED USES OF THIS DOCUMENT

This EIS/EIR evaluates the potential significant environmental impacts of the Phase 4a Project, and will be used to support the specific USACE decisions on whether to grant permission for the Phase 4a Project proposed by SAFCA pursuant to Sections 408, 404, and 10; and the specific SAFCA decision regarding whether to approve the Phase 4a Project.

This EIS/EIR will also be used by CEQA responsible agencies, such as the Central Valley Flood Protection Board and Central Valley Regional Water Quality Control Board and trustee agencies, such as the California Department of Fish and Game, to ensure that they have met the requirements of CEQA before deciding whether to issue discretionary permits over which they have authority. It may also be used by other state and local agencies, including CEQA trustee agencies, that may have an interest in resources that could be affected by the project.

This EIS/EIR is not intended to be used as the environmental clearance document for future development projects proposed in the Natomas Basin.

Incorporation by reference is encouraged by both NEPA (40 Code of Federal Regulations [CFR] 1500.4, 1502.21) and CEQA (California Code of Regulations [CCR] Section 15150). Both NEPA and CEQA require brief citation to and summary of the referenced material as well as the public availability of this material. CEQA also requires citation of the State identification number of the EIRs cited. This EIS/EIR is tiered from, or incorporates by reference, information contained in the following documents:

- *Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area*, State Clearinghouse No. 2006072098 (Local Funding EIR) (SAFCA 2007a), which evaluated impacts expected to result from the Phase 1 Project at a project level and the NLIP at a program level;

- *Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project*, State Clearinghouse No. 2007062016 (Phase 2 EIR) (SAFCA 2007c), which evaluated impacts expected to result from the Phase 2 Project at a project level and the remainder of the NLIP at a program level;

- *Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project* (Phase 2 EIS) (USACE 2008), which evaluated impacts expected to result from the Phase 2 Project at a project level and the remainder of the NLIP at a program level;

- *Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project—Phase 2 Project*, State Clearinghouse No. 2007062016 (Phase 2 SEIR) (SAFCA 2009a), which evaluated impacts expected to result from the modification to the Phase 2 Project at a project level; and

- *Draft Environmental Impact Statement/Draft Environmental Impact Report on the Natomas Levee Improvement Program, Phase 3 Landside Improvements Project*, State Clearinghouse No. 2008072060 (Phase 3 DEIS/DEIR) (USACE and SAFCA 2009), which evaluated impacts expected to result from the Phase 3 Project at a project level.[1]

Relevant portions of these documents, where specifically noted, are summarized throughout this EIS/EIR. Printed copies of these documents are available to the public at SAFCA's office at 1007 7th Street, 7th Floor,

[1] Throughout this document, reference is made to the fact that the Phase 4a EIS/EIR is tiered from, or incorporates by reference, information contained in the Phase 3 DEIS/DEIR. Although SAFCA has certified the Phase 3 EIR (as described in Section ES.5, "Project Background and Phasing"), USACE has not yet issued its Record of Decision (ROD) with regard to the Phase 3 Project. The Phase 3 FEIS was released for a 30-day public review period in August 2009, after which time USACE will take action on the project and issue its ROD.

Sacramento, California, during normal business hours, and are also available on SAFCA's Web site, at http://www.safca.org/Programs_Natomas.html.

ES.3 LEAD AGENCIES AND COOPERATING AGENCY

USACE is the Federal lead agency for NEPA, and SAFCA is the California lead agency for CEQA.

The Federal Aviation Administration (FAA) is serving as a cooperating Federal agency for NEPA. In the event that SAFCA and USACE select an alternative that requires the Sacramento International Airport (Airport) to change its Airport Layout Plan or seek a release from Federal Airport Improvement Grant assurances, the FAA would use this EIS/EIR in exercising its decision-making authority under 49 USC 47107 regarding whether to approve those actions.

ES.4 PROJECT LOCATION

The Natomas Basin is located at the confluence of the American and Sacramento Rivers. Encompassing approximately 53,000 acres, the Basin extends northward from the American River and includes portions of the city of Sacramento, Sacramento County, and Sutter County. In addition to the American and Sacramento Rivers to the south and west, respectively, the Natomas Basin is bordered to the north by the Natomas Cross Canal (NCC) and to the east by the Pleasant Grove Creek Canal (PGCC) and the Natomas East Main Drainage Canal (NEMDC) (**Plate 1-1**). The NCC diverts the runoff from a large watershed in western Placer and southern Sutter Counties around the Natomas area and is a major contributor to the flows in the upper reach of the Sacramento River channel in SAFCA's jurisdiction. The NEMDC is an engineered channel along the southeastern flank of Natomas. Tributaries to the NEMDC include Dry Creek, Arcade Creek, Rio Linda Creek, Robla Creek, and Magpie Creek Diversion Channel. The Natomas Basin is protected from high flows in these tributaries and in the American and Sacramento Rivers by a Federal perimeter levee system.

The Natomas Basin floodplain is occupied by more than 83,000 residents and over $8.2 billion in damageable property, including the Airport and extensive urban development, primarily in the southern one-third of the Basin. The remaining agricultural lands in the Natomas Basin provide habitat for several important wildlife species. This habitat is protected under Federal and state laws, and expansion of the urban footprint into much of the remaining agricultural areas is governed by the *Natomas Basin Habitat Conservation Plan* (NBHCP), which is aimed at setting aside and conserving tracts of agricultural land that are needed to sustain the affected species.

The Phase 4a Project location primarily includes the Sacramento River east levee Reaches 10–15, NCC south levee, Riverside Canal, and various borrow sites within the Natomas Basin (primarily the Fisherman's Lake Borrow Area). These areas are shown in **Plates 2-6a** through **2-6d**.

ES.5 PROJECT BACKGROUND AND PHASING

As stated above, the overall purpose of the multi-phase NLIP is to bring the entire 42-mile Natomas Basin perimeter levee system into compliance with applicable Federal and state standards for levees protecting urban areas. The Phase 4a Project is one subphase of the fourth project phase of the NLIP Landside Improvements Project, and includes proposed improvements affecting approximately 6 miles of the levee system in Reaches 10–15 of the Sacramento River east levee.

The proposed improvements address identified deficiencies in the Natomas Basin perimeter levee system based on (1) design criteria used to certify levees as providing 100-year flood risk reduction under regulations adopted by the Federal Emergency Management Agency (FEMA), (2) design criteria used by USACE and the State for

the levees comprising the American River Common Features Project, and (3) design 200-year[2] water surface elevations developed by SAFCA in cooperation with the State using hydrologic modeling data developed by USACE and the State as part of the Sacramento–San Joaquin River Basins Comprehensive Study.

Although SAFCA anticipates that all segments of the Natomas perimeter levee system will eventually be improved to meet all of the above design criteria, SAFCA is partnering with the California Department of Water Resources (DWR) using SAFCA's local assessments and grant funding available through DWR's FloodSAFE California Program to initiate improvements to segments of the Natomas perimeter levee system. SAFCA proposes to complete this "early implementation project" by the end of 2010. It is anticipated that the remaining segments of the perimeter levee system would be improved by USACE. This will require Congressional authorization to expand the scope of the already authorized Common Features Project based on a General Re-evaluation Report (GRR) to be completed by USACE for presentation to Congress in 2010. SAFCA is coordinating with USACE to ensure that the planning and design of the early implementation project are consistent with applicable USACE planning, engineering, and design guidelines. While the GRR will be a separate report with its own environmental documentation, USACE and SAFCA recognize that Federal actions taken in connection with the early implementation project will need to be appropriately reflected in the GRR.

To move forward as quickly as possible to reduce the risk of flooding in the Natomas Basin, SAFCA identified the broad outlines of the early implementation project at a program level of detail and developed an incremental implementation strategy based on carrying out the project in four phases, with each phase contributing independently and cumulatively to reducing flood risk. Each individual project phase would contribute to reduced flood risk for the Natomas Basin, and thus has independent utility. However, no single project phase would achieve the overall flood risk reduction objectives of the NLIP. The NLIP, as a program, has independent utility from the other areas under consideration in the GRR because the NLIP will provide added flood risk reduction to an entire area (similar to a ring levee) and this increased flood risk reduction is not dependent on the outcome of the GRR. The four phases of the project are as follows:

- The Phase 1 Project involved improvements to address underseepage deficiencies affecting a 1.9-mile segment of the NCC south levee. The environmental impacts of these improvements were evaluated in the Local Funding EIR (SAFCA 2007a), which the SAFCA Board of Directors certified in February 2007. These improvements were constructed in 2007 and 2008.

- The Phase 2 Project focuses on improvements to address underseepage and levee height deficiencies along the entire 5.3-mile length of the NCC south levee as well as underseepage, erosion, encroachment, and levee height deficiencies along the upper 4.5 miles of the Sacramento River east levee (Reaches 1–4B). The environmental impacts of these improvements are evaluated in detail in the Phase 2 EIR, which the SAFCA Board of Directors certified in November 2007, and the Phase 2 EIS, for which a record of decision (ROD) was issued by USACE in January 2009. USACE also issued the 408 permission and 404 permit for the Phase 2 Project in January 2009. Since the November 2007 certification of the Phase 2 EIR, SAFCA made minor modifications to the design of the Phase 2 Project. A supplemental EIR (Phase 2 SEIR) was prepared by SAFCA to evaluate these modifications; the SAFCA Board of Directors certified the SEIR in January 2009, at which time the Board also approved the modifications to the Phase 2 Project. The Phase 2 Project could be constructed on a stand-alone basis, assuming no further action on the balance of the NLIP is taken. Construction began in May 2009 and is anticipated to be completed in 2010, assuming receipt of all required environmental clearances and permits.

[2] Design event analysis results, as a measure of system performance, are given as the expected (mean) frequency of the maximum event that can be safely passed through the reservoir, spillway, and downstream leveed system with a set (e.g., 3 feet) "freeboard" above the computed (expected) water surface profile. Design event analysis is not the same as the analysis procedure used by USACE as a basis for determining Federal interest in a project or for USACE certification for FEMA's National Flood Insurance Program. USACE defines system performance as containing a specified frequency event (e.g., 1% event) with a high level of assurance (i.e., Conditional Non-exceedance Probability = 90%) and includes consideration of system uncertainties.

- The Phase 3 Project focuses on addressing underseepage, riverbank erosion, encroachment, and levee height deficiencies along the Sacramento River east levee Reaches 5A–9B, the PGCC west levee, and a portion of the NEMDC west levee (between Elkhorn and Northgate Boulevards). In February 2009, USACE and SAFCA issued the Phase 3 DEIS/DEIR for public review and comment. Following public review, SAFCA prepared a final EIR (FEIR) (SAFCA 2009b) to provide responses to comments on the Phase 3 DEIS/DEIR. The SAFCA Board of Directors certified the FEIR and approved the Phase 3 Project in May 2009. Separately, USACE is preparing a final EIS (FEIS) to provide responses to comments received on the Phase 3 DEIS/DEIR that will be issued for public review in August 2009. USACE will consider whether to grant Section 408 permission and issue permits under Sections 404 and 10. Preliminary construction (canal work, utility relocation, vegetation removal, and demolition of structures) of the Phase 3 Project is planned to begin in summer/fall 2009; however, major levee construction would not begin until 2010, assuming receipt of all required environmental clearances and permits. The potential exists for up to 30% of the Phase 2 Project to also be constructed in 2010, concurrent with Phase 3 Project construction, or even potentially concurrently with the Phase 4a Project, depending on the timing and availability of funding.

- The Phase 4a Project includes levee raising and seepage remediation along the Sacramento River east levee (Reaches 10–15) and in two locations of the NCC south levee as well as relocation and extension of the Riverside Canal. Parcels within the Fisherman's Lake Borrow Area (including Novak) would be the primary source of soil borrow for Phase 4a Project construction. Additional borrow could be obtained from the Interstate 5 (I-5) Borrow Area, and borrow areas previously addressed in the Phase 3 DEIS/DEIR; those areas excavated for borrow material would be reclaimed as agricultural land, grassland, or managed marsh depending on their location and existing land use. This EIS/EIR evaluates the environmental impacts of the Phase 4a Project. If permitted, these improvements could be constructed at the same time as portions of the Phase 2 and 3 Projects. Construction is planned to begin in 2010 and be completed in 2011, assuming receipt of all required environmental clearances and permits.

- The Phase 4b Project would include seepage remediation along the Sacramento River east levee (Reaches 16–20) and the American River north levee (Reaches 1–4); levee raising and widening, slope flattening, and seepage remediation along the NEMDC west levee (from Sankey Road to Elkhorn Boulevard); and improvements to the West Drainage Canal south of I-5. The Phase 4b Project will also include improvements to achieve 200-year flood risk reduction along the American River north levee (Reaches 1–4), PGCC west levee, and NEMDC west levee. The environmental impacts of these improvements were evaluated at a program level in the Local Funding EIR, Phase 2 EIR, and Phase 2 EIS; the project-specific impacts of the Phase 4b Project will be evaluated in a separate, project-specific EIS/EIR in 2010. Construction is planned to begin and be completed in 2011 or beyond, assuming receipt of all required environmental clearances and permits.

Each of the project phases discussed above also includes associated habitat, drainage, irrigation, and related infrastructure improvements.

ES.6 NEED FOR ACTION

The need for the action is to reduce the flood risk to the Natomas Basin. The need for the NLIP was initially outlined in the *Natomas Levee Evaluation Study Final Report Prepared for SAFCA in Support of the Natomas Basin Components of the American River Common Features* (SAFCA 2006), which concluded that segments of the Natomas perimeter levee system have the following problems for both the FEMA 100-year and the 200-year design water surface elevations:

- inadequate levee height,
- through-levee seepage and foundation underseepage with excessive hydraulic gradients,
- embankment instability, and
- susceptibility to riverbank erosion and scour.

Although not highlighted in the levee evaluation report, portions of the perimeter levee system, particularly along the east levee of the Sacramento River, are also subject to vegetative and structural encroachments into the levee prism.

The Natomas Basin floodplain is occupied by over 83,000 residents and $8.2 billion in damageable property. Although previous improvements to the Natomas Basin perimeter levee system, completed as part of the Sacramento Urban Levee Reconstruction Project and the North Area Local Project, have significantly reduced flood risk for the area, the Natomas Basin remains vulnerable to flooding in a less than 100-year flood event. Uncontrolled flooding in the Natomas Basin floodplain in a flood exceeding a 100-year event could result in $7.4 billion in damage (this excludes the Airport facilities) (SAFCA 2007b). Flooding could release toxic and hazardous materials, contaminate groundwater, and damage the metropolitan power and transportation grids. The disruption in transportation that could result from a major flood could affect the Airport and interstate and state highways. In addition, displacement of residents, businesses, agriculture, and recreational areas could occur. Resulting damage could hinder community growth, stability, and cohesion.

In January 2008, FEMA remapped the Natomas Basin as an AE zone. The flood zone designation took effect in December 2008. FEMA defines AE zones as areas with a 1% annual chance of flooding. The designation requires flood insurance and requires that the bottom floor of all new buildings be constructed at or above base flood elevation—as little as 3 feet above ground level in some areas of the Natomas Basin but up to 20 feet above ground level in much of the Basin. This designation and the associated constraints effectively stopped all development projects that were not issued building permits before the new maps took effect.

ES.7 PROJECT PURPOSE/PROJECT OBJECTIVES

ES.7.1 SACRAMENTO AREA FLOOD CONTROL AGENCY

SAFCA's project objectives adopted in connection with the NLIP are: (1) provide at least a 100-year level of flood risk reduction to the Natomas Basin as quickly as possible, (2) provide 200-year flood risk reduction to the Basin over time, and (3) avoid any substantial increase in expected annual damages as new development occurs in the Basin. The first two project objectives would reduce the residual risk of flooding sufficiently to meet the minimum requirements of Federal and state law for urban areas like the Natomas Basin. The third project objective is a long-term objective of SAFCA's.

Additional project objectives that have informed SAFCA's project design are to:

(1) use flood damage reduction projects in the vicinity of the Airport to facilitate management of Airport lands in accordance with the Airport's *Wildlife Hazard Management Plan* (Sacramento County Airport System [SCAS] 2007); and

(2) use flood damage reduction projects to increase the extent and connectivity of the lands in the Natomas Basin being managed to provide habitat for giant garter snake, Swainson's hawk, and other special-status species.

SAFCA's approach to defining its flood risk reduction accomplishments' level of protection (system performance) differs from that of USACE. References in this document to levels of flood risk reduction are based on SAFCA's "best estimate" approach (FEMA's and the state's current method) and should not be taken as USACE concurrence that such levels would be achieved based on USACE's approach of incorporating risk and uncertainty in the estimate of system performance. In any case, flood risk to the Natomas Basin would be considerably reduced by the project.

ES.7.2 U.S. ARMY CORPS OF ENGINEERS

The overall purpose of the project is to develop and select an alternative that would reduce the risk of flood damage in the Natomas Basin. Some residual risk will always remain, however, in any flood damage reduction system. USACE must make decisions on whether or not to grant permission for SAFCA's Phase 4a Project to alter the Natomas Basin levee system (Federal project levees) under Section 408 and issue permits under Section 404 and Section 10. USACE decisions contemplated by this EIS/EIR pertain only to the proposed Phase 4a Project, which is the subject of this EIS/EIR. USACE's Regulatory Branch has already made decisions under these authorities for the Phase 1 and 2 Projects, and decisions are pending for the Phase 3 Project.

As stated above, this EIS/EIR will be used to support the specific USACE decisions on whether to grant permission for the Phase 4a Project proposed by SAFCA pursuant to Sections 408, 404, and 10.

ES.8 ALTERNATIVES SCREENING

SAFCA, in coordination with USACE, formulated the Proposed Action and a reasonable range of project alternatives that would achieve the specific project objectives through the following steps:

- identification of the deficiencies in the Natomas levee system that must be addressed to provide at least 100-year flood risk reduction as quickly as possible;
- identification of the deficiencies in the Natomas levee system that must be addressed to provide 200-year flood risk reduction;
- identification of feasible remedial measures to address the deficiencies;
- determination of the likely significant environmental impacts of the remedial measures;
- development of a reasonable range of flood damage reduction alternatives for implementing the remedial measures; and
- identification of measures to ensure that each alternative would improve aviation safety, minimize impacts on significant cultural resource sites, and enhance habitat values.

Alternatives screening for the overall NLIP has been undertaken by SAFCA in a systematic manner through several environmental documents as detailed in **Appendix B1**, "Alternatives Formulation and Screening Details."

ES.9 ALTERNATIVES

ES.9.1 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Numerous alternatives have been considered by USACE and SAFCA to reduce flood risk in the Natomas Basin. Many alternatives have been evaluated and eliminated from further consideration during completion of the previous environmental documents related to the NLIP (see ES.2, "Purpose and Intended Uses of This Document").

The following alternatives were reviewed and eliminated from further consideration in the Local Funding EIR, Phase 2 EIR, Phase 2 EIS, and Phase 3 DEIS/DEIR. The descriptions of these eliminated alternatives are hereby incorporated by reference and summarized as follows:

- **Yolo Bypass Improvements.** This measure would involve lengthening the Fremont Weir and widening the Yolo Bypass to increase the amount of floodwater conveyed through the bypass and reduce the amount of

floodwater conveyed through the Sacramento River channel downstream of the weir. This alternative was rejected because (1) it would be too costly for SAFCA to implement; (2) even following implementation of this alternative, some levee height increases and substantial seepage and underseepage and slope stability remediation would still be required for the Natomas perimeter levee system, adding to the costs of the bypass alternative; (3) the bypass improvements would lie outside of SAFCA's jurisdiction and would require Federal, state, and local cooperation and funding; and (4) the project objective of restoring 100-year flood risk reduction to the Natomas Basin could not be achieved as quickly as possible using the Proposed Action. (Considered and eliminated in Phase 2 EIS.)

- **Reduced Natomas Urban Levee Perimeter.** This measure would involve construction of a cross levee running east to west across the Natomas Basin along an alignment north of Elkhorn Boulevard to protect existing developed areas in the City and County of Sacramento. This alternative was rejected because (1) it is inconsistent with current Federal and state authorizations and would strand Federal, state, and local investments already made in improving the NCC south levee and Sacramento River east levee pursuant to past Congressional authorization; (2) it would result in the need to raise State Route (SR) 99/70 or otherwise protect SR 99/70 from flooding; (3) it would divide Reclamation District 1000 and disrupt several portions of the Natomas Basin irrigation and drainage system and require reconfiguration of these systems; (4) it would present significant barriers to achieving the goals of the NBHCP; (5) it would have substantially greater costs than other alternatives without achieving any additional flood damage reduction benefit; (6) it would not protect existing residential, commercial, and industrial development in the Sutter County portion of the Basin north of the cross levee, and (7) it would leave a portion of the Basin currently planned for development by Sutter County (i.e., *Sutter Pointe Specific Plan* mixed-use development project) outside the urban levee perimeter and likely cause Sutter County to exercise its rights under SAFCA's joint exercise of powers agreement to prevent the expenditure of Consolidated Capital Assessment District funds on this measure. (Considered and eliminated in Local Funding EIR and Phase 2 EIS.)

- **Construction of a New Setback Levee.** This alternative would involve construction of a 5-mile-long levee along the northern reaches of the Sacramento River east levee parallel to the existing levee alignment but set back from the existing alignment by 500–1,000 feet. This alternative was rejected because it is infeasible because of (1) the presence of waterside residences along the existing levee from approximately the southern end of Reach 2 of the Sacramento River east levee (north of Riego Road) in the north to the American River north levee in the south, and the need to maintain access to these residences from Garden Highway; (2) the proximity of the Sacramento River east levee to the Airport, and the need to prevent project features from increasing potential hazards to aviation safety; and (3) the possibility that utility relocations (power poles) and flood damage reduction measures could encroach into surface slopes of Airport runway approach zones. (Considered and eliminated in Phase 2 EIR and Phase 2 EIS.)

- **Raise Levee in Place with a 1,000-Foot Levee Setback in the Upper 1.4 Miles along the Sacramento River East Levee.** This alternative would have provided a location for a substantial amount of tree planting on the waterside of the setback levee, contributing to the offsetting mitigation for the loss of the trees that may need to be removed along the existing levee to meet USACE criteria. This alternative was rejected because it was unlikely that the new setback levee would provide 100-year flood risk reduction per USACE criteria. (Considered and eliminated in Phase 2 EIR and analyzed, but not selected as the Proposed Action, in Phase 2 EIS.)

- **Construct an Adjacent Setback Levee with a 500-Foot Levee Setback in the Upper 1.4 Miles along the Sacramento River East Levee.** This alternative was evaluated because it would provide the opportunity for partially offsetting the loss of landside tree groves through the establishment of new riparian plantings in the levee setback area as well as woodland plantings on the landside of the adjacent setback levee. This alternative was rejected because it would require substantially greater quantities of borrow material with greater impacts on important farmland and transportation and circulation. (Considered and eliminated in Phase 2 EIR and analyzed, but not selected as the Proposed Action, in Phase 2 EIS.)

- **No SAFCA Levee Improvements—Private Levees in Natomas.** This alternative was analyzed assuming that there would be no SAFCA project providing flood risk reduction in the Basin, thus causing private developers to separately fund and implement individual flood risk reduction in the form of private compartment levees that would protect new developments. This alternative was rejected because it would (1) only partially meet the objective of providing 100-year flood risk reduction, (2) potentially lead to increased fragmentation of habitat for special-status species, and (3) increase projected flood damages without a commensurate reduction in flood risk. (Considered and eliminated in Local Funding EIR and Phase 2 EIR; the effects of this alternative are summarized in **Appendix B1**.)

- **Natomas 100-Year Protection.** SAFCA analyzed the impacts associated with creation of one new assessment district, which would provide only 100-year flood risk reduction to the Natomas Basin, and which would use funding raised through existing Capital Assessment District Number 3 to provide the local share of the cost of completing improvements to provide 100-year flood risk reduction to the lower American River and South Sacramento Streams Group areas (SAFCA 2007a). This alternative was rejected because it would fail to provide groundwork for the creation of 200-year protection over time (SAFCA 2007a). (Considered and eliminated in Local Funding EIR.)

The following additional alternatives that could contribute to addressing the Natomas Basin's flood problems and needs were evaluated and eliminated from further consideration either in the Phase 2 EIS (No-Action Alternative–Airport Compartment Levee) or in the Phase 3 DEIS/DEIR (Cultural Resources Impact Reduction Alternative):

- **No-Action Alternative—Airport Compartment Levee.** The Phase 2 EIS evaluated and eliminated from further consideration the No-Action Alternative—Airport Compartment Levee Alternative. The prior discussion of which is hereby incorporated by reference, is summarized as follows (see also **Appendix B1**, "Alternatives Formulation and Screening Details," for a summary of the impacts associated with the Airport Compartment Levee). With no authorization of the Phase 2 Project, SAFCA would not be able to provide the Natomas Basin with at least a 100-year level of flood risk reduction by the end of 2010 and would not be able to facilitate achieving a 200-year level of protection by the end of 2012. Federal and state floodplain regulations would prevent new development in most of the Natomas Basin. The Airport would either be compelled to operate within its existing footprint, abandoning its current plans for modernization and expansion, or, alternatively, the Airport may construct its own limited flood damage reduction structure (i.e., a ring levee) to protect existing facilities and its expansion area. This alternative was eliminated for the following reasons: (1) construction of a separate levee around the Airport would be under the responsibility and jurisdiction of another agency (SCAS), over which SAFCA would have no jurisdiction, and would require a process that is completely separate from the Proposed Action; (2) the timeline for that process is unknown and there are no design plans that would enable an accurate evaluation of potential environmental impacts; and (3) the action would require SCAS to prepare a separate CEQA and potentially NEPA environmental process and analysis. (Considered and eliminated in Phase 2 EIR and Phase 2 EIS.)

  In addition to the reasons provided in the Phase 2 EIS, design plans are not available for this alternative, thus preventing USACE and SAFCA from accurately evaluating its potential impacts; implementation of the Airport Compartment Levee would not meet any of the goals and objectives of the project; the residents, residences, and businesses within the Natomas Basin would not receive flood risk reduction; implementation of the Airport Compartment Levee would only protect the Airport; and SCAS has not proposed such a project and, therefore, it is not considered a reasonable alternative.

- **Cultural Resources Impact Reduction Alternative.** The Phase 3 Project includes construction of deep cutoff walls in the Sacramento River east levee Reaches 5A–9B, which have the potential to result in significant and unavoidable impacts on known prehistoric resources, previously unidentified cultural resources, and human remains. Construction of a 500-foot berm rather than deep cutoff walls would avoid the deep ground-disturbing work that may adversely affect potential cultural resources while still achieving flood damage reduction objectives. This alternative was eliminated because of the intensity and severity of

environmental impacts associated with construction, including the temporary closure, disruption, and redesign of all or portions of the Teal Bend Golf Club. This alternative would have resulted in impacts on ten environmental topic areas (hydrology and hydraulics, sensitive aquatic habitats, vegetation and wildlife, special-status terrestrial species, paleontological resources, transportation and circulation, air quality, visual resources, recreation, utilities and service systems, and hazards and hazardous materials) that would be potentially more substantial than those associated with the Phase 3 Project Proposed Action; and there would be a net increase in the number, intensity, and severity of environmental impacts relative to the Phase 3 Project Proposed Action. (Considered and eliminated in Phase 3 DEIS/DEIR.) See **Appendix B1** for analyses of each specific environmental issue area.

Although this alternative was eliminated in the Phase 3 DEIS/DEIR as an alternative to the Phase 3 Project Proposed Action, 500-foot-wide seepage berms are being analyzed in this EIS/EIR as part of the Phase 4a Project Proposed Action to represent the worst-case scenario for the following reasons:

- it is anticipated that at least one very large cultural site may require avoidance (CA-Sac-16/H), and
- additional previously undiscovered cultural resource sites may be present (surveys are ongoing).

The locations and widths of the seepage berms would be determined during final engineering design. Overall impacts of using seepage berms on resources and potential effects on residences, heritage oak trees, or other sensitive resources would be taken into consideration during this process. SAFCA would employ measures to minimize the Phase 4a Project footprint to avoid these resources to the extent feasible given levee design and seepage-remediation performance requirements.

ES.9.2 ALTERNATIVES CARRIED FORWARD FOR EVALUATION IN THIS EIS/EIR

Three alternatives, one no-action and two action alternatives, were carried forward for detailed analysis in this EIS/EIR: the No-Action Alternative (which includes two scenarios: No Construction and Potential Levee Failure), the Proposed Action (Adjacent Levee), and the Raise and Strengthen Levee in Place (RSLIP) Alternative. These alternatives are summarized below and described in detail in Chapter 2.0, "Alternatives." The major project elements of the action alternatives are summarized in **Table ES-1**.

The No-Action Alternative, under NEPA, is the expected future without-project conditions. Under CEQA, the No-Action Alternative is the existing condition at the time the notice of preparation was published (March 27, 2009), as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved. The Phase 4a Project **No-Action Alternative** assumes the Phase 1, 2, and 3 Projects are implemented. This alternative consists of the conditions that would be reasonably expected to occur in the foreseeable future if no additional permissions to alter the existing levees or discharge dredged or fill material into waters of the United States would be granted. Different scenarios are possible under this circumstance. Under one scenario, no project construction would occur and, thus, no construction-related impacts would occur under this alternative (this scenario is referred to in this EIS/EIR as "No-Action Alternative: No Construction"). Without improvements to the Natomas perimeter levee system (e.g., implementation of one of the action alternatives, described below), the Natomas area would continue to be designated as a special flood hazard area; new development would be effectively precluded in most areas of the Natomas Basin; and existing residential, commercial, and industrial developments in the Natomas Basin would remain subject to a significant risk of flooding. Under the second scenario, a levee failure and subsequent flooding would be considered reasonably foreseeable, if the project were not approved. Therefore, this EIS/EIR includes an analysis of the resulting potential impacts (this scenario is referred to in this EIS/EIR as "No-Action Alternative: Potential Levee Failure"); however, because impacts associated with a potential levee failure are largely unknown and would depend on the location and extent of flooding, many of these potential impacts are considered too speculative for meaningful consideration. A general, qualitative discussion of the likely impacts is nonetheless provided in this EIS/EIR.

The **Proposed Action (Adjacent Levee)** includes levee raising and seepage remediation along the Sacramento River east levee (Reaches 10–15) and in two locations of the NCC south levee as well as relocation and extension of the Riverside Canal. Parcels within the Fisherman's Lake Borrow Area would be the primary source of soil borrow for Phase 4a Project construction; those parcels excavated for borrow material would be reclaimed as agricultural land, grassland, or managed marsh depending on their location and existing land use. Wells would be constructed to provide a water supply for habitat features.

The **RSLIP Alternative** would be the same as described for the Proposed Action except for the method of levee raising and rehabilitation, the extent of levee degrade to construct cutoff walls, and extent of encroachment removal along the Sacramento River east levee. Differences from the Proposed Action, including encroachment removal and reduced footprint impacts, are shown in italicized text in **Table ES-1**.

If permitted, the Phase 4a Project could be constructed at the same time as portions of the Phase 2 and 3 Projects. Construction of the Phase 4a Project is planned to begin in 2010 and anticipated to be completed in 2011, assuming receipt of all required environmental clearances and permits.

ES.10 MAJOR CONCLUSIONS OF THE ENVIRONMENTAL ANALYSIS

The potential environmental impacts of the Proposed Action and alternatives under consideration, and mitigation measures to avoid, eliminate, minimize, or reduce the significant and potentially significant impacts to less-than-significant levels, are summarized in **Table ES-2** (presented at the end of this executive summary). This table also presents additional information on the impacts, including duration and quantification, where available, to provide a comparison among the alternatives.

ES.10.1 SIGNIFICANT AND UNAVOIDABLE IMPACTS OF THE ACTION ALTERNATIVES

A significant and unavoidable impact is one that would result in a substantial or potentially substantial adverse effect on the environment and that could not be reduced to a less-than-significant level even with implementation of applicable feasible mitigation.

The following impacts of the Proposed Action were found to be significant and unavoidable. Most of these impacts would be temporary and related to construction activities. Where feasible mitigation exists, it has been included to reduce these impacts; however, the mitigation would not be sufficient to reduce the impacts to a less-than-significant level. The following impacts are presented in the order they appear in Chapter 4.0, "Environmental Consequences and Mitigation Measures."

- conversion of Important Farmland to nonagricultural uses;
- conflicts with lands under Williamson Act[3] contracts;
- potential to temporarily physically divide or disrupt an established community;
- potential loss of mineral resources;
- loss of woodland habitats (10–15 years until maturity);
- impacts on Swainson's hawk and other special-status birds;

[3] The California Land Conservation Act of 1965 is commonly known as the Williamson Act (California Government Code Section 51200 et seq.).

Table ES-1
Summary of the Major Project Elements of the Proposed Action and the Raise and Strengthen-Levee-in-Place Alternative

Major Project Elements	Proposed Action (Adjacent Levee)	Raise and Strengthen Levee in Place Alternative
Sacramento River east levee Reaches 10–15: levee raising/ rehabilitation and seepage remediation	Construct an adjacent levee, raised in Reaches 10–11B, with cutoff walls, seepage berms, and relief wells, where required, to reduce seepage potential. Cutoff wall construction would continue 24 hours per day, 7 days per week (24/7).	*For Reaches 10–11B, raise the existing levee and flatten the existing landside slope, and construct cutoff walls within the existing levee section, seepage berms, and relief wells, where required, to reduce seepage potential. For Reaches 12–15, widen the levee crown, flatten landside slopes, construct cutoff walls within the existing levee section, and construct seepage berms and relief wells, where required, to reduce seepage potential.* Cutoff wall construction would take place on a 24/7 schedule.
Sacramento River east levee Reach 4B: seepage remediation	Install cutoff wall in the adjacent levee from Station 190+00 to 214+00 to provide additional seepage remediation.	Same as the Proposed Action.
Riverbank erosion control	None.	*Implement erosion control improvements along approximately 5,400 feet of riverbank at the waterside toe of the Sacramento River east levee at River Miles 68.8 through 70.0 (Sites I, J, K, L, M in Sacramento River east levee Reaches 10–11B of the Sacramento River east levee).*
NCC south levee: levee raising and seepage remediation at two locations	At NCMWC's Bennett Pump Station and Northern Main Pump Station, raise the NCC south levee, flatten levee side slopes, install cutoff walls, and modify or replace the existing pumps and motors to reflect raising the discharge pipes above the 200-year design flood elevation. Cutoff wall construction would continue 24/7.	Same as the Proposed Action.
Replacement of South Lauppe Pump	At Sacramento River Mile 77.2 (left bank), remove the pump, intake, and support structure prior to initiation of a separate USACE project to construct bank protection at the site. Following completion of USACE's bank protection project, SAFCA would reconstruct the pump, intake, and support structure.	Same as the Proposed Action.
Riverside Canal (highline irrigation canal) relocation and extension	Extend the relocated canal upstream of Powerline Road in Reaches 11B–12B of the Sacramento River east levee, relocate the canal east of the adjacent levee in Reaches 13–15 and east of the adjacent levee, residences, and tree groves in Reaches 15–17, and construct a piped section in Reach 15–18B at the toe of the new adjacent levee.	Same as the Proposed Action, *except a piped section would be construction in Reaches 12B–13, in addition to Reaches 15–18B.*

Table ES-1
Summary of the Major Project Elements of the Proposed Action and the Raise and Strengthen-Levee-in-Place Alternative

Major Project Elements	Proposed Action (Adjacent Levee)	Raise and Strengthen Levee in Place Alternative
Modifications to NCMWC Riverside Pumping Plant	Raise the pumping plant's discharge pipes above the 200-year design water surface and modify or replace the plant's existing pumps and motors to accommodate the raised discharge pipes. In-water construction would include use of dredge pumps to remove sediment so that new pumps could be installed, but no dewatering involving use of a coffer dam is anticipated.	Same as the Proposed Action.
Modifications to RD 1000 Pumping Plants Nos. 3 and 5	Raise the pumping plants' discharge pipes above the 200-year design water surface, extend the pipes to tie into existing discharge pipes within the waterside bench, replace or modify pumps and motors, and perform other seepage remediation, including relocating the landside stations away from the levee to accommodate the raised discharge pipes. These modifications would take place above the Sacramento River's normal summer and fall water surface elevations; therefore, no dewatering is anticipated.	Same as the Proposed Action.
Development of new and replacement groundwater wells	Abandon approximately 13 agricultural wells and replace the wells in locations outside the footprint of the levee improvements. Additionally, construct five new wells to provide a water supply for habitat mitigation features. Drilling of the wells would require construction to continue 24 hours per day for up to three days to avoid collapse or seizing of drill equipment within the hole.	Same as the Proposed Action.
Borrow site excavation and reclamation	Excavate earthen material at the borrow sites and then return the sites to preconstruction uses or suitable replacement habitat. For the Phase 4a Project levee and canal improvements along the Sacramento River east levee, the Fisherman's Lake Borrow Area is anticipated to be the primary source of soil borrow material. However, additional borrow sites may be needed for Phase 4a Project work along the Sacramento River; these include the I-5 Borrow Area, the Elkhorn Borrow Area, South Sutter, LLC, Krumenacher, the Airport north bufferlands, and the Twin Rivers Unified School District stockpile site. For the Phase 4a Project construction on the NCC south levee, the Brookfield borrow site is anticipated to be the primary source of soil borrow material. Some of these borrow sites (Elkhorn Borrow Area, Airport north bufferlands, Krumenacher, Twin Rivers Unified School District stockpile site, and South Sutter, LLC) have been fully analyzed in previous environmental documents; therefore, their potential impacts are incorporated by reference into this EIS/EIR. The Fisherman's Lake and I-5 Borrow Areas are fully analyzed in this EIS/EIR.	Same as the Proposed Action.

Table ES-1
Summary of the Major Project Elements of the Proposed Action and the Raise and Strengthen-Levee-in-Place Alternative

Major Project Elements	Proposed Action (Adjacent Levee)	Raise and Strengthen Levee in Place Alternative
Habitat creation and management	Establish a habitat complex in the Fisherman's Lake Borrow Area (Fisherman's Lake Habitat Complex) through the creation of approximately 140 acres of agricultural upland habitat; establishment of perennial native grasses on levee slopes, seepage berms, and access and maintenance area; creation of up to 120 acres of managed seasonal and perennial marsh; and establishment of woodlands consisting of native riparian and woodland species at locations along the landside of the Sacramento River east levee.	Same as the Proposed Action.
Infrastructure relocation and realignment	Realign and relocate private irrigation and drainage infrastructure (wells, pumps, canals, and pipes); and relocate utility infrastructure (power poles) as needed to accommodate the levee improvements and canal relocations.	Same as the Proposed Action.
Landside vegetation removal	In Reaches 12B–15 of the Sacramento River east levee, clear landside vegetation in a corridor up to 660 feet wide to prepare for Phase 4a Project levee and canal improvement work.	Same as the Proposed Action.
Waterside Vegetation Removal	Up to 4 acres of waterside vegetation would be removed due to replacement of pumping plants and construction of outfalls in Reaches 10–15 of the Sacramento River east levee.	*In Reaches 10–15 of the Sacramento River east levee, clear waterside vegetation to meet USACE vegetation guidance criteria (estimated 21 acres of lost Shaded Riverine Aquatic [SRA] habitat).*
Right-of-way acquisition	Acquire lands within the Phase 4a Project footprint along the Sacramento River east levee, NCC south levee, and at associated borrow sites.	Same as the Proposed Action.
Encroachment management	Remove encroachments as required to meet the criteria of USACE, the Central Valley Flood Protection Board, and the Federal Emergency Management Agency.	*Remove substantial encroachments from the waterside and landside of the Sacramento River east levee (Reaches 10–15) to ensure the levees can be certified as meeting the minimum requirements of the National Flood Insurance Program and USACE encroachment guidance.*
Exchange of properties between SAFCA and SCAS in Reaches 4A, 5B, and 6 of the Sacramento River east levee	SAFCA and SCAS would carry out a land exchange that would support expansion of Airport bufferlands along the eastern edge of the new Elkhorn Irrigation Canal and provide SAFCA additional habitat mitigation land along the upper portion of the Sacramento River east levee outside of the 10,000 foot Critical Zone.	Same as the Proposed Action.

Notes: NCC = Natomas Cross Canal; PGCC = Pleasant Grove Creek Canal; NEMDC = Natomas East Main Drainage Canal; GGS = giant garter snake; I-5 = Interstate 5; NCMWC = Natomas Central Mutual Water Company; RD = Reclamation District; USACE = U.S. Army Corps of Engineers; CVFPB = Central Valley Flood Protection Board; FEMA= Federal Emergency Management Agency; NLIP = Natomas Levee Improvement Program

Source: Compiled by EDAW in 2009, based on information provided by SAFCA in 2009

- potential damage or disturbance to known prehistoric resources from ground-disturbance or other construction-related activities;
- potential damage to or destruction of previously undiscovered cultural resources from ground-disturbance or other construction-related activities;
- potential discovery of human remains during construction;
- temporary increase in traffic on local roadways;
- temporary emissions of reactive organic gases (ROG), oxides of nitrogen (NO_X), and respirable particulate matter less than 10 microns in diameter (PM_{10}) during construction;
- generation of temporary, short-term construction noise;
- temporary, short-term exposure of residents to increased traffic noise levels from hauling activity;
- alteration of scenic vistas, scenic resources, and existing visual character of the project area; and
- new sources of light and glare that adversely affect views.

Significant and unavoidable impacts associated with the RSLIP Alternative would be the same as those for the Proposed Action with the following additional significant and unavoidable impacts:

- loss of shaded riverine aquatic (SRA) habitat associated with levee improvement and encroachment removal activities;
- long-term loss of woodland habitats;
- impacts on wildlife corridors;
- impacts on successful implementation of the NBHCP; and
- temporary disruption of emergency service response times and access.

Impacts of the RSLIP Alternative would be greater than those of the Proposed Action, for example, because some Garden Highway residents would be affected by an 8- to 12-week closure of 1.5- to 2-mile sections of Garden Highway to allow for installation of a cutoff wall in the existing levee.

ES.10.2 CUMULATIVE IMPACTS OF THE ACTION ALTERNATIVES

Significant cumulative impacts associated with the Proposed Action would be as follows:

- **Agricultural Resources:** Project implementation would involve the permanent conversion of large acreages of Important Farmland (Prime Farmland and Farmland of Statewide Importance), which cannot feasibly be replaced. Historically, agricultural land in the Natomas Basin, much of it Prime Farmland and other categories of Important Farmland, has been converted to residential and commercial development. The Phase 4a Project would contribute to this loss.
- **Cultural Resources:** Known or unknown archaeological resources could be disturbed, and cultural resources damaged or destroyed during construction activities. This would contribute to a historical trend in the loss of these resources as artifacts of cultural significance and as objects of research importance.

- **Air Quality:** The Proposed Action, in combination with probable future projects, would contribute to air pollutant emissions in Sutter and Sacramento Counties, and to the nonattainment status of the Feather River Air Quality Management District (FRAQMD) and the Sacramento Metropolitan Air Quality Management District (SMAQMD) for ozone and PM_{10}.

In addition to the significant cumulative impacts listed above for the Proposed Action, implementation of the RSLIP Alternative would also result in the following significant cumulative impacts related to biological resources:

- **Fisheries:** The loss of SRA habitat along the Sacramento River to conform with USACE guidance regarding levee encroachments (particularly vegetation on levees), and reduction in input of woody debris associated with this removal, could contribute to a cumulatively considerable effect; it is unknown whether adequate mitigation could be provided to compensate for this impact because conformance with the USACE guidance is expected to disallow the implementation of any measures that would restore, replace, or rehabilitate any loss of SRA habitat along the Sacramento River in the vicinity of the project. Further, compensation for SRA habitat loss would be limited to the purchase of SRA habitat credits at an authorized mitigation bank; currently, however, there are no known mitigation banks with SRA habitat credits on the Sacramento River.

- **Special-Status Terrestrial Species:** Removal of riparian woodlands from the waterside of the Sacramento River east levee would decrease the overall value as habitat for various species; this woodland supports active Swainson's hawk nests, elderberry shrubs, and other important biological resources. While the woodland restoration and preservation proposed for the RSLIP Alternative may be adequate to offset the removal of landside woodlands, these replacement woodlands would not be adequate to compensate for the extensive loss of mature waterside vegetation. Additional woodland mitigation could be provided through the purchase of credits from an authorized woodland mitigation bank; however, there are currently no such banks in operation along the Sacramento River.

ES.11 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

ES.11.1 AREAS OF CONTROVERSY

Based on the comments received during the scoping period and the history of the NEPA and CEQA processes undertaken by USACE and SAFCA, respectively, the major areas of public controversy associated with the project are:

- temporary, construction-related effects on Garden Highway residents (including potential 24/7 cutoff wall construction along the Sacramento River east levee);

- concerns regarding the hydraulic modeling used to analyze the project's hydraulic impacts;

- construction-related impacts on cultural and biological resources,

- vegetation and tree removal and relocation of power poles,

- removal of agricultural lands and loss of opportunity for future development, and

- SAFCA's ability to fund mitigation measures.

The first two issues were the subject of a lawsuit, filed in December 2007, by the Garden Highway Community Association challenging the Phase 2 EIR prepared by SAFCA, which was settled. A copy of the settlement agreement is included as **Appendix A3**, and applies to all affected Garden Highway residents. SAFCA intends to voluntarily apply the design and construction provisions in the agreement to all Sacramento River east levee

components of the project. Agreements made by SAFCA in the settlement regarding construction practices are incorporated into the project or reflected, as appropriate, in the mitigation measures in this EIS/EIR.

Other issues, including potential 24/7 cutoff wall construction along the Sacramento River east levee, vegetation and tree removal, relocation of power poles, and impacts to agricultural lands have been raised in comment letters by affected property owners. USACE and SAFCA have and will continue to respond to these issues, most recently in responses to comments on the Phase 3 DEIS/DEIR. Additionally, SAFCA continues to work individually with these property owners to respond to concerns.

Allegations regarding construction-related impacts on cultural and biological resources and SAFCA's ability to fund mitigation measures were the subject of a Petition for Writ of Mandate and Complaint for Injunctive Relief (Petition) filed in March 2009 by the Garden Highway Community Association challenging the adequacy of the Phase 2 SEIR under CEQA. In June 2009, both the Garden Highway Community Association and the Association for the Environmental Preservation of the Garden Highway filed Petitions challenging certification of the Phase 3 EIR. Both petitions made allegations similar to those contained in the 2007 lawsuit and in comment letters submitted on the Phase 3 DEIS/DEIR, including the issues described above. In July 2009, the Association for the Environmental Preservation of the Garden Highway dismissed its lawsuit.

ES.11.2 ISSUES TO BE RESOLVED

SAFCA will need to determine whether to approve the Proposed Action. This decision will be based on numerous factors, including the potential environmental impacts addressed in this EIS/EIR, but also the type of financing available, permitting requirements, and implementation schedule.

USACE will consider the Proposed Action and either grant or deny permission for the Phase 4a Project pursuant to Sections 408, 404, and 10.

ES.12 STEPS IN THE NEPA/CEQA PROCESS

On March 27, 2009, USACE and SAFCA issued a notice of intent (NOI) and notice of preparation (NOP), respectively, for preparing this EIS/EIR. A scoping meeting was held on April 13, 2009, to solicit comments on the scope of the EIS/EIR from interested agencies, individuals, and organizations. This DEIS/DEIR is being distributed for public and agency review and comment, in accordance with NEPA and CEQA. The review period begins on August 28, 2009 and closes on October 13, 2009. This distribution ensures that interested parties have an opportunity to express their views regarding the significant environmental impacts of the project, and to ensure that information pertinent to permits and approvals is provided to the decision makers for USACE, SAFCA, FAA, and other Federal and state agencies. This document is available for public review during normal business hours at the following locations:

- USACE, Sacramento District office, 1325 J Street, Sacramento, California;
- SAFCA, 1007 7th Street, 7th Floor, Sacramento, California;
- Sacramento Central Library, 828 I Street, Sacramento, California; and
- Sutter County Library, 750 Forbes Avenue, Yuba City, California.

A public meeting will be held before the SAFCA Board of Directors on September 17, 2009 at 3:00 p.m. in the Sacramento County Board of Supervisors Chambers located at 700 H Street, Sacramento, California, at which it will receive input from agencies and the public on the EIS/EIR. In addition, written comments from the public, reviewing agencies, and stakeholders will be accepted throughout the public comment period. Comments must be received by 5:00 p.m. on October 13, 2009 by USACE or SAFCA at the following address, fax number, or e-mail address:

Elizabeth Holland, Planning Division
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, CA 95814
Telephone: (916) 557-6763
Fax: (916) 557-7856
E-mail: Elizabeth.G.Holland@usace.army.mil

or

John Bassett, Director of Engineering
Sacramento Area Flood Control Agency
1007 7th Street, 7th Floor
Sacramento, CA 95814
Telephone: (916) 874-7606
Fax: (916) 874-8289
E-mail: BassettJ@saccounty.net

Following public review of the DEIS/DEIR, an FEIS and an FEIR will be prepared, in which USACE and SAFCA will provide responses to comments on the DEIS/DEIR. The FEIS will constitute a reprint of the entire DEIS/DEIR, and will include comment letters, responses to comments, and any text changes/clarifications. The FEIR will be a separate volume containing responses to comments and any text changes/clarifications.

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Agricultural Resources						
Impact 4.2-a: Conversion of Important Farmland to Nonagricultural Uses	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Permanent and Temporary	Permanent: 676 acres Temporary: 495 acres	Significant	Mitigation Measure 4.2-a: Minimize Important Farmland Conversion to the Extent Practicable and Feasible	Significant and Unavoidable
	RSLIP Alternative	Permanent and Temporary	Permanent: 593 acres Temporary: 495 acres	Significant	Implement Mitigation Measure 4.2-a	Significant and Unavoidable
Impact 4.2-b: Conflict with Lands under Williamson Act Contracts	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	Proposed Action	Temporary and Permanent	Permanent: 216 acres Temporary: 40 acres	Significant	Mitigation Measure 4.2-b: Minimize Impacts on Agricultural Preserve Land and Williamson Act-Contracted Land; Comply with Government Code Sections 51290–51293; and Coordinate with Landowners and Agricultural Operators	Significant and Unavoidable
	RSLIP Alternative	Temporary and Permanent	Permanent: 184 acres Temporary: 40 acres	Significant	Implement Mitigation Measure 4.2-b	Significant and Unavoidable

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Land Use, Socioeconomics, and Population and Housing						
Impact 4.3-a: Inconsistency with Airport Master Plan, Airport Land Use Compatibility Plan, and Airport Wildlife Hazard Management Plans	No-Action Alternative: No Construction	Not Applicable	Not Applicable	Consistent	No mitigation is required	Consistent
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Not Applicable	Not Applicable	Consistent	No mitigation is required	Consistent
Impact 4.3-b: Inconsistency with the Natomas Basin Habitat Conservation Plan	No-Action Alternative: No Construction	Not Applicable	Not Applicable	Consistent	No mitigation is required	Consistent
	No-Action Alternative: Potential Levee Failure	Temporary or Permanent	Unquantifiable	Consistent	No mitigation is required	Consistent
	Proposed Action	Permanent	1 acre of rice, 6 acres of canals, 18 acres landside woodlands, 4 acres of waterside woodlands (SRA habitat), 473 acres of cropland, and 66 acres of grasslands	Inconsistent	Mitigation Measure 4.3-b: Implement Mitigation Measure 4.7-k, "Ensure that Project Encroachment Does Not Jeopardize Successful Implementation of the NBHCP and Implement Mitigation Measures 4.7-a and 4.7-c through 4.7-h"	Consistent
	RSLIP Alternative	Permanent	1 acre of rice, 6 acres of canals, 18 acres landside woodland, 21 acres waterside woodlands (SRA habitat), 546 acres of cropland,	Inconsistent	Implement Mitigation Measure 4.3-b	Inconsistent

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
			and 61 acres of grasslands			
Impact 4.3-c: Potential to Physically Divide or Disrupt an Established Community	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Temporary	Intermittent road closures and detours; and closure of one lane of Garden Highway downstream of Powerline Road for approximately 8 to 12 weeks	Significant	Mitigation Measure 4.3-c: Notify Residents and Businesses of Project Construction and Road Closure Schedules; Comply with the Garden Highway Settlement Agreement; and Implement Mitigation Measure 4.10-a, "Prepare and Implement a Traffic Safety and Control Plan for Construction-Related Truck Trips," and Mitigation Measure 4.10-c, "Notify Emergency Service Providers about Project Construction and Maintain Emergency Access or Coordinate Detours with Providers"	Significant and Unavoidable
	RSLIP Alternative	Temporary	Numerous closures of 1.5 to 2 mile segments for approximately 8 to 12 weeks per segment	Significant	Implement Mitigation Measure 4.3-c	Significant and Unavoidable
Geology, Soils, and Mineral Resources						
Impact 4.4-a: Potential Temporary and Permanent Localized Soil Erosion during Construction and Operation	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Propose Action and RSLIP Alternative	Temporary and Permanent	Unquantifiable	Potentially Significant	Mitigation Measure 4.4-a(1): Implement Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions" Mitigation Measure 4.4-a(2): Secure and Implement the Conditions of the California Surface Mining and Reclamation Act Permit or Exemption	Less than Significant
Impact 4.4-b: Potential Loss of Mineral Resources	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Propose Action and RSLIP Alternative	Temporary	Unquantifiable	Potentially Significant	Mitigation Measure 4.4-b: Conduct Soil Core Sampling in Areas of the Phase 4a Project Footprint Designated as MRZ-3	Significant and Unavoidable
Hydrology and Hydraulics						
Impact 4.5-a: Hydraulic Impacts on Other Areas and Exposure to Flood Risk	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Temporary or Permanent	Continued high risk of flooding	Significant	No feasible mitigation is available	Significant and Unavoidable

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Proposed Action and RSLIP Alternative	Permanent	Substantially reduced risk of flooding; no hydraulic impacts	Less than Significant (Beneficial)	No mitigation is required	Less than Significant (Beneficial)
Impact 4.5-b: Alteration of Local Drainage	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary or Permanent	Unknown	Potentially Significant	Mitigation Measure 4.5-b: Coordinate with Landowners and Drainage Infrastructure Operators, Prepare Final Drainage Studies as Needed, and Implement Proper Project Design	Less than Significant
Impact 4.5-c: Effects on Groundwater	No-Action Alternative: No Construction and Potential Levee Failure	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	Proposed Action and RSLIP Alternative	Permanent	No substantial decrease in groundwater levels or well yields or increase in pumping costs is expected	Less than Significant	No mitigation is required	Less than Significant
Water Quality						
Impact 4.6-a: Temporary Impacts on Water Quality from Stormwater Runoff, Erosion, or Spills	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Potentially Significant	Mitigation Measure 4.6-a: Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions	Less than Significant
Impact 4.6-b: Impacts to Sacramento River Water Quality from Stormwater Runoff from Garden Highway Drainage Outlets	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Temporary	Unquantifiable	Significant	Mitigation Measure 4.6-b: Implement Standard Best Management Practices and Comply with NPDES Permit Conditions	Less than Significant
	RSLIP Alternative	Temporary	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant
Impact 4.6-c: Effects on Water Quality from Groundwater Discharged by Relief Wells	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Temporary	Unquantifiable	Too Speculative	No feasible mitigation is available	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Potentially Significant	Mitigation Measure 4.6-c: Conduct Groundwater Quality Tests, Notify the Central Valley RWQCB, and Comply with the RWQCB's Waste Discharge Authorization and NPDES Permit	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Biological Resources						
Impact 4.7-a: Loss of Woodland Habitats	No-Action Alternative: No Construction	Permanent	Loss of 21 acres to conform with USACE guidance regarding levee vegetation encroachments	Potentially Significant	No feasible mitigation is available	Significant and Unavoidable
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Permanent	Loss of approximately 18 acres of landside woodlands and approximately 4 acres of waterside woodlands	Significant	Mitigation Measure 4.7-a: Minimize Effects on Woodland Habitat; Implement all Woodland Habitat Improvements and Management Agreements; Compensate for Loss of Habitat; and Comply with Section 7 of the Federal Endangered Species Act, Section 1602 of the California Fish and Game Code, and Section 2081 of the California Endangered Species Act Permit Conditions	Less than Significant
	RSLIP Alternative	Permanent	Loss of approximately 18 acres of landside woodlands and 21 acres of waterside woodland	Significant	Implement Mitigation Measure 4.7-a	Significant and Unavoidable
Impact 4.7-b: Impacts on Wildlife Corridors	No-Action Alternative: No Construction	Permanent	Loss of 21 acres to conform with USACE guidance regarding levee vegetation encroachments	Potentially Significant	No feasible mitigation is available	Significant and Unavoidable
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Proposed Action	Permanent	Loss of small amount of canal, approximately 18 acres of landside woodlands, and approximately 4 acres of waterside woodlands	Significant	Mitigation Measure 4.7-b: Implement Mitigation Measure 4.7-a, "Minimize Effects on Woodland Habitat; Implement all Woodland Habitat Improvements and Management Agreements; Compensate for Loss of Habitat; and Comply with Section 7 of the Federal Endangered Species Act, Section 1602 of the California Fish and Game Code, and Section 2081 of the California Endangered Species Act Permit Conditions," and Mitigation Measure 4.7-e, "Minimize the Potential for Direct Loss of Giant Garter Snake Individuals, Implement All Upland and Aquatic Habitat Improvements and Management Agreements to Ensure Adequate Compensation for Loss of Habitat, and Obtain Incidental Take Authorization"	Less than Significant
	RSLIP Alternative	Permanent	Loss of small amount of canal, approximately 18 acres of landside woodlands, and 21 acres of waterside woodlands	Significant	Implement Mitigation Measure 4.7-b	Significant and Unavoidable
4.7-c: Impacts to Jurisdictional Waters of the United States	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Temporary and Permanent	Temporary impacts: 1 acre (if all potential borrow sites are used); permanent impacts: <19.76 acres	Potentially Significant	Mitigation Measure 4.7-c: Minimize Effects on Jurisdictional Waters of the United States; Complete Detailed Design of Habitat Creation Components and Secure Management Agreements to Ensure Compensation of Waters Filled; and	Less than Significant (Beneficial)

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
					Comply with Section 404, Section 401, Section 10, and Section 1602 Permit Processes	
	RSLIP Alternative	Temporary and Permanent	Temporary impacts: 1 acre (if all potential borrow sites are used); permanent impacts: <28.35 acres	Potentially Significant	Implement Mitigation Measure 4.7-c	Less than Significant (Beneficial)
4.7-d: Impacts on Special-Status Plant Species	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Permanent	No special-status plant species found	Less than Significant	No mitigation is required	Less than Significant
4.7-e: Impacts on Giant Garter Snake Related to Project Construction Activities and Operational Activities of Relocated or Modified Pump Plants	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Permanent	Approximately 4 acres of canal/ditch and 1 acre of rice	Potentially Significant	Mitigation Measure 4.7-e: Minimize the Potential for Direct Loss of Giant Garter Snake Individuals, Implement All Upland and Aquatic Habitat Improvements and Management Agreements to Ensure Adequate Compensation for Loss of Habitat, and Obtain Incidental Take Authorization	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
4.7-f: Impacts on Swainson's Hawk and Other Special Status Birds	No-Action Alternative: No Construction	Not Applicable	Loss of 21 acres of waterside woodlands to conform with USACE guidance regarding levee vegetation encroachments Grassland and Cropland loss unknown	Potentially Significant	No feasible mitigation is available	Significant and Unavoidable
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Permanent	539 foraging acres and 12 potential nesting acres	Significant	Mitigation Measure 4.7-f: Minimize Potential Impacts on Swainson's Hawk and Other Special-Status Birds Foraging and Nesting Habitat, Monitor Active Nests during Construction, Implement All Upland and Agricultural Habitat Improvements and Management Agreements to Compensate for Loss of Quantity and Quality of Foraging Habitat, Obtain Incidental Take Authorization, and Implement Mitigation Measure 4.7-a, "Minimize Effects on Woodland Habitat, Implement all Woodland Habitat Improvements and Management Agreements, Compensate for Loss of Habitat, and Comply with Section 7 of the Federal Endangered Species Act, Section 1602 of the California Fish and Game Code, and Section 2081 of the California Endangered Species Act Permit Conditions"	Significant and Unavoidable
	RSLIP Alternative	Permanent	607 foraging acres and 32 nesting acres	Potentially Significant	Implement Mitigation Measure 4.7-f	Significant and Unavoidable

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
4.7-g: Impacts on Valley Elderberry Longhorn Beetle	No-Action Alternative: No Construction	Permanent	Unknown number of shrubs and 21 acres of waterside woodland	Potentially Significant	No feasible mitigation is available	Significant and Unavoidable
	No-Action Alternative: Potential Levee Failure	Not applicable	Unquantifiable	Too Speculative	No mitigation is required	Significant and Unavoidable
	Proposed Action	Permanent	Loss of approximately 13 shrubs, loss of approximately 18 acres of landside woodlands and approximately 4 acres of waterside woodlands	Significant	Mitigation Measure 4.7-g: Conduct Focused Surveys for Elderberry Shrubs as Needed, Implement all Woodland Habitat Improvements and all Management Agreements, Ensure Adequate Compensation for Loss of Shrubs, and Obtain Incidental Take Authorization	Less than Significant
	RSLIP Alternative	Permanent	Unknown shrubs, loss of approximately 18 acres of landside woodlands and 21 acres of waterside woodlands	Significant	Implement Mitigation Measure 4.7-g	Less than Significant
4.7-h: Impacts on Other Special-Status Wildlife Species, Including Burrowing Owl and Northwestern Pond Turtle	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Permanent	Approximately 4 acres of canal/ditch and 1 acre of rice	Potentially Significant	Mitigation Measure 4.7-h: Conduct Focused Surveys for Northwestern Pond Turtles, Relocate Turtles, Minimize Potential Impacts on Burrowing Owls, and Relocate Owls as Needed	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
4.7-i: Temporary Construction-related Impacts to Fish and Aquatic Habitats	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary and Permanent	Unquantifiable	Significant	Mitigation Measure 4.7-i: Implement Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, Prepare and Implement a Spill Containment Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions," Implement a Feasible Construction Work Window that Minimizes Impacts to Special-Status Fish Species for Any In-Water Activities, and Implement Operational Controls and a Fish Rescue Plan that Minimizes Impacts to Fish Associated with Cofferdam Construction and Dewatering	Less than Significant
4.7-j:Impacts to Fish Species Associated with Operation of Pump Plants and Surface Drains	No-Action Alternative: No Construction	Temporary or Permanent	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Temporary or Permanent	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Permanent	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
4.7-k: Impacts on Successful Implementation of the NBHCP	No-Action Alternative: No Construction	Permanent	Loss of 21 acres of nesting habitat for Swainson's hawk (covered by the NBHCP)	Significant	No feasible mitigation is available	Significant and Unavoidable
	No-Action Alternative: Potential Levee Failure	Not Applicable	Not Applicable	Less than Significant	No mitigation is required	Less than Significant
	Proposed Action	Permanent	1 acre of rice, 6 acres of canals, 18 acres landside woodlands, 4 acre of waterside woodlands (SRA habitat), 473 acres of cropland, and 66 acres of grasslands	Significant	Mitigation Measure 4.7-k: Ensure that Project Encroachment Does Not Jeopardize Successful Implementation of the NBHCP and Implement Mitigation Measures 4.7-a, and 4.7-c through 4.7-h	Less than Significant
	RSLIP Alternative	Permanent	1 acre of rice, 6 acres of canals, 18 acres landside woodland, 21 acres waterside woodlands (SRA habitat), 546 acres of cropland, and 61 acres of grasslands	Significant	Implement Mitigation Measure 4.7-k	Significant and Unavoidable

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Cultural Resources						
Impact 4.8-a: Potential Changes to Elements of Reclamation District 1000 and Rural Landscape District	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Permanent	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant
	Proposed Action and RSLIP Alternative	Permanent	Unquantifiable	Potentially Significant	Mitigation Measure 4.8-a: Incorporate Mitigation Measures to Documents Regarding Any Elements Contributing to RD 1000 and Rural Landscape District and Distribute the Information to the Appropriate Repositories	Less than Significant
Impact 4.8-b: Potential Damage or Disturbance to Known Prehistoric Resources from Ground-Disturbance or Other Construction-Related Activities	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Permanent	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant
	Proposed Action and RSLIP Alternative	Permanent	Five identified prehistoric sites	Potentially Significant	Mitigation Measure 4.8-b: Avoid Ground Disturbance Near Eligible and Listed Resources to the Extent Feasible, Prepare a Finding of Effect, and Resolve Any Adverse Effects through Preparation of an HPTP	Significant and Unavoidable
Impact 4.8-c: Potential Damage to or Destruction of Previously Undiscovered Cultural Resources from Ground-Disturbance or Other Construction-Related Activities	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Proposed Action and RSLIP Alternative	Permanent	Unquantifiable	Potentially Significant	Mitigation Measure 4.8-c: Train Construction Workers before Construction, Monitor Construction Activities, Stop Potentially Damaging Activities, Evaluate Any Discoveries, and Resolve Adverse Effects on Eligible Resources, if Encountered	Significant and Unavoidable
Impact 4.8-d: Potential Discovery of Human Remains during Construction	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Potentially Significant	Mitigation Measure 4.8-d: Stop Work Within An Appropriate Radius Around the Find, Notify the Applicable County Coroner and Most Likely Descendant, and Treat Remains in Accordance with State Law and Measures Stipulated in an HPTP Developed in Consultation between USACE, SAFCA, and the SHPO	Significant and Unavoidable
Paleontological Resources						
Impact 4.9-a: Disturbance of Unknown Unique Paleontological Resources during Earthmoving Activities	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Permanent	Not Applicable	Less than Significant	No mitigation is required	Less than Significant
	Proposed Action and RSLIP Alternative	Permanent	Unquantifiable	Potentially Significant	Mitigation Measure 4.9-a: Conduct Construction Personnel Training and, if Paleontological Resources Are Found, Stop Work Near the Find and Implement Mitigation in Coordination with a Professional Paleontologist	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Transportation and Circulation						
Impact 4.10-a: Temporary Increase in Traffic on Local Roadways	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Temporary	Up to 2,200 trips/day for the Sacramento River east levee and 20 trips/day for the NCC; closure of one lane of Garden Highway downstream of Powerline Road for approximately 8 to 12 weeks; and closure of Garden Highway (to through traffic) for up to 60 days in three locations, requiring detours	Significant	Mitigation Measure 4.10-a: Prepare and Implement a Traffic Safety and Control Plan for Construction-Related Truck Trips	Significant and Unavoidable
	RSLIP Alternative	Temporary	1,900 haul trips/day for the Sacramento River east levee and 20 trips/day for the NCC; numerous closures of 1.5 to 2 mile segments of Garden Highway for approximately 8 to 12 weeks per segment; and closure of Garden	Significant	Implement Mitigation Measure 4.10-a	Significant and Unavoidable

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
			Highway (to through traffic) for up to 60 days in three locations, requiring detours			
Impact 4.10-b: Temporary Increase in Traffic Hazards on Local Roadways	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Reconstruction of two public roadways and multiple farm road intersections with Garden Highway; closures of portions of Garden Highway (see Impact 4.10-a)	Significant	Mitigation Measure 4.10-b: Implement Mitigation Measure 4.10-a, "Prepare and Implement a Traffic Safety and Control Plan for Construction-Related Truck Trips"	Less than Significant
Impact 4.10-c: Temporary Disruption of Emergency Service Response Times and Access	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Temporary	Numerous temporary road closures and detours; closures of portions of Garden Highway (see Impact 4.10-a)	Potentially Significant	Mitigation Measure 4.10-c: Notify Emergency Service Providers about Project Construction and Maintain Emergency Access or Coordinate Detours with Providers	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	RSLIP Alternative	Temporary	Numerous temporary road closures and detours; closures of portions of Garden Highway (see Impact 4.10-a)	Potentially Significant	Implement Mitigation Measure 4.10-c	Significant and Unavoidable
Impact 4.10-d: Conflict with Adopted Policies, Plans, or Programs Supporting Alternative Transportation	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	See Impact 4.10-a	Significant	Mitigation Measure 4.10-d: Prepare and Implement a Bicycle Detour Plan for Project Area Roadways, Including Garden Highway	Less than Significant
Air Quality						
Impact 4.11-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Temporary	Total mitigated emissions in 2010, combined Phase 2, 3, and 4a Projects in Sacramento County: ROG 287.6 lb/day NO_X 1,476.8 lb/day PM_{10} 3,846.9 lb/day	Significant	Mitigation Measure 4.11-a: Implement Applicable District-Recommended Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction	Significant and Unavoidable

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	RSLIP Alternative	Temporary	Sutter County: ROG 101.7 lb/day NO_X 527 lb/day PM_{10} 1,259.5 lb/day Total mitigated emissions in 2010, combined Phase 2, 3, and 4a Projects in Sacramento County: ROG 266.5 lb/day NO_X 1,394.8 lb/day PM_{10} 3,395.1 lb/day Sutter County: ROG 68.2 lb/day NO_X 341 lb/day PM_{10} 822.4 lb/day	Significant	Implement Mitigation Measure 4.11-a	Significant and Unavoidable
Impact 4.11-b: General Conformity with the Applicable Air Quality Plan	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Mitigation would reduce impacts to the Federal *de minimis* thresholds	Less than Significant	No mitigation is required	Less than Significant
Impact 4.11-c: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Project Implementation	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Temporary	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Proposed Action and RSLIP Alternative	Permanent	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant
Impact 4.11-d: Exposure of Sensitive Receptors to Toxic Air Emissions	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant
Noise						
Impact 4.12-a: Generation of Temporary, Short-Term Construction Noise	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Temporary	Unquantifiable	Less than Significant	No feasible mitigation is available	Less than Significant
	Proposed Action and RSLIP Alternative	Temporary	79–90 dBA without feasible noise control (50 feet from nearest noise source); highest noise level would be 77.9 dBA L_{eq} (100 feet from construction activities)	Significant	Mitigation Measure 4.12-a: Implement Noise-Reducing Construction Practices, Prepare and Implement a Noise Control Plan, and Monitor and Record Construction Noise Near Sensitive Receptors	Significant and Unavoidable
Impact 4.12-b: Temporary, Short-term Exposure of Sensitive Receptors to or Temporary, Short-term Generation of Excessive	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Temporary	Unquantifiable	Less than Significant	No feasible mitigation is available	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Groundborne Vibration	Proposed Action and RSLIP Alternative	Temporary	0.089 in/sec PPV or 87 VdB (for bulldozers)	Less than Significant	No mitigation is required	Less than Significant
Impact 4.12-c: Temporary, Short-term Exposure of Residents to Increased Traffic Noise Levels from Truck Hauling Associated With Borrow Activity	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	71.5 dBA L_{eq} (50 feet from roadway centerline), resulting in interior noise levels of 46.5 dBA L_{eq}	Potentially Significant	Mitigation Measure 4.12-c: Implement Noise-Reduction Measures to Reduce the Impacts of Haul Truck Traffic Noise	Potentially Significant and Unavoidable
Impact 4.12-d: Long-Term Increases in Project-Generated Noise	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Permanent	78–88 dBA 3–5 feet away; meets compliance standards	Less than Significant	No mitigation is required	Less than Significant
Impact 4.12-e: Temporary Exposure of People Working in the Project Area to Excessive Airport Noise Levels	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Temporary	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Proposed Action and RSLIP Alternative	Temporary	Would not exceed Airport noise threshold levels	Less than Significant	No mitigation is required	Less than Significant
Visual Resources						
Impact 4.13-a: Alteration of Scenic Vistas, Scenic Resources, and Existing Visual Character of the Project Area	No-Action Alternative: No Construction	Not Applicable	Not Applicable	Potentially Significant	No mitigation is required	Significant and Unavoidable
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action	Permanent	Removal of approximately 18 acres of landside woodlands and 4 acre of waterside woodlands	Significant	No feasible mitigation is available	Significant and Unavoidable
	RSLIP Alternative	Permanent	Removal of approximately 18 acres of landside woodlands and 21 acres of waterside woodland	Significant	No feasible mitigation is available	Significant and Unavoidable
Impact 4.13-b: New Sources of Light and Glare that Adversely Affect Views	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Significant	Mitigation Measure 4.13-b: Implement Mitigation Measure 4.15-f, "Coordinate Work in the Critical Zone with Airport Operations and Restrict Night Lighting within and near the Runway Approaches," and Direct Lighting Away from Adjacent Properties	Significant and Unavoidable
Utilities and Service Systems						
Impact 4.14-a: Potential Temporary Disruption of Irrigation Water Supply	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Potentially Significant	Mitigation Measure 4.14-a: Coordinate with Irrigation Water Supply Users Before and During All Irrigation Infrastructure Modifications and Minimize Interruptions of Supply	Less than Significant
Impact 4.14-b: Potential Disruption of Utility Service	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Potentially Significant	Mitigation Measure 4.14-b: Verify Utility Locations, Coordinate with Utility Providers, Prepare and Implement a Response Plan, and Conduct Worker Training with Respect to Accidental Utility Damage and Implement Mitigation Measure 4.15-c, "Review Design Specifications and Prepare and Implement an Impact Avoidance and Contingency Plan in Consultation with Wickland Pipelines, LLC"	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Impact 4.14-c: Increases in Solid Waste Generation	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Estimated over 100,000 cy solid waste; would not exceed remaining capacity	Less than Significant	No mitigation is required	Less than Significant
Hazards and Hazardous Materials						
Impact 4.15-a: Accidental Spills of Hazardous Materials	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary or Permanent	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant
Impact 4.15-b: Exposure to Hazardous Materials Encountered at Project Sites	No-Action Alternative: No Construction	Not Applicable	Not Applicable	Potentially Significant	No mitigation is required	Significant and Unavoidable
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Significant	Mitigation Measure 4.15-b(1): Implement Mitigation Measure 4.11-a, "Implement Applicable District-Recommended Control Measures to Minimize Temporary Emissions of	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
					ROG, NO_X, and PM_{10} during Construction," and Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions"; and Complete Phase I and/or II ESAs and Implement Recommended Measures Mitigation Measure 4.15-b(2): Complete Investigations Related to the Extent to Which Soil and/or Groundwater May Have Been Contaminated in Areas Not Covered by the Phase I and/or II ESAs and Implement Required Measures (e.g., Site Management and/or Other Contingency Plans)	
Impact 4.15-c: Risk of Accidental Release of Jet Fuel from Construction Near an Existing Pipeline in Reach 11B of the Sacramento River East Levee	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Potentially Significant	Mitigation Measure 4.15-c: Review Design Specifications and Prepare and Implement an Impact Avoidance and Contingency Plan in Consultation with Wickland Pipelines, LLC	Less than Significant
Impact 4.15-d: Interference with an Adopted Emergency Evacuation Plan	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Significant	Mitigation Measure 4.15-d: Notify State and Local Emergency Management Agencies about Project Construction and Coordinate Any SR 99/70 Detours with these Agencies to Ensure That Any Need for Emergency Use Is Not Significantly Impaired	Less than Significant
Impact 4.15-e: Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	One existing and one proposed school	Significant	Mitigation Measure 4.15-e: Notify the Natomas Unified School District and Applicable Schools with Jurisdiction within One-Quarter Mile of Project Construction Activities	Less than Significant
Impact 4.15-f: Temporary Aircraft Safety Hazards Resulting from Project Construction Activities within or near the Airport Critical Zone	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Significant	Mitigation Measure 4.15-f: Coordinate Work in the Critical Zone with Airport Operations and Restrict Night Lighting Within and Near the Runway Approaches	Less than Significant

Table ES-2
Summary of Impacts and Mitigation Measures

Resource Topic/Impact	Alternative	Duration of Impact	Quantification of Impact (Where Applicable)	Level of Significance before Mitigation	Mitigation Measure	Level of Significance after Mitigation
Impact 4.15-g: Potential for Higher Frequency of Collisions between Aircraft and Wildlife at Sacramento International Airport	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary and Permanent	Unquantifiable	Less than Significant	No mitigation is required	Less than Significant
Impact 4.15-h: Potential Exposure to Wildland Fires	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary	Unquantifiable	Significant	Mitigation Measure 4.15-h: Prepare and Implement a Fire Management Plan to Minimize Potential for Wildland Fires	Less than Significant
Environmental Justice						
Impact 4.16-a: Potential to Have a Disproportionate High and Adverse Environmental Impact on any Minority or Low-Income Populations	No-Action Alternative: No Construction	Not Applicable	Not Applicable	No Impact	No mitigation is required	No Impact
	No-Action Alternative: Potential Levee Failure	Not Applicable	Unquantifiable	Too Speculative	No mitigation is required	Too Speculative
	Proposed Action and RSLIP Alternative	Temporary and Permanent	Unquantifiable	Significant	Mitigation Measure 4.16-a: Increase the Direct Benefits of the Project for the Ancestors of the Native American Tribes	Less than Significant

1 INTRODUCTION AND STATEMENT OF PURPOSE AND NEED

1.1 INTRODUCTION

This document is a joint environmental impact statement/environmental impact report (EIS/EIR) prepared for the Sacramento Area Flood Control Agency's (SAFCA's) proposed Natomas Levee Improvement Program (NLIP), Phase 4a Landside Improvements Project (Phase 4a Project). This EIS/EIR has been prepared by both the U.S. Army Corps of Engineers (USACE), Sacramento District as Federal lead agency under the National Environmental Policy Act (NEPA) and SAFCA as state lead agency under the California Environmental Quality Act (CEQA). See Code of Federal Regulations (CFR), Title 40, Sections 1502.25, 1506.2, and 1506.4 (authority for combining Federal and state environmental documents) and California Code of Regulations (CCR), Title 14, Division 6, Chapter 3 (State CEQA Guidelines), California Code of Regulations (CCR) Section 15222 ("Preparation of Joint Documents"). See also 33 CFR Part 230 (USACE NEPA regulations) and 33 CFR Part 325, Appendix B ("NEPA Implementation Procedures for the [USACE] Regulatory Program").

This EIS/EIR evaluates the potential impacts on the environment resulting from implementation of the Phase 4a Project (Proposed Action/Proposed Project), hereinafter referred to as "the project." This EIS/EIR also evaluates alternatives and includes mitigation to reduce, minimize, or avoid any significant adverse impacts.

1.1.1 SCOPE OF ENVIRONMENTAL ANALYSIS

The Phase 4a Project consists of improvements to a portion of the perimeter levee system protecting the Natomas Basin in Sutter and Sacramento Counties, California, and associated landscape and irrigation/drainage infrastructure modifications, as proposed by SAFCA. SAFCA has initiated this effort in cooperation with the California Department of Water Resources (DWR) and the California Central Valley Flood Protection Board (CVFPB, formerly called the Reclamation Board) and with USACE with the goal of incorporating the NLIP into the Natomas components of the Federally authorized American River Common Features Project (Common Features Project).

The overall purpose of the multi-phase NLIP is to bring the entire 42-mile Natomas Basin perimeter levee system into compliance with applicable Federal and state standards for levees protecting urban areas through a program of proposed levee improvements to address levee height deficiencies, levee seepage potential, and streambank erosion conditions along the Natomas Basin perimeter levee system. The Landside Improvements Project, which is a component of the NLIP, consists of four phases. The Phase 1 Project has been completed. The Phase 2 Project has been analyzed in previous environmental documents (see Section 1.5.4.2, below) and is currently under construction. The Phase 3 Project has been analyzed in previous environmental documents (see Section 1.5.4.3, below) and preliminary construction would begin in late summer/early fall 2009; however, major levee construction would not begin until 2010, assuming receipt of all required environmental clearances and permits. The Phase 4 Project was divided into two sub-phases to provide the flexibility to construct this phase over more than one construction season. Both of the sub-phases has their own independent utility, can be accomplished with or without the other sub-phase, and provide additional flood risk reduction benefits to the Natomas Basin whether implemented individually or collectively. The Phase 4a Project is the subject of this EIS/EIR. The Phase 4b Project was analyzed at a programmatic level in the Phase 2 EIR and Phase 2 EIS, and will be the subject of a future, project-level EIS/EIR.

To implement the Phase 4a Project, SAFCA is requesting permission from USACE pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 United States Code [USC] 408, hereinafter referred to as "Section 408") for alteration of Federal project levees; Section 404 of the Clean Water Act (33 USC 1344, hereinafter referred to as "Section 404") for the placement of fill in jurisdictional waters of the United States; and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403, hereinafter referred to as "Section 10") for work in, over, or under

navigable waters of the United States (such as excavation of material from or deposition of material into navigable waters).

NEPA evaluation is required when a major Federal action, including a permit or approval, is under consideration and may have significant impacts on the quality of the human environment. The Phase 4a Project has the potential to significantly affect the human environment, and thus an EIS has been prepared.

Compliance with CEQA is required when a state or local public agency proposes to carry out or approve a project that may have a significant direct or indirect effect on the environment. SAFCA has determined that the proposed project may have significant impacts on the environment; and therefore, as the lead agency for CEQA compliance, an EIR has been prepared. SAFCA may also need to obtain several state approvals or permits, including a CVFPB encroachment permit, California Surface Mining and Reclamation Act permit, Clean Water Act Section 401 water quality certification, Clean Water Act Section 402 National Pollutant Discharge Elimination System permit, California Fish and Game Code Section 2081 incidental take authorization, California Fish and Game Code Section 1602 Streambed Alteration Agreement, California Department of Transportation (Caltrans) encroachment permit, and permits from two local air districts, Sacramento Metropolitan Air Quality Management District and Feather River Air Quality Management District.

This EIS/EIR and will be used to support the USACE decision on whether to grant permission for the Phase 4a Project pursuant to Sections 408, 404, and 10; and the SAFCA decision to approve the Phase 4a Project pursuant to CEQA.

Incorporation by reference is encouraged by both NEPA (40 CFR 1500.4, 1502.21) and CEQA (State CEQA Guidelines CCR Section 15150). Both NEPA and CEQA require brief citation to and summary of the referenced material as well as the public availability of this material. CEQA also requires citation of the State identification number (i.e., State Clearinghouse number) of the EIRs cited. This EIS/EIR is tiered from, or incorporates by reference, information contained in the following documents:

- *Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area*, State Clearinghouse No. 2006072098 (SAFCA 2007a) (Local Funding EIR), which evaluated impacts expected to result from the Phase 1 Project at a project level and the NLIP at a program level;

- *Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project*, State Clearinghouse No. 2007062016 (SAFCA 2007c) (Phase 2 EIR), which evaluated impacts expected to result from the Phase 2 Project at a project level and the remainder of the NLIP at a program level;

- *Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project* (USACE 2008) (Phase 2 EIS), which evaluated impacts expected to result from the Phase 2 Project at a project level and the remainder of the NLIP at a program level;

- *Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project—Phase 2 Project*, State Clearinghouse No. 2007062016 (SAFCA 2009a) (Phase 2 SEIR), which evaluated impacts expected to result from the modification to the Phase 2 Project at a project level;

- *Draft Environmental Impact Statement/Draft Environmental Impact Report on the Natomas Levee Improvement Program, Phase 3 Landside Improvements Project*, State Clearinghouse No. 2008072060

(USACE and SAFCA 2009) (Phase 3 DEIS/DEIR), which evaluated impacts expected to result from the Phase 3 Project at a project level.[1]

Relevant portions of these documents, where specifically noted, are summarized throughout this EIS/EIR. Printed copies of these documents are available to the public at SAFCA's office at 1007 7th Street, 7th Floor, Sacramento, California, during normal business hours, and are also available on SAFCA's Web site, at http://www.safca.org/Programs_Natomas.html.

1.2 PROJECT LOCATION AND EXISTING PERIMETER LEVEE SYSTEM

The 53,000-acre Natomas Basin in northern Sacramento and southern Sutter Counties, California, including a portion of the city of Sacramento (**Plate 1-1**), is bounded by a levee system. Originally constructed in the early part of the 20th century, this levee system is bordered by the Natomas Cross Canal (NCC) to the north, the Sacramento River to the west, the American River to the south, and the Pleasant Grove Creek Canal (PGCC) and the Natomas East Main Drainage Canal (NEMDC)/Steelhead Creek to the east.

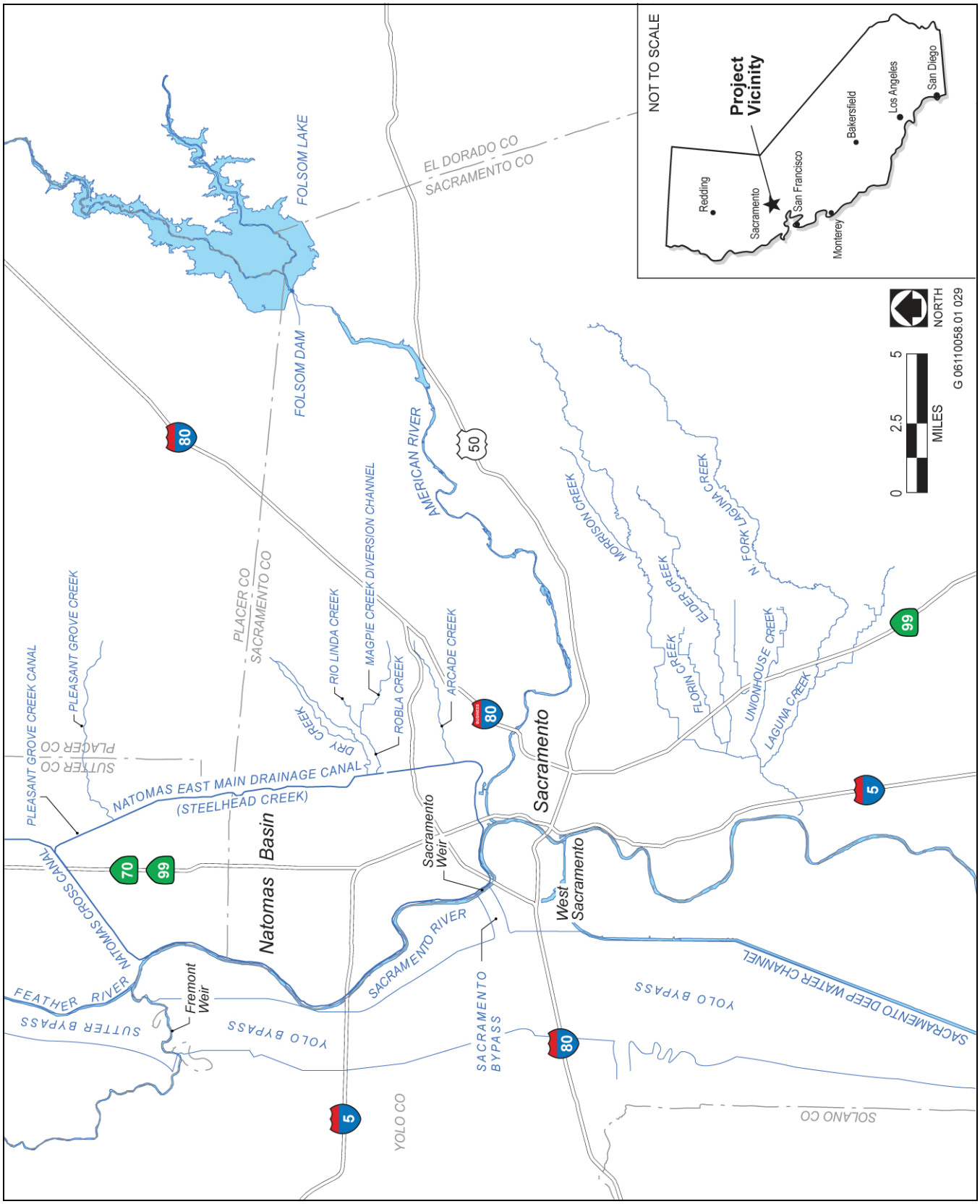
This levee system was initially designed to improve navigation and reduce the risk of flooding for the purposes of facilitating agricultural development of the extensive floodplains encompassed by the Sacramento Valley. Levees set closely along the rivers were designed to contain flows generated by common floods and bypasses were constructed to carry overflows generated by large floods. The close-set levees along the rivers ensured that velocities in the river would help scour the river bottom and move sediment through the system, reducing dredging costs for sustaining navigation. Together, the river channels and bypasses were designed to transport a flood of the magnitude of the 1907 and 1909 Sacramento River floods (see **Table 1-1** for the 1907 and 1909 flood flows relative to other historical flood flows).

Table 1-1
Ranking of Maximum 3-day Unimpaired Flows at Specified Locations

Rank	Sacramento River at Shasta Dam [a]	Sacramento River at Bend Bridge [b]	Feather River at Oroville [c]	Yuba River near Marysville [d]	American River at Fair Oaks [e]
1	1997–168 kcfs	1997–241 kcfs	1997–244 kcfs	1997–124 kcfs	1986–166 kcfs
2	1970–132 kcfs	1974–212 kcfs	1986–187 kcfs	1986–123 kcfs	1997–164 kcfs
3	1974–130 kcfs	1970–206 kcfs	1965–165 kcfs	1965–118 kcfs	1965–140 kcfs
4	1940–125 kcfs	1940–196 kcfs	**1907–150 kcfs**	1956–107 kcfs	1956–127 kcfs
5	1956–120 kcfs	1965–187 kcfs	1956–147 kcfs	**1907–103 kcfs**	1951–108 kcfs
6	1965–117 kcfs	1956–176 kcfs	**1909–129 kcfs**	**1909–87 kcfs**	1928–98 kcfs
7	1986–115 kcfs	1986–175 kcfs			1980–98 kcfs
8	**1907–~95 kcfs**	1983–174 kcfs			1963–94 kcfs
9	**1909–~95 kcfs**	**1909–162 kcfs**			**1907–88 kcfs**
10		**1907–158 kcfs**			**1909–87 kcfs**

Notes: kcfs = 1,000 cubic feet per second; bold denotes the flows during the 1907 and 1909 floods
Periods of Record = [a] 1932–1998, [b] 1893–1998, [c] 1902–1997, [d] 1904–1997, and [e] 1905–1997
Sources: California Reclamation Board and USACE 2002 (for all data except Sacramento River at Shasta Dam 1907 and 1909) and Roos 1997: 2 (Sacramento River at Shasta Dam 1907 and 1909 values were estimated from this source)

[1] Throughout this document, reference is made to the fact that the Phase 4a EIS/EIR is tiered from, or incorporates by reference, information contained in the Phase 3 DEIS/DEIR. Although SAFCA has certified the Phase 3 EIR (as described in Section 1.5.4, "Natomas Levee Improvement Program Environmental Documentation and Relationship of this EIS/EIR to Other Documents"), USACE has not yet issued its Record of Decision (ROD) with regard to the Phase 3 Project. The Phase 3 FEIS was released for a 30-day public review period in August 2009, after which time USACE will take action on the project and issue its ROD.



Source: Adapted by EDAW in 2007 based on CASIL Layers; SAFCA 2007a

Project Location **Plate 1-1**

1.2.1 PERIMETER LEVEE SYSTEM

The perimeter levee system around the Natomas Basin is part of an integrated system of levees, overflow bypass channels, and dams that comprises the Sacramento River Flood Control Project (SRFCP) (**Plate 1-2**). Over time, the original capacity of the SRFCP was greatly expanded by the construction of five major multipurpose dam-reservoir complexes (Shasta, Black Butte, Oroville, New Bullards Bar, and Folsom Reservoirs) containing 2.7 million acre-feet of dedicated flood storage space. These dams were justified in part by public safety considerations, specifically the need to provide a high level of flood risk reduction to the historical urban settlements at the confluence of the Feather and Yuba Rivers (Yuba City and Marysville) and the American and Sacramento Rivers (Sacramento and West Sacramento). Following are descriptions of flood damage reduction facilities provided by the levee system and the channels that border the Natomas Basin.

1.2.1.1 NATOMAS CROSS CANAL

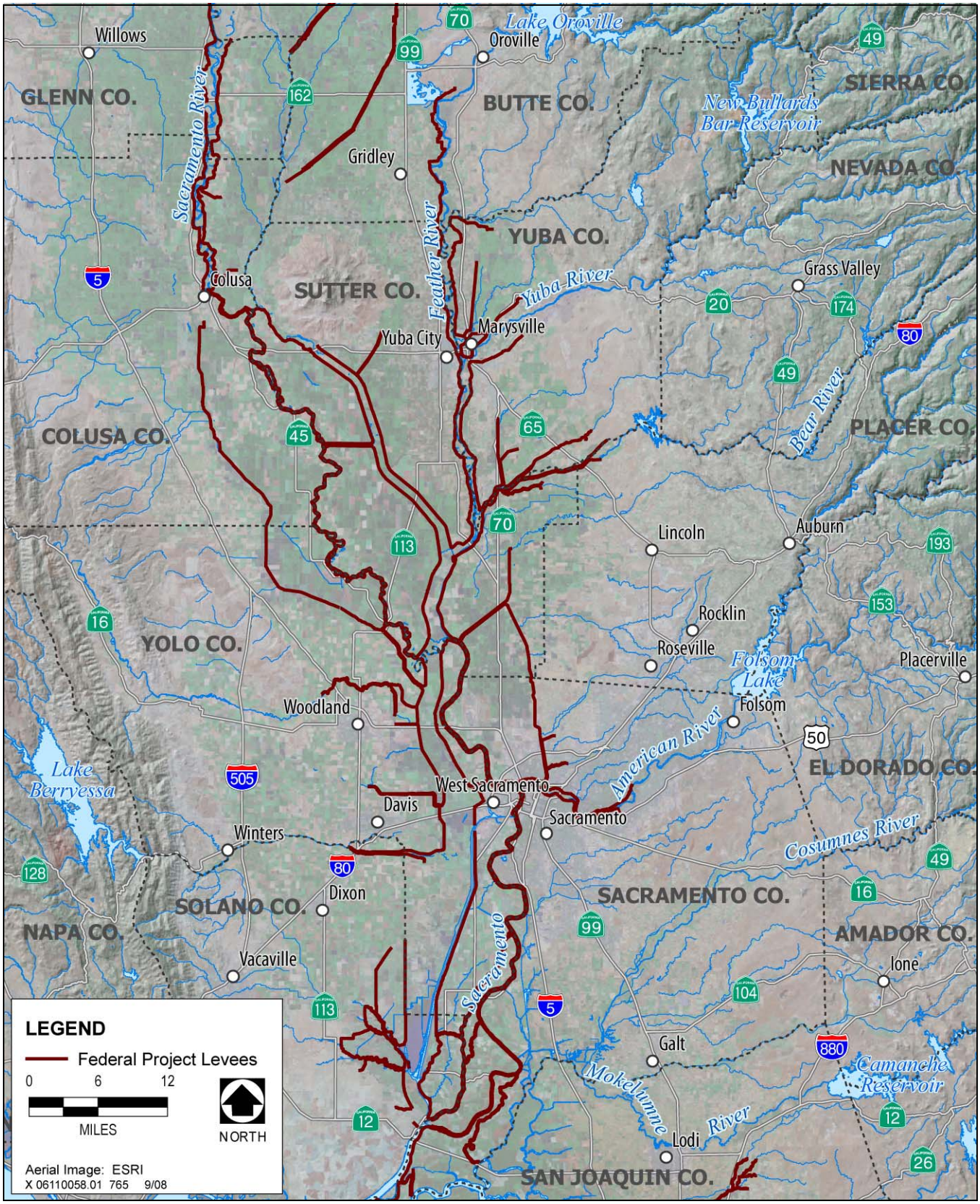
The NCC carries water from several tributary watersheds in western Placer County and southern Sutter County to the Sacramento River. The 5.3-mile-long channel at the north boundary of the project begins at the PGCC and East Side Canal, and extends southwest to its confluence with the Sacramento River near the Sankey Road/ Garden Highway intersection. Raised water elevations that can affect the NCC levees come during periods of flooding. The Sutter Bypass, Sacramento River, Feather River, and NCC all contribute to flooding of the NCC. For planning purposes, the NCC south levee is divided into seven reaches, as shown in **Plate 1-3**. In the pre-NLIP project condition, much of the south levee contained a stability berm with an internal drainage system that was constructed as part of the North Area Local Project (NALP). Levee slopes were approximately 3:1 horizontal to vertical (3H:1V) on the waterside and 2H:1V on the landside, with an approximately 80- to 100-foot maintenance access area on the landside of the levee through most of the NCC's length. The Phase 2 Project widened the levee footprint by raising the levee, flattening the landside levee slope, and constructing a cutoff wall. Most of the land along the south levee consists of privately owned farmland and habitat owned and managed by The Natomas Basin Conservancy (TNBC).

1.2.1.2 SACRAMENTO RIVER EAST LEVEE

The east levee of the Sacramento River, referenced in this document as the "Sacramento River east levee," protects the 18-mile west side of the Natomas Basin between the NCC and the American River. For planning purposes, the levee is divided into 20 reaches, as shown in **Plate 1-3**. Garden Highway is located on top of the levee crown through all 20 reaches. A 10-foot-wide drained stability berm is present on the landside slope of the levee between the NCC and Powerline Road (Reaches 1–11) and cutoff walls are present in the levee in Reaches 12–20. These improvements were components of the Sacramento Urban Levee Reconstruction Project and the Common Features Project.

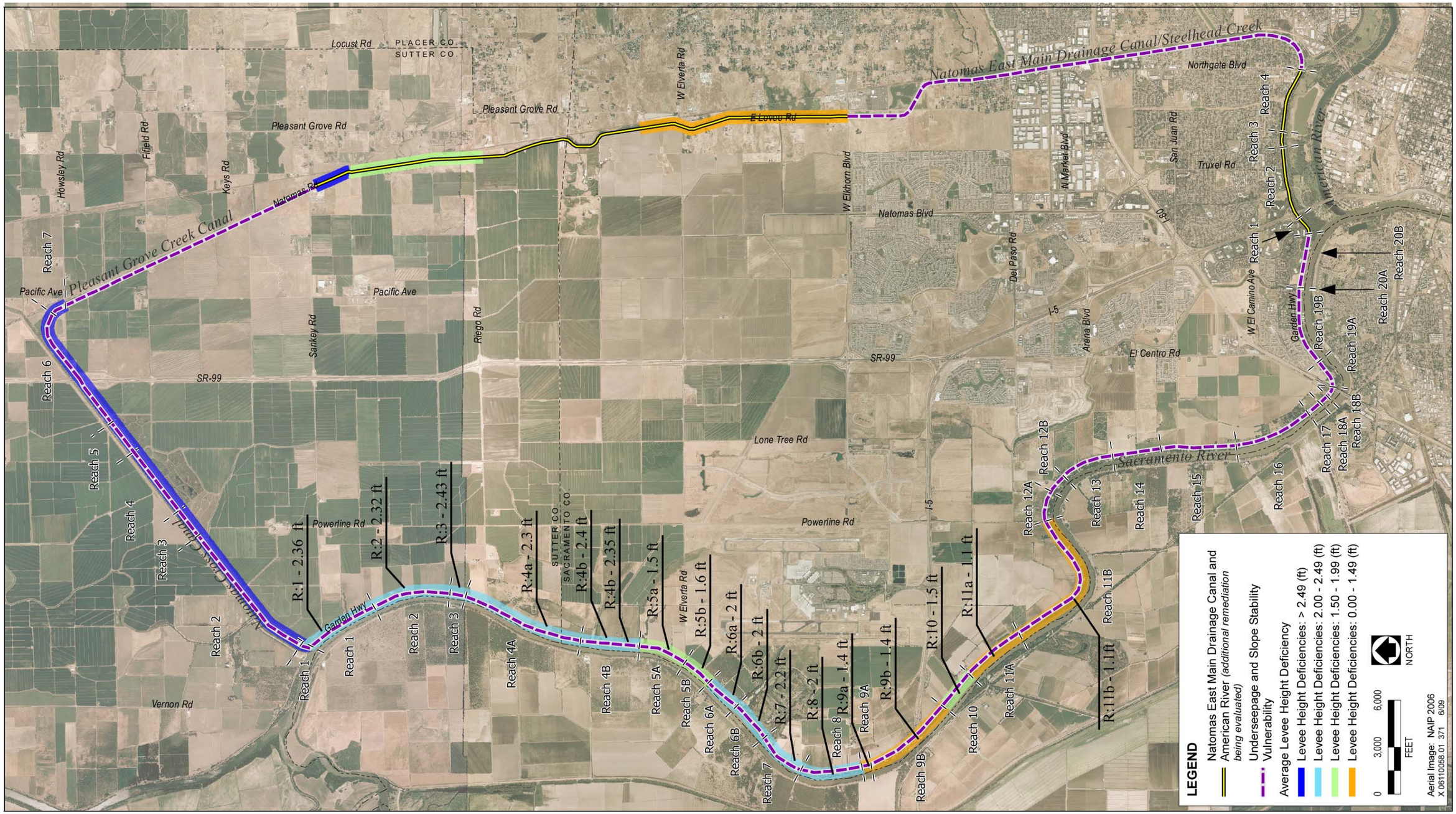
Along the landside, Reaches 1–13 are bordered mainly by private agricultural lands containing a few rural residences, the Sacramento International Airport (Airport), and two farmed parcels owned and managed by TNBC. The Airport lands bordering Reaches 1–13 are referred to as the "Airport north bufferlands." Teal Bend Golf Club is west of the Airport, adjacent to the levee along Reach 6. The parcels bordering Reaches 14–18 contain more residences, several rural estates, and three TNBC parcels. The landside of Reaches 19 and 20 is bordered by residential subdivisions, a business park, and the City of Sacramento's Natomas Oaks Park, undeveloped Costa Park site, and Shorebird Park.

Several marinas and restaurants are located along the waterside of the levee in Reaches 1–20 along with more than 150 residences and numerous private boat docks. Many fences, gates, and other appurtenances associated with these properties are located on the levee itself.



Source: Adapted by EDAW in 2006 based on data from MBK Engineers

Sacramento River Flood Control Project **Plate 1-2**



Source: Aerial Image SACOG 2007; adapted by EDAW in 2008 based on data from HDR and Wood Rodgers

Levee Segments Requiring Seepage Remediation and Levee Height Increases **Plate 1-3**

1.2.1.3 PLEASANT GROVE CREEK CANAL WEST LEVEE

The PGCC west levee extends southerly for approximately 3.3 miles from the east end of the NCC south levee at Howsley Road to the north end of the NEMDC/Steelhead Creek levee near the Sankey Road crossing (**Plate 1-3**). The PGCC west levee protects the Natomas Basin from flood flows from the Pleasant Grove Creek, tributary creeks in western Placer County and southern Sutter County, and water backed up in the NCC from high river stages in the Sacramento River.

Levee slopes are generally 2H:1V on both the waterside and landside of the levee. Natomas Road is located on top of the levee crown. No berms support this levee. However, as part of implementing the NALP, SAFCA constructed concrete-capped sheetpile walls at Howsley, Fifield, and Sankey Roads to provide hardened sections at these roadway crossings where levee height was inadequate. The Fifield Road/Natomas Road intersection was subsequently raised by Sutter County when it replaced the Fifield Road bridge over the PGCC. Several drainage culverts cross under the PGCC to drain areas to the east into the Reclamation District (RD) 1000 drainage system. A private irrigation canal extends parallel to the PGCC west levee for about 1,500 feet at the landside levee toe. The land uses along the PGCC are primarily agricultural uses along with minimal industrial manufacturing and rural residential uses.

1.2.1.4 NATOMAS EAST MAIN DRAINAGE CANAL WEST LEVEE

The NEMDC (also known as Steelhead Creek) extends for approximately 13.3 miles from high ground near Sankey Road to the American River north levee and, with the PGCC west levee, forms the easterly boundary of the Natomas Basin (**Plate 1-3**). The west levee of the NEMDC confines the canal through the entire reach. The east side of the canal is unconfined north of SAFCA's NEMDC stormwater pumping station. This facility is connected to the NEMDC west levee and the Dry Creek north levee. It prevents elevated floodwaters in Dry Creek and the southern reach of the NEMDC from entering the northern reach of the NEMDC. The pumping facility also collects local flood runoff from the Natomas East Stream Group and from spills (PGCC floodwaters) over the high ground near Sankey Road and discharges this stormwater into the southern reach of the NEMDC. The east side of this southern reach intersects Dry/Robla Creek and Arcade Creek and is confined by the NEMDC east levee, which extends for about 4 miles from the Dry/Robla Creek south levee to the Arcade Creek north levee and from the Arcade Creek south levee to the American River north levee at the mouth of the NEMDC. East Levee Road extends along the crown between Sankey Road and Main Avenue.

As part of the NALP, SAFCA raised the west levee of the NEMDC from 2.0 to 4.5 feet between the NEMDC stormwater pumping station and the American River north levee and raised the east levee of the NEMDC from 1.0 to 3.5 feet between the Dry/Robla south levee and the American River north levee. These improvements were designed to provide a high level of flood risk reduction to the Natomas Basin by providing at least 3 feet of levee height above the 200-year[2] flood in Dry Creek and Arcade Creek combined with the maximum water surface likely to be produced at the mouth of the NEMDC by a 200-year or greater flood along the American River.

1.2.1.5 AMERICAN RIVER NORTH LEVEE

The Natomas section of the American River north levee extends for about 2.2 miles from its junction with the Sacramento River east levee at the mouth of the American River to its junction with the NEMDC west levee near the mouth of the NEMDC, as shown in **Plate 1-3**. This levee was constructed as part of the Natomas perimeter

[2] Design event analysis results, as a measure of system performance, are given as the expected (mean) frequency of the maximum event that can be safely passed through the reservoir, spillway, and downstream leveed system with a set (e.g., 3 feet) "freeboard" above the computed (expected) water surface profile. Design event analysis is not the same as the analysis procedure used by USACE as a basis for determining Federal interest in a project or for USACE certification for FEMA's National Flood Insurance Program. USACE defines system performance as containing a specified frequency event (e.g., 1% event) with a high level of assurance (i.e., Conditional Non-exceedance Probability = 90%) and includes consideration of system uncertainties.

levee system and is designed to prevent floodwaters in the American River from entering the Natomas Basin. Built before the construction of Folsom Dam, this levee is set back over 1,000 feet north of the American River main channel and is high enough to provide 3 feet of levee height above the maximum water surface elevation likely to be produced at the mouth of the NEMDC by a 200-year or greater flood along the American River. For NLIP planning purposes, this levee has been divided into four reaches, as shown in **Plate 1-3**. The general configuration of the levee in these reaches is 3H:1V waterside slopes and 2H:1V landside slopes. Levee crown widths range from 30 to 60 feet. Garden Highway runs along the levee crown for most of these reaches and ranges from two to four lanes.

1.2.2 FLOODFLOW CONDITIONS

The Natomas Basin is subject to flooding from a combination of flows in the Sacramento and American River channels and in the tributary streams east of the Basin. Along the northern and western perimeters of the Basin, the greatest threat is from a large flood in the Sacramento–Feather River basin combined with high runoff in the creeks and streams of southern Sutter and western Placer Counties that drain through the NCC. This threat is somewhat mediated by the operation of the Fremont Weir and Yolo Bypass system, which absorbs approximately 80% of the flood flow reaching the northern end of the Natomas Basin from the Feather and Sacramento River basins. Along the southern and southeastern perimeters of the Basin, the greatest threat is from a large flood in the American River basin combined with high runoff in the tributary creeks and streams of western Placer and northern Sacramento Counties that drain through the NEMDC/Steelhead Creek.

1.3 PROJECT HISTORY AND PLANNING CONTEXT

SAFCA has developed the NLIP to address identified deficiencies in the levee system protecting the Natomas Basin in Sacramento and Sutter Counties, California. The objectives of the NLIP are to: (1) provide at least a 100-year level of flood risk reduction to the Natomas Basin as quickly as possible; (2) provide 200-year flood risk reduction to the Basin over time; and (3) avoid any substantial increase in annual flood damages as new development occurs in the Basin.

The Natomas Basin perimeter levee system was originally constructed to promote agricultural development. The historic Sacramento River floods of 1907 and 1909 (see **Table 1-1** for flood flows) triggered the comprehensive, federally financed and managed, flood risk reduction effort that has unfolded over the past 85 years under the leadership of USACE and the State. The product of this effort is the SRFCP, an integrated system of levees, overflow bypass channels, and dams that was designed and constructed by Federal, State, and local interests over several decades to protect farmlands and urban areas in the Sacramento Valley from large floods. The SRFCP has protected the Natomas Basin from significant flooding since construction of the perimeter levee system in 1914.

Today, the Natomas Basin is the location of the Airport and the site of extensive urban development, primarily occupying the southern third of the Basin. The Basin's remaining agricultural lands provide habitat for a number of important wildlife species. This habitat is protected under State and Federal law, and expansion of the urban footprint into much of the remaining agricultural areas is governed by the *Natomas Basin Habitat Conservation Plan* (NBHCP), which is aimed at setting aside and conserving tracts of agricultural land that are needed to sustain habitat for the affected species. The Natomas Basin's historic floodplain is occupied by more than 83,000 residents and contains $8.2 billion in damageable property. **Table 1-2** presents a brief timeline of major flood-related events in the Natomas Basin.

SAFCA is partnering with DWR using SAFCA's local assessments and grant funding available through DWR's FloodSAFE California Program to initiate improvements to segments of the Natomas perimeter levee system. SAFCA proposes to complete this "early implementation project" by the end of 2010. It is anticipated that the remaining segments of the perimeter levee system would be improved by USACE. This will require Congressional authorization to expand the scope of the already authorized Natomas components of the Common

Table 1-2
History of the Natomas Basin Flood Damage Reduction System

Year/Timeframe	Flood Damage Reduction Project/Event
1911–1915	Natomas Basin reclaimed: levees and interior drainage constructed
1917–1967	Levees authorized as part of the SRFCP; construction on the SRFCP is initiated and completed in stages
1968	National Flood Insurance Program authorized
1978	First NFIP 100-year Flood Maps issued by FEMA
1986	Major floods lead to SRFCP system re-evaluation
1989	FEMA issues new 100-year Flood Maps encompassing most of the city of Sacramento
1990–1993	Congress provides funding for the Sacramento Urban Levee Reconstruction Project
1993–1998	SAFCA carries out the NALP
1996	Congress authorizes raise and strengthening of Sacramento River east levee and strengthening of American River north levee
1997	Major flood in SRFCP
1998	USACE certifies Natomas Basin levees for 100-year FEMA flood protection
1999	Congress authorizes raise and strengthening of the NCC south levee
1999	Post-1997 Flood Assessment recognizes underseepage as a threat
2000	USACE initiates Natomas Basin Common Features Design
2002	USACE conducts public scoping meetings
2003	USACE Levee Task Force completes development of deep underseepage criteria
2004	USACE adopts Standard Operating Procedures for Urban Levee Design
2004–2006	SAFCA evaluates Natomas Basin levees
2004	USACE initiates General Re-Evaluation of the Common Features Project
2006	USACE recommends levee decertification based on new geotechnical information and new standards
2006	SAFCA initiates the NLIP
2006	SAFCA Board of Directors certifies the Local Funding EIR, and USACE adopts a Finding of No Significant Impact and grants permission pursuant to Section 408 for the Phase 1 Project
2007	SAFCA Board of Directors certifies the Phase 2 EIR
2008	USACE issues the Phase 2 EIS
2008	SAFCA completes construction of the Phase 1 Project
2009	USACE issues the Phase 2 ROD, granting permission pursuant to Sections 408 and 404 for the Phase 2 Project
2009	SAFCA Board of Directors certifies the Phase 2 SEIR
2009	USACE and SAFCA issue the Phase 3 DEIS/DEIR; SAFCA issues the Phase 3 FEIR and certifies the Phase 3 EIR
2009	SAFCA begins construction of the Phase 2 Project
2009	USACE issues the Phase 3 FEIS
2009	USACE and SAFCA issue the Phase 4a DEIS/DEIR

Notes: EIR = environmental impact report; EIS = environmental impact statement; FEMA = Federal Emergency Management Agency; NFIP = National Flood Insurance Program; NLIP = Natomas Levee Improvement Program; NLAP = North Area Local Project; NCC = Natomas Cross Canal; SAFCA = Sacramento Area Flood Control Agency; SRFCP = Sacramento River Flood Control Project; USACE = U.S. Army Corps of Engineers; ROD = record of decision; SEIR = Supplemental EIR
Source: Data compiled by EDAW in 2008 and 2009

Features Project based on a General Re-evaluation Report (GRR) to be completed by USACE for presentation to Congress in 2010. SAFCA is coordinating with USACE to ensure that the planning and design of the early implementation project are consistent with applicable USACE planning, engineering, and design guidelines. While the GRR will be a separate report with its own environmental documentation, USACE and SAFCA recognize that Federal actions taken in connection with the early implementation project will need to be appropriately reflected in the GRR.

To move forward as quickly as possible to reduce the risk of flooding in the Natomas Basin, SAFCA identified the broad outlines of the early implementation project at a program level of detail and developed an incremental implementation strategy based on carrying out the project in four phases, with each phase contributing independently and cumulatively to reducing flood risk. Each individual project phase would contribute to reduced flood risk for the Natomas Basin, and thus has independent utility. However, no single project phase would achieve the overall flood risk reduction objectives of the NLIP. The NLIP, as a program, has independent utility from the other areas under consideration in the GRR because the NLIP will provide added flood risk reduction to an entire area (similar to a ring levee) and this increased flood risk reduction is not dependent on the outcome of the GRR. The four phases of the project are described in Section 1.5.4, "Natomas Levee Improvement Program Environmental Documentation and Relationship of This EIS/EIR to Other Documents," below.

The NLIP Landside Improvements Project and the NLIP as a whole are part of a larger program of improvements to the flood damage reduction system protecting the Sacramento Area that was initiated as part of the American River Watershed Investigation (ARWI) following the record flood of 1986. This section outlines the key events and actions that have shaped the ARWI so as to provide the historical and legislative context within which the NLIP Landside Improvements Project is being pursued.

1.3.1 1986 FLOOD

The record flood of 1986 caused levee failures in many areas of the Sacramento Valley that resulted in millions of dollars of property damage and exposed numerous deficiencies in the SRFCP. In the Sacramento area, these deficiencies included: (1) unstable levees along the east bank of the Sacramento River that were susceptible to failure due to the porous nature of the material used in their construction, (2) inadequate conveyance capacity in the drainage channels around the Natomas Basin that serve to divert runoff from the foothills into the Sacramento and American Rivers, and (3) inadequate reservoir storage capacity for controlling large floods in the American River watershed.

1.3.2 SACRAMENTO URBAN LEVEE RECONSTRUCTION PROJECT

SAFCA was formed in September 1989 to work with USACE and the State to address the deficiencies exposed by the 1986 flood. The initial step in this effort was to quickly implement the Sacramento Urban Levee Reconstruction Project to stabilize the levees along the east bank of the Sacramento River upstream and downstream of the American River. These levees were constructed in the early part of the 20th century using materials dredged from the river channel that contained significant amounts of sand and silt dislodged from the foothills and mountains along the east side of the Sacramento Valley during the hydraulic mining era. These materials proved to be excessively porous when subjected to the prolonged high flows produced by the 1986 flood, particularly in the Natomas Basin, where levee failure due to seepage through the levee was avoided only through a massive effort to shore up the levee during the height of the flood.

The stabilization effort employed two measures to address this seepage problem. Where space permitted, such as upper Natomas Basin, a drained stability berm was constructed along the landside toe of the levee to intercept any water seeping through the levee and discharge it onto adjacent lands where it is collected by the interior drainage system and then pumped back into the river. Where space was limited, as in the Pocket area and the lower Natomas Basin, a slurry cutoff wall was excavated through the levee and into less permeable ground below. This cutoff wall serves to reduce seepage through the permeable levee embankment soils. Construction of these

improvements, covering approximately 33 miles of the Sacramento River east levee, was initiated in 1990 and completed in 1993.

1.3.3 AMERICAN RIVER WATERSHED INVESTIGATION SELECTED PLAN

In addition to levee stabilization, USACE, the State, and SAFCA used the ARWI to develop a broad program of improvements to Sacramento's flood damage reduction system focusing on construction of a flood detention dam along the American River near Auburn combined with raising and strengthening the levees along the tributary streams and drainage canals around the Natomas Basin. The ARWI Selected Plan, which was designed to provide a 200-year level of flood risk reduction to the Sacramento area, was presented to Congress in 1992. However, in the face of opposition to the detention dam, Congress authorized only the levee improvements around the Natomas Basin and directed that these improvements should proceed while the USACE re-evaluated options for controlling floods along the remainder of the Lower American River. The legislation left open the possibility that the authorized improvements could be constructed by non-Federal interests in exchange for future credits or reimbursements.

1.3.4 NORTH AREA LOCAL PROJECT

Relying on the authorization described above, SAFCA quickly initiated the NALP. This locally funded project was designed to provide a high level of flood risk reduction to the Natomas Basin in a manner that neither depended on nor prejudiced the outcome of the continuing effort to develop a comprehensive plan for protecting the floodplains along the Lower American and Sacramento Rivers outside the Natomas Basin. Toward this end, SAFCA designed the levees along the lower reaches of the NEMDC/Steelhead Creek, Arcade Creek, and Dry/ Robla Creek to contain the maximum water surface elevation that could be anticipated in the Lower American River at the mouth of the NEMDC/Steelhead Creek during a 200-year or greater flood event under any of the alternatives under consideration by the AWRI, including no action. The NALP, which also included levee strengthening measures along the south levee of the NCC and west levee of the PGCC, was completed in 1996.

1.3.5 FOLSOM DAM REOPERATION

In 1995, SAFCA entered into a 5-year agreement with the U.S. Bureau of Reclamation (Reclamation) to initiate a variable space storage operation at Folsom Dam. This would allow for an increase in the available space in three large non-Federal reservoirs located in the American River watershed upstream of Folsom Dam which could be used for flood damage reduction. This effort would result in incidental flood damage reduction benefits without formally incorporating the non-Federal reservoirs into the flood damage reduction system and without creating unacceptable impacts to anadromous fish in the Lower American River water supply, hydropower, and recreational uses dependent on Folsom Dam.

1.3.6 AMERICAN RIVER COMMON FEATURES PROJECT

In 1996, USACE transmitted a Supplemental Information Report (SIR) to Congress that presented the results of the requested re-evaluation of flood risk reduction options for the American River watershed. The SIR concluded that regardless of what measures might be implemented to increase the reservoir storage space available, the levees extending upstream from the mouth of the river should be strengthened to resist seepage. Moreover, the SIR indicated that SAFCA's levee improvements on the northern and eastern levees of the Natomas Basin were sufficient to protect the Basin from very large floods along the American River, and with modifications to the upper 12 miles of the east levee of the Sacramento River, including increased levee height and levee stability improvements and levee stability along the American River north levee adjacent to Natomas, a similarly high level of flood risk reduction could be secured along the Sacramento River. These American River and Natomas Basin improvements were considered "common features" of any long-term effort to provide Sacramento with a high level of flood risk reduction, and Congress directed the Secretary of the Army to design and construct them

under the auspices of the Common Features Project. The authorization of the Common Features Project also allowed the non-Federal partners to proceed with the improvements and receive credit for the work. Finally, Congress directed the Secretary of the Interior to continue the variable space storage operation at Folsom Dam and to extend Reclamation's operational agreement with SAFCA pending implementation of a comprehensive flood damage reduction program for the American River watershed.

1.3.7 1997 FLOOD

Shortly after the conclusion of the 1996 Federal legislative session, the Sacramento Valley again experienced a flood of record magnitude. The flood of 1997 produced flows in the Lower Sacramento and American Rivers comparable to those of the flood of 1986. The levees around the Natomas Basin and along the Lower American and Sacramento Rivers, bolstered by the accomplishments of the Sacramento Urban Levee Reconstruction Project and the NALP, and relieved by the additional reservoir storage capacity made available by the Folsom Reoperation Project, passed these flows without the signs of levee stress that occurred in 1986. However, the flood did cause failures of some SRFCP levees along the Feather River and Sutter Bypass upstream of the Natomas Basin. The USACE post-flood assessment concluded that deep underseepage may have contributed to these levee failures. To address this risk, USACE recommended a broader scope for the Common Features Project, including deeper seepage cutoff walls through the levees along the Lower American River. USACE also called for an assessment of the need for similar measures along the east levee of the Sacramento River in the Natomas Basin.

1.3.8 FOLSOM DAM MODIFICATION PROJECT AND EXPANSION OF THE COMMON FEATURES PROJECT

In 1999, Congress approved a plan for increasing flood risk reduction along the American River by modifying Folsom Dam's outlet works to be more efficient. Congress also expanded the scope of the Common Features Project, calling for additional reaches of the levees along the lower American River to be raised and strengthened to ensure safe containment of flows in the river up to 160,000 cubic feet per second (cfs) with at least 3 feet of additional levee height[3], and directing USACE to raise and strengthen the south levee of the NCC to provide the same level of flood risk reduction afforded by the previously authorized improvements of the east levee of the Sacramento River. Lastly, Congress directed the Secretary of the Army to cooperate with the Secretary of the Interior in devising a long-term variable space storage operation plan for Folsom Dam that would take advantage of the operational capabilities created by the modification of the dam's outlet works and improved weather forecasting.

1.3.9 JOINT FEDERAL PROJECT

In 2005, technical challenges associated with enlarging the existing outlet works at Folsom Dam caused USACE, the State, SAFCA, and Reclamation to embrace a new approach to increasing the dam's low-level discharge capacity. This "Joint Federal Project," which was approved by Congress in 2007, will address both flood damage reduction and dam safety issues through construction of a new auxiliary spillway and control gates. The new facilities will significantly increase Folsom Dam's low-level outlet capacity, enabling the dam to meet applicable Federal dam safety standards while permitting dam operators to safely contain the 200-year flood in the American River watershed. The new flood damage reduction operation assumes that the variable storage space plan will be continued and that releases from the dam will be increased to 160,000 cfs when inflows to the dam exceed the magnitude of a 100-year flood.

[3] See definition of "levee height" in Section 1.4.2.1, "Flood Problems and Needs."

1.3.10 GENERAL RE-EVALUATION OF THE COMMON FEATURES PROJECT

Changes in engineering standards and a better understanding of flood risks in the SRFCP system have caused USACE to initiate a general re-evaluation of the elements included in the Common Features Project. The GRR is expected to be presented to Congress in 2010 with recommendations of scope and cost modifications necessary to ensure that the project can achieve its authorized flood risk reduction objectives.

Initially, the GRR was primarily focused on evaluating the needs of the Natomas Basin. However, a significant similar effort is also under way with respect to the elements of the Common Features Project along the Lower American and Sacramento Rivers outside the Natomas Basin, where scope and cost modifications may also be needed to ensure that the flood risk reduction objectives of the "Joint Federal Project" are achieved. Here, USACE has determined that the Sacramento River east levee between the American River and the town of Freeport may lack adequate levee height, and may be susceptible to underseepage and erosion in a 200-year flood event. In addition, the levees along the Lower American River may be susceptible to erosion based on the magnitude and duration of the releases from Folsom Dam that occur in such an event. Accordingly, USACE is studying comprehensive alternatives that would consider all the basins in the greater Sacramento area, to ensure that levees protecting the city and county of Sacramento, and the area of Sutter County within the Natomas Basin provide the same level of protection as the Joint Federal Project Folsom Dam improvements, which are already under construction.

SAFCA successfully obtained a grant from the DWR for funding an early implementation project as part of FloodSAFE California. FloodSAFE California is a strategic initiative to maximize Proposition 1E and 84 bond funds to reduce flood risk to Californians, develop a sustainable flood management system for the future, and lessen the consequences of floods when they do occur. As detailed in the Local Funding EIR, SAFCA's cost share requirement was met and the funding awarded. SAFCA's early implementation project (Phases 1–4 of the NLIP Landside Improvements Project) is running ahead of the GRR submittal date with the expectation that the perimeter levee improvements that are constructed in advance of any Congressional action on the GRR will be found consistent with the recommendations contained in the GRR. On that basis, SAFCA anticipates that the non-Federal costs incurred in the early implementation project could be credited against the remaining non-Federal share of the cost of the enlarged Common Features Project or Joint Federal Project.

1.4 PROJECT PURPOSE/PROJECT OBJECTIVES AND NEED FOR ACTION

1.4.1 PROJECT PURPOSE/PROJECT OBJECTIVES

USACE and SAFCA each view the project purpose from the purview of their respective responsibilities, as defined below.

1.4.1.1 SACRAMENTO AREA FLOOD CONTROL AGENCY

SAFCA's project objectives adopted in connection with the NLIP are: (1) provide at least a 100-year level of flood risk reduction to the Natomas Basin as quickly as possible, (2) provide 200-year flood risk reduction to the Basin over time, and (3) avoid any substantial increase in expected annual damages as new development occurs in the Basin. The first two project objectives would reduce the residual risk of flooding sufficiently to meet the minimum requirements of Federal and state law for urban areas like the Natomas Basin. The third project objective is a long-term objective of SAFCA's.

Additional project objectives that have informed SAFCA's project design are to:

(1) use flood damage reduction projects in the vicinity of the Airport to facilitate management of Airport lands in accordance with the Airport's *Wildlife Hazard Management Plan* (WHMP); and

(2) use flood damage reduction projects to increase the extent and connectivity of the lands in the Natomas Basin being managed to provide habitat for giant garter snake, Swainson's hawk, and other special-status species.

SAFCA's approach to defining flood risk reduction accomplishments (system performance) differs from that of USACE. References in this document to levels of flood risk reduction are based on SAFCA's "best estimate" approach (the Federal Emergency Management Agency's [FEMA's] and the state's current method) and should not be taken as USACE concurrence that such levels would be achieved based on USACE's approach of incorporating risk and uncertainty in the estimate of system performance. In any case, flood risk to the Natomas Basin would be considerably reduced by the project. FEMA and NLIP design criteria for the 1% and 0.5% events is provided in Table B1-1 in **Appendix B1**.

1.4.1.2 U.S. ARMY CORPS OF ENGINEERS

The overall purpose of the project is to develop and select an alternative that would reduce the risk of flood damage in the Natomas Basin. Some residual risk will always remain, however, in any flood damage reduction system. USACE must make decisions on whether or not to grant permission for SAFCA's Phase 4a Project to alter the Natomas Basin levee system (Federal project levees) under Section 408 and issue permits under Sections 404 and 10. USACE decisions contemplated by this EIS/EIR pertain only to the proposed Phase 4a Project, which is the subject of this EIS/EIR. USACE's Regulatory Branch has already made decisions under these authorities for the Phase 1 and 2 Projects, and decisions are pending for the Phase 3 Project.

As stated above, this EIS/EIR will be used to support the specific USACE decisions on whether to grant permission for the Phase 4a Project proposed by SAFCA pursuant to Sections 408, 404, and 10.

1.4.2 NEED FOR ACTION

The need for the action is to reduce the flood risk to the Natomas Basin.

The Natomas Basin floodplain is occupied by over 83,000 residents and $8.2 billion in damageable property. Although improvements to the Natomas Basin perimeter levee system, completed as part of the Sacramento Urban Levee Reconstruction Project and the NALP, have significantly reduced flood risk for the area, the Natomas Basin remains vulnerable to flooding in a less than 100-year flood event. Uncontrolled flooding in the Natomas Basin floodplain in a flood exceeding a 100-year event could result in $7.4 billion in damage (this excludes the Airport facilities) (SAFCA 2007b). Flooding could also release toxic and hazardous materials, contaminate groundwater, and damage the metropolitan power and transportation grids. The disruption in transportation that could result from a major flood could affect the Airport and interstate and state highways. In addition, displacement of residents, businesses, agriculture, and recreational areas could occur. Resulting damage could hinder community growth, stability, and cohesion.

The NLIP was initially outlined in the *Natomas Levee Evaluation Study Final Report Prepared for SAFCA in Support of the Natomas Basin Components of the American River Common Features* (SAFCA 2006). This evaluation was based on the engineering studies and reports that were included as appendices to the above-referenced report, which are available for review at SAFCA's office at 1007 7th Street, 7th Floor. These studies and reports indicate that segments of the Natomas perimeter levee system reflect the following problems for both the FEMA 100-year and the 200-year design water surface elevations:

- inadequate levee height,
- through-levee seepage and foundation underseepage with excessive hydraulic gradients,
- embankment instability, and
- susceptibility to riverbank erosion and scour.

Although not highlighted in the levee evaluation report, portions of the perimeter levee system, particularly along the east levee of the Sacramento River, are also subject to vegetative and structural encroachments into the levee prism.

In January 2008, FEMA remapped the Natomas Basin as an AE zone. The flood zone designation took effect in December 2008. FEMA defines AE zones as areas with a 1% annual chance of flooding. The designation requires flood insurance and requires that the bottom floor of all new buildings be constructed at or above base flood elevation—as little as 3 feet above ground level in some of the Natomas Basin but up to 20 feet above ground level in much of the Basin. This designation and the associated constraints effectively stopped all projects that were not issued building permits before the new maps took effect.

The following subsections describe the problems and needs related to project implementation.

1.4.2.1 FLOOD PROBLEMS AND NEEDS

Inadequate Levee Height

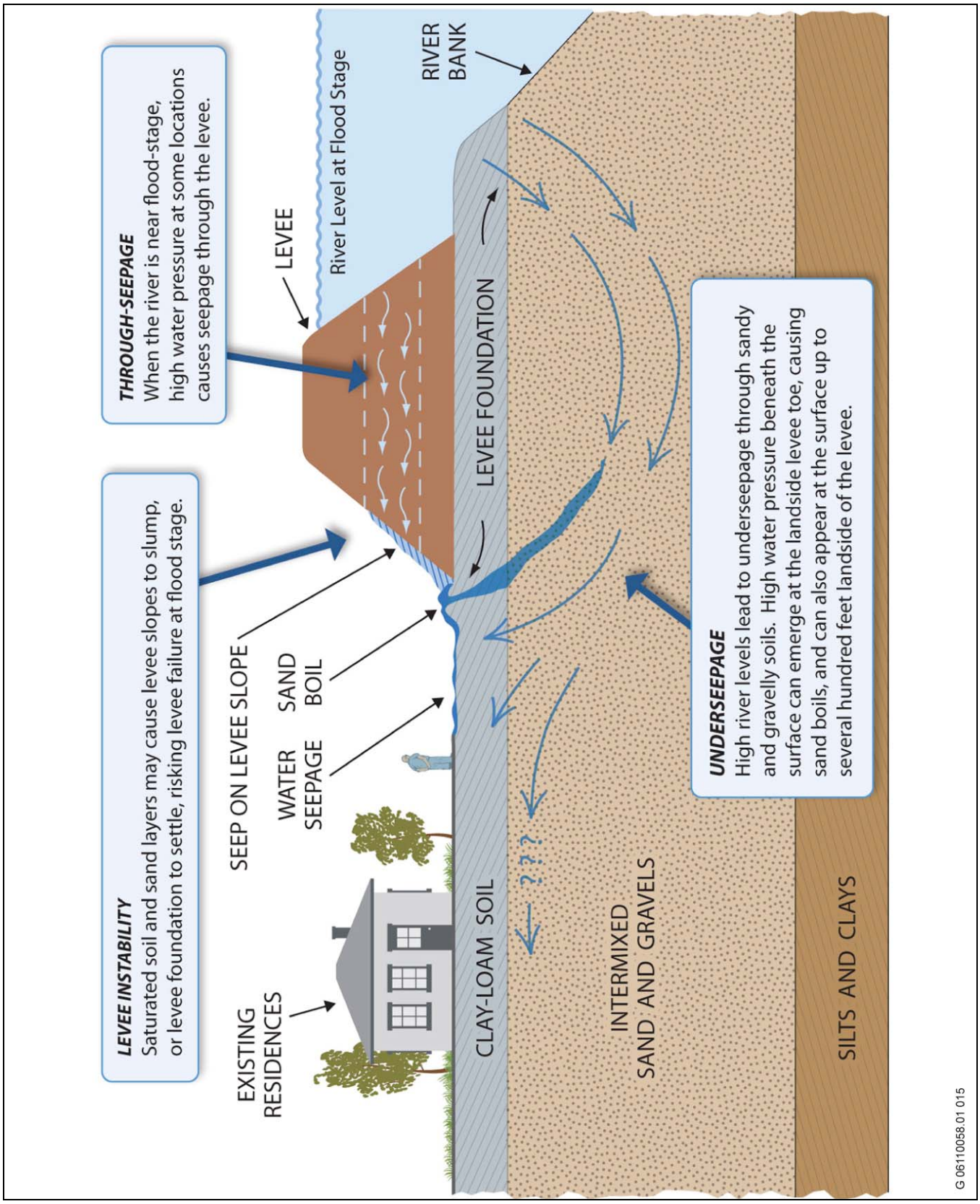
"Levee height" refers to a measure of the height of a levee above a defined water surface elevation. The NCC south levee and Reaches 1–11 of the Sacramento River east levee provide less than the 3 feet of additional levee height that is required to meet the minimum requirements for 100-year flood risk reduction established by FEMA as part of the National Flood Insurance Program or the minimum requirements for 200-year flood risk reduction established by the State. Both the FEMA 100-year and the 200-year design water surface elevations were derived using hydraulic modeling outputs that assume SRFCP levees outside the Natomas Basin do not fail when overtopped. **Plate 1-3** shows the locations and amounts of levee height deficiency that would be addressed by the NLIP Landside Improvements Project.

Seepage

Seepage beneath and through segments of the Natomas levee system has been identified as a significant risk to the stability and reliability of the system (SAFCA 2006). Underseepage problems occur in locations where levees are constructed on low-permeability foundation soil (silt and clay) underlain by higher-permeability layers (sand and gravel). Excessive underseepage makes the affected levee segment susceptible to failure during periods of high river stage. Under these conditions, seepage travels horizontally under the levee and then is forced vertically upward through the low-permeability foundation layer, often referred to as the "blanket." Failure of the blanket can occur either by uplift, a condition in which the blanket does not have enough weight to resist the confined pressure acting upon the bottom of the blanket, or by piping (internal erosion) caused by water flowing under high vertical gradients through the erodible blanket and carrying fine soil particles out of the foundation materials. Through-seepage is seepage through a levee embankment that can occur during periods of high river stage. Depending on the duration of high water and the permeability of embankment soil, seepage may exit the landside face of the levee. Seepage can also pass directly through pervious layers in the levee if such layers are present. Under these conditions, the stability of the landside levee slope may be reduced. **Plate 1-4** shows a schematic of these two failure mechanisms. **Plate 1-3** shows the locations around the Natomas Basin where seepage has been identified as a problem.

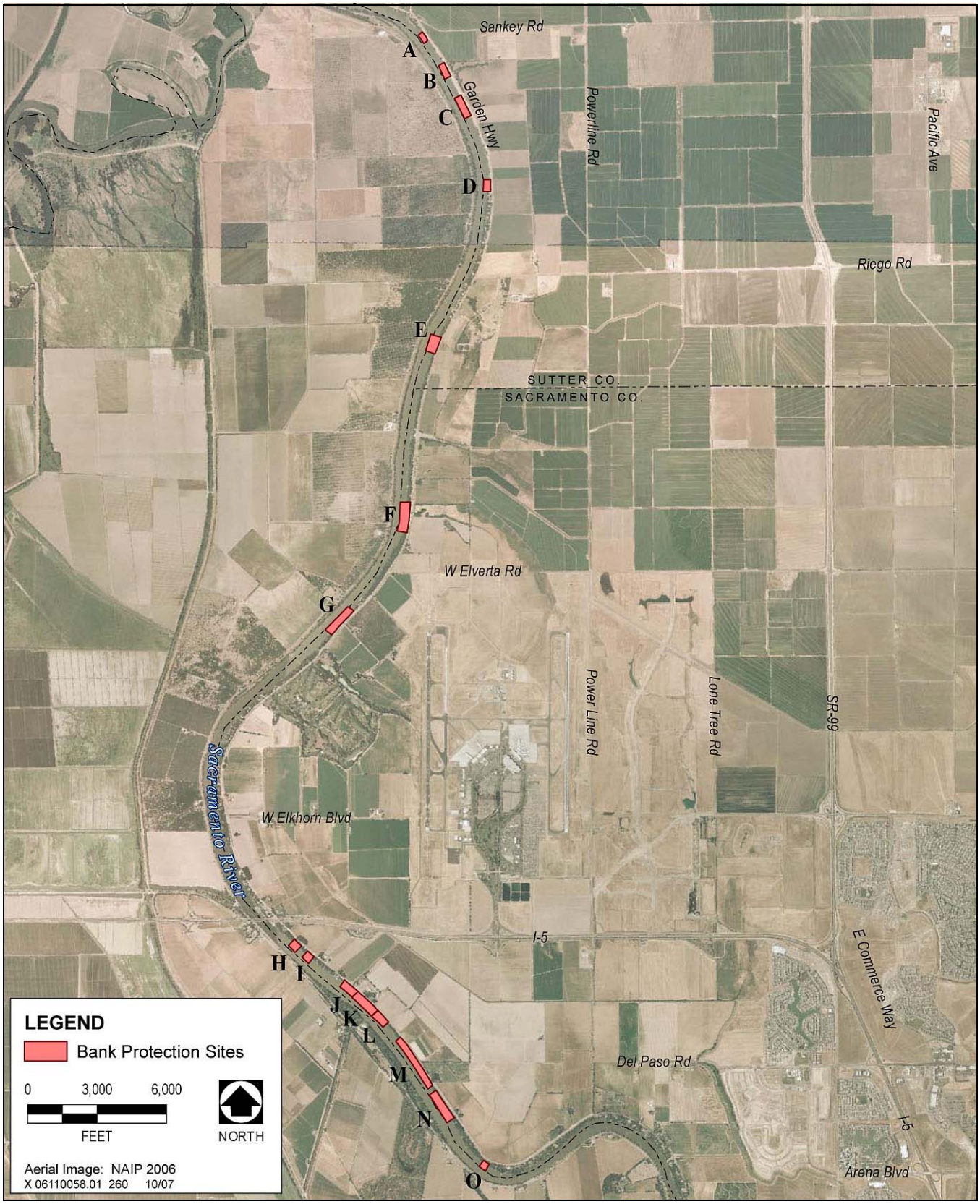
Riverbank Erosion

As shown in **Plate 1-5**, approximately 15 sites along the waterside of the Sacramento River east levee are subject to bank erosion in the form of bed or toe scour and wave wash that threatens the stability of the adjacent levee. Risk priorities have been assigned to the affected sites based primarily on the risk of slope failure due to



Source: SAFCA 2007b

Underseepage and Through-Seepage Levee Risks **Plate 1-4**



Source: Aerial image SACOG 2007; adapted by EDAW in 2007 based on data from SAFCA 2007b

Natomas Basin Erosion Sites **Plate 1-5**

undermining. High-risk sites exhibit one or more of the following characteristics and are considered potentially susceptible to failure in a 100-year flood event:

- the toe of the bank lies inside or very near the levee template and the slope below the waterline is reasonably steep, scour depths are below river bed elevations at the toe, or the local bed has been observed to be lowering;
- the toe of the bank lies outside the levee template but there is risk of cantilever failure based on the estimated stratigraphy of the bank; or
- the bank at the low-water elevation (the contact between the flood basin deposits and the alluvial deposits) lies near the levee template, and there is potential for a failure originating at the contact point to intersect the levee prism. If the failure seems unlikely to intersect the levee prism, the site was ranked as moderate.

Moderate-risk sites exhibit one or more of the following characteristics and may be recommended for treatment as part of any 200-year flood risk reduction improvement program:

- the toe of the bank lies reasonably close to the levee template, but the slope below the waterline is moderate and general scour elevations are not very far beneath the local bed level;
- the bank at the low-water elevation (the contact between the flood basin deposits and the alluvial deposits) lies inside the levee template, but an individual failure is unlikely to intersect the levee prism; or
- the toe of the bank lies from 20 to 50 feet from the levee template and the risk of slope failure is low to moderate, but erosion appears to be very active or specific site factors, such as lack of vegetation, structures, or fallen trees, suggest that erosion might proceed very quickly during a large flood.

Sites A (River Mile [RM] 78.6), C (RM 78.0), D (RM 77.3), G (RM 73.5), J (RM 69.8), and M (RM 68.8) are considered high-risk sites. Sites B (RM 78.2), I (RM 70.0), K (RM 69.4), and L (RM 69.1) are considered moderate-risk sites.

Encroachment

USACE levee guidance requires the removal of vegetation greater than 2 inches in diameter on the levee slopes and within 15 feet of the waterside and landside levee toes. This guidance also may require removal of encroachments on the levee slopes, including utilities, fences, structures, retaining walls, driveways, and other features that penetrate the levee prism or affect operation and maintenance of the levee system. Substantial encroachments are present on the Sacramento River east levee. **Plates 1-6a** and **1-6b** illustrate typical encroachments in the area. Should any of these existing encroachments be determined to threaten the integrity of the levee or otherwise increase flood risk unacceptably, the encroachments would need to be removed. RD 1000 is the entity initially responsible for removing encroachments that have been identified as threatening levee integrity. Any such encroachment removal would be subject to future, separate environmental compliance and review.

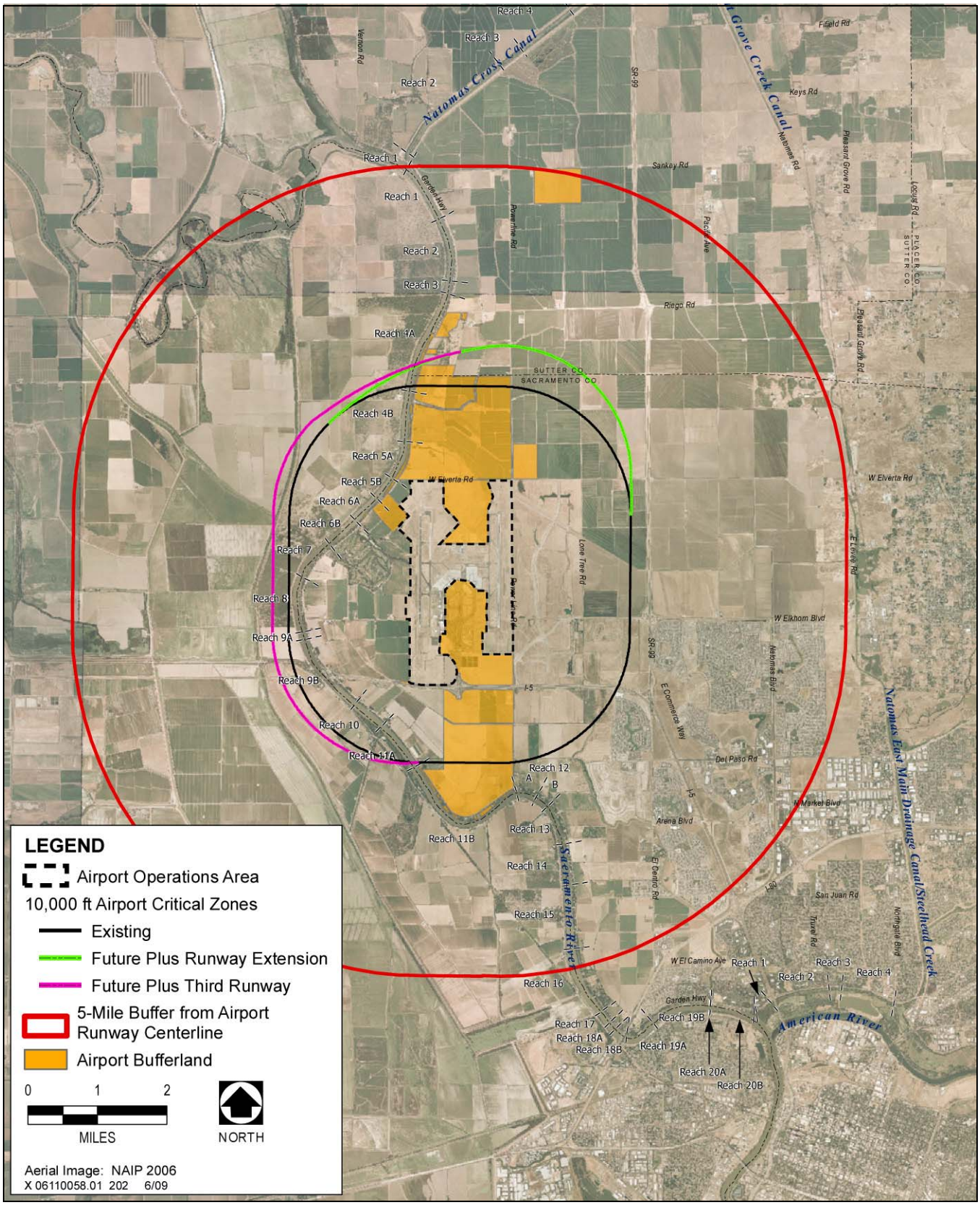
1.4.2.2 Other Problems and Needs Related to Project Implementation

Aviation Safety

The Airport is located approximately 1.5 miles east of the Sacramento River east levee and 12 miles north of downtown Sacramento. The Airport includes the Airport Operations Area and adjacent terminals, parking lots, and landscaped areas (**Plate 1-7**). There are two 8,600-foot parallel runways, oriented roughly north-south, and three airline terminals, as well as additional buildings associated with various airport operations. Approximately half of the 5,900 acres of Sacramento County–owned land at the Airport are located due south and due north of

Source: Photographs taken by EDAW in 2007

Examples of Waterside Encroachments on the Sacramento River East Levee **Plates 1-6a and b**



Source: Aerial image SACOG 2007, adapted by EDAW in 2007 based on data from HDR and Wood Rodgers

Sacramento International Airport Operations Area, Airport Critical Zones, and Bufferlands **Plate 1-7**

the Airport Operations Area and function as aviation "bufferlands" to prevent encroachment by land uses, such as residential development, that are incompatible with aircraft operations.

The Airport has one of the highest numbers of reported bird strikes of all California airports. The frequency of these strikes is directly related to the Airport's location in the western portion of the Natomas Basin, which is a relatively flat, low-lying area, along the Pacific Flyway, dominated by agricultural crop lands and supporting irrigation and drainage infrastructure. These agricultural uses are the primary wildlife attractants in the area, with rice cultivation, including flooding of the rice fields in winter and summer, considered the most significant attractant.

Since 1996, the Federal Aviation Administration (FAA) has required the Airport to maintain and implement a WHMP. The WHMP relies on a combination of wildlife control and land management strategies and outlines steps for monitoring, documenting, and reporting potential wildlife hazards and bird strikes. In accordance with FAA Advisory Circular (AC) 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports* (FAA 2007), the Airport has been directed by the FAA to reduce wildlife attractants in the Airport Critical Zone, the area within a 10,000-foot radius from the centerline of the two parallel runways for turbine-powered aircraft.

The following land management objectives in the WHMP are relevant to the proposed early implementation project:

- maintain grasslands in the Airport Operations Area (the area within the fenced perimeter of the Airport) to discourage use by hazardous wildlife;
- reduce aquatic habitat that promotes hazardous wildlife;
- reduce hazardous wildlife use of ditches in the Airport Operations Area; and
- reduce hazardous wildlife on Sacramento County–owned agricultural land in the 10,000-foot Airport Critical Zone.

Habitat Conservation

The Natomas Basin provides habitat for a variety of wildlife species, ranging from those that use the widely distributed agricultural fields and levee maintenance zones to species that are restricted to remnant patches of native vegetation and the area's historical agricultural irrigation and drainage ditches and canals. Many common wildlife species use the project area, and a number of special-status species also have potential to occur within and adjacent to the levee improvement areas. These special-status species include the following:

- valley elderberry longhorn beetle
- giant garter snake
- northwestern pond turtle
- Swainson's hawk
- burrowing owl
- northern harrier
- other nesting birds
- rose mallow
- Delta tule pea
- Sanford's arrowhead

The NBHCP was developed by the City of Sacramento, Sutter County, and TNBC in 2003 to promote conservation of the NBHCP-covered species in conjunction with economic and urban development in the Natomas Basin. The NBHCP establishes a conservation program designed to minimize and mitigate the expected loss of habitat values and incidental take of "covered species" that could result from urban development and operation and maintenance of irrigation and drainage systems. The NBHCP currently authorizes take associated with 17,500 acres of urban development in southern Sutter County and within the city of Sacramento. The U.S. Fish and Wildlife Service (USFWS) approved the NBHCP in 2003 and issued incidental take permits to the City of Sacramento and Sutter County for take of Federally listed species resulting from permitted activities.

The NBHCP's habitat reserve acquisition and management activities are implemented by TNBC, a private, nonprofit organization that began operating in 1998 and whose mission is to serve as "plan operator" of the NBHCP. TNBC receives mitigation fees paid by developers and other NBHCP participants. These funds are used to acquire, establish, enhance, monitor, and manage mitigation lands in perpetuity. As development occurs within the Natomas Basin, and as TNBC acquires mitigation lands, site-specific management plans are implemented by TNBC to ensure that the objectives of the NBHCP are fulfilled. These management plans may include excavation and grading of the acquired lands to create marsh habitats reflective of the floodplain conditions that prevailed in portions of the Natomas Basin before reclamation.

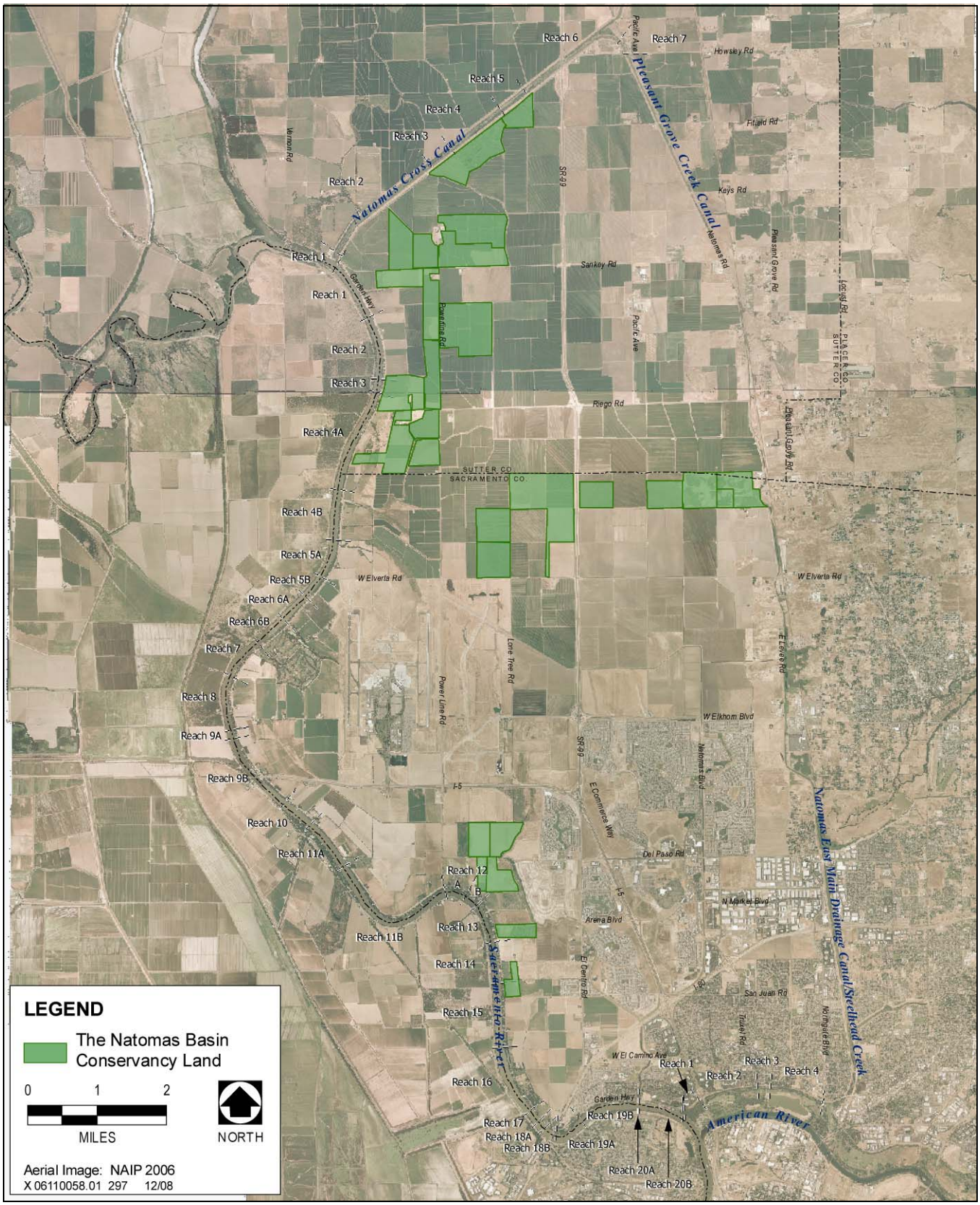
As of January 2006, nearly 4,000 acres of mitigation property had been acquired in the Natomas Basin. As shown in **Plate 1-8**, this property is concentrated in three areas: north of the Airport and west of State Route 99 in Sutter County, east of the Airport between Elverta Road and the Sacramento/Sutter County border in Sacramento County, and south of the Airport in the vicinity of Fisherman's Lake in Sacramento County. TNBC's goal is to consolidate these three blocks of land through infill acquisitions and to ensure that these lands are reliably served and connected by the Natomas Basin's historical agricultural irrigation and drainage infrastructure.

Agricultural Irrigation and Drainage Infrastructure

Reclamation of the Natomas Basin for agricultural development required construction of two major ditch and canal systems in the Basin: an irrigation system owned and operated by Natomas Central Mutual Water Company (NCMWC) and a drainage system owned and operated by RD 1000. NCMWC pumps water into the Basin to provide irrigation water to its shareholders for agricultural use within the Basin. During winter (October through April), drainage is primarily rainfall runoff; during summer (May through September), drainage water from agricultural fields is typically recirculated for irrigation. Because the Basin is surrounded by levees, all excess drainage within the Basin must be pumped out. In general, water is pumped into the Basin from the Sacramento River and NCC as irrigation water and returned to the perimeter drainage channels via RD 1000's interior drainage system.

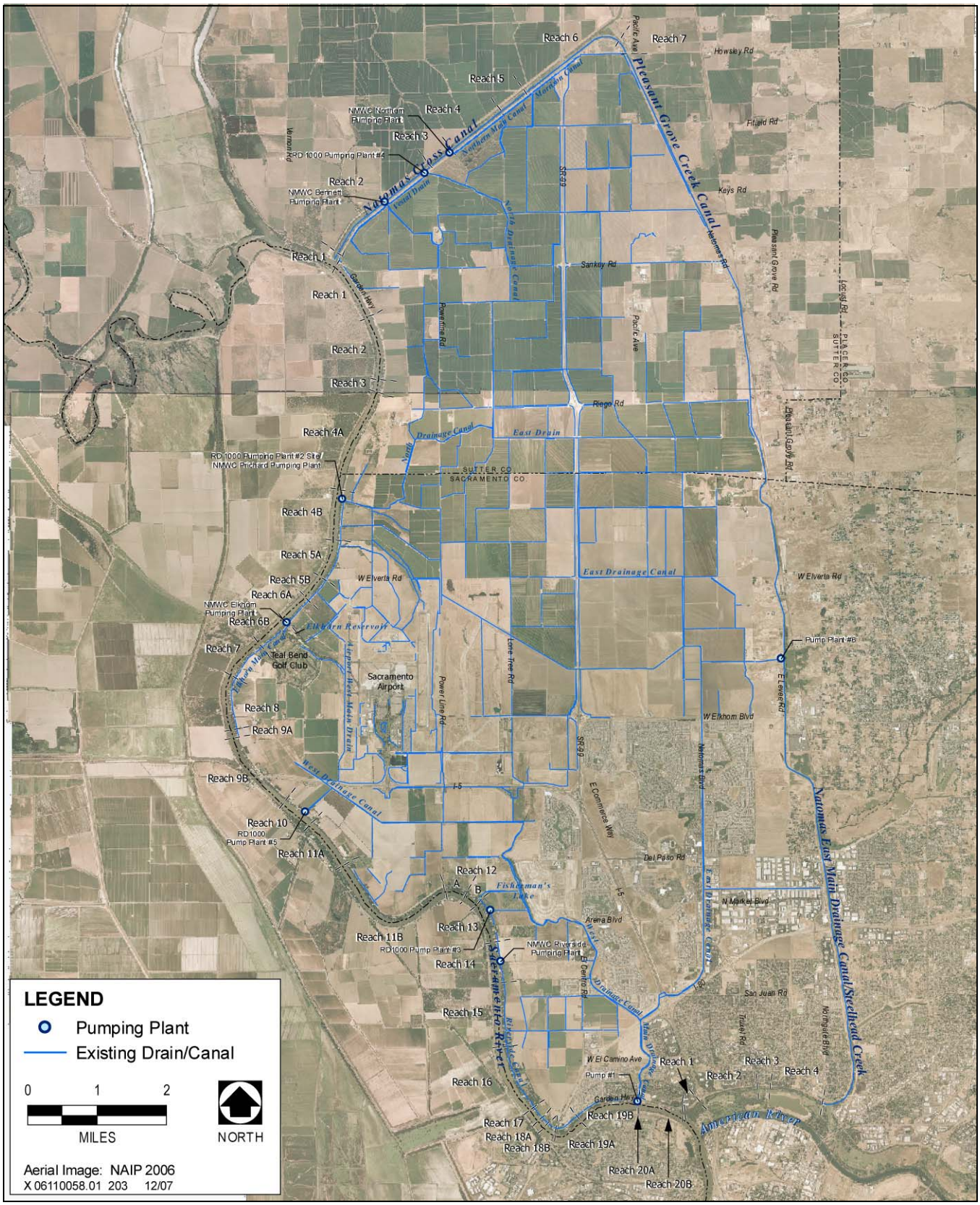
Several irrigation canals, pipelines, wells, and pump stations exist along the Sacramento River east levee. These include the Elkhorn Main Irrigation Canal (Elkhorn Canal), which runs parallel to the Sacramento River east levee from the North Drainage Canal to just south of West Elkhorn Boulevard, and the Riverside Main Irrigation Canal (Riverside Canal), which runs parallel to the Sacramento River east levee from approximately 1 mile north of San Juan Road to approximately Orchard Lane. These NCMWC canals are fed by three pumping plants on the Sacramento River (**Plate 1-9**). These canals are referred to as "highline" canals because they have embankments that allow water levels to be maintained above surrounding ground surfaces so that water can be delivered to agricultural receiving lands by gravity flow. The NCMWC also operates two pumps along the NCC south levee that provide irrigation water to agricultural lands in the northern portion of the Basin. These NCMWC irrigation systems and several other landowner-operated systems along the Sacramento River east levee, NCC south levee, and PGCC west levee would need to be relocated to accommodate improvements to these levees.

RD 1000 operates several drainage pumping plants along the Sacramento River east levee, the NCC south levee, and the NEMDC west levee that could be affected by levee improvement activity. As shown in **Plate 1-9**, Pumping Plant No. 2, located in Sacramento River Reach 4B, pumps drain water from the lower end of the North Drainage Canal; Pumping Plant No. 3, located in Sacramento River Reach 13, pumps drain water from the West Drainage Canal; Pumping Plant No. 1, located in Sacramento River Reach 20A, pumps drain water from the Main Drainage Canal; Pumping Plant No. 4, located in NCC Reach 2, pumps drain water from the upper end of the North Drainage Canal; Pumping Plant No. 5, located in Sacramento River Reach 10, pumps drain water from the West Drainage Canal; Pumping Plant No. 8, located on the NEMDC west levee between Del Paso Road and North Market Boulevard, pumps drain water from the C-1 Drain; and Pumping Plant No. 6, located on the NEMDEC west levee between Elverta Road and Elkhorn Boulevard, pumps drain water from the E Drain. These pumping facilities include discharge pipelines that would need to be relocated as part of the levee improvements



Source: Aerial image SACOG 2007, adapted by EDAW in 2007 based on data from HDR and Wood Rodgers

The Natomas Basin Conservancy Lands **Plate 1-8**



Source: Aerial image SACOG 2007; adapted by EDAW in 2007 based on data from Eric Hansen

Existing Natomas Basin Drainage and Irrigation Features **Plate 1-9**

in these locations. Pumping Plant No. 2 was temporarily removed as part of an emergency levee repair in 2006 but would be reconstructed as part of the Phase 3 Project.

The City of Sacramento operates the Willow Creek stormwater pumping station, which is located in Sacramento River Reach 19B; Pump Station 58, which is located on the American River north levee at Asuza Street; and Pump Station 102, which is located on the NEMDC west levee in Gardenland Park.

1.5 INTENDED USES OF THE EIS/EIR AND RELATIONSHIP TO OTHER DOCUMENTS

1.5.1 NATIONAL ENVIRONMENTAL POLICY ACT

NEPA provides an interdisciplinary framework for Federal agencies to develop information that will help them to take environmental factors into account in their decision-making (42 USC 4321, 40 CFR 1500.1). According to NEPA, an EIS is required whenever a proposed major Federal action (e.g., a proposal for legislation or an activity financed, assisted, conducted, or approved by a Federal agency) would result in significant effects on the quality of the human environment.

Implementation of the project is dependent upon Federal action because it would require Federal approval for one or more of the following activities: (i) alteration of Federal project levees (requires permission from USACE pursuant to Section 408); (ii) placement of fill material into jurisdictional waters of the United States (requires permission from USACE pursuant to Section 404); (iii) work performed in, over, or under navigable waters of the United States (such as excavation of material from or deposition of material into navigable waters) (requires permission from USACE under Section 10); and (iv) activities affecting plant or animal species protected by the Federal Endangered Species Act (ESA) (16 USC 1531[c][1][2]). An EIS is used by Federal agencies in making decisions and is intended to provide full and open disclosure of environmental consequences prior to agency action.

As discussed above under Section 1.1.1, "Scope of Environmental Analysis," this EIS/EIR is tiered from, or incorporates by reference, where appropriate, information contained in the Local Funding EIR, Phase 2 EIR, Phase 2 EIS, Phase 2 SEIR, and Phase 3 DEIS/DEIR. Incorporation of previous analysis by reference is encouraged for NEPA analysis under the Council on Environmental Quality (CEQ) regulations (40 CFR 1500.4, 1502.21). Section 1502.21 reads:

> Agencies shall incorporate material into an environmental impact statement by reference when the effect will be to cut down on bulk without impeding agency and public review of the action. The incorporated material shall be cited in the statement and its content briefly described. No material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment. Material based on proprietary data which is itself not available for review and comment shall not be incorporated by reference.

NEPA requires a brief citation and summary of the referenced material, as well as the public availability of the referenced material.

1.5.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

According to the State CEQA Guidelines (14 CCR Section 15064[f][1]), preparation of an EIR is required whenever a project may result in a significant environmental impact. An EIR is an informational document used to inform public agency decision makers and the general public of the significant environmental effects of a project, identify possible ways to mitigate or avoid the significant effects, and describe a range of reasonable alternatives to the project that could feasibly attain most of the basic objectives of the project while substantially

lessening or avoiding any of the significant environmental impacts. Public agencies are required to consider the information presented in the EIR when determining whether to approve a project.

CEQA requires that state and local government agencies consider the environmental effects of projects over which they have discretionary authority before taking action on those projects (Public Resources Code [PRC] Section 21000 et seq.). CEQA also requires that each public agency avoid or mitigate to less-than-significant levels, wherever feasible, the significant environmental effects of projects it approves or implements. If a project would result in significant and unavoidable environmental impacts that cannot be feasibly mitigated to less-than-significant levels, the project can still be approved, but the lead agency's decision makers must issue a "statement of overriding considerations" explaining in writing the specific economic, social, or other considerations that they believe, based on substantial evidence, make those significant effects acceptable.

As discussed above under Section 1.1.1, "Scope of Environmental Analysis," this EIS/EIR is tiered from, and incorporates by reference, where appropriate, information contained in the Local Funding EIR, Phase 2 EIR, Phase 2 EIS, Phase 2 SEIR, and Phase 3 DEIS/DEIR. Under CEQA, tiering is encouraged and incorporation by reference is authorized where project-specific analysis is tiered from previous analysis (PRC Sections 21093 and 21094; State CEQA Guidelines CCR Sections 15150 and 15152). Under CCR Section 15152 of the State CEQA Guidelines, when CEQA documentation has been performed for a program of projects, project-specific studies for subsequent projects within the program should be limited to effects which:

- were not examined as significant effects on the environment in the prior EIR; or
- are susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means (State CEQA Guidelines CCR Section 15152[d]).

CEQA requires a brief citation to and summary of the referenced material, as well as the public availability of the referenced material. Relevant portions of all documents incorporated by reference into this EIS/EIR are summarized throughout this EIS/EIR where specifically noted (State CEQA Guidelines CCR Section 15150). See Section 1.10, "Related NEPA Documents, Documents Relied on in Preparation of This EIS/EIR, and Documents Incorporated by Reference."

1.5.3 PROJECT AUTHORIZATION

SAFCA is authorized to proceed with the early implementation project as approved by the SAFCA Board of Directors in April 2007 and as funded in part by the Consolidated Capital Assessment District that was formed in April 2007 following an affirmative vote of property owners occupying the 200-year floodplain in Sacramento. In October 2007, the California Legislature approved, and the Governor signed, Senate Bill 276 authorizing the state's participation in the project. The state has the capability to fund its share of the project cost under the authorities created by the passage of Propositions 1E and 84 in November 2006. Federal financial participation in the project would require additional action by Congress based on the results of the Common Features Project GRR as discussed above.

1.5.4 NATOMAS LEVEE IMPROVEMENT PROGRAM ENVIRONMENTAL DOCUMENTATION AND RELATIONSHIP OF THIS EIS/EIR TO OTHER DOCUMENTS

The relationship of the NLIP Landside Improvement Project phases to one another and their relationship to this EIS/EIR are summarized below. **Table 1-3** presents the NLIP Landside Improvements Project's major components and construction timing of each project phase; these are also shown in **Plate 2-7**. Years are shown in the table below to identify the anticipated starting point of each NLIP project phase; however, as described in the subsections below, only some components of each project phase would begin in the first year of construction

(e.g., while some portions of the Phase 3 Project would begin in 2009, proposed levee work would not begin until 2010). Further, the project phases, while originally envisioned to be constructed in the order they are numbered, could be constructed out of order (e.g., the Phase 4a Project, or components thereof, could be constructed before the Phase 3 Project) depending on project approvals, permitting, project design, and other factors. Project phasing and construction sequencing of project components are not necessarily dependent upon one another, but are dependent more on the availability and timing of funding. Because each project is analyzed in the cumulative context of the entire NLIP Landside Improvements Project, there will be no undisclosed impacts if the order of construction is altered.

Table 1-3
Major Components and Construction Timing of the Landside Improvements Project Phases

Project Phase and Construction Timing	Project Component
Phase 1 Project 2007–2008	Natomas Cross Canal south levee improvements (westernmost 12,500 feet): Through-seepage and underseepage remediation
Phase 2 Project 2009–2010	Natomas Cross Canal south levee improvements: Levee raising and seepage remediation Sacramento River east levee (Reaches 1–4B): Levee raising and seepage remediation Relocation of the Upper Elkhorn Canal (North Drainage Canal to Elkhorn Reservoir) Construction of the Upper GGS/Drainage Canal (North Drainage Canal to just south of Elkhorn Reservoir) Removal of a deep culvert at the location of Reclamation District 1000 Pumping Plant No. 2 Borrow and reclamation at: Airport north bufferlands; Brookfield; Dunmore; RD 1001; and Sutter Pointe Habitat creation and management Right-of-way acquisition Infrastructure relocation and realignment
Phase 3 Project 2009–2010	Sacramento River east levee (Reaches 5A–9B): Levee raising and seepage remediation Pleasant Grove Creek Canal west levee: Levee raising, slope flattening, and widening; and seepage remediation Natomas East Main Drainage Canal west levee (Elkhorn Boulevard to NEMDC Stormwater Pumping Station): Levee widening and flattening and seepage remediation Natomas East Main Drainage Canal west levee (NEMDC Stormwater Pumping Station to Northgate Boulevard): Seepage remediation and slope stability remediation Relocation of approximately 9,400 feet of the Elkhorn Canal (highline irrigation canal) downstream of Elkhorn Reservoir Construction of a new GGS/Drainage Canal downstream of Elkhorn Reservoir Reconstruction of RD 1000 Pumping Plant No. 2 Habitat creation and management Infrastructure relocation and realignment Landside vegetation removal Right-of-way acquisition Encroachment management Borrow and reclamation at Airport north bufferlands; Brookfield; Dunmore; Elkhorn Borrow Area; Lower Woodland Corridor; Krumenacher; Novak; Pacific Terrace; private property (in Reaches 5A, 6B, and 7); RD 1001; South Sutter, LLC; Sutter Pointe; and Twin Rivers Unified School District Reconfiguration of Airport West Ditch
Phase 4a Project 2010–2011	Sacramento River east levee (Reaches 10–15): Levee raising and seepage remediation Sacramento River east levee Reach 4B: Seepage remediation Natomas Cross Canal south levee: Levee raising and seepage remediation at two locations Replacement of South Lauppe Pump Riverside Canal (highline irrigation canal) relocation and extension Modifications to Natomas Central Mutual Water Company's Riverside Pumping Plant and RD 1000's Pumping Plants Nos. 3 and 5

Table 1-3 Major Components and Construction Timing of the Landside Improvements Project Phases	
Project Phase and Construction Timing	Project Component
	Development of new and replacement groundwater wells Borrow site excavation and reclamation at Fisherman's Lake Borrow Area (including Novak); I-5 Borrow Area; Elkhorn Borrow Area; South Sutter, LLC; Krumenacher; Twin Rivers Unified School District stockpile; and Airport north bufferlands Habitat creation and management Infrastructure relocation and realignment Landside and waterside vegetation removal Landside vegetation removal in Sacramento River east levee Reaches 12A–15 Right-of-way acquisition Encroachment management Exchange of properties between SAFCA and the Sacramento County Airport System in Reaches 4A, 5B, and 6 of the Sacramento River east levee
Phase 4b Project 2011 (or beyond)	Sacramento River east levee (Reaches 16–20): Seepage remediation American River north levee (Reaches 1–4): Seepage remediation and improvements to achieve 200-year flood risk reduction Pleasant Grove Creek Canal west levee: Improvements to achieve 200-year flood risk reduction Natomas East Main Drainage Canal west levee (Sankey Road to Elkhorn Boulevard): Levee raising and widening, slope flattening, and seepage remediation; and improvements to achieve 200-year flood risk reduction West Drainage Canal: Improvements south of I-5 Borrow site excavation and reclamation Habitat creation and management Infrastructure relocation and realignment Landside vegetation removal Right-of-way acquisition Encroachment management
Notes: Airport = Sacramento International Airport; GGS = Giant Garter Snake; NEMDC = Natomas East Main Drainage Canal; RD = Reclamation District; I-5 = Interstate 5 Source: Data compiled by EDAW in 2009, based on information provided by SAFCA	

1.5.4.1 PHASE 1 PROJECT

In February 2007, the SAFCA Board of Directors certified the Local Funding EIR (SAFCA 2007a), which examined the physical environmental effects associated with the program of flood damage reduction measures and related mitigation and habitat enhancements that the local funding mechanisms would be used to finance. The Local Funding EIR covered the NLIP Landside Improvements Project Phases 1–4 at a program level of detail and the Phase 1 Project (NCC South Levee Phase 1 Improvements) at a project-specific level of detail. The Phase 1 Project was constructed in 2007 and 2008.

1.5.4.2 PHASE 2 PROJECT

In November 2007, the SAFCA Board of Directors certified the Phase 2 EIR (State Clearinghouse No. 2007062016), which covered the three additional phases of "landside" components of the NLIP that were proposed for construction in 2008 (Phase 2 Project), 2009 (Phase 3 Project), and 2010 (Phase 4 Project). The Phase 2 EIR was tiered from the analysis in the Local Funding EIR, consistent with Section 15152 of the State CEQA Guidelines. The 2008 construction phase (now referred to as the Phase 2 Project) was analyzed at a project

level, and the 2009–2010 construction phases (now referred to as the Phase 3 Project and Phase 4 Project, or the remainder of the Landside Improvements Project) were analyzed at a program level. The Phase 2 Project was approved for implementation by the SAFCA Board of Directors on November 29, 2007.

To implement the Phase 2 Project, SAFCA required permission from USACE pursuant to Section 408 for alteration of a Federal project levee and Section 404 for the discharge of fill into jurisdictional waters of the United States. Therefore, following completion of the Phase 2 EIR and local approval of the Phase 2 Project, USACE prepared the Phase 2 EIS (USACE 2008). A record of decision (ROD) was issued in January 2009, at which time USACE also issued the 408 permission and 404 permit for the Phase 2 Project.

The Phase 2 Project as presented in the Phase 2 EIS differs from the Phase 2 Project as evaluated in the 2007 Phase 2 EIR for the following reasons: By the time the Phase 2 EIS began, SAFCA's engineering consultants had determined that cutoff walls could be used instead of berms along several of the Sacramento River east levee reaches. Thus, the Phase 2 EIS includes proposed cutoff walls in some Sacramento River east levee reaches and a discussion of the impacts of the cutoff walls on groundwater recharge. Additionally, it became clear during the EIS process that much of the 2008 construction phase (or Phase 2 Project) would actually have to be conducted in 2009. The Phase 2 EIS therefore acknowledges that possibly all of the Phase 2 Project construction could be concurrent with construction of the Phase 3 Project, and discusses the consequences to haul truck traffic, noise, air quality, and other construction-related effects accordingly. These differences were considered in the Phase 2 SEIR (State Clearinghouse No. 2007062016) (SAFCA 2009a), prepared by SAFCA, which was certified by the SAFCA Board of Directors in January 2009, at which time the Board also approved the modifications to the Phase 2 Project.

Construction of the Phase 2 Project began in May 2009 and is anticipated to be completed in 2010, assuming receipt of all required environmental clearances and permits. The Phase 2 Project can be constructed on a stand-alone basis, assuming no further action on the balance of the NLIP is taken. It is clear that a portion of Phase 2 Project construction would be complete prior to construction of the Phase 3 Project. However, it is still likely that there would be some overlap in construction schedules between these two phases (see below).

1.5.4.3 PHASE 3 PROJECT

The Phase 3 Project addresses underseepage, riverbank erosion, encroachment, and levee height deficiencies along the Sacramento River east levee Reaches 5A–9B, the PGCC west levee, and a portion of the NEMDC west levee (between Elkhorn and Northgate Boulevards).

In February 2009, USACE and SAFCA issued the Phase 3 DEIS/DEIR (State Clearinghouse No. 2008072060) for public review and comment. Following public review, SAFCA prepared an FEIR (SAFCA 2009b) to provide responses to comments on the Phase 3 DEIS/DEIR. The SAFCA Board of Directors certified the FEIR and approved the Phase 3 Project in May 2009. Separately, USACE prepared an FEIS to provide responses to comments received on the Phase 3 DEIS/DEIR; the Phase 3 FEIS is being issued for public review in August 2009. USACE will consider whether to grant Section 408 permission and issue permits under Sections 404 and 10.

Preliminary construction (canal work, utility relocation, vegetation removal, and demolition of structures) of the Phase 3 Project is planned to begin in summer/fall 2009; however, major levee construction would not begin until 2010, assuming receipt of all required environmental clearances and permits. The potential exists for up to 30% of the Phase 2 Project to also be constructed in 2010, concurrent with Phase 3 Project construction, or even potentially concurrently with the Phase 4a Project, depending on the timing and availability of funding.

1.5.4.4 PHASE 4A PROJECT

This EIS/EIR evaluates the direct, indirect, and cumulative effects of the Phase 4a Project. The Phase 4a Project includes levee raising and seepage remediation along the Sacramento River east levee (Reaches 10–15) and in two

locations of the NCC south levee as well as relocation and extension of the Riverside Canal. Parcels within the Fisherman's Lake Borrow Area (including Novak) would be the primary source of soil borrow for Phase 4a Project construction. Additional borrow could be obtained from the Interstate 5 (I-5) Borrow Area, and borrow areas previously addressed in the Phase 3 DEIS/DEIR; those areas excavated for borrow material would be reclaimed as agricultural land, grassland, or managed marsh depending on their location and existing land use. If permitted, these improvements could be constructed at the same time as portions of the Phase 2 and 3 Projects. Construction is planned to begin in 2010 and anticipated to be completed in 2011, assuming receipt of all required environmental clearances and permits.

1.5.4.5 PHASE 4B PROJECT

The Phase 4b Project will include seepage remediation along the Sacramento River east levee (Reaches 16–20) and the American River north levee (Reaches 1–4); levee raising and widening, slope flattening, and seepage remediation along the NEMDC west levee (from Sankey Road to Elkhorn Boulevard); and habitat improvements to the West Drainage Canal south of I-5. The Phase 4b Project will also include improvements to achieve 200-year flood risk reduction along the American River north levee (Reaches 1–4), PGCC west levee, and NEMDC west levee. The environmental impacts of these improvements were evaluated at a program level in the Local Funding EIR, the Phase 2 EIR, and the Phase 2 EIS. The project-specific impacts of the Phase 4b Project will be evaluated in a separate, project-specific EIS/EIR in 2010. Construction is planned to begin and anticipated to be completed in 2011 or beyond, assuming receipt of all required environmental clearances and permits.

1.6 SCOPE AND FOCUS OF THE EIS/EIR

Pursuant to the CEQ, USACE's NEPA regulations, CEQA, and the State CEQA Guidelines (CCR Section 15064), the discussion of potential effects on the environment in this EIS/EIR is focused on those impacts that USACE and SAFCA have determined may be potentially significant.

To make a preliminary determination of which impacts may be potentially significant, USACE published a notice of intent (NOI) to prepare an EIS in the *Federal Register* on March 27, 2009; and SAFCA filed a notice of preparation (NOP) of an EIR with the State Clearinghouse and released the NOP publicly on March 27, 2009 (**Appendix A1**).

This EIS/EIR includes an evaluation of 15 environmental issue areas and other NEPA- and CEQA-mandated issues (e.g., cumulative impacts and growth-inducing impacts). The 15 environmental issue areas are as follows:

- Agricultural Resources
- Land Use, Socioeconomics, and Population and Housing
- Geology, Soils, and Mineral Resources
- Hydrology and Hydraulics
- Water Quality
- Biological Resources
- Cultural Resources
- Paleontological Resources
- Transportation and Circulation
- Air Quality
- Noise
- Visual Resources
- Utilities and Services Systems
- Hazards and Hazardous Materials
- Environmental Justice

1.6.1 ENVIRONMENTAL RESOURCES NOT CONSIDERED IN DETAIL

CEQA and the State CEQA Guidelines provide for the identification and elimination from detailed study the issues that are not significant or that have been covered by prior environmental review (PRC 21002.1, State CEQA Guidelines CCR Sections 15143 and 15150). The NEPA regulations provide similar provisions (40 CFR 1501.7[a][3]). During scoping, and based on review of available information, it was determined that the Phase 4a Project would not result in significant environmental effects related to recreation.

The analysis of effects on recreational facilities under NEPA and CEQA generally focuses on whether a project would increase the use of existing parks and recreational facilities such that the physical deterioration of the facilities would be accelerated, or whether the project would create a demand for the construction of new facilities that would result in adverse physical effects on the environment. There are no public or private recreational facilities located within the Phase 4a Project area, and the project would not introduce new housing into the area that would create additional demand for recreational facilities. Therefore, this issue is not discussed further in this EIS/EIR. Potential impacts on recreational and commuter bicyclists using roadways in the Phase 4a Project area are addressed in Section 4.10, "Transportation and Circulation."

1.7 AGENCY ROLES AND RESPONSIBILITIES

USACE will use this EIS/EIR in exercising its regulatory authority under Sections 408, 404, and 10. It also may be used as an informational document by Federal cooperating agencies, such as the FAA, that could have permitting or approval authority (including partial funding) for aspects of the project.

This EIS/EIR will be used by SAFCA and CEQA responsible and trustee agencies, such as the CVFPB, DWR, Central Valley Regional Water Quality Control Board (RWQCB), and California Department of Fish and Game (DFG), to ensure that they have met the requirements of CEQA before deciding whether to approve or permit project elements over which they have jurisdiction. It may also be used by other state and local agencies, which may have an interest in resources that could be affected by the project, or that have jurisdiction over portions of the project.

This EIS/EIR is not intended to be used as the environmental clearance document for future development projects proposed in the Natomas Basin.

1.7.1 LEAD AGENCIES

USACE is the Federal lead agency for NEPA compliance. SAFCA is the state lead agency for CEQA compliance.

1.7.2 COOPERATING, RESPONSIBLE, AND TRUSTEE AGENCIES

Under NEPA, any Federal agency other than the lead agency that has jurisdiction by law or special expertise with respect to any environmental impact involved in an action requiring an EIS is eligible to be a cooperating agency (NEPA Section 1501.6). Cooperating agencies are encouraged to actively participate in the NEPA process of the Federal lead agency, review the NEPA documents of the Federal lead agency, and use the documents when making decisions on the project.

Under CEQA, a responsible agency is a public agency, other than the lead agency, that has responsibility to carry out or approve a project (PRC Section 21069). A trustee agency is a state agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California (PRC Section 21070).

1.7.2.1 FEDERAL COOPERATING AGENCIES

The FAA is serving as a cooperating agency under NEPA because, if USACE and SAFCA select an alternative that requires the Airport to seek a release from Federal Airport Improvement Grant assurances, the FAA would use this EIS/EIR in exercising its decision-making authority under 49 USC 47107 regarding whether to approve those actions.

1.7.2.2 STATE RESPONSIBLE AND TRUSTEE AGENCIES

The following state agencies may serve as responsible and trustee agencies if they have jurisdiction or regulatory approval over the project or a portion of the project:

- California Air Resources Board
- California Department of Education
- California Department of Fish and Game
- California Department of Toxic Substances Control
- California Department of Transportation
- California Department of Water Resources
- California State Lands Commission
- California State Office of Historic Preservation
- Central Valley Flood Protection Board (formerly the State Reclamation Board)
- Central Valley Regional Water Quality Control Board (Region 5)
- State Water Resources Control Board

1.7.2.3 REGIONAL AND LOCAL RESPONSIBLE AGENCIES

The following regional and local agencies may serve as responsible agencies if they have jurisdiction or regulatory approval over the project or a portion of the project:

- County of Sacramento
- County of Sutter
- City of Sacramento
- Feather River Air Quality Management District
- Natomas Central Mutual Water Company
- Natomas Unified School District
- Reclamation District No. 1000
- Reclamation District No. 1001
- Robla School District
- Sacramento Area Sewer District
- Sacramento County Environmental Management Department
- Sacramento County Local Agency Formation Commission
- Sacramento County Municipal Services Agency
- Sacramento County Water Agency (Zone 41 and 11C Water Districts)
- Sacramento Metropolitan Air Quality Management District
- Sacramento Metropolitan Fire District
- Sacramento Municipal Utility District
- Sacramento Regional County Sanitation District
- Sutter County Environmental Health Services
- Twin Rivers Unified School District

1.7.3 REGULATORY REQUIREMENTS, PERMITS, AND APPROVALS

1.7.3.1 FEDERAL ACTIONS/PERMITS

The Federal actions, authorizations, permissions, or permits that would be required for project implementation are listed below.

- **U.S. Army Corps of Engineers:** Decision on whether or not to grant permission for the Phase 4a Project under Sections 408 and 10 and decision on whether to issue a permit under Section 404.

- **National Marine Fisheries Service:** Federal ESA consultation and incidental-take authorization for the take of, or concurrence with conclusion of no effect for, Federally listed endangered and threatened species.

- **U.S. Environmental Protection Agency:** Reviewing and commenting on the EIS, filing and noticing the EIS, concurrence with Section 404 Clean Water Act permit, and Clean Air Act conformity.

- **U.S. Fish and Wildlife Service:** Federal ESA consultation and incidental-take authorization for the take of, or concurrence with conclusion of no effect for, Federally listed endangered and threatened species.

1.7.3.2 STATE ACTIONS/PERMITS

The state actions or permits that would be required for project implementation are listed below.

- **California Department of Fish and Game, Sacramento Valley:** Compliance with the California Endangered Species Act, streambed alteration (California Fish and Game Code Section 1602), Section 2081 permit, and protection of raptors (California Fish and Game Code Section 3503.5).

- **California Department of Transportation:** Encroachment permit and/or transportation management plan.

- **California State Office of Historic Preservation:** National Historic Preservation Act Section 106 compliance in relation to Federal project authorizations.

- **Central Valley Flood Protection Board (formerly the Reclamation Board) and Reclamation District Nos. 1000 and 1001:** levee and floodway and other encroachment permits.

- **Central Valley Regional Water Quality Control Board (Region 5):** National Pollutant Discharge Elimination System construction stormwater permit (Notice of Intent to proceed under General Construction Permit) for disturbance of more than 1 acre, discharge permit for stormwater, general order for dewatering, and Clean Water Act Section 401 certification or waste discharge requirements.

1.7.3.3 REGIONAL AND LOCAL ACTIONS/PERMITS

The regional and local actions and permits that would be required for project implementation are listed below.

- **City of Sacramento:** Possible construction authorizations/encroachment permits.

- **Counties of Sacramento and Sutter:** Permits for compliance with the state's Surface Mining and Reclamation Act, and other possible construction authorizations/encroachment permits.

- **Feather River Air Quality Management District and Sacramento Metropolitan Air Quality Management District:** Authority to construct (for devices that emit air pollutants), permit to operate, and Air Quality Management Plan consistency determination.

1.8 PUBLIC INVOLVEMENT UNDER NEPA AND CEQA

1.8.1 NOTICE OF INTENT, NOTICE OF PREPARATION, AND SCOPING MEETING

On March 27, 2009, USACE and SAFCA issued an NOI and NOP, respectively, for preparing this EIS/EIR. In addition to the State Clearinghouse's distribution of the NOP to potentially interested state agencies, copies of the NOP were distributed to approximately 1,000 recipients, including Federal, state, regional, and local agencies; non-profit and private organizations; homeowners associations; partnerships; businesses; and individual residents in the project area to solicit input as to the scope and content of the EIS/EIR. There is no mandated time limit to receive written comments in response to the NOI under NEPA. The NOP was circulated for a 30-day public comment period, in accordance with the State CEQA Guidelines, which closed on April 27, 2009.

A joint public scoping meeting was held on April 13, 2009 from 4:30 to 6:30 p.m. at the South Natomas Community Center (Activity Room) in Sacramento, California, to brief interested parties on the Phase 4a Project, and obtain the views of agency representatives and the public on the scope and content of the EIS/EIR. **Appendix A1** and Chapter 7.0, "Consultation and Coordination," of this EIS/EIR include copies of the comment letters received and a summary listing of the substantive comments on the NOI and NOP, respectively.

1.8.2 ADDITIONAL STEPS IN THE ENVIRONMENTAL PROCESS

This DEIS/DEIR is being distributed for a public and agency review and comment period that begins on August 28, 2009 and closes on October 13, 2009.

A public meeting will be held before the SAFCA Board of Directors on September 17, 2009 at 3:00 p.m., at which it will receive input from agencies and the public on the DEIS/DEIR. USACE may hold one or more public meetings during the comment period. In addition, written comments from the public, reviewing agencies, and stakeholders will be accepted throughout the public comment period. Comments must be received by 5:00 p.m. on October 13, 2009 by USACE or SAFCA at the following addresses, fax numbers, or e-mail addresses:

Elizabeth Holland, Planning Division
U.S. Army Corps of Engineers, Sacramento District
1325 J Street
Sacramento, CA 95814
Telephone: (916) 557-6763
Fax: (916) 557-7856
E-mail: Elizabeth.G.Holland@usace.army.mil

Or

John Bassett, Director of Engineering
Sacramento Area Flood Control Agency
1007 7th Street, 7th Floor
Sacramento, CA 95814
Telephone: (916) 874-7606
Fax: (916) 874-8289
E-mail: BassettJ@saccounty.net

Following public review of the DEIS/DEIR, an FEIS and an FEIR will be prepared, in which USACE and SAFCA, respectively, will provide responses to comments on the DEIS/DEIR. The FEIS will constitute a reprint of the entire DEIS/DEIR, and will include comment letters, responses to comments, and any text changes/clarifications. The FEIR will be a separate volume containing responses to comments and any text changes/clarifications.

1.9 ORGANIZATION OF THIS EIS/EIR

The content and format of this EIS/EIR are designed to meet the requirements of NEPA, as set forth by the Council on Environmental Quality and USACE's NEPA policy and guidance, including Appendix B, "NEPA Implementation Procedures for the Regulatory Program," appended to 33 CFR Part 325, "Processing of Department of Army Permits;" and CEQA and the State CEQA Guidelines. The EIS/EIR is organized as follows:

- The Abstract identifies the project title, lead agencies, an abstract, and comment submission information.
- The Executive Summary summarizes the purpose and intended uses of the EIS/EIR, lead agencies, project location, project background and phasing, need for action, and project purpose/objectives; presents an overview of the Proposed Action and alternatives under consideration as well as the major conclusions of the environmental analysis; documents the known areas of controversy and issues to be resolved; and ends with a summary table that lists the environmental impacts, mitigation measures, and significance conclusions for the Proposed Action and alternatives under consideration.
- Chapter 1.0, "Introduction and Statement of Purpose and Need," explains the NEPA and CEQA processes; lists the lead, cooperating, responsible, and trustee agencies that may have discretionary authority over the project; specifies the underlying project purpose/objectives and need for action, to which the lead agencies are responding in considering the proposed project and project alternatives; summarizes required permits,

approvals, and authorizations; outlines the organization of the document; and provides information on public participation.

- Chapter 2.0, "Alternatives," presents the Proposed Action and alternatives under consideration. This chapter constitutes the project description and describes the project components. This chapter also describes alternatives considered, but eliminated from further consideration; and provides a summary matrix that compares the environmental consequences of the Proposed Action and alternatives under consideration.

- Chapter 3.0, "Affected Environment," is divided into 15 sections. Each of the sections is devoted to a particular issue area and describes the baseline or existing environmental and regulatory conditions.

- Chapter 4.0, "Environmental Consequences and Mitigation Measures," provides an analysis of impacts at an equal level of detail for the Proposed Action and alternatives under consideration, and identifies mitigation measures that would avoid or eliminate significant impacts or reduce them to a less-than-significant level, where feasible and available.

- Chapter 5.0, "Cumulative and Growth-Inducing Impacts and Other Statutory Requirements," provides a summary of and incorporates by reference the analyses of cumulative impacts contained in the Local Funding EIR, Phase 2 EIR, Phase 2 EIS, Phase 2 SEIR, and Phase 3 DEIS/DEIR. The "Cumulative Impacts" section also includes any new cumulative impacts; the cumulative impacts of the potential construction of the Phase 2, 3, and 4a Projects simultaneously; and the Phase 4a Project contribution to cumulative impacts from implementation of the Phase 4b Project. The "Growth-Inducing" impacts section provides a summary of and incorporates by reference the analysis of growth-inducing impacts contained in the Local Funding EIR, Phase 2 EIR, Phase 2 EIS, Phase 2 SEIR, and Phase 3 DEIS/DEIR. The remainder of this chapter includes the following requirements of NEPA and CEQA that are not addressed elsewhere in this EIS/EIR: relationship between short-term uses of the environment and long-term productivity, significant and unavoidable environmental impacts, and irreversible and irretrievable commitments of resources.

- Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations," summarizes the Federal laws and regulations that apply to the project and describes the project's compliance with them.

- Chapter 7.0, "Consultation and Coordination," summarizes public involvement activities under NEPA and CEQA; Native American consultation; and coordination and with other Federal, state, regional, and local agencies. A list of organizations and individuals receiving a copy and/or notice of this EIS/EIR is also included.

- Chapter 8.0, "References," provides a bibliography of sources cited in this EIS/EIR.

- Chapter 9.0, "List of Preparers," lists individuals who were involved in preparing this EIS/EIR.

- Chapter 10.0, "Index," contains the NEPA-required index for easy reference of topics and issues.

- Appendices contain background information that supports this EIS/EIR and can be found on the CD located in the back cover of this EIS/EIR. The appendices are as follows:

    - Appendix A, "Public Outreach and Involvement"
    - Appendix B, "Project Description"
    - Appendix C, "Hydraulics and Hydrology"
    - Appendix D, "Biological Resources"
    - Appendix E, "Cultural Resources"
    - Appendix F, "Air Quality Modeling Results"
    - Appendix G, "Noise Modeling Results"
    - Appendix H, "United States Census Block Groups Data"

- Appendix I, "Borrow Site Environmental Conditions: South Sutter Property (APNs 201-0250-015, 201-0270-002 and -037), Novak Property (APN 225-0090-040), Huffstutler/Johnson Trust Property (APNs 225-0110-019, -020, -037) Sacramento County, CA"

1.10 RELATED NEPA DOCUMENTS, DOCUMENTS RELIED ON IN PREPARATION OF THIS EIS/EIR, AND DOCUMENTS INCORPORATED BY REFERENCE

The following NEPA documents, previously prepared by USACE, were reviewed by USACE staff in the analysis of the project:

- April 1991, *Draft American River Watershed Investigation California Feasibility Report: Part I—Main Report* and *Part II—Draft Environmental Impact Statement/Environmental Impact Report*;
- December 1991, *American River Watershed Investigation (AWRI) California Feasibility Report (FR): Part I—Main Report* and *Part II—Environmental Impact Statement/Environmental Impact Report*;
- December 1991, AWRI FR, Volume 2, Appendix G: Section 404 Evaluation;
- March 1996, *Supplemental Information Report, American River Watershed Project, California: Part I—Main Report* and *Part II—Final Supplemental Environmental Impact Statement (FSEIS)/Environmental Impact Report*;
- June 27, 1996, Chief's Report on FSEIS, signed by Acting Chief of Engineers, Major General Pat M. Stevens; and
- July 1, 1997, ROD on FSEIS, signed by Director of Civil Works, Major General Russell L. Furman.

The authors of this EIS/EIR have relied on several background documents in reaching many of the conclusions. These documents provide background information, are sources of technical information, or are part of the planning context for the overall program. Some of these documents form the foundation of the technical analysis conducted in this EIS/EIR. These documents are as follows:

- Local Funding EIR;
- Phase 2 EIR;
- Phase 2 EIS;
- Phase 2 SEIR;
- Phase 3 DEIS/DEIR;
- *Sacramento Area Flood Control Agency, Natomas Levee Improvement Program, Summary Report on Hydraulic Impact Analyses* (**Appendix C1**);
- *Evaluation of Potential Groundwater Impacts Due to Proposed Construction for Natomas Levee Improvement Program* (**Appendix C2**);
- Evaluation of Cutoff Walls (**Appendix C3**);

- Potential Impacts of Proposed Slurry Cutoff Walls Along Reach 4B of the Sacramento River East Levee (**Appendix C4**);

- Potential Impacts of Proposed Phase 4a Habitat Mitigation Wells (**Appendix C5**);

- Programmatic Biological Opinion issued by USFWS on the Natomas Levee Improvement Program, Landside Improvements Project (October 2008) and Amendment (May 2009) (**Appendix D1**);

- California Endangered Species Act Section 2081 (b) Incidental Take Permit, Natomas Levee Improvement Program Landside Improvements Project (May 2009);

- Final NLIP Landside Improvements Project Programmatic Long-Term Management Plan (April 2009);

- Wetland delineation verification letters from USACE (**Appendix D2**);

- *Natomas Levee Improvement Program Initial Site Survey and Phase I Environmental Site Assessment, Volumes 6, 9, 10, 11, and 12*; and

- *Borrow Site Environmental Conditions: South Sutter Property (APNs 201-0250-015, 201-0270-002 and -037), Novak Property (APN 225-0090-040), Huffstutler/Johnson Trust Property (APNs 225-0110-019, -020, -037) Sacramento County, CA (August 2009)* (**Appendix I**).

As described above under Section 1.1.1, "Scope of Environmental Analysis," incorporation by reference is encouraged by both NEPA (40 CFR 1500.4, 1502.21) and CEQA (State CEQA Guidelines CCR Section 15150). Citations (including the state identification number) are provided in Section 1.1.1. The following documents are incorporated by reference into this EIS/EIR:

- Local Funding EIR,
- Phase 2 EIR,
- Phase 2 EIS,
- Phase 2 SEIR, and
- Phase 3 DEIS/DEIR.

Relevant portions of these documents, where specifically noted, are summarized throughout this EIS/EIR. Printed copies of these documents are available to the public at SAFCA's office at 1007 7th Street, 7th Floor, Sacramento, California, during normal business hours, and are also available on SAFCA's Web site, at http://www.safca.org/Programs_Natomas.html.

2 ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the alternatives that were considered to provide additional flood risk reduction to the Natomas Basin consistent with the objectives in Chapter 1.0, "Introduction and Statement of Purpose and Need." The Phase 4a Project builds upon a program of improvements previously analyzed in the Local Funding EIR, Phase 2 EIR and Phase 2 SEIR, Phase 2 EIS, and Phase 3 DEIS/DEIR for achieving flood risk damage reduction for the 53,000-acre Natomas Basin, which is encircled by 42 miles of levees (**Plate 1-1**). Although they provide contrasting advantages and disadvantages, each of the alternatives is considered feasible for the purpose of analysis based on relevant economic, environmental, social, technological, and legal factors. Three alternatives were evaluated at an equal level of detail:

- No-Action Alternative,
- Proposed Action (Adjacent Levee), and
- Raise and Strengthen Levee in Place (RSLIP) Alternative.

These alternatives represent a reasonable range of alternatives, consistent with the requirements of NEPA and CEQA and when considered in the context of prior alternatives analyses described in previous documents from which the current analysis is tiered (see **Appendix B1**, "Alternatives Formulation and Screening Details"). The action alternatives under consideration have been formulated to feasibly accomplish the primary objectives of the project as discussed in Chapter 1.0, "Introduction and Statement of Purpose and Need," of this EIS/EIR. In particular, the action alternatives provide early compliance to meet requirements for certification of 100-year flood protection criteria and are compatible with construction of additional components to meet 200-year flood protection criteria for urban areas. The action alternatives include components that could avoid or substantially lessen one or more of the significant effects of the preferred alternative.

2.1.1 NEPA/CEQA REQUIREMENTS FOR EVALUATION OF ALTERNATIVES

2.1.1.1 NEPA REQUIREMENTS

The NEPA Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] 15012.14) require that an EIS include:

- an objective evaluation of reasonable alternatives;
- identification of the alternatives considered but eliminated from detailed study, along with a brief discussion of the reasons that these alternatives were eliminated;
- information that would allow reviewers to evaluate the comparative merits of the proposed action (i.e., proposed project) and alternatives;
- consideration of the no-action alternative;
- identification of the agency's preferred alternative, if any; and
- appropriate mitigation measures not already included in the proposed action or alternatives.

NEPA requires the analysis of the proposed action and of all alternatives at a substantially similar level of detail. The Council on Environmental Quality Regulations (40 CFR 1502.14) require agencies to rigorously explore and objectively evaluate all reasonable alternatives and to devote substantial treatment to each alternative considered,

including the proposed action. All alternatives considered, including the preferred alternative, must be evaluated compared to the No-Action Alternative (future without project).

2.1.1.2 CEQA REQUIREMENTS

The California Code of Regulations (CCR) Section 15126.6(a) of the State CEQA Guidelines requires that an EIR:

(1) describe a range of reasonable alternatives to a proposed project, or to the location of the project, that would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects of the project; and

(2) evaluate the comparative merits of the alternatives.

An EIR need not consider every conceivable alternative to a proposed project, but must consider a range of reasonably potentially feasible alternatives that will foster informed decision making and public participation.

The range of alternatives required to be evaluated in an EIR is governed by a "rule of reason" that requires the EIR to consider only those alternatives necessary to permit a reasoned choice. The EIR need examine in detail only those alternatives that the lead agency determines could feasibly attain most of the basic project objectives, taking into account factors that include site suitability; economic viability; availability of infrastructure; general plan consistency; other plans or regulatory limitations; jurisdictional boundaries; and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (State CEQA Guidelines CCR Section 15126.6[f]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project.

The State CEQA Guidelines recommend that an EIR should briefly describe the rationale for selecting the alternatives to be discussed, identify any alternatives that were considered by the lead agency but were eliminated as infeasible, and briefly explain the reasons underlying the lead agency's determination (State CEQA Guidelines CCR Section 15126.6[c]).

An EIR must also evaluate a "no-project" alternative, which represents "what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (State CEQA Guidelines CCR Section 15126.6[e][2]). Under CEQA, the no-project alternative, like all of the alternatives, is compared to the proposed project.

2.1.2 ALTERNATIVES SCREENING

SAFCA, in coordination with USACE, formulated the Proposed Action and a reasonable range of project alternatives that would achieve the specific project objectives through the following steps:

- identification of the deficiencies in the Natomas levee system that must be addressed to provide at least 100-year flood risk reduction as quickly as possible;
- identification of the deficiencies in the Natomas levee system that must be addressed to provide 200-year flood risk reduction,
- identification of feasible remedial measures to address the deficiencies,
- determination of the likely environmental impacts of the remedial measures,
- development of a reasonable range of flood damage reduction alternatives for implementing the remedial measures; and

- identification of measures to ensure that each alternative would improve aviation safety, minimize impacts on significant cultural resource sites, and enhance habitat values.

Alternatives screening for the overall NLIP has been undertaken by SAFCA in a systematic manner through several environmental documents as summarized in this chapter and detailed in **Appendix H**, "Alternatives Formulation and Screening Details." A description of the flood risk reduction measures that SAFCA considered for developing alternatives is provided below.

2.1.3 TYPES OF FLOOD RISK REDUCTION MEASURES CONSIDERED

Designing effective flood risk reduction measures is an iterative process that involves identifying, evaluating, and comparing measures and preliminary alternatives to develop a reasonable range of final alternative plans for consideration by decision makers and the general public. For the NLIP Landside Improvements Project, engineering measures were developed and considered that alone or in various combinations would address the project objectives.

The engineering measures that were considered for the Phase 4a Project must meet several criteria. The design selected must adequately improve performance of the levee so that FEMA accreditation is possible. Generally, the requirements are to provide a sufficient height of levee raise so that the levee height is adequate, levee stability meets levee design criteria, and/or seepage through or beneath the levee is reduced to acceptable levels (**Plate 1-3**). Measures considered are described below.

2.1.3.1 LEVEE RAISE

A levee raise may be necessary to meet the 200-year flood protection standard required by the State for urbanized areas, such as the Natomas Basin.

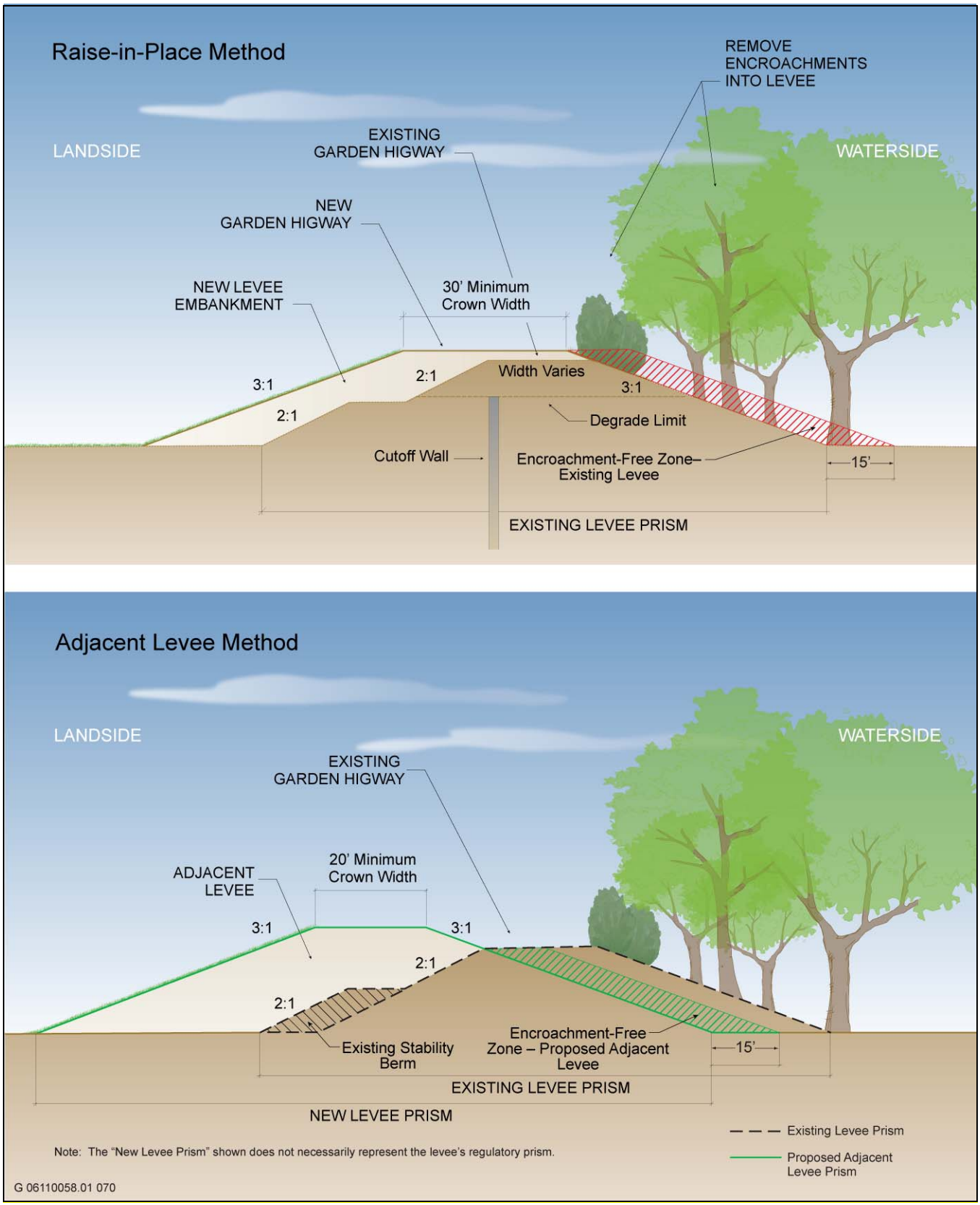
For this Phase 4a Project, a levee raise is possible, using either of two engineering design methods to meet flood protection criteria and be compatible with the engineering design for the Phase 2 and 3 Projects: raising the existing levees in their current alignments (**Plate 2-1**, upper illustration) or constructing a new larger levee adjacent to the existing levee (**Plate 2-1**, lower illustration). In all reaches, the final levee configuration would be designed to meet the USACE criteria of a 20-foot-wide minimum crown, a 3-to-1 horizontal-to-vertical (3H:1V) waterside slope, and a 3H:1V landside slope.

Raise-in-Place Method

Raising the levee in place would require the existing levee footprint to be widened at its base on one or both sides. While the levee footprint (its base) size may not be substantially altered, mitigation for loss of habitat would be required by various regulatory agencies. Where the widening results in filling waters of the United States, including wetlands, mitigation, generally at a 1:1 replacement ratio, would be required. Where the widening occurs on the landside or waterside and trees that provide habitat or are otherwise protected exist, the mitigation requirement is to plant replacement woodlands. In some instances, irrigation and drainage ditches and canals exist at the toe of the levee, and would require relocation. Widening of the existing levee may require the purchase of additional easements and/or rights-of-way, including areas for utilities and planting/replacement woodlands and other habitats. Proper construction of the widened levee may require excavation of a keyway trench in the foundation area at the toe of the levee.

Adjacent Levee (Preferred)

An adjacent levee is proposed in lieu of modifying the existing Sacramento River east levee, which has substantial structural and vegetation encroachments along its waterside (**Plates 1-6a** and **1-6b**). The adjacent levee raise would involve constructing a new landside embankment adjoining the Sacramento River east levee. The



Source: SAFCA 2007b

Alternative Methods for Increasing Levee Height **Plate 2-1**

concept of an adjacent levee is that the levee prism would be shifted landward (as shown in **Plate 2-1**, lower illustration), such that much of the vegetation on the waterside of the existing levee is less likely to need to be cleared for levee operation and maintenance. This design reduces vegetation removal on the waterside, but requires excavation of additional suitable material to build the adjacent structure. The irrigation and drainage ditches and canals that exist at the toe of the levee may require relocation farther to the landside. Construction of an adjacent levee may also require the purchase of additional easements and/or rights-of-way, including areas for utilities and planting of replacement woodlands and other habitats. Proper construction of the adjacent levee foundation often requires excavation of an inspection trench in the foundation soils. Because the Natomas Basin's natural levees have been augmented by human efforts, it is possible to find buried prehistoric features at considerable depth in the landside footprint. Where additional levee height is required, the adjacent levee height would be greater than that of the existing levee. Where additional levee height is not required, the adjacent levee height would be the same as the existing levee.

A trench, usually 6 feet deep and 12 feet wide at the base, is constructed at the base of the levee to allow visible inspection for shallow foundation conditions and the presence of buried utilities. In some instances, relocation of irrigation and drainage ditches and canals may be necessary to construct the inspection trench. In addition to the inspection trench, the landside toe of the existing levee, within the footprint of the new adjacent levee, would be stripped to a depth of approximately 1 foot to remove vegetative matter and topsoil material from the adjacent levee foundation.

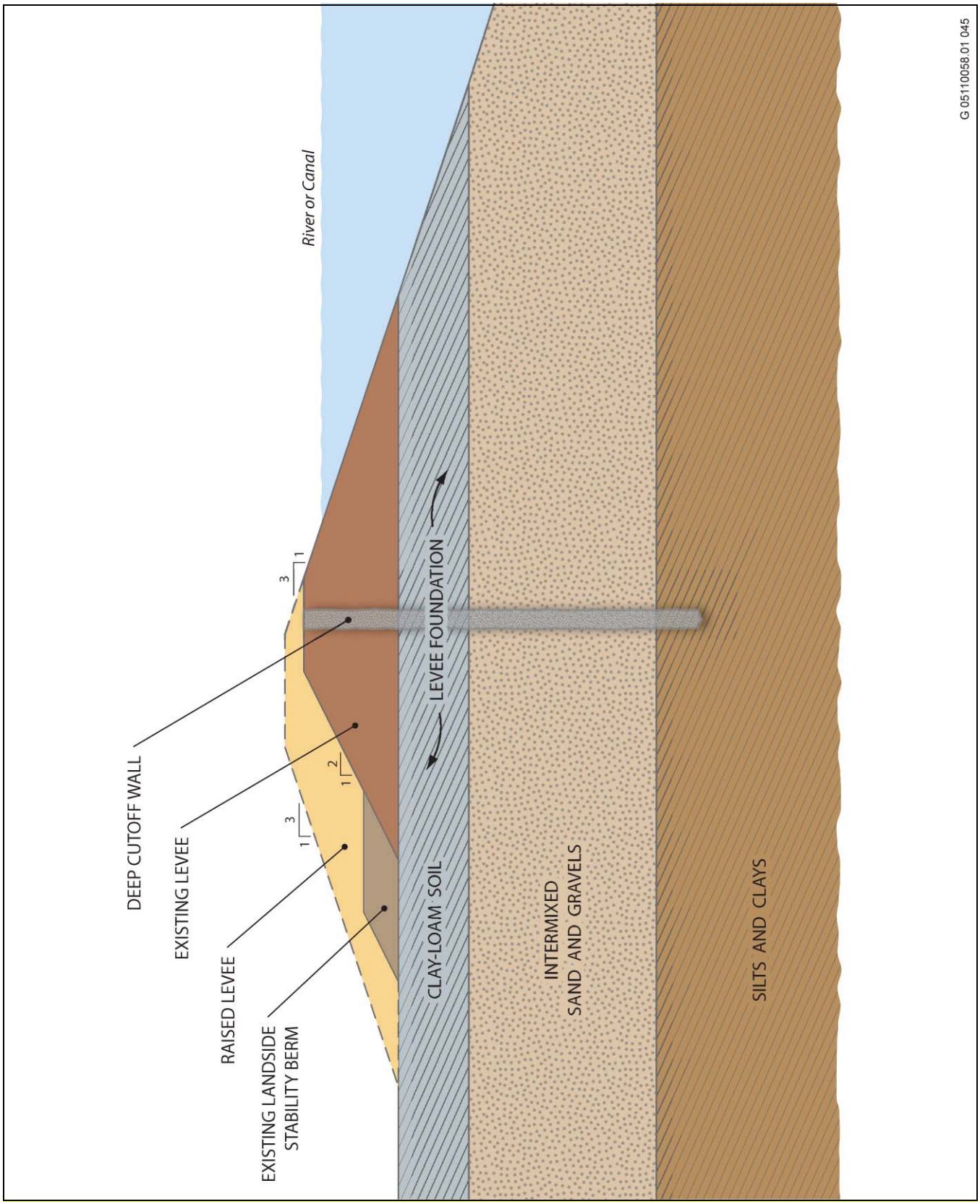
2.1.3.2 SEEPAGE REMEDIATION

Pre-NLIP existing seepage remediation in the Natomas Basin has primarily addressed through-seepage. Through-seepage is the movement of water through the levee itself, when high-flow conditions, and/or wind and wave action exist on the waterside of the levee. Through-seepage may be addressed by construction of cutoff walls through the levee prism or a drained stability berm on the landside slope. The cutoff walls provide a low-permeability barrier to water flow through the levee. Underseepage occurs below the levee prism, and is caused by the buildup of water pressure in the subsurface foundation soils, when high river stages are present on the waterside of the levees. This pressure can be great enough to force water through the earthen foundation layers under the levee. The water finds a pathway of less resistance and exits at the landside ground surface (**Plate 1-4**). Excessive underseepage gradients can be corrected through the use of cutoff walls, seepage berms, and relief wells, which are discussed below. Current construction methods can correct underseepage and be compatible with the underseepage improvement methods employed for Phase 2 and 3 Project construction.

Cutoff Walls

Cutoff walls use specialized earthen materials (often bentonite clay) that are installed into the center of the levee. Successful construction of cutoff walls often requires construction to continue 24 hours per day,7 days per week (24/7) so that the cutoff wall material keeps its proper consistency (see Section 2.3.1.1, "Sacramento River East Levee," for a detailed discussion of 24/7 construction of cutoff walls). Specialized equipment allows the cutoff walls to reach deep into the subsurface, to depths of 120 feet (**Plate 2-2**). Often the levee crown is "degraded," meaning that it is excavated to create a wide platform so that the construction equipment can install the cutoff wall. Of the three seepage remediation methods, fully penetrating cutoff walls are generally preferred because they are the least costly (particularly if a soil-bentonite mix is feasible and the depth of wall is less than 85 feet); are the most reliable under uncertain hydraulic and geotechnical conditions (e.g., water surface elevations above design and variations in foundation soil conditions); and, when combined with an adjacent levee, minimize construction disturbance outside the levee footprint.

Due to the long history of natural and human-enhanced levee buildup in the Natomas Basin, it is not unusual to find conditions of underseepage to depths greater than the maximum feasible construction depth of a cutoff wall. In those cases, a seepage berm and/or relief wells may be used to protect against underseepage.



Source: SAFCA 2007b

Typical Levee Raise, Flattening of Landside Levee Slope, and Seepage Cutoff Wall **Plate 2-2**

Seepage Berms

Seepage berms are wide, shallow features with relatively flat surface slopes graded to drain landward. They are typically constructed using material excavated from borrow sites. In some cases, a 1- to 1.5-foot-thick drainage layer consisting of sand or drainrock encapsulated in geotextile fabric is placed on the ground below the seepage berm. Seepage berms may extend up to 500 feet landside of the toe of the levee or the adjacent levee (**Plate 2-3**). In areas of limited space, seepage berms are constructed with relief wells at the landside toe of the seepage berms.

Constructing seepage berms rather than cutoff walls avoids the deep ground-disturbing work that may adversely affect cultural resources that may be present, while still achieving flood damage reduction objectives. It is possible to construct a seepage berm using specialized equipment that minimizes vibration and pressure on the immediate subsurface environment. This construction method is often used where sensitive historical features may be expected near the ground surface, and relief wells are omitted. A seepage berm without relief wells extends the levee footprint farther landside and depending upon adjacent land use, may require relocation of permanent structures or take affected agricultural land out of production, as well as other environmental impacts.

Relief Wells

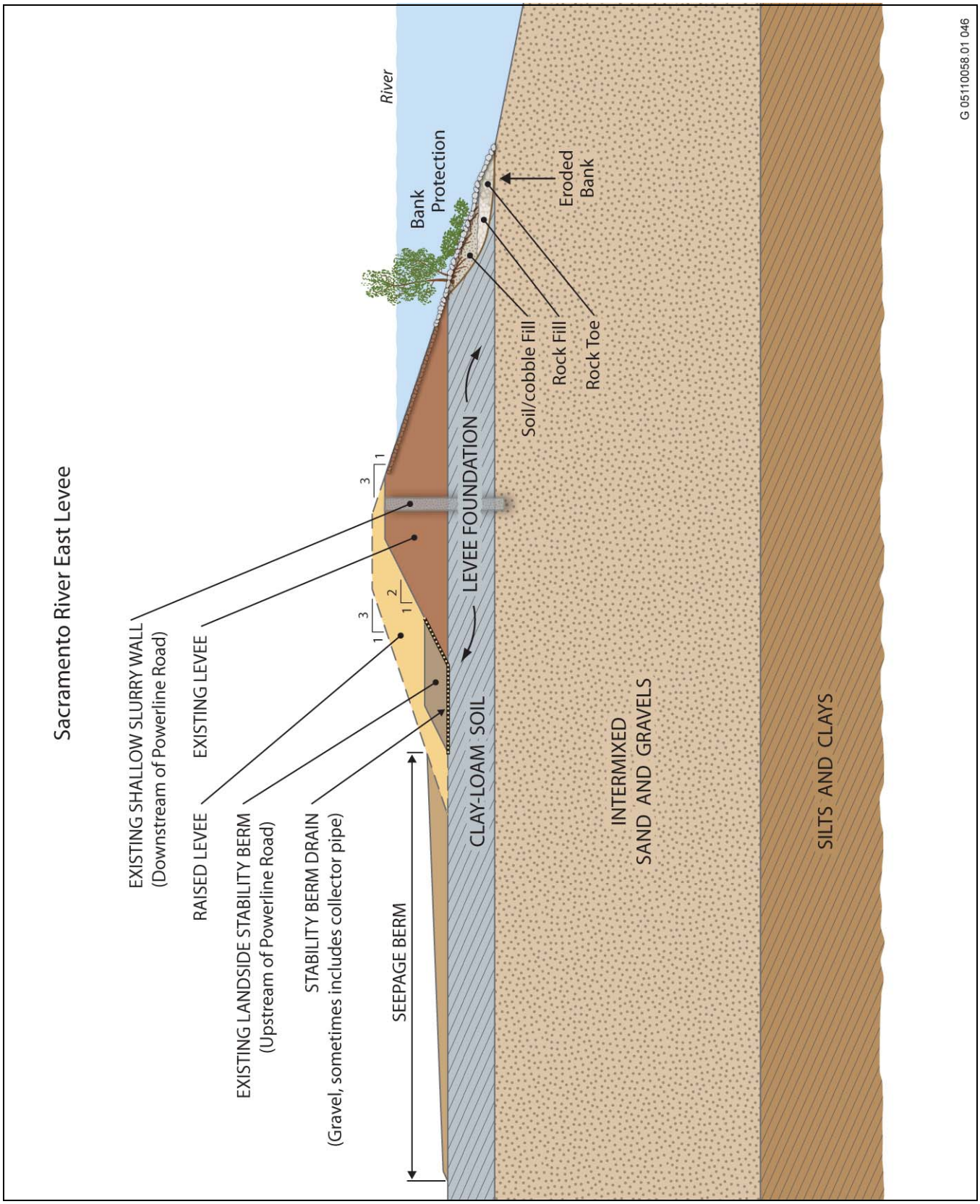
Relief wells are controlled artificial springs that relieve the confined water pressures to safe values. This reduces the potential for the removal of soil via piping or internal erosion caused by the uplift pressures beneath elements of the levee or beneath landward soil next to the levee. Relief wells are usually spaced about 50–150 feet apart to allow water to flow without pumping during times of high water table. Piezometers are used as a tool to verify relief well performance by measuring the hydrostatic pressure between the wells. Because relief wells may only flow on an intermittent basis sometimes several years apart, it is necessary to conduct regular maintenance of relief wells to ensure that they perform properly (**Plate 2-4**).

2.1.3.3 BANK EROSION

Bank erosion poses either a high or moderate risk to the stability of the Sacramento River east levee at several locations upstream and downstream of Interstate 5 (I-5) where river flows and waves generated by boat wakes have weakened and undercut portions of the bank supporting the levee. The adjacent levee design would address the potential instability created by these bank erosion processes by enlarging the levee section and moving the levee foundation landward away from the eroding bank. These bank erosion processes could also be addressed by installing rock rivetments or other engineered structures along the eroding banks so as to reduce further erosion and protect the foundation of the levee (as proposed for the RSLIP Alternative; see Section 2.4.1.1, “Sacramento River East Levee,” under “Riverbank Erosion Control”).

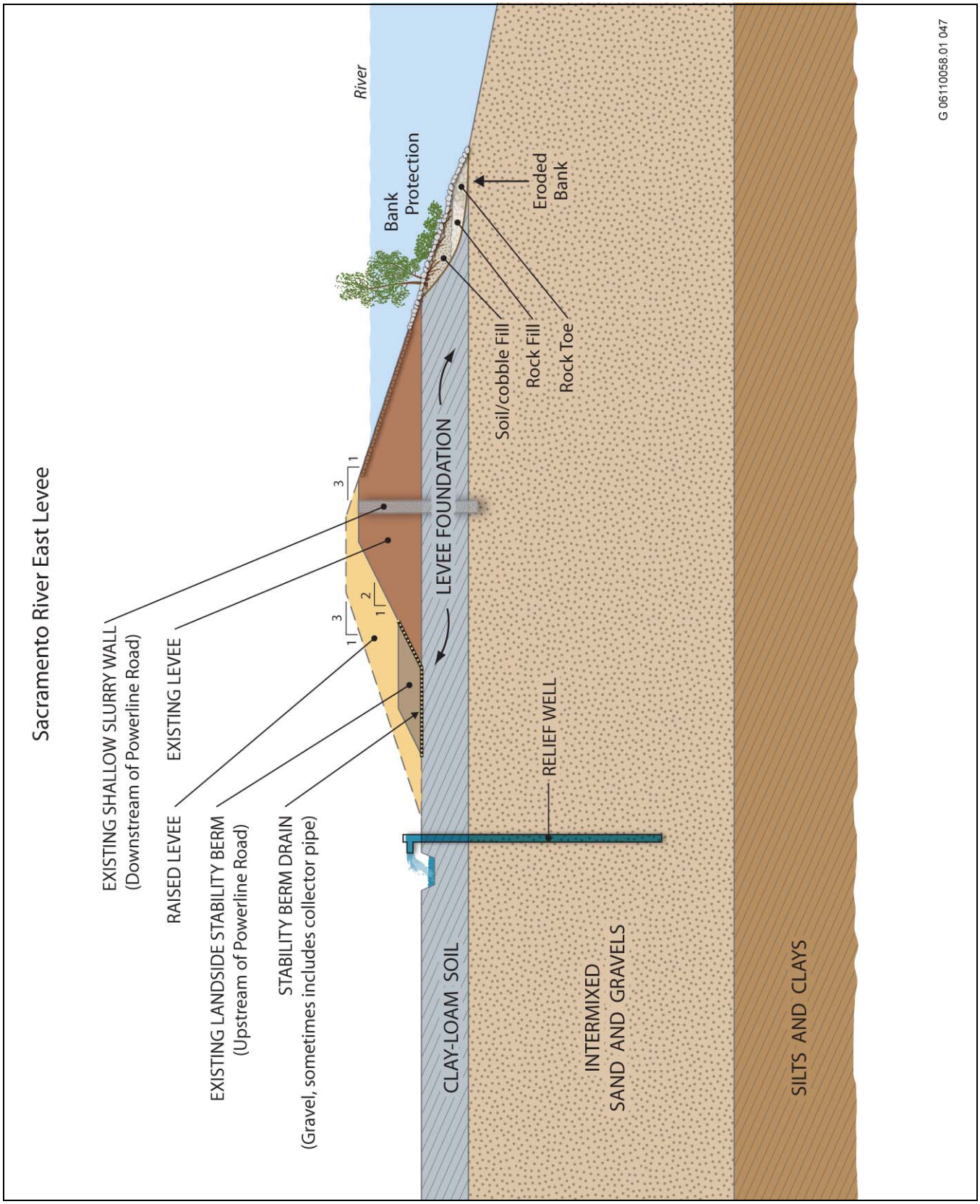
2.1.4 ALTERNATIVES CONSIDERED IN PREVIOUS ENVIRONMENTAL ANALYSES AND INCORPORATED BY REFERENCE

The analyses of alternatives performed in the previous environmental documents from which this EIS/EIR is tiered, which are listed below, are summarized in **Appendix B1**, “Alternatives Formulation and Screening Details.” The alternatives analyses from these documents are incorporated by reference, herein. The material summarized in **Appendix B1** is provided to summarize the scope of analysis that has already been performed and thus shows which alternatives have been eliminated from further analysis or rejected by previous agency decisions.



Source: SAFCA 2007b

Typical Seepage Berm **Plate 2-3**



Source: SAFCA 2007b

Typical Relief Well **Plate 2-4**

The alternatives analyses incorporated herein by reference are from the following environmental documents:

- *Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area*, State Clearinghouse No. 2006072098 (SAFCA 2007a) (Local Funding EIR);
- *Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project*, State Clearinghouse No. 2007062016 (SAFCA 2007b) (Phase 2 EIR);
- *Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project* (USACE 2008) (Phase 2 EIS);
- *Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project—Phase 2 Project*, State Clearinghouse No. 2007062016 (SAFCA 2009a) (Phase 2 SEIR); and
- *Draft Environmental Impact Statement/Draft Environmental Impact Report on the Natomas Levee Improvement Program, Phase 3 Landside Improvements Project*, State Clearinghouse No. 2008072060 (Phase 3 DEIS/DEIR) (USACE and SAFCA 2009).

Relevant portions of these documents, where specifically noted, are summarized throughout this EIS/EIR. Printed copies of these documents are available to the public at SAFCA's office at 1007 7th Street, 7th Floor, Sacramento, California, during normal business hours, and are also available on SAFCA's Web site, at http://www.safca.org/Programs_Natomas.html.

2.1.5 ALTERNATIVES CONSIDERED, BUT ELIMINATED FROM FURTHER CONSIDERATION

Numerous alternatives have been considered by USACE and SAFCA to reduce flood risk in the Natomas Basin. These alternatives were evaluated and eliminated from further consideration during completion of previous environmental documents. This section briefly summarizes alternatives considered but eliminated in these documents. More detailed information on alternatives considered but eliminated is provided in **Appendix B1**, "Alternatives Formulation and Screening Details."

2.1.5.1 ALTERNATIVES EVALUATED AND ELIMINATED IN PREVIOUS NATOMAS LEVEE IMPROVEMENT PROGRAM ENVIRONMENTAL DOCUMENTS

The following alternatives were reviewed and eliminated from further consideration as described below:

- **Yolo Bypass Improvements.** This measure would involve lengthening the Fremont Weir and widening the Yolo Bypass to increase the amount of flood water conveyed through the bypass and reduce the amount of flood water conveyed through the Sacramento River channel downstream of the weir. This alternative was eliminated because (1) it would be too costly for SAFCA to implement; (2) levee height increases and substantial seepage and slope stability remediation would still be required for the Natomas perimeter levee system, adding to costs; (3) these improvements lie outside of SAFCA's jurisdiction and would require Federal, State, and local cooperation and funding; and (4) the project objective of restoring 100-year flood protection to the Natomas Basin could not be achieved as quickly as possible. (Considered and eliminated in Phase 2 EIS.)
- **Reduced Natomas Urban Levee Perimeter.** This measure would involve construction of a cross levee running east to west across the Natomas Basin along an alignment north of Elkhorn Boulevard to protect existing developed areas in the City and County of Sacramento. This alternative was eliminated because (1) it

is inconsistent with current Federal and State authorizations and would strand Federal, State, and local investments already made in improving the Natomas Cross Canal (NCC) south levee and Sacramento River east levee pursuant to past Congressional authorization; (2) it would result in the need to raise State Route (SR) 99/70 or otherwise protect SR 99/70 from flooding; (3) it would divide Reclamation District (RD) 1000 and disrupt several portions of the Natomas Basin irrigation and drainage system and require reconfiguration of these systems; (4) it would present significant barriers to achieving the goals of the *Natomas Basin Habitat Conservation Plan* (NBHCP); (5) it would have substantially greater costs than other alternatives without achieving any additional flood damage reduction benefit; and (6) it would leave a portion of the Basin currently planned for development by Sutter County (i.e., *Sutter Pointe Specific Plan* mixed-use development project) outside the urban levee perimeter and likely cause Sutter County to exercise its rights under SAFCA's joint exercise of powers agreement to prevent the expenditure of Consolidated Capital Assessment District funds on this measure. (Considered and eliminated in Local Funding EIR and Phase 2 EIS.)

- **Construction of a New Setback Levee.** This alternative would involve construction of a 5-mile-long levee along the northern reaches of the Sacramento River east levee parallel to the existing levee alignment but set back from the existing alignment by 500–1,000 feet. This alternative was eliminated because it is infeasible because of (1) the presence of waterside residences along the existing levee from the southern end of Reach 2 of the Sacramento River east levee in the north to the American River north levee in the south, and the need to maintain access to these residences from Garden Highway; (2) the proximity of the Sacramento River east levee to the Airport, and the need to prevent project features from increasing potential hazards to aviation safety; and (3) the possibility that utility relocations (power poles) and flood damage reduction measures could encroach into surface slopes of runway approach zones. (Considered and eliminated in Phase 2 EIR and Phase 2 EIS.)

- **Raise Levee in Place with a 1,000-Foot Levee Setback in the Upper 1.4 Miles along the Sacramento River East Levee.** This alternative would have provided a location for a substantial amount of tree planting on the waterside of the setback levee, contributing to the offsetting mitigation for the loss of the trees that may need to be removed along the existing levee to meet USACE criteria. This alternative was eliminated because it was unlikely that the new setback levee would provide 100-year flood protection per USACE criteria. (Considered and eliminated in Phase 2 EIR and analyzed, but not selected as the Proposed Action, in Phase 2 EIS.)

- **Construct an Adjacent Setback Levee with a 500-Foot Levee Setback in the Upper 1.4 Miles along the Sacramento River East Levee.** This alternative was evaluated because it would provide the opportunity for partially offsetting the loss of landside tree groves through the establishment of new riparian plantings in the levee setback area as well as woodland plantings on the landside of the adjacent setback levee. This alternative was eliminated because it would require substantially greater quantities of borrow material with greater impacts on important farmland and transportation and circulation. (Considered and eliminated in Phase 2 EIR and analyzed, but not selected as the Proposed Action, in Phase 2 EIS.)

- **No SAFCA Levee Improvements—Private Levees in Natomas.** This alternative was analyzed assuming that there would be no SAFCA project providing flood protection in the Basin, thus causing private developers to separately fund and implement individual flood protection in the form of private compartment levees that would protect new developments. This alternative was eliminated because it would (1) only partially meet the objective of providing 100-year flood protection, (2) potentially lead to increased fragmentation of habitat for special-status species, and (3) increase projected flood damages without a commensurate reduction in flood risk. (Considered and eliminated in Local Funding EIR and Phase 2 EIR; the effects of this alternative are summarized in **Appendix B1**.)

- **Natomas 100-Year Protection.** SAFCA analyzed the impacts associated with creation of one new assessment district, which would provide only 100-year flood protection to the Natomas Basin, and which would use funding raised through existing Capital Assessment District Number 3 to provide the local share of

the cost of completing improvements to provide 100-year flood protection to the lower American River and South Sacramento Streams Group areas (SAFCA 2007a). This alternative was eliminated because it would fail to provide groundwork for the creation of 200-year protection over time (SAFCA 2007a). Because this alternative represents an alternative to the proposed funding mechanisms and not an alternative to the proposed levee improvements, this alternative was not considered to be an alternative to the Phase 2 Project and was not included in the Phase 2 EIS. (Considered and eliminated in Local Funding EIR.)

2.1.5.2 ALTERNATIVES EVALUATED AND ELIMINATED IN THE PHASE 2 EIS AND PHASE 3 DEIS/DEIR

The following additional alternatives were evaluated and eliminated from further consideration either in the Phase 2 EIS (No-Action Alternative—Airport Compartment Levee) or in the Phase 3 DEIS/DEIR (Cultural Resources Impact Reduction Alternative):

- **No-Action Alternative—Airport Compartment Levee.** The Phase 2 EIS evaluated and eliminated from further consideration the No-Action Alternative—Airport Compartment Levee. The prior discussion, which is hereby incorporated by reference, is summarized as follows (see also **Appendix B1**, for a summary of the impacts associated with the Airport Compartment Levee).With no authorization of the Phase 2 Project, SAFCA would not be able to provide the Natomas Basin with at least a 100-year level of flood protection by the end of 2011 and would not be able to facilitate achieving a 200-year level of protection by the end of 2012. Federal and State floodplain regulations would prevent new development in most of the Natomas Basin. Either the Airport would be compelled to operate within its existing footprint, abandoning its current plans for modernization and expansion, or, alternatively, the Airport may construct its own limited flood damage reduction structure (i.e., a ring levee) to protect existing facilities and its expansion area. This alternative was eliminated because (1) construction of a separate levee around the Airport would be under the responsibility and jurisdiction of another agency (Sacramento County Airport System [SCAS]), over which SAFCA would have no jurisdiction, and would require a lengthy process that is completely separate from the Proposed Action; (2) the timeline for that process is unknown and there are no design plans that would enable an accurate evaluation of potential environmental impacts; and (3) the action would require SCAS to prepare a separate CEQA and potentially NEPA environmental process and analysis. (Considered and eliminated in Phase 2 EIR and Phase 2 EIS.)

  In addition to the reasons provided in the Phase 2 EIS, design plans are not available for this alternative, thus preventing USACE and SAFCA from accurately evaluating its potential impacts; implementation of the Airport Compartment Levee would not meet any of the goals and objectives of the project; the residents, residences, and businesses within the Natomas Basin would not receive flood protection; implementation of the Airport Compartment Levee would only protect the Airport; and SCAS has not proposed such a project and, therefore, it is not considered a reasonable alternative.

- **Cultural Resources Impact Reduction Alternative.** The Phase 3 Project Proposed Action includes construction of deep cutoff walls in Sacramento River east levee Reaches 5A–9B, which have the potential to result in significant and unavoidable impacts on known prehistoric resources, previously unidentified cultural resources, and human remains. Construction of a 500-foot-wide seepage berm rather than deep cutoff walls would avoid the deep ground-disturbing work that may adversely affect potential cultural resources, while still achieving flood damage reduction objectives. This alternative was eliminated because of the intensity and severity of environmental impacts associated with construction, including the temporary closure, disruption, and redesign of all or portions of the Teal Bend Golf Club. This alternative would have resulted in impacts on ten environmental topic areas (hydrology and hydraulics, sensitive aquatic habitats, vegetation and wildlife, special-status terrestrial species, paleontological resources, transportation and circulation, air quality, visual resources, recreation, utilities and service systems, and hazards and hazardous materials) that would be potentially more substantial than those associated with the Proposed Action; and there would be a net increase in the number, intensity, and severity of environmental impacts relative to the Proposed Action. (Considered

and eliminated in Phase 3 DEIS/DEIR.) See **Appendix B1**, for analyses of each specific environmental issue area.

Although this alternative was eliminated in the Phase 3 DEIS/DEIR as an alternative to the Phase 3 Project Proposed Action, 500-foot-wide seepage berms are being analyzed in this EIS/EIR as part of the Phase 4a Project Proposed Action to represent the worst-case scenario (see Section 2.3.1) for the following reasons:

- it is anticipated that at least one very large cultural site may require avoidance (CA-Sac-16/H), and
- additional previously undiscovered cultural resource sites may be present (surveys are ongoing).

The locations and widths of the seepage berms would be determined during final engineering design. Overall impacts of using seepage berms on resources and potential effects on residences, heritage oak trees, or other sensitive resources would be taken into consideration during this process. SAFCA would employ measures to minimize the Phase 4a Project footprint to avoid these resources to the extent feasible given levee design and seepage-remediation performance requirements.

2.1.6 ALTERNATIVES CARRIED FORWARD FOR EVALUATION IN THIS EIS/EIR

The following Phase 4a Project alternatives were carried forward for detailed analysis in this EIS/EIR:

- **No-Action Alternative**—Under NEPA, the expected future without-project conditions; under CEQA, the existing condition at the time the notice of preparation was published (March 27, 2009), and what would be reasonably expected to occur in the foreseeable future (two scenarios) if the Phase 4a Project were not approved.

- **Proposed Action**—An adjacent levee would be constructed along the Sacramento River east levee, raised in Reaches 10–11B and at the same height as the existing levee in Reaches 12–15; and, where required, cutoff walls, seepage berms, and relief wells would be installed for seepage remediation. A cutoff wall would be installed for additional seepage remediation in Reach 4B. In two locations, the NCC south levee would be raised, a cutoff wall would be installed, and existing pumps would be modified or replaced to reflect raising the discharge pipes above the 200-year design flood elevation. The Riverside Canal would be relocated and extended. Parcels within the Fisherman's Lake Borrow Area would be used as the primary source of soil borrow for Phase 4a Project construction; those parcels excavated for borrow material would be reclaimed as agricultural land, grassland, or managed marsh depending on their location and existing land use. Wells would be constructed to provide a water supply for habitat features.

- **RSLIP Alternative**—The Sacramento River east levee would be raised in place in Reaches 10–12 and strengthened in place in Reaches 12–15 and seepage remediation and erosion control measures would be implemented. The RSLIP Alternative would be the same as described for the Proposed Action except for the method of levee raising and rehabilitation, the extent of levee degrade to construct cutoff walls, and extent of encroachment removal along the Sacramento River east levee.

The above three alternatives are described in detail in the remaining portions of this chapter. The Proposed Action and the RSLIP Alternative were developed for consideration with a focus on improvements to the Sacramento River east levee (Reaches 10–15). Phase 4a Project improvements to the NCC south levee, relocation and extension of the Riverside Canal, and modifications to the landscape and irrigation/drainage system would be similar under the Proposed Action and the RSLIP Alternative.

As noted above, the Proposed Action and the RSLIP Alternative would use differing methods to achieve the required levee height increases along the Sacramento River east levee for flood damage reduction. Therefore, the differences between the Proposed Action and the RSLIP Alternative, including effects on habitats, are the result of these differences in design of the Sacramento River east levee.

2.2 NO-ACTION ALTERNATIVE

2.2.1 NO-ACTION ALTERNATIVE—NO FLOOD DAMAGE REDUCTION MEASURES

For the purposes of NEPA compliance, the No-Action Alternative serves as the baseline against which the impacts and benefits of the action alternatives are evaluated. The No-Action Alternative consists of the conditions that would be reasonably expected to occur in the foreseeable future if no additional permissions to alter the existing levees or discharge dredged or fill material into waters of the United States are granted.

Under the No-Action Alternative, SAFCA would not receive permission or permits from USACE to undertake the Phase 4a Project under Section 408, 404, or 10. However, given the known deficiencies in the Natomas Basin perimeter levee system and its inclusion as part of the Federal flood damage reduction system, it can be assumed that USACE and/or the State of California would repair the Natomas levee system at some time in the future to meet the Federal and/or State flood risk reduction objectives associated with the Federal flood damage reduction system. As discussed in Section 1.3.10, "General Re-evaluation of the Common Features Project," USACE is preparing a General Re-evaluation Report (GRR) on the Common Features Project, including Natomas Basin levee improvements, that is expected to be presented to Congress in 2010. The earliest that Federal construction under a Congressionally reauthorized USACE project could begin would be 2011 or 2012. Therefore, it is assumed that USACE and/or the State of California would begin repairs on the Natomas Basin levee system in 2011 at the earliest and would complete the improvements providing 100-year flood protection no sooner than 2013.

Based on the criteria that SAFCA, in coordination with USACE and the State, has used to select alternatives for detailed analysis, it is reasonable to assume that one of the two action alternatives described below (the Proposed Action and the RSLIP Alternative) would be implemented by USACE and/or the State and that the environmental effects of project construction would be the same as, or very similar to, those of the action alternatives evaluated in this EIS/EIR. In the period before implementation of flood damage reduction measures for the Natomas Basin, however, there would remain a high potential for a major levee failure and flooding of the Natomas Basin. (USACE evaluation of geotechnical information and other data indicate that a future flood event with an approximately 3% or greater probability of occurring in any year could cause a major levee failure.)

Therefore, the No-Action Alternative analyzed in this EIS/EIR consists of two scenarios: No Project Construction and Potential Levee Failure. "No Project Construction" refers to the impacts that would result because no flood damage reduction measures would be constructed as part of the NLIP. "Potential Levee Failure" refers to the impacts that could occur if the Natomas Basin perimeter levee system failed. These two components of the No-Action Alternative are further described below and the analysis contained in Chapter 4.0, "Environmental Consequences and Mitigation Measures," is presented using these subheadings.

2.2.1.1 NO PROJECT CONSTRUCTION

The No-Action Alternative in this scenario consists of the conditions that would likely prevail in the Natomas Basin if no action at all were taken by SAFCA, the State, or USACE to further improve the Basin's perimeter levee system beyond the accomplishments of the Sacramento Urban Levee Reconstruction Project, the North Area Local Project and the NLIP Phase 1, 2, and 3 Projects. Under this scenario, key segments of this system would continue to provide less than 100-year flood protection, and the entire Natomas Basin would be permanently designated as a FEMA special flood hazard area subject to development restrictions and mandatory flood insurance requirements pursuant to the regulations of the National Flood Insurance Program. SAFCA would not provide the Natomas Basin with at least a 100-year level of flood protection by the end of 2010 and would not be able to facilitate achieving a 200-year level of protection by the end of 2012.

To meet USACE requirements as described in *Guidelines for Landscape Planting and Vegetation Management at Floodwalls, Levees, and Embankment Dams* (USACE 2000), a substantial number of structural features may need

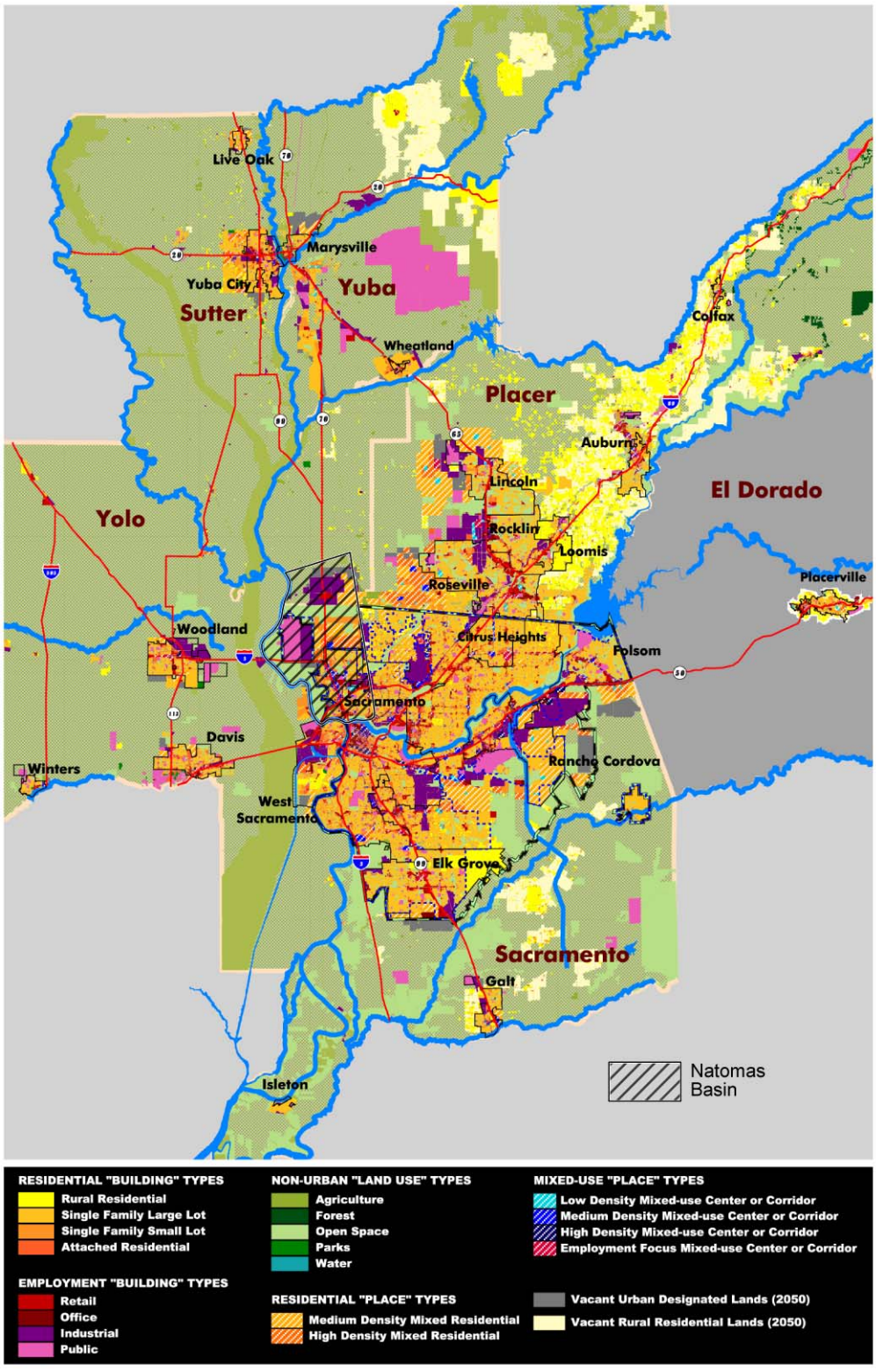
to be removed from the waterside of the existing levees. As part of its ongoing operations and maintenance (O&M) activities, RD 1000 would be initially responsible for removal of any encroachments that would threaten levee integrity. Without construction of an adjacent levee, approximately 21 acres of vegetation within the Phase 4a Project footprint would require removal, under the worst-case scenario. Chapter 4.0, "Environmental Consequences and Mitigation Measures," discusses the impacts related to the No-Action Alternative; however, it is not appropriate in this EIS/EIR to propose mitigation measures for the No-Action Alternative because SAFCA, as the project proponent, has no authority or jurisdiction over USACE's proposed guidelines, impacts, or timing, or over implementation of mitigation for impacts caused by USACE's implementation of such guidance. Mitigation implementation would be considered part of levee maintenance and would be the subject of a future, separate environmental document. Environmental permits and other regulatory approvals would also be required, which may include a California Fish and Game Code Section 1602 Streambed Alteration Agreement, Clean Water Act Section 401 permit, and/or Clean Water Act Section 404 permit.

Without improvements, Federal and State floodplain regulations would effectively prevent most new development in most of the Natomas Basin. Existing residential, commercial, and industrial development would continue to be concentrated in the southeastern portion of the Basin, south of Elkhorn Boulevard, occupying approximately one-third of the 53,000 acres encompassed by the perimeter levee system. Approximately two-thirds of the Basin, generally north of Elkhorn Boulevard, would remain in some form of agricultural, agricultural support, or open space use along with Airport uses. The Airport may be compelled to operate within its existing footprint, abandoning its current plans for modernization and expansion; alternatively, the Airport may construct its own limited flood damage reduction structure (i.e., a ring levee) to protect existing facilities and its expansion area. As of December 31, 2007, all agricultural leases on Airport property expired and have not been renewed. Some new development could occur along the eastern fringe of the basin where existing high ground could support new structures elevated above the 100-year base flood elevation. The special flood hazard designation in the Natomas Basin would interrupt the regional blueprint for future (2030) growth adopted by the Sacramento Area Council of Governments and Valley Vision in 2006 (**Plate 2-5**). Up to 60,000 dwelling units and associated commercial and industrial developments that the blueprint anticipates will be located in the Natomas Basin would be need to be redirected to other areas in the region over the next two decades. The Basin's existing residential, commercial, and industrial structures and their contents, with a replacement value of approximately $8.2 billion, or approximately $7.2 billion if the Airport facilities are excluded, would remain subject to a relatively high risk of flooding. The risk of environmental damage resulting from flooding in the urbanized portion of the Basin would remain relatively high.

2.2.1.2 POTENTIAL LEVEE FAILURE

The same conditions with respect to development within the Natomas Basin, as described above for the No Project Construction scenario, would exist for the Potential Levee Failure scenario. Without additional improvements to the Natomas perimeter levee system, wind and wave run-up or seepage conditions could cause portions of this system to fail, triggering widespread flooding and extensive damage to the Basin's existing residential, commercial, agricultural, and industrial structures. Extensive damage to utilities, roadways, and other infrastructure systems would also likely occur. According to the Sacramento County Department of Water Resources, a levee failure could result in nearly complete inundation of the Basin with water level depths that could average 10 to 20 feet, and potentially reach over 30 feet in some areas (Sacramento County Department of Water Resources 2008); however, the magnitude of the flood damage would depend upon the location of the levee breach, severity of the storm, and river flows at the time of a potential levee failure (Sacramento County Department of Water Resources 2009).

Because impacts associated with a potential levee failure are largely unknown and would depend on the location and extent of flooding, many of these potential impacts are considered too speculative for meaningful consideration. A general, qualitative discussion of the likely impacts is nonetheless provided in this EIS/EIR.



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Source: SACOG 2004

SACOG Preferred Blueprint Scenario Map **Plate 2-5**

2.2.2 NO-ACTION ALTERNATIVE—IMPLEMENTATION OF NATOMAS LEVEE IMPROVEMENT PROGRAM PHASE 1, 2, AND 3 PROJECTS ONLY

Under this alternative, it is assumed that USACE has authorized construction of the Phase 1 and 2 Projects and a portion of the Phase 3 Project[1] only, which each have independent utility from the Phase 4a Project. The Phase 4a Project would not be approved by USACE or SAFCA. Under this alternative, the following Phase 1, 2, and 3 Project activities would occur:

- **NCC south levee improvements: Seepage remediation**—Construct a seepage cutoff wall along the centerline of the NCC south levee in Reaches 1–3 (to overlap the Sacramento River east levee by approximately 500 feet) and reconstruct the levee.

- **NCC south levee improvements: Levee raising and seepage remediation**—Raise and realign the NCC south levee to provide additional height and more stable waterside and landside slopes, and to reduce the need to remove waterside vegetation. Construct seepage cutoff walls through the levee crown in Reaches 3–7.

- **Sacramento River east levee Reaches 1–4B: Levee raising and seepage remediation**—Construct an adjacent levee from the NCC to the end of Reach 4B, raised where needed to provide adequate height. Use a combination of cutoff walls, seepage berms, and relief wells for seepage remediation where required.

- **Sacramento River east levee Reaches 5A–9B: Levee raising and seepage remediation**—Construct a raised adjacent levee from just north of Elverta Road to just south of I-5. Use cutoff walls, seepage berms, and relief wells where required to reduce seepage potential. Acquire additional land in Reach 9B to maintain a 450-foot protection corridor to prevent land uses that would be incompatible with proposed levee improvements.

- **Pleasant Grove Creek Canal (PGCC) west levee: Levee raising, slope flattening, and widening, and seepage remediation**—Raise the existing levee between Howsley Road and Sankey Road, flatten and widen the levee slopes, and construct cutoff walls or seepage berms to reduce seepage potential.

- **Natomas East Main Drainage Canal (NEMDC) west levee from Elkhorn Boulevard to NEMDC Stormwater Pumping Station: Levee widening and flattening and seepage remediation**—Widen and flatten the slopes of the existing levee and construct a cutoff wall to reduce seepage potential.

- **NEMDC west levee from NEMDC Stormwater Pumping Station to Northgate Boulevard: Seepage and slope stability remediation**—Construct a cutoff wall in the existing levee and/or reconstruct portions of the levee where required to reduce seepage potential and slope instability.

- **Relocation of the Elkhorn Canal (highline irrigation canal) between the North Drainage Canal and Elkhorn Reservoir**—Relocate approximately 10,500 feet of the canal and construct the relocated canal several hundred feet east of the landside toe of the Sacramento River east levee in Reaches 4B–6A.

- **Relocation of portions of the Elkhorn Canal downstream of Elkhorn Reservoir**—Pipe approximately 9,400 feet of the canal between the new adjacent levee and Teal Bend Golf Club in Reaches 6B and 7, and in an area adjacent to the landside residential properties in Reach 8; and reconstruct the canal parallel to the adjacent levee at a distance of approximately 200 feet from the levee in Reaches 7–9A.

- **Construction of a new Giant Garter Snake (GGS)/Drainage Canal between the North Drainage Canal and Elkhorn Reservoir**—Construct a new canal designed to provide drainage and associated giant garter

[1] The Phase 3 Project Section 404 permit has been separated into three subphases (a, b, and c), and USACE will consider these permit applications separately.

snake habitat (referred to as the "GGS/Drainage Canal") from the North Drainage Canal to the slough east of Elkhorn Reservoir in Reaches 4B–6B.

- **Construction of a new GGS/Drainage Canal downstream of Elkhorn Reservoir**—Construct a new canal designed to provide drainage and associated giant garter snake habitat (GGS/Drainage Canal) between Elkhorn Reservoir and the West Drainage Canal at I-5.

- **Removal of a deep culvert at the location of Pumping Plant No. 2**—Excavate and remove approximately 400 feet of the existing levee section adjacent to the RD 1000 Pumping Plant No. 2 site to expose a deep culvert and possible voids under the levee; remove the deep culvert; reconstruct the levee adjacent to the pumping plant's sump with levee embankment fill; and demolish, remove, and relocate the remnants of the pumping plant within the project footprint.

- **Habitat creation and management**—Establish habitat features for giant garter snake in the new GGS/ Drainage Canal. Recontour and create managed marsh and grassland on lands used as borrow sources to offset project effects on giant garter snake and Swainson's hawk habitats. Establish grassland on the slopes of the adjacent levee and seepage berms. Install woodland plantings to offset the loss of portions of tree groves within the landside levee footprint.

- **Infrastructure relocation and realignment**—Realign and relocate irrigation and drainage canals and other infrastructure, such as utility poles, as needed to accommodate the flood damage reduction measures.

- **Removal of landside vegetation**—In Reaches 10–12A of the Sacramento River east levee, clear landside vegetation in a 670-foot-wide corridor to prepare for future flood damage reduction work.

- **Encroachment management**—Remove encroachments as required to meet the criteria of USACE, the Central Valley Flood Protection Board (CVFPB), and FEMA.

- **Reclamation of borrow sites**—Excavate earthen material at the borrow sites, then return the sites to preconstruction uses or suitable replacement habitat.

- **Reconfiguration of Airport West Ditch**—Modify irrigation distribution and agricultural drainage systems and infrastructure to allow for dewatering of the Airport West Ditch.

- **Acquisition of right-of-way**—Acquire right-of-way through fee title or easement interest within the footprint of the project features and at the borrow sites, and prevent encroachments into the flood damage reduction system.

The environmental impacts of the Phase 1 Project are addressed in detail in the Local Funding EIR; the environmental impacts of the Phase 2 Project are addressed in detail in the Phase 2 EIR, Phase 2 SEIR, and Phase 2 EIS; and the environmental impacts of the Phase 3 Project are addressed in detail in the Phase 3 DEIS/DEIR. The environmental impacts of the Phase 2 and 3 Projects are summarized in **Table 2-1**.

The No-Action Alternative, assuming implementation of the NLIP Phase 1, 2, and 3 Projects only, is an unlikely long-term alternative for the Natomas Basin because the Basin would still face elevated risks from lack of 100-year flood protection, and those risks would be further reduced by the Phase 4a Project. Although the Phase 1, 2, and 3 Projects would provide reduced flood risk, it would still be less than 100-year flood damage reduction. Therefore, the Phase 1, 2, and 3 Projects by themselves would not achieve the overall project purpose and project objectives.

Table 2-1
Summary of the Impacts of the Phase 2 and 3 Projects

Issue Area	Summary of Environmental Impact
Agricultural Resources	**Phase 2 Project**
	Important Farmland would be converted for maintenance activities and encroachment prevention associated with widening the landside footprint of the NCC south levee and associated maintenance access corridor, which would substantially widen the Sacramento River east levee's flood damage reduction facilities. Soil borrow sites for the improvements include the Brookfield site and the RD 1001 site. Borrow material for the Sacramento River east levee improvements would come from the Airport north bufferlands sites, the Dunmore site, or potentially the Sutter Pointe site. These borrow sites are in areas classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Except at the RD 1001 site, removing borrow from borrow sites would entail preserving and replacing the topsoil on these parcels, thus retaining their potential use for agriculture. Therefore, conversion to nonagricultural uses of nearly all agricultural sites used for borrow would not be permanent. If the RD 1001 borrow site is used, is it assumed that the conversion from agricultural use and the loss of Important Farmland would be permanent.
	Phase 3 Project
	Additional Important Farmland would be permanently converted to nonagricultural use for widening of the Sacramento River east levee, the PGCC levee improvements, and creation of marsh, grassland, and woodland habitat to compensate for habitat removed. Permanent conversion of Important Farmland would take place on the Lower Woodland and RD 1001 borrow sites. All other borrow sites would be reclaimed and returned to agricultural uses. Williamson Act contracts would be terminated on land acquired in Reach 9B and on the Elkhorn Canal alignment.
Land Use and Socioeconomics	**Phase 2 and 3 Projects**
	The project would be consistent with Policy B.10 of the City of Sacramento General Plan because it would reduce flood risk in accordance with Resource Protection Policy B.10, which states: "The City shall seek to minimize or avoid adverse impacts to historic and cultural resources from natural disasters. To this end, the City shall promote seismic safety, flood protection, and other building programs that preserve, enhance, and protect these resources." Portions of the levee improvement footprint would overlap parts of the Airport's Critical Zone. The flood damage reduction improvements would not modify intended land uses within those areas, nor would they include components such as the creation of water features that could attract waterfowl, thereby introducing hazards into the Critical Zone. The improvements also would not conflict with implementation of the adopted Airport master plan, Airport land use compatibility plan, or Airport wildlife hazard management plans.
Geology and Soils	**Phase 2 and 3 Projects**
	Borrow activities and levee improvement construction activities would temporarily disturb soil and could expose disturbed areas to erosion caused by wind or by winter or early-season rainfall events. Wind or rainfall of sufficient intensity could dislodge soil particles from the soil surface. Once particles are dislodged, substantial localized erosion could occur. Project activities are required to comply with standard best management practices.
Hydrology and Hydraulics	**Phase 2 and 3 Projects**
	Implementation of the project would not measurably alter water surface elevations in the project area except in the most extreme circumstances (i.e., a 200-year [0.5% AEP] or 500-year [0.2% AEP] flood with no upstream levee failures despite 100 miles of levee overtopping in areas upstream of the Natomas Basin). The action alternatives would not change the existing geometry of the channels surrounding the Natomas Basin; therefore, they would not cause substantial changes to water flow in these channels, or cause adverse hydraulic effects upstream or downstream of the project area during peak flows. The borrow sites that would be used in Phase 2 Project construction would be 3–5 feet lower after the conclusion of borrow operations. These sites would be regraded and either developed as grassland or returned to rice cultivation. Because specific plans have not been finalized to ensure uninterrupted conveyance of drainage, there is the potential for construction activities to temporarily or permanently alter the existing drainage pattern of the project area. Project engineers would coordinate with owners and operators of local drainage systems to evaluate

Table 2-1
Summary of the Impacts of the Phase 2 and 3 Projects

Issue Area	Summary of Environmental Impact
	preproject and postproject drainage needs to remediate any substantial project-related drainage disruption. Drainage from these sites would be routed to the existing drainage system for these lands. The presence of cutoff walls could restrict the movement of groundwater in either direction (away from or toward the NCC or Sacramento River). Potential consequences are increases or decreases in the water levels in shallower wells and/or localized near-surface groundwater levels in areas immediately east and west of the cutoff wall.
Water Quality	**Phase 2 and 3 Projects**
	Levee improvement activities have the potential to result in both short-term and long-term water quality effects from runoff and sedimentation. Potentially affected waterways include the NCC, Morrison Canal near the NCC south levee, the PGCC, the NEMDC, the North Drainage Canal, the West Drainage Canal, the Riverside Canal, and the Elkhorn Canal. Extensive ground-disturbing activities near these local drainages and waterways could potentially cause the waterways to become contaminated by soil or construction substances. Excavated areas that fill with groundwater or surface drainage during project construction would require dewatering. Effluent from dewatering operations typically contains high levels of suspended sediment and often high levels of petroleum products and other construction-related contaminants. To mitigate potential impacts on water quality, SAFCA shall file a notice of intent to discharge stormwater associated with construction activity with the Central Valley Regional Water Quality Control Board. Final design and construction specifications shall require the implementation of standard erosion, siltation, and good-housekeeping best management practices.
Fish and Aquatic Habitat	**Phase 2 and 3 Projects**
	Project construction activities could adversely affect migratory habitat for listed adult and juvenile Chinook salmon and steelhead that would be susceptible to water quality–related effects. In addition to construction activities, removal of riparian vegetation or woody material along the existing levee or otherwise in the floodplain could result in the loss of important shaded riverine aquatic habitat function. Bank erosion-control improvements in the Phase 2 Project footprint along the waterside toe of the Sacramento River east levee and replacement of the outfall structure at RD 1000 Pumping Plant No. 2 in the Phase 3 Project footprint would require removing a small number of trees, and trimming the canopies of other trees growing on the eroding bank. It is anticipated that any temporary construction losses of overhead shaded riverine aquatic habitat cover would be fully replaced by on-site mitigation planting by the end of the fifth growing season. Additionally, the bank protection concept has been designed to fully compensate for impacts on habitat values through the use of suitable types of substrate, vegetation, and instream woody material.
Sensitive Aquatic Habitats	**Phase 2 Project**
	Up to 371.48 acres of jurisdictional wetlands and waters of the United States could be temporarily affected by the project's borrow activities (including activities at the Brookfield borrow site in Sutter County). Up to 36.75 acres of jurisdictional wetlands and waters could be permanently affected.
	Phase 3 Project
	If all the borrow sites are affected, the project would result in temporary impacts to 354.01 acres and permanent impacts on 33.04 acres of waters of the United States, including wetlands. These impacts would result from construction along the Sacramento River east levee, PGCC west levee, NEMDC west levee, new Elkhorn Canal and GGS/Drainage Canal, and construction activities at the borrow sites and along haul roads.
Vegetation and Wildlife	**Phase 2 Project**
	Levee improvements would require SAFCA to acquire additional land for maintenance activities and to prevent encroachment along the flood damage reduction facilities. Beneficial effects would include creation of approximately 30 acres of woodland habitat that would likely be planted along landside corridors, and acquisition by SAFCA of approximately 16 acres of existing woodland for preservation in public ownership.

Table 2-1
Summary of the Impacts of the Phase 2 and 3 Projects

Issue Area	Summary of Environmental Impact
	Existing canals providing aquatic habitat would be adversely affected by the construction of the Phase 2 Project. Effects would include both temporary disturbance and permanent loss. Adverse effects, however, would be offset by creation of the proposed new canals that would also provide improved movement corridors for aquatic species. Substantial acreage of riparian woodland vegetation would be planted in the levee setback area under this alternative for the Phase 2 Project; however, this vegetation would not mature for several years, and its near-term value as cover would therefore be limited when compared with the value of the existing landside woodland corridor along the Sacramento River east levee. After mitigation measures, adverse effects on woodlands and wildlife movement corridors would be reduced to a less-than-significant level.
	Phase 3 Project
	The Phase 3 Project would remove as much as 12 acres of landside woodland habitat and less than 1 acre of waterside woodland habitat in Reaches 5A–9B of the Sacramento River east levee. In addition, approximately 1.1 acres of landside woodland habitat would be removed where replacement irrigation/drainage canal segments to be constructed in Reaches 6B–9B would intersect with existing woodland and connect to existing lateral canals. An additional 4.6 acres of woodland could be removed by the reconstruction of RD 1000's Pumping Plant No. 2. No woodlands are expected to be removed along the PGCC and NEMDC levees for this project phase. Approximately 20 acres of landside woodlands would be removed in Reaches 10–12A of the Sacramento River east levee to prepare for future flood damage reduction work (as part of a subsequent project phase). Loss of woodland habitat under the Proposed Action would be offset by creating approximately 35.5 acres of new woodland habitat and preserving 2.5 acres of existing woodland along corridors on the landside of the adjacent levee along the Sacramento River in the Phase 3 Project footprint. These compensatory measures would complement woodland preservation and creation activities carried out as part of the Phase 2 Project. The Proposed Action, when considered together with the Phase 2 Project, would result in a net increase of 52.5 acres of landside woodlands in the Basin.
Special-Status Terrestrial Species	**Phase 2 and 3 Projects**
	Levee improvement activities could adversely affect habitat for special-status species (rose mallow, special-status birds, Delta tule pea, and Sanford's arrowhead), elderberry, giant garter snake, and the Northwestern pond turtle. However, mitigation measures, such as replacement planting, relocation, and project timing, would reduce these impacts to less-than-significant levels. The Phase 2 and 3 Projects would support attainment of the NBHCP's goals and objectives by creating and preserving habitat and creating a valuable aquatic corridor linking The Natomas Basin Conservancy reserves in the northern and southern portions of the Natomas Basin. However, the potential for the Phase 2 and 3 Projects to threaten the viability of populations of certain covered species, reduce the effectiveness of the NBHCP's conservation strategy, and adversely affect attainment of the goals and objectives of the NBHCP could jeopardize successful implementation of the NBHCP. The Phase 2 and 3 Projects would not result in the development of land outside the NBHCP permit area, but it would result in land use conversions. Land use conversion, however, would not cause a net loss in the habitat values provided by these lands for NBHCP-covered species in the Natomas Basin. Habitat creation and preservation associated with the Phase 2 and 3 Projects would result in an increase in overall habitat quality, which is anticipated to compensate for the loss associated with land conversions. However, if habitat creation and preservation are not effectively implemented to provide woodland habitat for Swainson's hawk or other special-status species, an overall adverse effect could occur.
Cultural Resources	**Phase 2 Project**
	Phase 2 Project would alter contributing elements of RD 1000 by modifying the NCC south levee, Sacramento River east levee, and realigning Sankey Road at the intersection with Garden Highway. It may be possible to avoid resources or recover and preserve them through a treatment plan if disturbance is unavoidable; however, physical changes to resources eligible for listing on the NRHP may still alter the significance of the resource. Therefore, if this site (the RD 1000 levee system) is determined to be eligible for listing, implementation of this mitigation may not fully reduce the

Table 2-1
Summary of the Impacts of the Phase 2 and 3 Projects

Issue Area	Summary of Environmental Impact
	impact to a less-than-significant level. Historic-era resources shall be formally evaluated for significance in accordance with the stipulations of the programmatic agreement between USACE, SAFCA, and the SHPO. Adverse effects shall be treated in accordance with measures stipulated in a historic preservation treatment plan developed in consultation between USACE, the SHPO, and SAFCA.
	Phase 3 Project
	Work associated with the Phase 3 Project may alter contributing elements of RD 1000. Constructing new features such as the replacement RD 1000 Pumping Plant No. 2 may affect the setting by introducing inconsistent elements and thus the integrity of RD 1000. Such changes could diminish the significance or integrity of contributing elements of the district. Constructing levee improvements may affect several prehistoric sites in the Phase 3 Project footprint, some of which have mortuary components. Several resources require evaluation to determine whether they are eligible for the NRHP. The evaluation of eligibility and determination of effects on all eligible and listed sites will be made in consultation with USACE and the SHPO. It is possible that ground-disturbing work associated with the Phase 3 Project may, absent mitigation or treatment, result in significant impacts on both listed and eligible resources. Significant impacts may occur when ground-disturbing construction would diminish the data contained in these resources or disturb interred human skeletal remains and associated grave goods.
	Phase 2 and 3 Projects
	Modern agricultural cultivation of the Sacramento Valley floodplains and riverbanks has destroyed many prehistoric occupation sites, and the remains of these sites are thus no longer easily visible above ground. During project construction activities, previously undiscovered cultural resources, including Native American traditional cultural properties, may be discovered and disturbed. SAFCA is required under the programmatic agreement to complete an inventory of cultural resources before each project construction phase. Identified resources will be evaluated for NRHP eligibility, and SAFCA will make a finding of effect, in consultation with USACE and the SHPO. If adverse effects on historic properties are identified, SAFCA must prepare a historic properties treatment plan. This plan specifies actions that SAFCA will take to resolve adverse effects on a historic property or a set of historic properties. The programmatic agreement also requires SAFCA to prepare and submit a plan before construction for responding to inadvertent discoveries.
Paleontological Resources	**Phase 2 and 3 Projects**
	The potential exists for unique paleontological resources to be encountered in excavation at depths of 10 feet or more. Deep excavation, associated mainly with cutoff wall construction and borrow activity in construction of the Phase 2 and 3 Projects, could destroy unique paleontological resources. Because of this potential, this impact would be potentially significant.
Transportation and Circulation	**Phase 2 and 3 Projects**
	The Phase 2 and 3 Projects would temporarily increase traffic on local roadways, potentially causing congestion on local roads during peak hours. Temporary road closures would contribute to congestion on local roads. Increased traffic, including use of roadways by heavy trucks, along with road closures would cause a temporary increase in hazards on local roadways. Increased congestion and road closures would also have a temporary effect on emergency service response times.
Air Quality	**Phase 2 and 3 Projects**
	Construction of the Phase 2 and 3 Projects would result in temporary and short-term generation of ROG, NO_X, and PM_{10} emissions from excavation, vegetation clearing, grading, borrow material hauling, and other construction activities. Control measures would be implemented to reduce these emissions below the Federal *de minimis* thresholds. Neither project phase would cause long-term changes in these emissions or expose sensitive receptors to toxic air contaminants.

Table 2-1
Summary of the Impacts of the Phase 2 and 3 Projects

Issue Area	Summary of Environmental Impact
Noise	**Phase 2 and 3 Projects**
	Construction of the Phase 2 and 3 Projects would result in generation of temporary and short-term construction noise along the Sacramento River east levee, NCC south levee, PGCC west levee, and NEMDC west levee. Noise control measures would be implemented, but operation of earth-moving equipment in the vicinity of noise-sensitive land uses, primarily residences, would exceed local exterior and interior noise standards. Twenty-four-hour cutoff wall construction and well drilling operations would cause disturbance during more noise-sensitive early morning and nighttime hours. Residents would also be exposed to higher noise levels from increase traffic caused by truck hauling. The Phase 3 Project would expose some residents to temporary groundborne vibrations due to pile driving at Pumping Plant No. 2.
Recreation	**Phase 2 and 3 Projects**
	Construction of the Phase 2 and 3 Projects would temporarily affect access to recreation facilities along the Sacramento River, such as marinas, as well as the Teal Bend Golf Club. Although temporary closure of sections of Garden Highway would be an inconvenience for recreationists, other travel routes would be available and could be used to access recreational facilities during the construction period. The quality of recreational opportunities is likely to be somewhat temporarily reduced in the vicinity of the Phase 2 and 3 Projects as a result of noise and visual disturbance from temporary levee construction activities.
Visual Resources	**Phase 2 and 3 Projects**
	The visual character of the Phase 2 Project and 3 Project areas would be temporarily degraded by the presence and movement of heavy construction equipment. A temporary but substantial source of light and glare would be created by 24/7 construction of cutoff walls along the Sacramento River east levee, NCC south levee, PGCC west levee, and NEMDC west levee; and 24-hours-per-day well drilling operations along the Sacramento River east levee. Changes in levee dimensions would not likely be noticeable; however, the removal of large, mature trees in scattered locations along the landside of the Sacramento River east levee would result in a substantial degradation in visual quality for several years until replacement trees in oak woodland planting areas have matured (approximately 10–15 years).
Utilities and Service Systems	**Phase 2 and 3 Projects**
	The Phase 2 and 3 Projects would involve relocation of irrigation facilities, including canals, wells, and pumps, as part of construction of levee improvements along the Sacramento River east levee and NCC south levee, along with replacement of the Elkhorn Canal. Significant temporary interruptions of irrigation supply could occur if irrigation infrastructure is damaged during relocation. Power poles carrying electrical distribution and telephone lines would be relocated to make way for expansion of the levee along the landside of the Sacramento River east levee. Construction activities could damage identified and unidentified public utility infrastructure, resulting in temporary interruptions of service in the western Natomas Basin.
Hazards and Hazardous Materials	**Phase 2 Project**
	The Phase 2 Project would not cause any significant hazards associated with the transport and handling of hazardous materials. Construction and maintenance activities would involve the use of potentially hazardous materials, such as fuels, oils and lubricants, and cleaners commonly used in construction projects. Construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, state, regional, and local regulations. No hazardous materials have been identified with the Phase 2 Project construction footprint or at borrow sites.

Table 2-1
Summary of the Impacts of the Phase 2 and 3 Projects

Issue Area	Summary of Environmental Impact
	Phase 3 Project
	No significant hazards associated with the transport and handling of hazardous materials would result from construction of the Phase 3 Project. Construction and maintenance activities would involve the use of potentially hazardous materials, such as fuels, oils and lubricants, and cleaners commonly used in construction projects. Construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, state, regional, and local regulations. One site, the Yuki Pear Farm, was the site of a large gasoline spill. Required remediation would take place prior to construction.
Airport Safety	**Phase 2 and 3 Projects**
	Phase 2 and 3 Project levee construction within Reaches 4A–9B of the Sacramento River east levee would take place within the Airport Critical Zone. Extensive night lighting of construction work and security lighting of construction staging areas at night could interfere with nighttime aircraft landing operations and create a safety hazard related to aircraft landings. Coordination with the Sacramento County Airport System would minimize safety hazards related to potential nighttime interference with aircraft landings. Implementation of the Phase 2 and 3 Projects would reduce hazardous wildlife attractants within the Airport Critical Zone by improving drainage on the Airport north bufferlands.
Wildfire Hazards	**Phase 2 and 3 Projects**
	Although the Phase 2 and 3 Project areas are located in either a “nonflammable” or “moderate” zone for wildland fires, the project components would take place in locations where physical and weather conditions could combine to lead to a high risk of fire hazard. Construction equipment or construction practices could ignite fires that may result in wildland fires and expose people or structures to a significant risk of loss, injury, or death. Implementation of a fire prevention plan would minimize the risk of fire hazard.
Environmental Justice	**Phase 2 and 3 Projects**
	The Phase 2 and 3 Projects would incrementally reduce the risk of flooding to existing residential, commercial, and industrial development in the Natomas Basin. Although there are low-income and minority populations present in a portion of the project area, the flood protection benefits of the project would accrue to all segments of the population in the Natomas Basin. Any potential environmental impacts on low-income and minority neighborhoods would be the same types of impacts experienced throughout the project area (e.g., primarily temporary exposure to construction noise, dust, and light and glare during construction), and no permanent residential relocations would occur in low-income areas or areas with high minority populations.

Notes: AEP = annual exceedance probability; Airport = Sacramento International Airport; GGS/Drainage Canal = new canal designed to provide drainage and associated giant garter snake habitat; NBHCP = Natomas Basin Habitat Conservation Plan; NCC = Natomas Cross Canal; NEMDC = Natomas East Main Drainage Canal; NRHP = National Register of Historic Places; PGCC = Pleasant Grove Creek Canal; RD = Reclamation District; SAFCA = Sacramento Area Flood Control Agency; SHPO = State Historic Preservation Officer; USACE = U.S. Army Corps of Engineers
Source: Data compiled by EDAW in 2009

2.3 PROPOSED ACTION

The Phase 4a Project addresses underseepage, stability, erosion, encroachment, and levee height deficiencies along approximately 6 miles of the Sacramento River east levee in Reaches 10–15. If permitted, these improvements could be constructed at the same time as the Phase 3 Project and with up to 30% of the Phase 2 Project. Construction of the Phase 4a Project is scheduled to begin in 2010 and is expected to be completed in 2011, assuming receipt of all required environmental clearances, permits, and approvals for project implementation. **Plates 2-6a** through **2-6d** provide an overview of the elements of the Proposed Action.

The Proposed Action has the following major elements:

- **Sacramento River east levee Reaches 10–15: Levee raising/rehabilitation and seepage remediation** (**Plates 2-6a** and **2-6b**)—Construct an adjacent levee, raised in Reaches 10–11B, with cutoff walls, seepage berms, and relief wells, where required, to reduce seepage potential. Cutoff wall construction would continue 24/7.

- **Sacramento River east levee Reach 4B: Seepage remediation**—Install cutoff wall in the adjacent levee from Stations 190+00 to 214+00 to provide additional seepage remediation (**Plate 2-6c**).

- **NCC south levee: Levee raising and seepage remediation at two locations**—At the Natomas Central Mutual Water Company (NCMWC) Bennett Pump Station and Northern Main Pump Station, raise the NCC south levee, flatten levee side slopes, install cutoff wall, and modify or replace the existing pumps and motors to reflect raising the discharge pipes above the 200-year design flood elevation. Cutoff wall construction would continue 24/7.

- **Replacement of South Lauppe Pump**—At Sacramento River Mile 77.2 (left bank), remove the pump, intake, and support structure prior to initiation of a separate USACE project to construct bank protection at the site. Following completion of USACE's bank protection project, SAFCA would reconstruct the pump, intake, and support structure.

- **Riverside Canal (highline irrigation canal) relocation and extension**—Extend the relocated canal upstream of Powerline Road in Reaches 11B–12B of the Sacramento River east levee; relocate the canal east of the adjacent levee in Reaches 13–15 and east of the adjacent levee, residences, and tree groves in Reaches 15–17; and construct a piped section in Reaches 15–18B at the toe of the new adjacent levee.

- **Modifications to NCMWC Riverside Pumping Plant**—Raise the pumping plant's discharge pipes above the 200-year design water surface and modify or replace the plant's existing pumps and motors to accommodate the raised discharge pipes. In-water construction would include use of dredge pumps to remove sediment so that new pumps could be installed, but no dewatering involving use of a cofferdam is anticipated.

- **Modifications to RD 1000 Pumping Plants Nos. 3 and 5**—Raise the pumping plants' discharge pipes above the 200-year design water surface, extend the pipes to tie into existing discharge pipes within the waterside bench, replace or modify pumps and motors, and perform other seepage remediation, including relocating the landside stations away from the levee to accommodate the raised discharge pipes. Most of these modifications would take place above the Sacramento River's normal summer and fall water surface elevations; however, reconstruction of the Pumping Plant No. 3 outfall and the removal of a deep culvert at Pumping Plant No. 3 would require dewatering.

- **Development of new and replacement groundwater wells**—Abandon approximately 13 agricultural wells and replace the wells in locations outside the footprint of the levee improvements. Additionally, construct 5 new wells to provide a water supply for habitat mitigation features. Drilling of the wells would require

construction to continue 24 hours per day for up to three days to avoid collapse or seizing of drill equipment within the hole.

- **Borrow site excavation and reclamation**—Excavate earthen material at the borrow sites and then return the sites to preconstruction uses or suitable replacement habitat. For the Phase 4a Project levee and canal improvements along the Sacramento River east levee, the Fisherman's Lake Borrow Area is anticipated to be the primary source of soil borrow material (see **Plate 2-7**). However, additional borrow sites may be needed for Phase 4a Project work along the Sacramento River; these include the I-5 Borrow Area, the Elkhorn Borrow Area, South Sutter, LLC, Krumenacher, the Airport north bufferlands, and the Twin Rivers Unified School District stockpile site. For the Phase 4a Project construction on the NCC south levee, the Brookfield borrow site is anticipated to be the primary source of soil borrow material. Some of these borrow sites (Elkhorn Borrow Area, Airport north bufferlands, Krumenacher, Twin Rivers Unified School District stockpile site, and South Sutter, LLC) have been fully analyzed in previous environmental documents; therefore, their potential impacts are incorporated by reference into this EIS/EIR. The Fisherman's Lake and I-5 Borrow Areas are fully analyzed in this EIS/EIR.

- **Habitat creation and management**—Establish a habitat complex in the Fisherman's Lake Borrow Area (Fisherman's Lake Habitat Complex) through the creation of approximately 140 acres of agricultural upland habitat; establishment of perennial native grasses on levee slopes, seepage berms, and access and maintenance areas; creation of up to 120 acres of managed seasonal and perennial marsh; and establishment of woodlands consisting of native riparian and woodland species at locations along the landside of the Sacramento River east levee.

- **Infrastructure relocation and realignment**—Realign and relocate private irrigation and drainage infrastructure (wells, pumps, canals, and pipes); and relocate utility infrastructure (power poles) as needed to accommodate the levee improvements and canal relocations.

- **Landside vegetation removal**—In Reaches 12B–15 of the Sacramento River east levee, clear landside vegetation in a corridor up to 660 feet wide to prepare for Phase 4a Project levee and canal improvement work.

- **Waterside vegetation removal**—Up to 4 acres of waterside vegetation would be removed due to replacement of pumping plants and construction of outfalls in Reaches 10–15 of the Sacramento River east levee.

- **Right-of-way acquisition**—Acquire lands within the Phase 4a Project footprint along the Sacramento River east levee, NCC south levee, and at associated borrow sites.

- **Encroachment management**—Remove encroachments as required to meet the criteria of USACE, CVFPB, and FEMA.

- **Exchange of properties between SAFCA and SCAS in Reaches 4A, 5B, and 6 of the Sacramento River east levee—**SAFCA and SCAS would carry out a land exchange that would support expansion of Airport bufferlands along the eastern edge of the new Elkhorn Irrigation Canal and provide SAFCA additional habitat mitigation land along the upper portion of the Sacramento River east levee outside of the 10,000-foot Airport Critical Zone.

Source: SACOG 2004

Proposed Phase 4a Project Features – Sacramento River East Levee **Plate 2-6a**

Proposed Phase 4a Project Features – Sacramento River East Levee and Fisherman's Lake Borrow Area

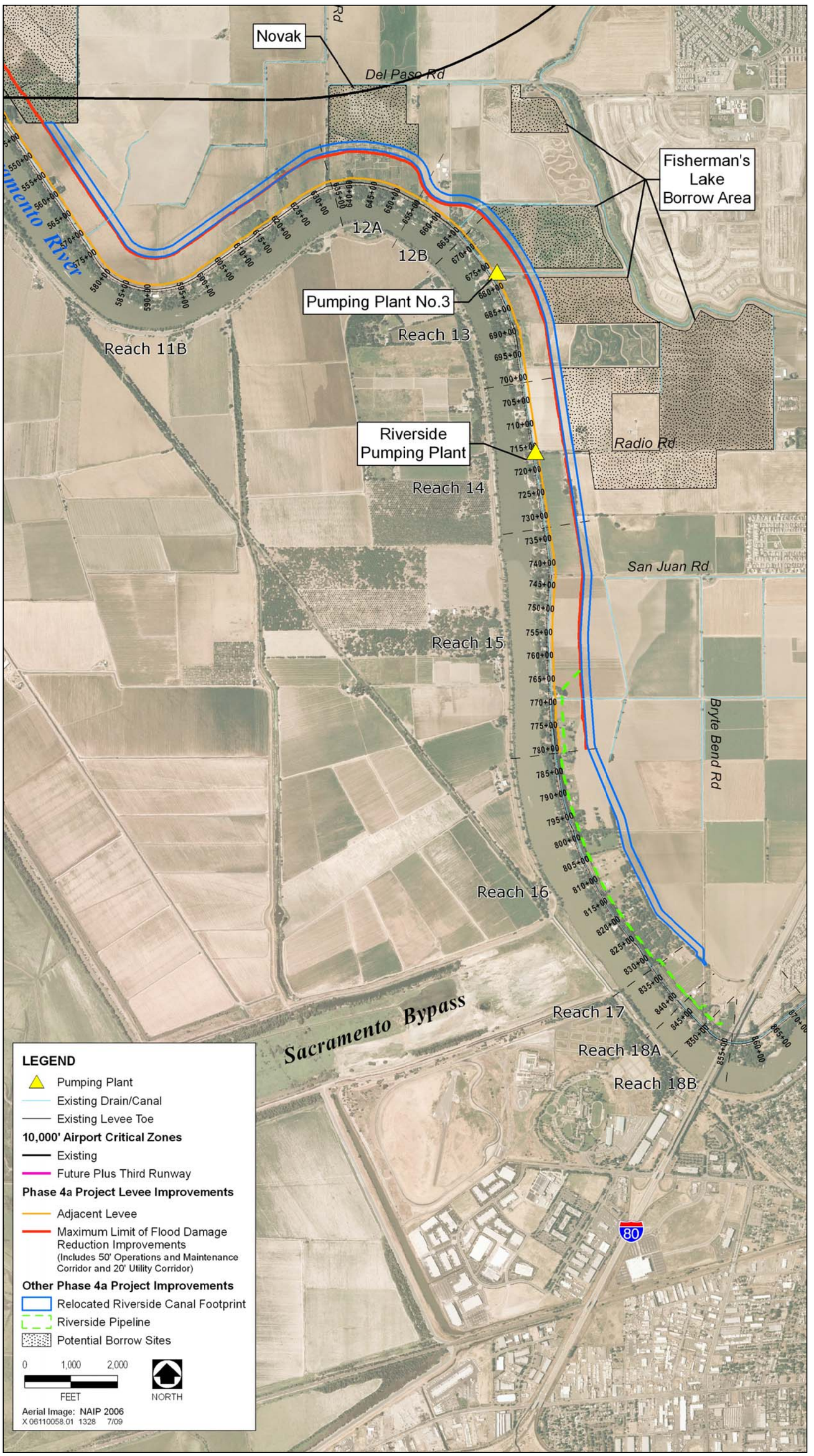
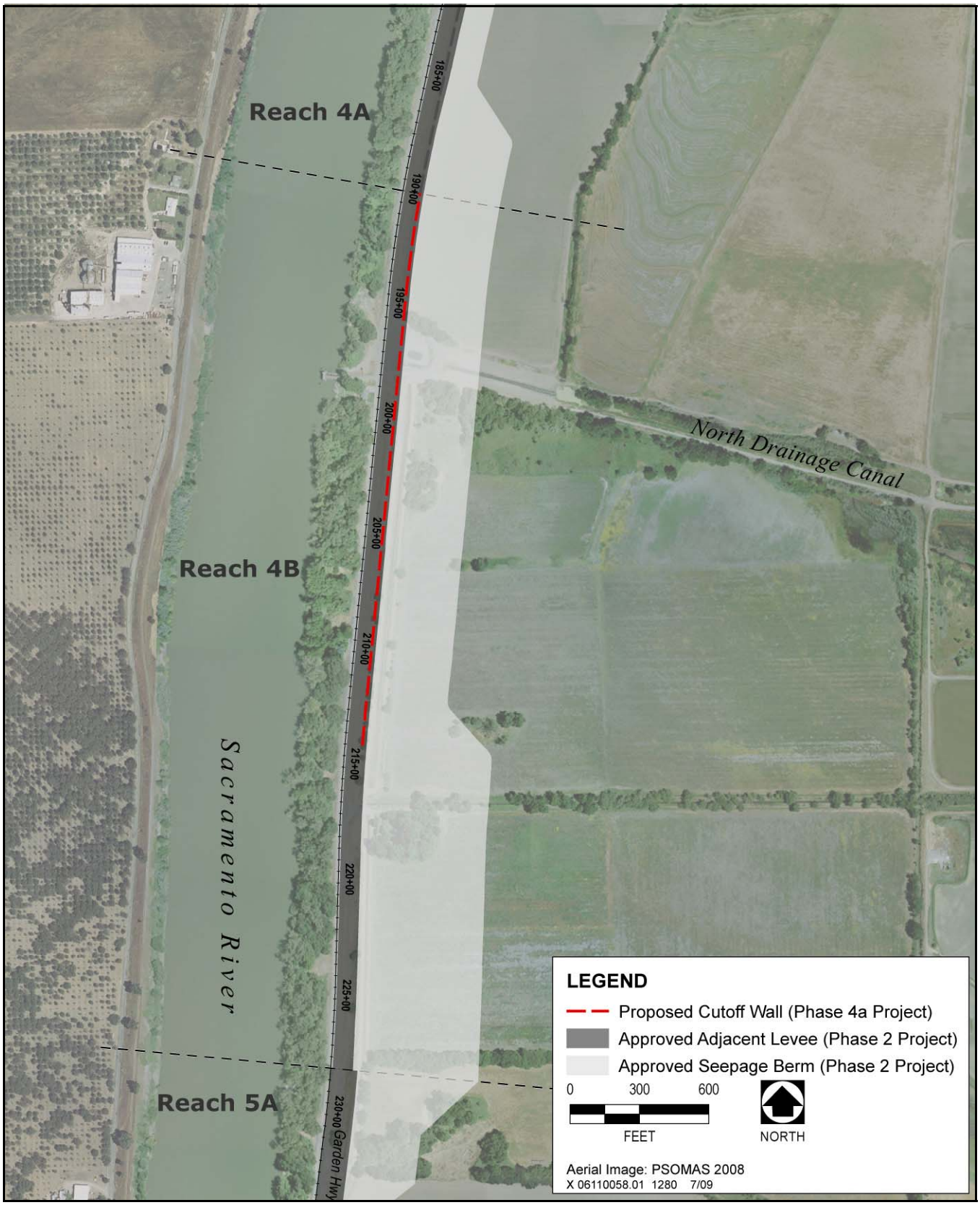


Plate 2-6b



Source: SACOG 2004

Proposed Cutoff Wall in Sacramento River East Levee Reach 4B **Plate 2-6c**

2.3.1 FLOOD RISK REDUCTION COMPONENTS

2.3.1.1 SACRAMENTO RIVER EAST LEVEE

Levee improvements would be constructed from the northern end of Reach 10 through the southern end of Reach 15 (Station 468+00 to Station 780+00), a distance of approximately 6 miles. These improvements would include the following components:

- **Adjacent Levee.** A new levee would be constructed adjoining the existing Sacramento River east levee. The levee's typical dimensions are shown in **Plate 2-8**. In Reaches 10–12, the levee would be raised to provide 3 feet of levee height above the 200-year (0.5% AEP) water surface profile (**Plate 2-8**, upper panel). The height of the raise would range from a few inches to 2.8 feet, with the smallest raise occurring in Reach 12. From a point approximately midway in Reach 12 to the end of Reach 15, where the existing levee already meets height requirements, the top of the new levee would be no higher than the elevation of the existing levee crown, as shown on the lower panel **Plate 2-8**. The landside slope of the adjacent levee would be between 3H:1V and 5H:1V.

- **Cutoff Walls.** Three-foot-wide cutoff walls made of either soil-bentonite or soil-cement-bentonite would be installed either through the existing levee or along the landside toe of the existing levee (see **Plate 2-8**). Depending on the construction method used, the top of the cutoff walls would be at least 5 feet above existing ground surface at the landside levee toe (within either the new adjacent levee or existing levee) and extend to a depth of 110 feet below ground surface in some areas. Locations and depths would be determined during engineering design. The maximum linear extent would be approximately 31,000 feet (in Reaches 10–15).

- **Seepage Berms.** Seepage berm width would range from 100 feet to 500 feet from the landside toe of the adjacent levee (see **Plate 2-8**). The seepage berms would be approximately 8 feet thick at the toe of the new adjacent levee and gradually slope downward to about 3 feet thick at the landside edge, with a 3H:1V slope to ground level. A gravel-surface patrol road would be constructed near the outside edge of the seepage berm. Locations of the seepage berms would be determined during engineering design. This Phase 4a EIS/EIR analyzes footprint impacts of the worst-case scenario, in which 500-foot-wide seepage berms would be used in all reaches. However, continuing cultural investigations and refinement of engineering design are likely to produce a footprint that includes 500-foot-wide berms in only a few culturally sensitive locations, with most reaches containing either 100-, 200-, or 300-foot-wide berms or deep cutoff walls. Soil borrow requirements, which are discussed below, are based on this more probable footprint.

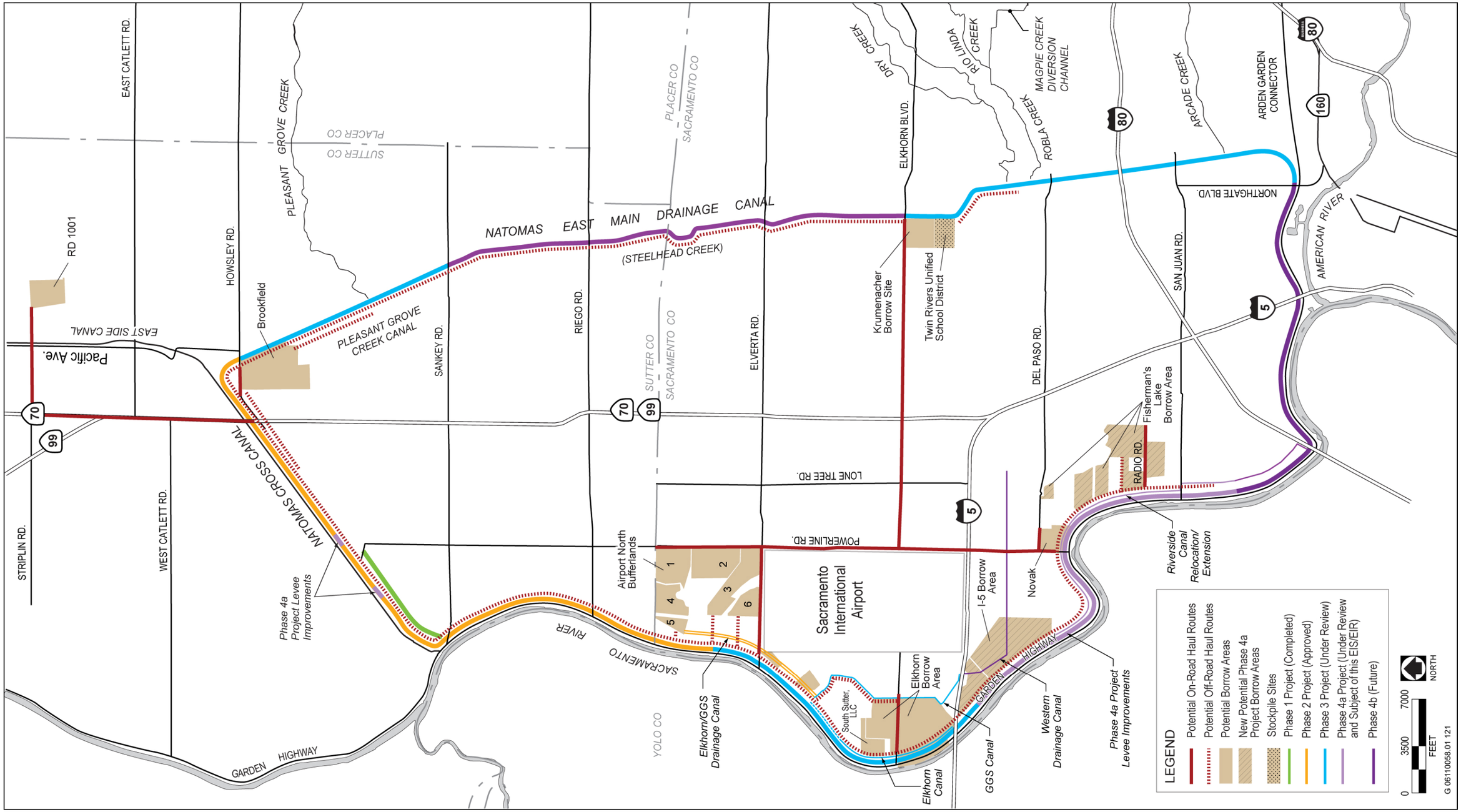
- **Relief Wells.** Relief wells would be constructed at selected locations where berms cannot be wide enough or cutoff walls deep enough to meet the required design parameters for seepage remediation. Relief wells would also be constructed along some of the entrance channels to the landside pump stations. Relief wells would be spaced 50–100 feet apart and would extend to 60–80 feet below the ground surface. Relief well surface discharge near the seepage berm toe would flow into new collection ditches or existing roadside ditches that would convey the water to Pumping Plant No. 5 or other parts of the interior drainage system.

- **O&M Access and Utility Corridors.** A 50-foot-wide O&M access corridor would be established adjacent to the landside toe of the levee or seepage berm. Beyond this corridor, a 20-foot-wide corridor would be established for relocated power poles and other utility infrastructure.

- **Measures to Reduce Impacts to Residences and Heritage Oaks.** Where residences and heritage oak trees are located, particularly in Reaches 12B and 13–15, SAFCA would employ measures to reduce the project footprint impacts to these resources, to the extent feasible given levee design and seepage-remediation performance requirements. These measures could include reducing the width of the adjacent levee, seepage berms, and O&M access and utility corridors; strategically using cutoff walls or seepage relief wells; and replacing open canals (e.g., the relocated and extended Riverside Canal) with underground pipe sections.

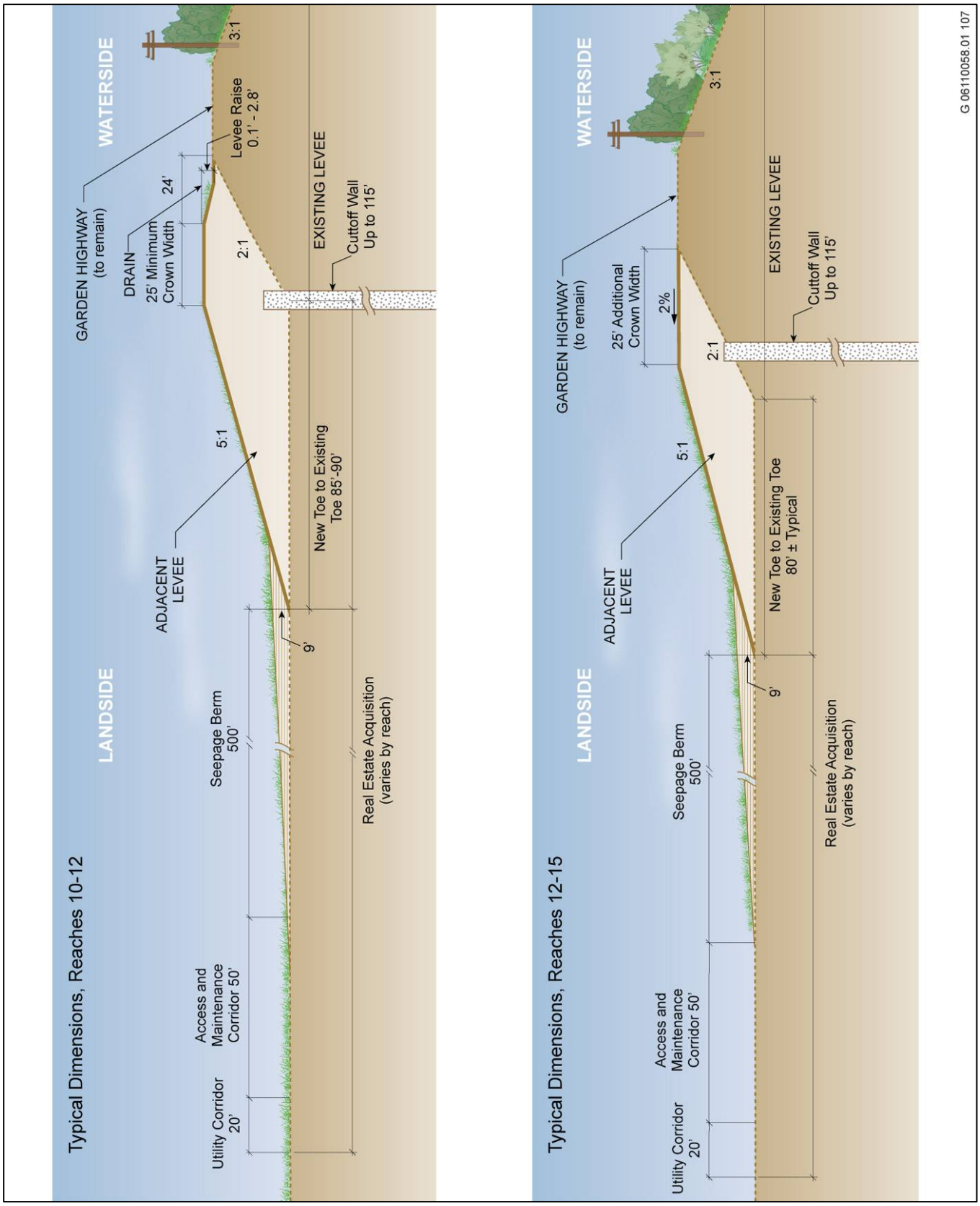
Source: SACOG 2004

Proposed Phase 4a Project Features – Natomas Cross Canal and Brookfield Borrow Site **Plate 2-6d**



Source: Base map from CASIL Layers and SACOG 2007; adapted by EDAW in 2008 and 2009 based on data from MBK Engineers and Mead & Hunt

Natomas Levee Improvement Program Construction Phasing and Anticipated Haul Routes from Soil Borrow Areas **Plate 2-7**



Source: SAFCA 2007b

Proposed Adjacent Levee Profiles **Plate 2-8**

- **Waterside Drainage Outfalls.** Raising the approximately 16,800 feet of levee in Reaches 10–12 would require stormwater to be collected and drained from the area between Garden Highway and the raised adjacent levee. A grassed drainage swale would convey runoff water to drop inlets, and new pipe laterals would convey the water beneath Garden Highway to new outfalls on the waterside of the levee. Seven to ten drainage outlets would be required; most of the outlets would be placed above the Sacramento River's 2-year water surface elevation. No waterside outlets would be required in Reach 15 because the new adjacent levee would not be raised above the existing levee, and runoff from Garden Highway would continue to drain to both the landside and waterside of the levee.

- **Reconstruction of Intersections.** The Garden Highway intersections at Powerline Road, Radio Road, and San Juan Road would require reconstruction to accommodate the adjacent levee. Intersecting road embankments would be raised, typically extending the approach embankment approximately 600 feet outward from the adjacent levee. The design would meet Sacramento County roadway design criteria.

Plates 2-6a and **2-6b** shows the levee improvements in plan view. The real estate acquisition area would extend approximately 660 feet from the landside toe of the existing levee in Reaches 10–15 of the Sacramento River east levee. The Phase 4a Project footprint includes a land use buffer to prevent future land uses that could be incompatible with flood damage reduction facilities. The exact limits of this corridor have not yet been determined; however, it would extend 450–500 feet from the centerline of Garden Highway. The width would be adjusted as required to avoid existing structures that are not in the levee improvement footprint (which includes the levee, seepage berm, O&M/utility corridor, and habitat corridor) and that are determined not to pose a risk to the proposed levee improvements.

Approximately 4.2 million cubic yards of soil borrow would be required to construct these levee improvements. The sources for this material are discussed below under "Borrow Sites." The average round-trip distance for truck hauls would be approximately 4 miles. Using haul trucks capable of carrying 14 cubic yards, about 2,200 trips per day would be required to transport this material over the 140 work days available during the 156-day construction season (April 1–November 1). However, most of these trips would take place on temporary haul roads constructed within the project footprint and may involve the use of scrapers rather than haul trucks. Short sections of Elkhorn Boulevard, Del Paso Road, Powerline Road, and Radio Road may be used for some trips (see **Plate 2-7**). Approximately 34,000 tons of aggregate base and 4,500 tons of asphalt concrete would be hauled to the work sites from commercial sources up to 30 miles away.

The levee improvements for the Phase 4a Project are anticipated to be constructed between April 15 and November 1, 2010. However, construction could extend as late as December 31. Some related activities, such as relocating power poles and demolishing or relocating residential or agricultural structures, may be conducted before April 15, and site restoration and demobilization could extend through January. The peak size of the construction crew would be up to 300 people per shift working two 12-hour shifts. The construction sequence would be divided into several different headings to meet the project schedule.

Installation of cutoff walls during nighttime hours (from 8:00 p.m. to 6:00 a.m.) would be necessary to maintain the construction schedule. The 24/7 construction schedule is required due to regional and national demand for the long-stick excavators and deep soil mixing equipment that are needed for cutoff wall construction, the relatively short levee construction window (April 15 through November 1), the need to reduce the risk of cutoff wall trench collapse, and the requirement that the cutoff wall be allowed to cure for at least 4 weeks before completing construction of the encapsulating adjacent levee (SAFCA 2009d).

It is anticipated that the 24/7 cutoff wall construction would occur Monday through Saturday, with Sunday reserved for equipment maintenance. However, if unanticipated events occur, cutoff wall construction could also be conducted on Sundays. Lights and power generators would be used during nighttime construction hours. Additional equipment would include cutoff wall rigs, excavators, generators, pumps, support vehicles, and other ancillary equipment. The cutoff wall would be installed in several headings. The number and locations of the

headings would be dependent on the project schedule and contractor preference. Each cutoff wall rig would move continuously along the proposed alignment to ensure an uninterrupted cutoff wall and to reduce prolonged disturbance to adjacent residences. Each cutoff wall rig can move between 50 and 100 feet horizontally during a 12-hour work shift.

Personnel, equipment, and imported materials would reach the Phase 4a Project site via SR 99/70, Powerline Road, and San Juan Road (**Plate 2-7**). The primary corridors where construction activity would take place are off public roadways, within and through the soil borrow areas, and within the adjacent levee alignment and existing unpaved roads used for access to the work areas.

Table 2-2 shows the quantity of each fill type needed for the Proposed Action and the expected primary sources of borrow material. Additional sources are identified and discussed in Section 2.3.3, "Borrow Sites." The levee fill and seepage berm fill and excavation quantities include a 25% shrinkage factor to account for volume loss during excavation, placement, and compaction. For some locations, it may be possible to use a scrape-and-place method, employing a wheel-tractor, which would reduce the number of haul trucks needed. Potential haul routes from the borrow sources to the Sacramento River east levee work area for the Phase 4a Project are shown in **Plate 2-7**. The majority of hauling from borrow areas would take place off local roadways, through the borrow area to the levee maintenance area and construction sites. Short sections of Del Paso Road, Powerline Road, Radio Road may be used for some trips. Hauling from the Krumenacher borrow site and the Twin Rivers Unified School District stockpile site would use the section of Elkhorn Boulevard between the NEMDC and Powerline Road. Up to 350,000 cubic yards of soil borrow material could be hauled from these two sites.

Table 2-2
Quantities of Fill Required for the Proposed Action

Material Type	Quantity	Primary Source (Average Round-Trip Haul Distance)
Levee fill	2,271,000 cy	Fisherman's Lake (4 miles)
Seepage berm fill	1,792,000 cy	Fisherman's Lake (4 miles)
Stability berm/Inspection trench	185,000 cy	On-site
Aggregate base	34,000 tons	Commercial source (30 miles)
Asphalt concrete	4,500 tons	Commercial source (30 miles)
Total	**4,194,000 cy / 38,500 tons**	

Note: cy = cubic yards
Source: Data provided by HDR in 2009 and compiled by EDAW in 2009

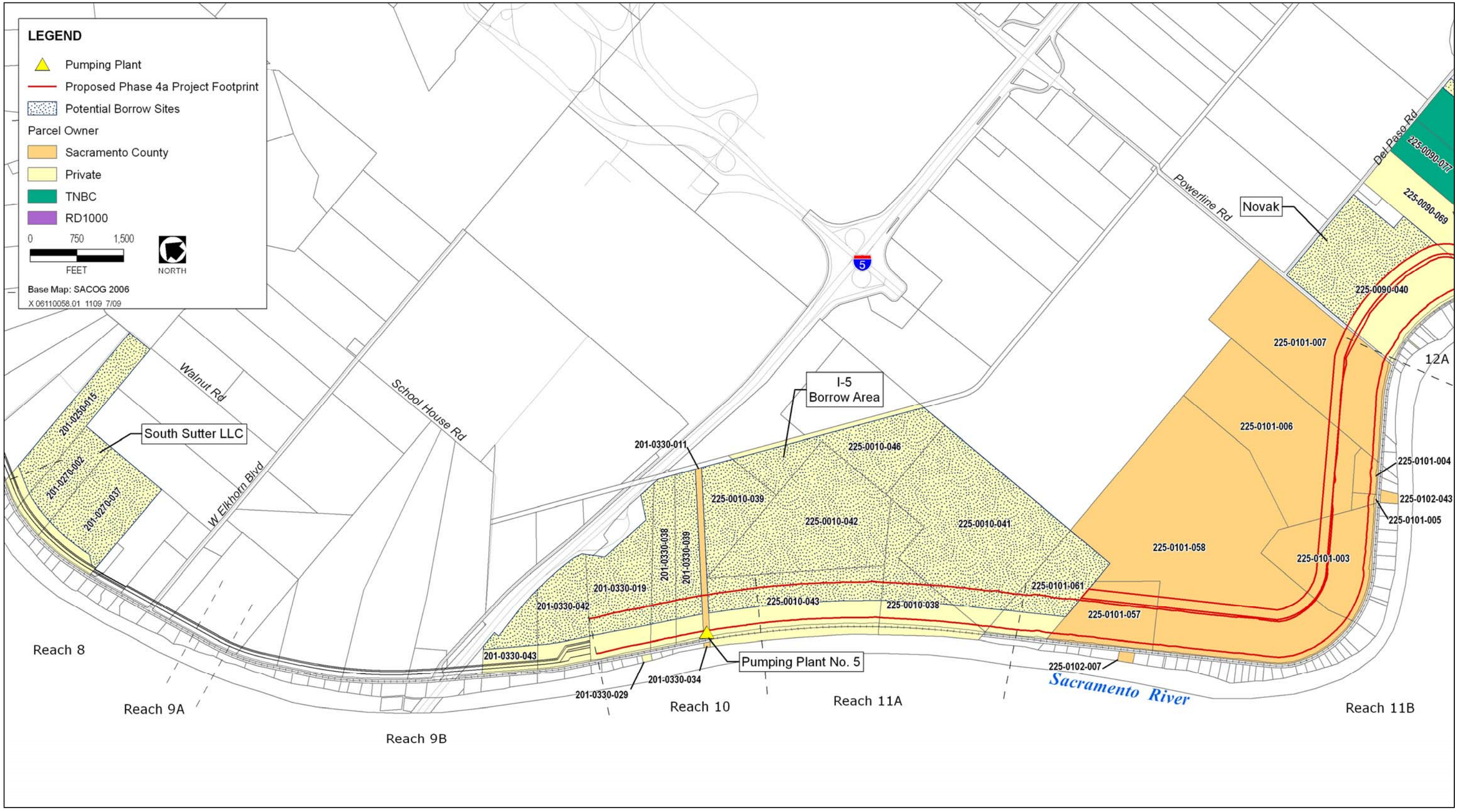
Delivery of the materials listed in **Table 2-2** for the Proposed Action would require up to 2,200 haul trips per day, with up to 200 trips per day taking place on Elkhorn Boulevard to bring borrow material from the eastside borrow/stockpile sites. These estimates are based on the assumption that the work would be completed in a 6-month construction period with 140 days out of the 156-working-day window being used to haul material. These estimates are based on conservative assumption of truck capacities of 14 cubic yards and 24 tons, and the worst-case assumption of use of haul trucks (rather than a combination of haul trucks and scrapers) to move all borrow material from the Fisherman's Lake Borrow Area and other potential borrow sites.

Table 2-3 summarizes the types of equipment that may be used throughout the construction sequence, along with the approximate duration of each activity.

Table 2-3
Anticipated Equipment Types and Duration of Use for Improvements to Sacramento River East Levee Reaches 10–15 under the Proposed Action

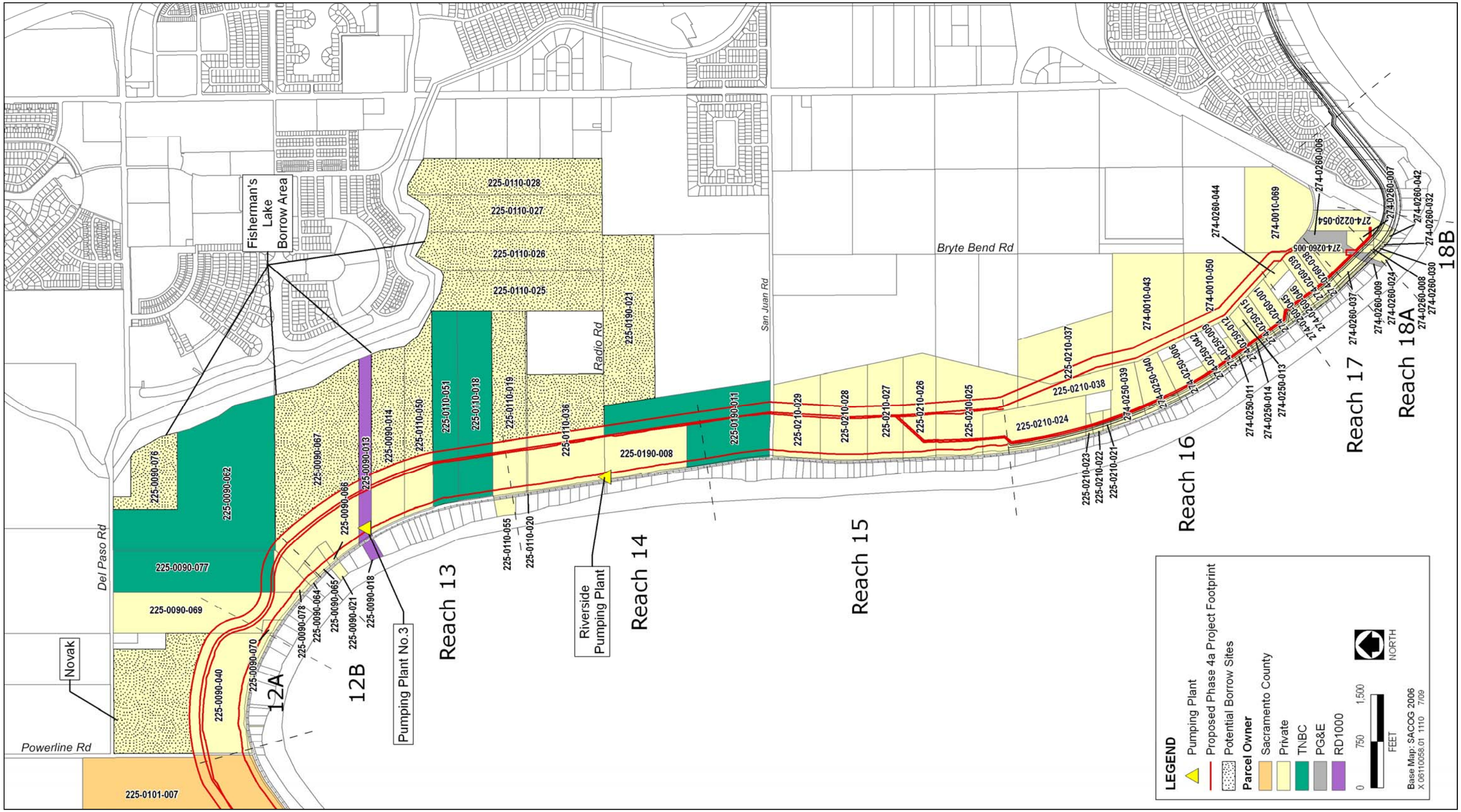
Construction Phase	Equipment Type and Number of Each Type	Estimated Duration (Work Days)
Mobilization	–	27
Site preparation (tree removal, clearing, grubbing, stripping)	Scrapers (6) Front-end loaders (2) Crawler/tractors (tree pushers) (2) Water trucks (2) Motor graders (2) Chippers/grinders (4) Haul trucks (10)	27–54 27–54 27–54 27–54 27–54 27–54 54
Removal of landside structures and other facilities	Excavators (2) Haul trucks (24) Front-end loaders (1)	48 48 48
Excavation of stability berm	Excavators (10) Scrapers (5) Haul trucks (12) Bulldozers (4) Graders (4) Water trucks (2)	14 14 14 14 14 14
Construction of adjacent levee and seepage berms (includes borrow site activities)	Scrapers (10) Excavators (10) Front-end loaders (10) Haul trucks (14 cubic yards) (190) Bulldozers (10) Sheepsfoot compactors (8) Motor graders (8) Water trucks (5)	140 140 140 140 140 140 140 140
Construction of cutoff wall	Front-end loaders (6) Bulldozers (25) Extended-boom pallet loaders (6) 300-kilowatt generators (6) Slurry pumps (6) Pickup trucks (8) Haul trucks (8) Excavators (6)	60 60 60 60 60 60 60 60
Reconstruction of Garden Highway at two intersections	Backhoes (2) Smooth drum compactors (2) Asphalt pavers (1) Haul trucks (6) Striping trucks (1) Truck-mounted augers (1)	27 27 27 27 27 27
Installation of surface drainage outlets across Garden Highway	Backhoes (2) Front-end loaders (2) Concrete trucks (3) Roller compactors (2) Asphalt paver (1) Haul truck (1)	21 21 21 21 21 21
Site restoration and demobilization	Hydroseeding trucks (6) Water trucks (6) Haul trucks (6)	34 34 34

Source: Data provided by HDR in 2009 and compiled by EDAW in 2009



Source: Parcels provided by Mead & Hunt in 2009, alignment footprint mapped by EDAW in 2009

Land Ownership in the Proposed Phase 4a Project Footprint **Plate 2-9a**



Source: Parcels provided by Mead & Hunt in 2009, alignment footprint mapped by EDAW in 2009

Land Ownership in the Proposed Phase 4a Project Footprint **Plate 2-9b**

The sequence of construction activities is described below.

- **Removal of Landside Vegetation:** Along the landside of the Sacramento River east levee in Reaches 12B–15, vegetation would be removed from the levee improvement footprint, up to 660 feet from the levee toe, as needed during the vegetation dormant season. This operation would require removal of some trees and relocation or removal of elderberry shrubs. Large trees would be felled approximately 3 feet above ground level, with stumps temporarily left in place. Where feasible, small trees and elderberry shrubs would be relocated to woodland preservation corridors that are part of the Phase 4a Project. A minimal amount of belowground disturbance would occur. Vegetation clearance for Reaches 10–12 of the Sacramento River east levee and for the relocated and extended Riverside Canal (Reaches 12A–18B) were addressed in the Phase 3 DEIS/DEIR.

- **Relocation of Power Poles:** Power poles currently situated on the landside slope of the levee and at the landside levee toe would need to be relocated and/or rerouted to accommodate the widened levee footprint. To the extent feasible, mainline utility infrastructure such as power poles would be relocated beyond the landside levee toe or berms, and secondary distribution lines of poles would be relocated to the drainage swale area between the existing levee and the adjacent levee. Should placing poles on top of the seepage berms be required, either raised foundations or steel-reinforced concrete piers would be constructed to prevent the poles from affecting the seepage berms. Some poles may need to be relocated to the waterside of the existing levee; however, no new power poles would be located on the waterside of the levee near existing waterside residences unless no feasible alternative exists for providing service to these residences. Tree pruning would likely be required in some locations to accommodate the power poles and associated wires. SAFCA would oversee relocation of the power poles in coordination with the appropriate utility companies and the construction operations.

- **Construction Mobilization:** Mobilization would involve setting up construction offices, transporting heavy construction equipment to the work site, and preparing the borrow sites. The main construction staging area is planned to be located on approximately 1 acre near Powerline Road (see **Plate 2-7**). The area would be used for the contractor's and engineer's construction trailers, parking for personnel, machine maintenance tools and parts, water trucks, and the storage of fuels and other materials to be used for construction.

  Site Preparation at the Levee: Site preparation (clearing, grubbing, and stripping) at the levee would begin by clearing structures and woody vegetation from the landside slope of the existing levee, the footprint of the adjacent levee and seepage berm, and the permanent O&M access and utility corridors. The clearing operation would be followed by grubbing operations to remove stumps, root balls, and belowground infrastructure. This operation would be followed by stripping the top 12 inches of earthen material from the landside slope of the existing levee and the footprint of the adjacent levee and seepage berm. If cultural resource sites are present, the stripping requirements would be modified and special construction methods would be used to minimize impacts on these features. Excess earthen materials (organic soils and grass from the adjacent levee foundation and excavated material that does not meet levee embankment criteria) would be temporarily stockpiled, then respread on the surface of the new levee slopes and seepage berms. Debris generated during the clearing and grubbing operations would be hauled off-site to landfills, concrete recycling plants, or cogeneration facilities.

- **Site Preparation at the Borrow Sites:** Site preparation (clearing, grubbing, and stripping) at the borrow sites would begin by clearing structures and woody vegetation from the borrow area. The clearing operation would be followed by grubbing operations to remove stumps, root balls, and belowground infrastructure. The borrow area would then be disked to chop surface vegetation and mix it with the near-surface organic soils. The disking operation would be followed by stripping the top 12 inches of earthen material from the borrow excavation area and stockpiling this soil at the borrow site. These soils would be respread on the surface of the borrow site after completion of the borrow excavation and grading. Debris generated during the clearing

and grubbing operations would be hauled off-site to landfills, concrete recycling plants, or cogeneration facilities.

- **Removal or Modification of Landside Structures and Other Facilities:** Approximately 12 residential and other agricultural structures are located within the footprint of the levee improvements. These structures, and the facilities supporting them, may have to be modified, removed, or relocated out of the project footprint before the start of levee construction in those areas (see "Measures to Reduce Impacts to Residences and Heritage Oaks," in Section 2.3.1.1, "Sacramento River East Levee," above). Irrigation facility conveyance features, distribution boxes, wells, and standpipes within the project footprint would be demolished and replaced as needed. Debris from structure demolition, power poles, utility lines, piping, and other materials requiring disposal would be hauled off-site to a suitable landfill. Demolished concrete could be sent to a concrete recycling facility. Wells and septic systems would be abandoned in accordance with the applicable State and county requirements.

- **Modification to Jet-Fuel Pipeline Access Valve in Reach 11B:** A 12-inch jet-fuel pipeline, owned and operated by Wickland Pipeline, LLC, generally travels 5–10 feet below the ground surface from the Port of Sacramento to the Airport through the Phase 4a Project footprint in Reach 11B of the Sacramento River east levee. The bore pit (the beginning of the directional bore) is approximately 300 feet north of the landside toe of the existing Sacramento River east levee. A shutoff valve is located at this site. From this point, the fuel line heads north (toward the Airport) and is approximately 5–6 feet below the existing ground surface. The fuel line would remain in its current location. However, because the shutoff valve is located within the footprint of a planned 500-foot-wide seepage berm, a new riser stem would be installed on the shutoff valve to extend the riser above the top of the seepage berm. The riser stem is a larger screw that allows an operator to manually turn a crank to open or close this valve. A concrete vault would be constructed around the shutoff valve for O&M purposes. The fuel line also has cathodic protection, with wires located near the valve. The wiring would also need to be extended up through the seepage berm for O&M purposes. This work could be performed without interfering with periodic deliveries of jet fuel to the Airport. USACE has not evaluated whether the pipeline must be relocated to comply with seepage remediation requirements.

- **Excavation of Stability Berm:** The existing stability berm along the levee from Station 468+00 to Station 635+00 (Reaches 10–11B) would be excavated and the fill material would be used in the construction of the seepage berm. The rock from the stability berm's drainage layer would be either incorporated into the seepage berm, incorporated into other project features, or hauled off-site to landfills. The geotextile fabric from the berm's drainage layer would be hauled off-site to landfills.

- **Construction of Adjacent Levee, Cutoff Walls, and Seepage Berms:** Borrow material from the Fisherman's Lake Borrow Area or other potential borrow sites would be delivered to the levee construction sites using haul trucks or scrapers. The borrow material would then be spread by motor graders and compacted by sheepsfoot rollers to build the adjacent levee and seepage berms. A water truck would be used to properly moisture-condition the soils for compaction. In areas of cutoff-wall construction, the adjacent levee would initially be built up to approximately 5 feet above existing grade at the toe of the levee to create a working platform. Portions of Garden Highway south of Powerline Road may experience single-lane closures for 8–12 weeks for construction of cutoff walls. One-way traffic would be maintained during cutoff-wall construction to provide access to properties along the work area. Lane closures on the landside of Garden Highway may also be necessary in this area for installation of underground utilities. These lane closures would be minimal in duration and extent, and measures would be taken to provide access outside of construction working hours for residents on the landside of Garden Highway. After completion and curing of the cutoff walls, additional material from the borrow sites would be delivered to the project site for construction of the remainder of the adjacent levee and the seepage berms.

- **Installation of Relief Wells:** Where they are needed, relief wells would be constructed using techniques typically used for drilling water wells. A drill rig would bore a hole into the ground to the required depth of

the well; the well casing, well screen sections, and filter pack would be installed; and then the well would be finished by pumping water from it to clean out the bentonite drilling fluid and to consolidate the well's gravel pack. After the solids are settled out, water from the well development operations would be discharged to adjacent fields or drainage ditches.

- **Traffic Control during Construction:** Single-lane traffic control and detours would be required during construction of the cutoff wall, reconstruction of Garden Highway, and installation of surface drainage outlets along the roadway. Examples of traffic-control measures to be considered are the use of flaggers, to maintain alternating one-way traffic while roadway and drainage facility work proceeds on half of the roadway/ intersection; use of advance construction signs and other public notices, to alert drivers to activity in the area; and use of "positive guidance" detour signage on alternate access roads, to reduce inconvenience to the driving public. If detours are required for through traffic, local traffic would be allowed, subject to delays during critical construction operations. Concrete barriers (K-Rail) would be used to separate traffic from the work areas for the cutoff wall.

- **Reconstruction of Garden Highway:** Where the cutoff wall would be constructed through the crown of the adjacent levee, reconstruction work on Garden Highway would be required to restore the landside lane of the roadway. Garden Highway intersections at Powerline Road, Radio Road, and San Juan Road would require reconstruction to accommodate the adjacent levee. It is anticipated that Garden Highway would be extended up and onto the widened adjacent levee at these locations to meet with the secondary roads. Approach embankments at the intersections would be enlarged and the entire intersections would be repaved. Intersecting roadway embankments would be raised and would be designed to meet Sacramento County roadway design criteria, typically extending the approach embankment approximately 600 feet outward from the adjacent levee. Traffic control and detours would be required during this phase of construction.

- **Installation of Surface Drainage Outlets across Garden Highway:** Upstream of Reach 15 of the Sacramento River east levee, the area between the new adjacent levee and the Garden Highway pavement would include new storm drainage collection facilities to convey surface water beneath Garden Highway and toward the Sacramento River. These drainage facilities would be necessary only in areas where the adjacent levee is higher than Garden Highway or during the transition back to the non-raised adjacent levee. A surface collection system (grassed drainage swale) would convey runoff water to drop inlets, and new pipe laterals would convey the water beneath Garden Highway to new waterside outfalls spaced approximately 1,500 feet apart in the berm along the east bank of the Sacramento River. In most locations, the outfalls would be placed above the Sacramento River's 2-year water surface elevation. The locations of the cross culverts would be selected to minimize impacts on existing residential properties. These discharge pipes would require minor landscape improvements to prevent erosion and ensure that applicable water quality standards are met. Excavation of a trench to install the culvert piping across Garden Highway would be required, and those segments where excavation occurs would have to be reconstructed. Single-lane traffic controls and through-traffic detours would be required during this phase of construction. No waterside outlets would be required in Reach 15 either because the new adjacent levee would not be raised above the existing levee or because the transition from the raised levee to the existing levee height would end at a point where runoff from Garden Highway in this reach could continue to drain to both the landside and waterside of the levee as it does now.

- **Site Restoration and Demobilization:** Upon completion of construction activities, the stripped material would be placed on top of the completed seepage berms, and both the levee slopes and the tops of the seepage berms would be hydroseeded. An aggregate-base patrol road would be constructed on the crown of the new levee and at the landside edge of the seepage berm. Any construction debris would be hauled to an appropriate waste facility. Equipment and materials would be removed from the site, and staging areas and any temporary access roads would be restored to preproject conditions. Demobilization would likely occur in various locations as construction proceeds along the project alignment.

- **Postconstruction Site Condition:** After construction, the levee slopes, seepage berms, maintenance access right-of-way, and any previously vegetated areas disturbed during construction would be seeded with a grass mix that meets DFG criteria. To the extent that they do not interfere with inspection and operations of the levees and seepage berms, maintenance practices for the areas of grassland cover within the footprint of the levee facilities would be conducted to promote the value of these areas as foraging habitat for Swainson's hawk.

Table 2-4 provides a summary of the major construction activities and their potential schedule.

Table 2-4
Overview of Construction Sequence for Proposed Improvements to the Sacramento River East Levee in Reaches 10–15

Construction Activity	Estimated Start Date (2010)	Estimated End Date (2010)	Estimated Duration (Work Days)
Power pole relocation	–	Before May 1	–
Mobilization	May 1	June 1	27
Site preparation (tree removal, clearing, grubbing, stripping)	June 1	July 1	25
Relocation of canal and removal of landside structures and other facilities	May 1	May 28	24
Excavation of stability berm and inspection trench	July 1	July 15	14
Construction of adjacent levee raise and seepage remediation	July 15	October 16	80
Reconstruction of Garden Highway at intersections	September 1	October 1	27
Installation of surface drainage outlets across Garden Highway	September 1	October 1	27
Site restoration and demobilization	November 1	November 30	26

Source: Data provided by HDR in 2009 and compiled by EDAW in 2009

Reach 4B Cutoff Wall Installation

Additional geotechnical analysis conducted since certification of the Phase 2 SEIR has determined that a cutoff wall is required in Reach 4B of the Sacramento River east levee. The 3-foot-wide soil-bentonite cutoff wall would be installed in the adjacent levee from approximately Station 190+00 to station 214+00. The approximate location of the proposed cutoff wall is shown on **Plate 2-6c**. Installation of the cutoff wall is expected to occur during the 2010 construction season, when reconstruction of RD 1000 Pumping Plant No. 2 is also planned. Construction of the Reach 4B adjacent levee, in which the cutoff wall would later be installed, is expected to occur in the 2009 construction season. Construction of the adjacent levee and reconstruction of Pumping Plant No. 2 were addressed in the Phase 2 EIR. Installation of the cutoff wall in Reach 4B, however, cannot occur until the Phase 4a ROD has been issued by USACE and the Phase 4a EIR has been certified by the SAFCA Board of Directors.

Construction of the 4B cutoff wall would involve degrading the new adjacent levee approximately 10 feet to create a working platform. The cutoff wall would be constructed from this working platform using a long-stick excavator, which would construct a continuous cutoff wall to depths ranging from approximately 20–75 feet. Once the cutoff wall is fully constructed and allowed to settle for at least four weeks, the adjacent levee embankment would be reconstructed and aggregate base/hydroseed would be placed on the surface.

As described in Section 2.3.1.1, installation of the cutoff wall would occur on a 24/7 basis to maintain the construction schedule, which is confined to April 15 through November 1 by the nesting and/or hibernating activities of State and Federally listed endangered species. The 24/7 construction schedule is also required because of regional and national competition for the long-stick excavators and deep soil mixing equipment that are needed for cutoff wall construction, the relatively short levee construction window, the need to reduce the risk of cutoff wall trench collapse, the requirement that the cutoff wall be allowed to cure for at least 4 weeks before

completing construction of the encapsulating adjacent levee, and the requirement to bring the flood protection system back to at least the same level of flood protection as existed before the start of that season of construction (SAFCA 2009d).

2.3.1.2 NATOMAS CROSS CANAL SOUTH LEVEE

NCMWC's Bennett and Northern Main Pump Stations

At the NCMWC pumping plants along the NCC south levee, discharge pipelines penetrate the levee at an elevation lower than the 200-year water surface elevation; these pipes must be raised or removed to comply with current levee design criteria. One 36-inch-diameter pipe and one 42-inch-diameter pipe are located at the Bennett Pump Station; three 30-inch-diameter and two 42-inch-diameter pipelines are located at the Northern Main Pump Station.

As discussed in Chapter 5.0, "Cumulative and Growth-Inducing Impacts, and Other Statutory Requirements," the demolition of the Bennett and Northern Main Pump Stations and the removal of the intake pipes are part of the American Basin Fish Screen and Habitat Improvement Project (ABFS), which would include a replacement pumping facility on the Sacramento River, near the intersection of Garden Highway and Sankey Road.

The timing and extent of construction at these sites under the NLIP depend on the following two scenarios:

- If construction of the ABFS is completed first, the demolition of the plants would be completed and the pipes beneath the levee would be removed as needed to install the cutoff wall.

- If the ABFS is not completed first, the cutoff wall would be installed along the NCC south levee and the pipes would be raised and the pumps and motors modified so that that these plants could continue to operate. After the ABFS is constructed and operational, the pipes and pumps would be removed.

Once the issues with timing of modifying the discharge pipes are resolved, cutoff walls would be installed up to 80 feet deep at the pumping plant locations to close gaps that would remain along the cutoff wall after construction of the Phase 1 band Phase 2 Projects along the NCC. The levee would also be raised at these locations to an elevation equal to at least 3 feet above the 200-year (0.5% AEP) design water surface. The levee's side slopes would be flattened to meet current design criteria. As discussed in the Phase 2 EIS and Phase 2 EIR, the drainage and irrigation canals at these locations would be moved farther away from the landside toe of the new levee slope when the pump plants are modified.

The locations of the two pumping plants are shown on **Plate 2-6d**. The Bennett Pump Station gap is located between Station 56+00 and Station 61+00; the Northern Main Pump Station gap is located between Station 118+50 and Station 122+10.

Construction of a Cutoff Wall

Installation of a cutoff wall at the pump station locations would include the mobilization of a long-reach excavator, levee-degrading equipment, and slurry production equipment. The levee would be degraded to half the levee height, as measured from the landside toe, and existing pump station pipes would be removed. At the Bennett Pump Station, where a 42-inch-diameter pipe is located deeper in the levee (approximately 20 feet beneath the existing crown), the levee would be further degraded to the base of the pipe and the pipe would be removed. The levee would then be reconstructed to half the levee height to support construction of a cutoff wall. The cutoff wall would be constructed along the existing levee's centerline, overlapping by a minimum of 50 feet the previously constructed cutoff walls adjacent to the pump stations. After approximately 3 weeks during which the cutoff wall would consolidate, levee reconstruction would begin, as discussed below.

At the pump station locations, a total length of about 1,050 linear feet (73,500 square feet) of cutoff wall, including overlaps, would be constructed.

Approximately 3,000 cubic yards of supplemental import material may be required to provide suitable material for the soil-bentonite cutoff wall (based on an estimate of 25–50% of the excavated material being unsuitable for use as backfill for the cutoff wall). The unsuitable material would require off-site disposal. The import of 3,750 cubic yards of material would be required to replace the unsuitable material.

The crew size for construction of a cutoff wall at the pump station locations is estimated at 10–15 people working two 12-hour shifts, 6 days a week. It is anticipated that the same crew would be used for both pump station locations.

During the cutoff-wall construction phase, the top 4 inches of the existing operating road surface at the pump station locations (300 cubic yards) would be salvaged for reinstallation after levee raise is completed. To complete this operation, an additional 150 cubic yards of gravel surfacing would be imported.

Table 2-5 shows the schedule and equipment anticipated for installing the cutoff wall.

Table 2-5
Anticipated Equipment Types and Duration of Cutoff-Wall Construction Work at NCMWC Pumping Station Locations along the NCC South Levee

Construction Phase	Equipment Type and Number of Each Type	Duration of Use (Work Days)
1. Clearing and grubbing/stripping	Elevating scraper (1)	2
	Water truck (1)	2
	Front-end loader (1)	2
	Haul truck (1)	2
2. Levee degrading (Lags item #1 by 2 days)	Bulldozer (1)	3
	Scraper (1)	3
	Loader (1)	3
	Water truck (1)	3
3. Pipeline removal	Excavator (1)	3
	Haul truck (1)	3
4. Construction of cutoff wall (Follows item #3)	Long-reach hydraulic excavator (1)	12
	Front-end loaders (1)	12
	Extended Boom pallet loader (1)	12
	300-kilowatt generator (2)	12
	Slurry pumps (2)	12
	Pickup trucks (3)	12
	Haul truck (1)	12
5. Reconstruction of levee crown	Scraper (1)	6
	Water truck (1)	6
	Sheepsfoot rollers (2)	6
6. Borrow site excavation (Concurrent with item #5)	Excavator (1)	6
	Water truck (1)	6
	Haul trucks (3)	6
7. Demobilization/cleanup (Follows item #6)	Water trucks (1)	2
	Hydroseeding truck (1)	2
	Haul trucks (1)	2

Source: Data provided by Mead & Hunt in 2009 and compiled by EDAW in 2009

Levee Raising

Levee raising would be carried out in a manner similar to the work completed as part of the Phase 2 Project (SAFCA 2007b). To obtain 3 feet of levee height above the 200-year design water surface, these levee sections would require raising approximately 3 feet. This operation would entail importing material that meets USACE requirements for levee fill. At the Bennett Pump Station, where additional levee degradation is required to remove a deeper pipeline, the levee would be reconstructed to a 3H:1V waterside slope, aligning with the portions of levee constructed adjacent to this reach as part of Phase 2. Given the landward setback of the Phase 2 Project construction, this slope configuration would provide a 3H:1V theoretical slope from the waterside toe to the top of the waterside levee slope's hinge point. At the Northern Main Pump Station, where it is not necessary to degrade the levee beyond half the levee height, the crown would be reconstructed from the point of degradation up at a slope of 3H:1V. Landside slopes at both locations would be constructed at 3H:1V. Approximately 33,000 cubic yards of import material, including a 25% factor for shrinkage, would be required to reconstruct the levee crown and raise and flatten the slopes. This assumes that approximately 80% of the existing levee crown meets levee fill material requirements. The Brookfield borrow site, which was analyzed in the Phase 2 EIR and Phase 2 EIS as part of the Phase 2 and 3 Projects, would be the most likely source for this material. Delivery of this material would require approximately 20 trips per day, assuming a construction period of 140 days out of a 156-working-day construction season. Excluding off-site fabrication work, the crew size for this phase of the project during its peak would be 15–20 people, working one 10-hour shift per day, 6 days a week. **Table 2-6** contains the schedule and equipment anticipated to raise the NCC south levee.

Table 2-6
Anticipated Equipment Types and Duration of Work to Raise the NCC South Levee

Construction Phase	Equipment Type and Number of Each Type	Duration of Use (Work Days)
1. Levee raising	Dozer (1)	10
	Loader (1)	10
	Water truck (1)	85
	Sheepsfoot rollers (4)	85
	Water truck (1)	85
2. Borrow site excavation (Concurrent with item #1)	Excavator (1)	12
	Dozer with ripper (1)	12
	Water truck (1)	12
	Haul trucks (10)	12
3. Finish grading (Follows item #2)	Motor grader (1)	2
	Hydroseed truck (1)	1
	Water trucks (1)	2
4. Construction of operating road (Follows item #3)	Haul trucks (5)	2
	Sheepsfoot compactors (2)	2
	Motor grader (1)	2

Source: Data provided by Wood Rodgers in 2009 and compiled by EDAW in 2009

2.3.2 IRRIGATION AND DRAINAGE COMPONENTS

2.3.2.1 RIVERSIDE CANAL REALIGNMENT

The existing Riverside Canal is approximately 18,600 feet long and is located roughly parallel and adjacent to the landside toe of the levee along Garden Highway. The existing canal is lined with concrete for most of its length. The Riverside Canal is a main irrigation canal that services NCMWC's Riverside system. The canal flows south along the toe of the levee to approximately Bryte Bend Road, beyond which the canal is abandoned.

Approximately 40 field services, roadway crossings, and diversion boxes are located along the canal. To accommodate levee construction, the Riverside Canal would be relocated eastward. The canal would also be extended north of Powerline Road for a new total canal length of approximately 31,000 feet. The supply pipes from the Riverside Pumping Plant would be extended to the relocated canal. The canal turnouts, roadway crossings, and diversion boxes would need to be replaced as part of the Phase 4a Project.

The bottom of the canal would be high enough to raise irrigation-water discharge outlets above the levels of adjacent fields so that these fields could be fed from the canal by gravity flow. The canal would be confined by earthen embankments designed to provide about 1 foot of embankment height above irrigation-water operating levels. The canals must have sufficient level-control structures (check structures) to maintain specified water levels at service points when flows are at a minimum.

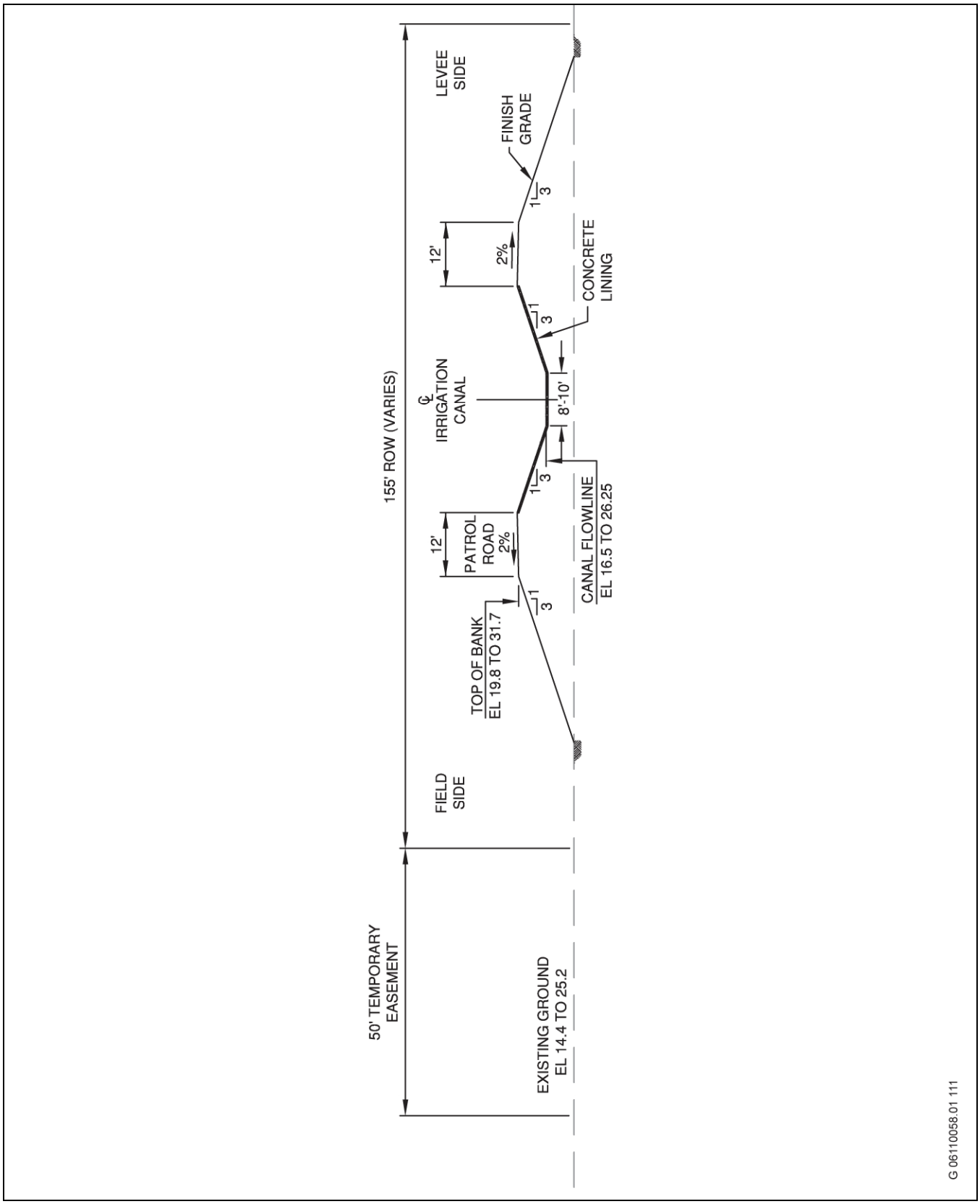
Canal Alignment

The proposed alignment of the replacement Riverside Canal was based primarily on the extent of the planned levee improvements (see **Plates 2-6a** and **2-6b**). Much of the replacement canal would be sited as close as possible to the toe of the new levee and seepage berm footprint. One-half to three-quarters of a mile south of San Juan Road southward to Interstate 80 (I-80), approximately 25 residences are located along the landside toe of the levee. To avoid removing a substantial number of the residential and agricultural structures on these private properties, the Riverside Canal alignment would follow the eastern property line of these parcels, veering farther east in Reach 16. The final alignment would also aim to minimize conflicts with large groves of existing trees and other site-specific constraints that are identified during final design. Based on these site-specific factors and the variation of the proposed seepage remediation methods in different reaches, the alignment would be only roughly parallel to the projected levee toe. The materials to construct the Riverside Canal would come primarily from the Fisherman's Lake Borrow Area (see "Borrow Sites" below).

The canal right-of-way would be roughly 155 feet wide, including a landside operation and maintenance corridor and embankments on each side of the channel. The bottom width of the canal would range from about 8 feet to 10 feet wide. To provide for stable banks, the side slopes of the canals would be 3H:1V or flatter. The invert and side slopes of the canal would likely be lined with concrete for vegetation control and to allow for easier maintenance. If lined, the canal's interior side slopes could be steepened up to a configuration of 2H:1V, possibly resulting in a slightly narrower footprint. The top of the embankments would be about 5.5 feet above the bottom of the channel, and up to 9.5 feet above existing grade, with top widths of approximately 12 feet. Patrol roads with an aggregate-base rock surface would be constructed on the top of the embankments. Disturbed areas, aside from the lined canal and patrol road, would be seeded after construction (**Plate 2-10**). Construction details are discussed below.

Pipeline Alignment

In addition to the open canal, an approximately 8,500-foot-long, 24-inch- to 36-inch-diameter pipeline would be constructed immediately east of the new levee footprint in Reaches 15–18B. The Riverside Pipeline would allow the relocated canal system to provide irrigation service to the parcels currently served by the Riverside Canal. After construction, these parcels would be located between the improved levee and the relocated Riverside Canal. The beginning of the pipeline would be roughly one-half mile south of San Juan Road in Reach 15, where the



Source: Prepared by Mead & Hunt in 2009

Typical Cross Section – Replacement Riverside Irrigation Canal **Plate 2-10**

replacement Riverside Canal veers eastward away from the levee toe, continuing southward to I-80 and connecting back to the canal in the vicinity of Bryte Bend Road.

A 20-foot-wide permanent right-of-way would be obtained to construct the pipeline and provide for access and maintenance after construction. The pipeline would be bedded with a sand-cement flowable fill and buried with at least 2 feet of cover. Typical cross sections for the pipeline showing both location options (within and east of the levee footprint) are shown in **Plate 2-11**. Turnouts would be provided along the pipeline to serve the parcels that receive irrigation water. The pipeline would also include seven inlet/outlet structures at road crossings and an outlet structure at the southern end. A piped section in Reaches 12B–13 is under consideration as a measure to avoid residences there.

Canal Construction

It is critical that the timing of construction of the new canal avoid interruptions in irrigation service. Temporary connections may need to be constructed to avoid or minimize service interruptions to adjacent agricultural properties. The new Riverside Canal would be constructed before the abandonment and filling of the existing Riverside Canal to allow construction of the levee improvements. Extension of the Riverside Pumping Plant's pipes to provide water to the new canal and turnout connections to users would be constructed outside of the irrigation season to avoid service interruptions.

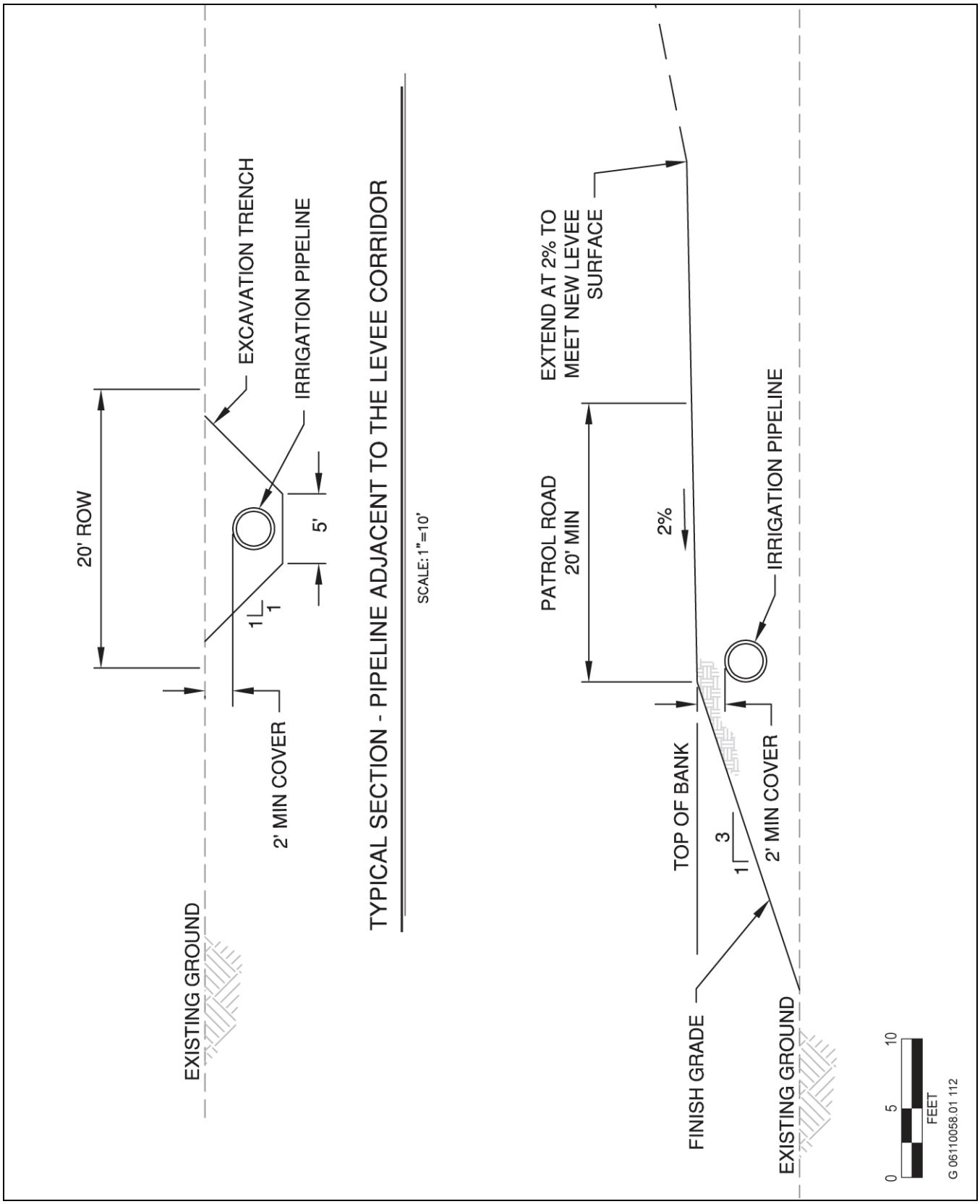
Before construction, the canal right-of-way surface would be cleared and stripped to a depth of 4–6 inches, with removal of low-growing vegetation and loose surface soils. Suitable earthen materials removed during this stage would be stockpiled. Earthen materials that are not suitable for reuse in embankments would be wasted and hauled off-site or respread over the finished canal slopes. Before excavation, any power poles in the path of the canal construction would need to be relocated. Natural-gas pipelines, gas wells, and other gas facilities would be avoided or reconfigured as part of final design of the new Riverside Canal.

Because of the length of the canal, at least three staging areas of about 1 acre each would be required along and at each end of the canal. The staging areas would be located on upland areas adjacent to the Riverside Canal footprint, either to the west on lands acquired for levee construction or to the east on croplands via use agreements with landowners. Access to and from the staging areas would be along established roadways and the canal alignment.

Material from excavation of the borrow sites would be used to construct the new canal embankments. Boom trucks and concrete pumps would be used along the concrete-lined canal sections to apply the concrete to the bottom and side slopes of the channel. Approximately 540,000 cubic yards of earthen material would be needed to construct the canal embankments.

Pipe sections would be constructed by excavating open trenches, laying the pipe, and backfilling to provide adequate cover material. Pipeline construction would likely occur in conjunction with construction of the open-channel portion of the Riverside Canal. This would facilitate operational changes and avoid potential service interruptions by temporarily creating a redundant system, because construction would occur while the existing Riverside Canal is still operational. However, because levee improvements south of Reach 15 (approximately the north end of the pipeline) would be constructed as part of the Phase 4b Project, it is possible that pipeline construction would be delayed and included in the contract for Phase 4b Project levee improvements. In that case, a temporary connection would be constructed from the relocated and extended Riverside Canal to the existing Riverside Canal to provide interim irrigation service to the parcels that would eventually be served by the pipeline (see **Plate 2-9b**). If the Phase 4b Project is not built, the interim pipeline connection would remain to serve irrigated agricultural fields south of Reach 15.

New facilities that would be constructed include distribution boxes, gate valves, cast-in-place concrete headwalls and control structures, and culverts. Backhoes and excavators would be used to excavate material for the new facilities. Precast distribution boxes, pipes, and other appurtenances would be transported to the site on trucks.



Source: Prepared by Mead & Hunt in 2009

Typical Cross Section – Pipeline Section of Replacement Riverside Irrigation Canal **Plate 2-11**

Other concrete facilities would be cast in place and concrete would be transported to the site in ready-mix trucks. Small compactors would be used to compact fill material around the structures.

Portions of farm canals and other irrigation facilities would be abandoned based on the alignment of the relocated and extended Riverside Canal. Canal segments that are outside the footprint of the proposed levee improvements would be filled after the relocation and extension of the Riverside Canal.

Erosion-control measures would be installed before the start of construction and maintained throughout the construction period to minimize sedimentation of adjacent waterways. A hydroseeding truck would be used at the end of construction to seed any disturbed area. Water trucks would be used throughout construction to control dust in any disturbed areas. After construction, all disturbed areas would be vegetated and the construction site would be generally cleaned up including hauling off of unused and waste materials.

The anticipated construction labor force would consist of 30–40 people working 8- to 10-hour shifts, 6 days per week. Riverside Canal construction would occur primarily during fall and winter 2010–2011 and would last for up to 90 days. A general construction schedule and description of the construction phases is included below, and **Table 2-7** shows the overview of the construction schedule.

Table 2-7
2010–2011 Construction Season Schedule for the Relocated and Extended Riverside Canal

Construction Phase	August				September				October				November				December				January			
Mobilization	■	■	■	■																				
Clearing and grubbing/stripping					■	■																		
Grading, relocation, reconnection of turnouts, and piping							■	■	■	■	■	■	■	■	■	■	■							
Finishing of site and grading work																		■	■	■				
Restoration																					■	■	■	
Demobilization/cleanup																								■

Source: Data provided by Mead & Hunt in 2009 and compiled by EDAW in 2009

Tables 2-8 and **2-9** present anticipated construction equipment and duration and expected hauling requirements, respectively, for the relocated and extended Riverside Canal.

2.3.2.2 MODIFICATIONS TO THE RIVERSIDE PUMPING PLANT

Much of the water from the Sacramento River for irrigated agriculture in the Natomas Basin is pumped into the Basin using NCMWC facilities. In the Phase 4a Project reaches, four irrigation-water pumping facilities, three owned by Sacramento County (Airport south bufferlands located south of I-5 and west of Powerline Road) and one owned by SAFCA (Novak property), pump water from the Sacramento River to irrigate landside properties. The discharge pipes from these facilities, and most likely the pumps and motors, would need to be modified to raise the pipes above the 200-year design water surface elevation. To avoid having to retrofit these individual pumps, SAFCA is evaluating the potential to consolidate these four pumps with the modifications to the Riverside Pumping Plant.

The existing design capacity of the Riverside Canal is 45 cubic feet per second or about 20,200 gallons per minute. The capacity of the modified Riverside Pumping Plant (see **Plate 2-6b**) would not increase as part of the pump consolidation efforts. This is because of a reduction in the Riverside Canal's service area. Irrigation-water

Table 2-8
Anticipated Construction Equipment and Duration of Use for the Relocated and Extended Riverside Canal

Construction Phase	Equipment Type and Number of Each Type	Estimated Duration (Work Days)
Clearing and grubbing/stripping	Dozers (4)	30
	Water trucks (2)	30
	Front-end loaders (4)	30
Construction of water control facility and pipeline	Backhoes (2)	17
	Flatbed trucks (2)	17
	Generators (2)	17
	Compactors (2)	6
	Boom trucks (2)	5
	Concrete pump (1)	5
Construction of embankment and access road	Dozers (3)	65
	Sheepsfoot rollers (3)	65
	Water trucks (3)	65
	Smooth drum rollers (3)	5
	Motor graders (3)	65
Canal lining	Boom trucks (4)	20
	Concrete pump (2)	20
Irrigation interconnections	Excavators (10)	20
	Water truck (5)	20
	Motor grader (5)	20
Erosion control	Hydroseeding truck (3)	15
	Water truck (3)	30
Abandonment of irrigation canal	Loaders (2)	20
	Compactors (2)	20
Demobilization/cleanup	Trucks (5)	5
	Front-end loader (1)	5

Source: Data provided by Mead & Hunt in 2009 and compiled by EDAW in 2009

Table 2-9
Hauling Requirements for Construction of the Relocated and Extended Riverside Canal

Construction Phase	Material Source	Material Destination	Volume (cubic yards)	Number of Trucks [1]	Total Truck Trips per Day	Duration (Work Days)
Clearing/grubbing	Project	Waste	90,000	25	200	30
Embankment construction	Borrow site	Project	540,000	40	600	60
Concrete delivery	Off-site	Project	100	2	6	3
Pipe delivery	Off-site	Project	NA	NA	10	10
Miscellaneous deliveries	Off-site	Project	NA	NA	1	75
Finish grading	Off-site	Seeding	10,800	3	1	15

Notes: NA = Not available

[1] Truck capacity is assumed to be 15 cubic yards

Source: Data provided by Mead & Hunt in 2008 and 2009 and compiled by EDAW in 2008 and 2009

service to the areas north and south of I-80 and San Juan Road was decreased as a direct result of urban development in these areas. Irrigation water would be provided from the Riverside Canal system to the proposed service area (Airport and Novak).

The NCMWC Riverside Pumping Plant's pump discharge pipes, which currently penetrate the Sacramento River east levee (Reach 14) below the 200-year design water surface elevation, would be raised to cross the levee above this elevation. Raising of the discharge pipes, which currently cross the levee under Garden Highway, would require closure of the road to through traffic for up to 60 days, with traffic detours between Powerline Road and San Juan Road. The existing pumps would require modification or replacement to achieve preproject performance after the levee improvements and pipe raising. The building superstructure that supports the pumps at the Riverside Pumping Plant would require retrofitting or other rehabilitation to accommodate the replacement pipes. The pump house, manifold structures, gate boxes, and outfall would be removed or modified for replacement of discharge pipes. Some excavation of sediments within the Sacramento River channel may be required for installation of the new pumps. In-water construction would include use of dredge pumps to remove sediment so that new pumps could be installed, but no dewatering involving use of a cofferdam would take place. Use of a backhoe, pneumatic hammers, and a front-end loader and haul truck would likely be required to remove the pump discharge manifold structure, the pump house, and the gate structures. The material would be removed from the site or salvaged and returned to NCMWC. For modifications to the pumps, the pumps would be removed from the platform and replaced with new pumps. Electrical service for the pumping plant could require upgrading because of the increased horsepower required to pump over the levee or because of changes in the Uniform Electrical Code. Temporary pipes would be installed under Garden Highway at the Riverside Pumping Plant (see **Plate 2-6b**) concurrent with cutoff wall construction. In the following construction year, permanent pipes will be installed after the levee has settled. Garden Highway would be closed to through traffic for up to 60 days for replacement of the temporary pipes. Traffic detours would be located between Powerline Road and San Juan Road for the Riverside Pumping Plant.

Similar to the Bennett and Northern Main Pumping Station locations described above, and as discussed in Section 5.1, "Cumulative Impacts," the retrofitting of the Riverside Pumping Plant and the removal and screening of the intake pipes are part of the ABFS. That project would include a replacement pumping facility on the Sacramento River, near the intersection of Garden Highway and Sankey Road.

The timing and extent of Phase 4a Project construction at this site depends on the following two scenarios:

- If construction of the ABFS is completed first, the demolition of the plant would be completed and the pipes across the levee would be removed and replaced as needed to implement seepage remediation measures.

- If the ABFS is not completed first, the seepage remediation measures would be implemented, and the pipes would be raised and the pumps and motors modified as necessary so that this plant could continue to operate. Then, as part of the ABFS project, the pipes and pumps would be removed and replacement (screened) facilities constructed.

2.3.2.3 MODIFICATIONS OR RELOCATIONS OF PUMPING PLANT NOS. 3 AND 5

Because the Natomas Basin is surrounded by levees, all excess drainage within the Basin must be pumped out. Drainage within most of the Basin is pumped to the Sacramento River via RD 1000's drainage system and pumping plants. The existing discharge pipes at RD 1000's Pumping Plant Nos. 3 and 5 cross through the levee above the 1957 design water surface elevation (see **Plates 2-6a** and **2-6b**). Under the new levee performance criteria, the discharge pipes are required to cross the levee above the new 200-year design water surface. Therefore, both pumping plants would require new discharge pipes and additional modifications to accommodate the new criteria and levee improvements. Raising these discharge pipes, which currently cross the levee under Garden Highway, would require closure of Garden Highway to through traffic for up to 60 days, with a traffic detour for Pumping Plant No. 5 between Bayou Road and Powerline Road and a detour for Pumping Plant No. 3

between Powerline Road and San Juan Road. As design evaluations continue and the design is refined, additional modifications could be required to maintain the plant's current operations, such as adding relief wells and lining the intake channel with either filter gravel or rock-covered geotextile fabric. In addition, relocating the pump stations may be necessary to accommodate the adjacent levee footprint. Temporary pipes will be installed under Garden Highway at Pumping Plant Nos. 3 and 5 (see **Plates 2-6a** and **2-6b**) concurrent with cutoff wall construction. In the following construction year, permanent pipes will be installed after the levee has settled. Garden Highway would be closed to through traffic for up to 60 days for replacement of the temporary pipes. Traffic detours would be located between Bayou Road and Powerline Road for Pumping Plant No. 5, and between Powerline Road and San Juan Road for Pumping Plant No. 3.

Pumping Plant No. 5

Pumping Plant No. 5 is located along Reach 10 of the Sacramento River east levee. An excavated intake channel is located adjacent to the levee and connected to the West Drainage Canal on the east end, and three pumps and an equipment building are located immediately adjacent to the landside levee toe. Each pump for Pumping Plant No. 5 connects to a buried discharge pipe that runs across the existing levee to an outfall structure on the Sacramento River. Three air/siphon release valves, one for each pipe, are located close to Garden Highway on the waterside of the levee.

The pumping-plant modifications would include replacing the discharge pipes that extend from Pumping Plant No. 5 across the levee to tie into the existing discharge pipes within the waterside bench. These modifications would take place above the Sacramento River's normal water surface elevations; therefore, no dewatering would occur. The air/siphon release valves would be replaced and shutoff valves would be added. The valves would be constructed in a concrete vault in the waterside shoulder of the levee. The pumps would also be replaced and/or upgraded to account for the higher head associated with the raised discharge pipes.

To facilitate raising of the pump discharge pipes, Garden Highway would require a local raise in grade over the pipes. The road raise would transition back down to existing grade upstream and downstream of the local raise. This work would require partial regrading of the waterside slope for the 1,200-foot length of the raised Garden Highway (approximately between Stations 479+00 and 491+00). The levee would transition upstream and downstream of this site from an adjacent levee to a raise of the existing levee in place. The levee at this site would require degrade and reconstruction with engineered fill.

An upgrade to the pumps and the electrical service for Pumping Plant No. 5 could be required to provide the increased horsepower needed to pump over the levee. Use of new pumps could require the excavation of a deeper sump, which may require some associated modifications to the intake channel. The plant and the intake channel would also require modifications to mitigate levee underseepage potential. The remediation work would include stabilization of the intake channel in front of the plant and subsurface stabilization around the plant on the landside of the levee. The channel remediation would extend 300–400 feet upstream of the pumping plant entrance and would include a combination of installing relief wells, flattening the slopes of the channel banks, and lining the channel with a gravel or geotextile filter layer covered with rock. The subsurface stabilization would include driving a sheetpile cutoff wall between the landside toe of the levee and the pumping plant approximately 60 feet deep and installing relief wells between the levee and sheetpile. This work would require relocation of the electrical control building landward further away from the levee.

In addition, this pump station may need to be relocated as a seepage and stability mitigation measure. The pump station would be moved 300–500 feet away from the levee along the existing intake canal. The intake channel between the existing and new pump station sites would be filled. The reconstructed Pumping Plant No. 5 would consist of a cast-in-place concrete sump, with a trash rack and operating deck. An enclosure building would be provided to house the electrical, control, and monitoring equipment. The pumps, electrical equipment, maintenance platform, and pump deck would be elevated above the Natomas Basin's interior 100-year flood elevation. Access roads would be reconstructed to allow access to the relocated pump station. Related

infrastructure, such as access roads and utilities that serve Pumping Plant No. 5 and are located within the levee footprint, would be relocated outside the footprint.

Pumping Plant No. 3

Pumping Plant No. 3 is located along Reach 13 of the Sacramento River east levee. Four pumps, a water vault, a control-room building, and associated infrastructure for the pumping plant are located immediately adjacent to the landside levee toe. Three of the pumps are connected to a concrete pressure vault and discharge into a single deep culvert under the levee with an outfall into the Sacramento River. The other pump is directly connected to a discharge pipe to the river and crosses through the levee high in the levee section, under Garden Highway. A spare discharge pipe also crosses through the levee high in the levee section. These two pipes are discharged into a concrete outfall structure built into the bank of the river.

The scope of the modifications required at Pumping Plant No. 3 would be similar to those described for Pumping Plant No. 5, in that the pipe across the levee would need to be raised and replaced. The extended pipe would tie into existing discharge pipes within the waterside bench. The modifications to Pumping Plant No. 3 would also include relocating and replacing the water vault. The new water vault and outlet pipe would likely be located on the waterside bench to tie into the existing outlet pipes at that location. These modifications would take place above the Sacramento River's normal water surface elevations; therefore, no dewatering would occur.

To comply with current levee construction standards, removal of the deep culvert at this site would be required. Removal of the culvert would require a deep excavation and dewatering, which would be accomplished by installation of a sheetpile cofferdam in the Sacramento River. Dewatering would be accomplished through the use of sheetpiling and pumping. In addition to pumping from behind the cofferdam, temporary holes with pumps would be installed around the perimeter of the area to be dewatered in order to lower the groundwater. Groundwater pumping would be discharged into the drainage canal upstream of Pumping Plant No. 3. The three Pumping Plant No. 3 pumps that discharge through this deep culvert would be reconfigured to pump into individual discharge pipes. These pipes would cross through the levee high in the levee section, similar to the other pumps. A new concrete outfall would be constructed in the bank of the river, similar to the existing concrete outfall for other pumps. This construction would likely take place behind the cofferdam that would be installed to remove the existing deep culvert. The concrete outfall would be constructed with the cofferdam, and the dam would be cut off flush with the outfall invert when complete. Rock would be placed around the outfall and down the slope to stabilize the area around the outfall.

New pumps could require the excavation of a deeper sump, which may require some excavation of and modification to the Pumping Plant No. 3 drainage canal Similar seepage and mitigation measures would be performed in the intake channel to 300–400 feet upstream of the pump entrance. Modifications would include a combination of installing relief wells, flattening the slopes of the channel banks, and lining the channel with a gravel or geotextile filter layer covered with rock. In addition, the Pumping Plant No. 3 facility may require relocation landward with similar construction features as Pumping Plant No. 5. Related infrastructure, such as access roads and utilities that serve the pumping plant and are located within the levee footprint, would be relocated outside the footprint.

2.3.2.4 SOUTH LAUPPE PUMP REPLACEMENT

USACE and CVFPB have approved a Sacramento River Bank Protection Project (bank protection project) to repair five erosion sites in the Sacramento River watershed, including a 1-acre, site at River Mile 77.2 on the left bank of the Sacramento River in Sutter County (USACE and CVFPB 2009). The bank protection project would install rock slope protection at this site, which would require reconstruction of the existing South Lauppe vertical river pump. The Phase 4a Project addresses the impacts of reconstruction of the pump. This facility is operated by a private landowner and serves approximately 200 acres of farmland, including The Natomas Basin Conservancy's (TNBC's) Huffman West Preserve. The pumping plant capacity is approximately 2,000 gallons

per minute (gpm) and irrigates the above farmland in conjunction with an existing groundwater well. Operational conditions would essentially remain unchanged.

The existing platform and vertical pump would be replaced by a new pile supported platform and slant pump. A steel operating deck would be constructed on the bench near top of bank, approximately 20 feet landside of the existing platform. Pairs of steel H-piles to support the slant pump would be driven every 20 feet from the new platform to 75 feet beyond the existing platform, a distance of approximately 120 feet. Pump supports and operating deck columns above the waterline could also be supported with concrete foundations.

Reconstruction of the new South Lauppe River Pump would occur following completion of the bank protection project. However, the existing pump, motor, electrical, and steel platform (including vertical supports) and discharge pipes would be removed to facilitate the bank protection project. The removal would require a system outage until the replacement facility can be constructed, which would be accomplished through reliance upon alternative delivery facilities, such as the groundwater well, and changes in cropping. The existing concrete abutments for platform posts would be left in place to support the new pump. Removal of the pump would not require dewatering, and the only activities below the ordinary high water mark would be cutting off steel supports and lifting the pump out of the river using a crane from the top of bank.

After installation of the rock, as part of the NLIP, steel H-piles would be driven using a crane and impact hammer. Because some of the supports are located within the rock protection area, coordination with USACE would be required to provide space for the new H-piles. During the rock placement, USACE could leave voids in the rock for the H-piles, or during the H-pile installation, the existing rock could be pulled back for the pile installation and replaced following installation. Rock placed below the water surface could be moved and replaced using equipment from the top of bank and divers underwater to avoid dewatering. Concrete foundations could be used to support the pump support columns above the waterline.

Once the supports are installed, the new steel platform would be constructed and connected to the new piles. The new slant pump would be installed and connected to the H-piles. New controls and electric service would be provided. The construction also includes a new discharge pipe to connect to the existing discharge pipe. Some limited excavation may be required for placement of footings (less than 50 square feet) above the waterline, but below the ordinary high water mark and on the bench. This construction activity would take place from the top of bank and the only work below the ordinary high water mark would be welding of steel supports and lifting the new pump into place.

The reconstruction of the new South Lauppe River Pump would require 4–6 weeks, including mobilization, construction, and clean-up activities, and would require construction within the Sacramento River. Access to the site would be directly from Garden Highway. No road closures would be required, but some limited traffic control may be required to move equipment to and from the site.

An alternative to modifying the existing South Lauppe River Pump would be to relocate the facility to the north such that it would be outside of the planned rock slope protection area. The facility would be relocated with a steel platform and vertical pump. Some in water pile driving would be required for this option as well. The overall footprint for the platform and pump would be much smaller, approximately half the length of the slant pump footprint, thus requiring much less in water work. This alternative would also require a 300-foot, 16-inch diameter pipeline to connect the new river pump to the existing irrigation system landside of the existing pump. The pipeline would be located on the water side of the levee above the ordinary high water mark.

2.3.2.5 DEVELOPMENT OF NEW AND REPLACEMENT GROUNDWATER WELLS

Approximately 13 existing water wells on the landside of the Sacramento River east levee would be disrupted by the proposed levee improvements and would require abandonment and replacement outside of the levee footprint.

The existing wells would be destroyed in accordance with regulatory requirements following construction of the replacement wells. The wells that would be abandoned and replaced include:

- Five existing agricultural wells in Reaches 1–4 that would be replaced by new wells outside the levee footprint;
- An agricultural well in Reach 6A that would be replaced by a new well either in Reach 6A or in Reach 5B that would serve as a back-up water supply for the new GGS/Drainage Canal that was addressed as part of the Phase 3 Project (USACE and SAFCA 2009);
- An agricultural well in Reach 8 that would be abandoned and replaced with a new well outside the levee footprint;
- Five existing agricultural wells in Reaches 9–12 that would be abandoned and replaced outside the proposed levee footprint; and
- A well on TNBC's Cummings tract, which serves as a redundant water supply for that preserve, would likely need to be abandoned and replaced.

In addition to replacement wells, approximately 5 new wells would be constructed to provide a water supply for habitat mitigation features:

- In Reach 6A, a groundwater well would be constructed to provide a back-up supply for the GGS/Drainage Canal during critically dry years, when surface water deliveries might be reduced;
- In Reach 7 or Reach 8, a new well is planned to provide irrigation water for woodland mitigation plantings that were addressed as part of the Phase 3 Project (USACE and SAFCA 2009); and
- In the Fisherman's Lake Habitat Complex, a new well is proposed within Reaches 12–14 for maintenance of woodland plantings. Within Reaches 13–14, two new wells are planned to serve as supplemental water supplies for new marsh habitat that would be created in that area (see Section 2.3.4.3, "Managed Marsh Creation").

Precise locations for replacement and new water wells would be determined during the design process.

Well Construction

Depths of the proposed new and replacement wells on the landside of the Sacramento River east levee would typically range from 200 to 500 feet. Final depth would be determined after exploratory drilling to evaluate yield of water bearing strata. Agricultural wells would generally be 16 inches in diameter. Wells to irrigate mitigation plantings may be smaller in diameter (approximately 12 inches). Well construction would generally use the reverse circulation rotary wash method which would require water to flush cuttings from the drill hole and a disposal area for drilling cuttings. Water supply would be trucked to the site if a sufficient local source is not available. Drilling cuttings would be disposed of in a temporary pond constructed adjacent to the work area by construction of perimeter berms. Once the disposal pond has sufficiently dried, the cuttings would be removed and incorporated into the levee or berm construction or possibly used as fill material for roadways and ramps.

Well construction would begin with drilling of an exploratory hole (test boring) to identify the water-bearing strata. This data would be used to evaluate the preliminary design and to select well construction materials. One test boring at each potential well site would be performed. Drilling of the exploratory holes would generally use mud rotary drilling methods which would utilize drilling muds (bentonite). The test boring drilling would last approximately one to two days per well. Several days of preparation would also be required to mobilize equipment and prepare the site for the drilling operation. For each test boring, a drill rig would be used to drill a

6-inch to 8-inch diameter test hole up to 500 feet in depth. During the drilling of the test hole, changes in soil types and water yield zones would be logged. Following completion of the test boring, the hole would be backfilled with the boring cuttings and bentonite.

For construction of each well, an outer casing and seal would initially be constructed to stabilize the hole and prevent contamination of lower soil layers during the drilling process. An outer casing hole (generally 36-inch or less) would initially be drilled to approximately 50 to 60 feet deep, lined with a steel casing, and the annular space outside of casing would be filled with grout. After the grout has set, the well hole would be drilled up to 500 feet deep. The well casing would be steel pipe with wire wrapped well screen or perforated casing set at water bearing layers. The wire wrapped well screen/perforated casing sections would be placed in high water yield areas that were predetermined based on the test boring results. After installation, the annular space around the casing and screens would be packed with gravel, and the upper approximately 50 feet would be sealed with grout. For the larger wells, the well casing would be 16-inch diameter or less. The bore holes would be sized for a 4-inch- to 6-inch thick gravel pack in the annular space. Well construction would require several days of preparation, approximately 2 to 3 days of drilling, and 2 to 3 days for the gravel pack placement and grouting.

The final phase of construction would be well development, test pumping and disinfection. Development would consist of swabbing or scouring the well with drilling equipment and pumping to consolidate gravel pack and remove fines and drilling fluid. Test pumping would be performed to establish the well yield and drawdown for final pump selection. Finally, the well would be disinfected with chlorine treatment, and a temporary cap would be installed. Well development and test pumping would last several days to one week. Water from test pumping would be discharges into existing irrigation facilities which the well serves, discharged into drainage ditches or discharged directly onto adjacent agricultural fields.

Pumps would be installed in each well. For the mitigation wells, submersible pumps would normally be used. For the agricultural wells, a 6-foot by 6-foot concrete pad would be constructed at ground level to provide for mounting a vertical turbine well pump. A service pole with meter and control panel would need to be installed near each well to provide overhead electrical service. At some sites the overhead electrical power lines would need to be extended to sites through Agency owned property or new easements.

Well destruction would be performed in accordance with Sutter or Sacramento County regulations. Well equipment would be removed and salvaged or hauled away. The well pump bases and casing would be cut below surrounding grade. Abandonment would generally require grouting the well.

The well construction would require a total of approximately three weeks. Drilling activities would require construction to continue 24 hours per day to avoid collapse or seizing of drill equipment within the hole. Development and test pumping would also continue 24 hours per day because continuous pumping is required to obtain accurate results. Construction equipment required would include a well drill rig, pump, generator, grouting machine, crane, flatbed truck, light plant, and water truck. Site preparation and cleanup would require earthmoving equipment such as a front-end loader or small dozer to construct the working pad and pond for cuttings. Drill pipe, casing and gravel, as well as miscellaneous construction material would require approximately 5 to 10 trips per hole.

2.3.3 BORROW SITES

The Fisherman's Lake Borrow Area is anticipated to be the primary source of soil borrow for Phase 4a Project construction (**Plates 2-6a** and **2-6b**). However, additional borrow sites (see below) may be needed. All potential borrow sources are listed in **Table 2-10**.

Table 2-10
Potential Borrow Sites for the Phase 4a Project

Borrow Site/Location	Size of Site (acres)	Amount Available for Excavation (acres)[1]	Estimated Average Depth of Excavation (feet)[2]	Current Use	Proposed Postreclamation Use
New Sources					
Fisherman's Lake Borrow Area	469	387	Marsh channel (40%): 9 Marsh bench (50%): 4 Marsh upland (10%): no cut Agricultural uplands: 4 Reclaimed cropland: shallow-graded (2-3-foot cut)	Field crops/rice	Marsh (up to 120 acres), agricultural uplands (up to 60 acres), and field crops (210 acres)
I-5 Borrow Area	505	225	3–4	Field crops/alfalfa/rice	Field crops
Previously Analyzed Sources[3]					
Brookfield	195	180	5	Rice	Rice
Airport north bufferlands (sites 3,5, and 6)	341	247	4-5	Idle	Idle
South Sutter, LLC (also known as Thornton)	97	68	4–5	Alfalfa	Alfalfa/field crops
Elkhorn Borrow Area	554	463	3–4	Field crops	Field crops
Novak (part of the Fisherman's Lake Borrow Area)	94	76	5	Field crops	Agricultural uplands (76 acres)
Krumenacher	118	NA	NA	Grazing/other	Grazing/other
Twin Rivers Unified School District stockpile site[4]	—	—	—	Stockpile	—

Notes: I-5 = Interstate 5; NA = Not Available

[1] Extent of excavation within site.

[2] Depth includes approximately one foot of topsoil stripping. Finished elevation would be approximately one foot higher after surface material respread, grading, and seeding.

[3] Previously disclosed and analyzed as a source of soil borrow for the Phase 3 Project (see Section 4.1.3, "Summary of Previous NEPA and CEQA Analyses of Borrow Sites").

[4] Twin Rivers Unified School District is a stockpile of soil created from grading; excavation is not required.

Source: Data provided by Mead & Hunt in 2009 and compiled by EDAW in 2009

Borrow material would be excavated from primarily agricultural lands that either are currently fallow or produce row or field crops. These sites may also contain scattered rural housing, drainage and irrigation features, and woodlands. Excavated soils not used for borrow material, such as the organic surface layer or soils considered unsuitable for levee construction, would be stockpiled and respread on-site after excavation. For areas planned to

be returned to agricultural use, approximately 1 foot of topsoil would be removed and stockpiled for reuse during reclamation of the site. The borrow-site excavation operations would use water for dust control and to maintain proper moisture content in the borrow material. Sites would be reclaimed for use and either returned to agriculture or used for habitat mitigation (see Section 2.3.4, "Habitat Improvements").

2.3.3.1 FISHERMAN'S LAKE BORROW AREA

The Fisherman's Lake Borrow Area consists of multiple parcels (**Plate 2-9b**) beginning at Powerline Road and extending south to and beyond Radio Road. These parcels, including the Novak borrow site, total approximately 563 acres. Existing land uses include orchard, field crops, and rice cultivation. Some lands in the area include managed marsh and agricultural upland (field crop) areas owned by TNBC. These conservation areas would not be used for borrow operations. As part of the Phase 4a Project, parcels within the Fisherman's Lake Borrow Area would be used for several project purposes: levee improvements, relocation and extension of the Riverside Canal, woodland mitigation, other habitat creation, and borrow. The areas excavated for borrow material would be reclaimed as agricultural land, grassland, or managed marsh depending on their location and existing land use.

As shown in **Plates 2-6a** and **2-6b**, the first 400–600 feet or greater width of land adjacent to the existing levee toe would be restricted from borrow excavation. Within the Fisherman's Lake Habitat Complex, approximately 76 acres of the Novak parcel and 387 acres of the remaining parcels would be available for excavation of borrow material. Of this total, up to 140 acres would be reclaimed as grassland and agricultural land (Agricultural Upland) and managed as Swainson's hawk foraging habitat and approximately 210 acres would be returned to field crops, which would not be included as part of SAFCA's habitat compensation. Up to 120 acres would be converted to managed marsh (discussed below under Section 2.3.4.3, "Managed Marsh Creation"). The managed marsh would be created on either side of the Pumping Plant No. 3 canal and would connect to existing TNBC marsh lands in the area, thus creating more contiguous habitat.

2.3.3.2 OTHER POTENTIAL BORROW SITES

To ensure that an adequate quantity of suitable fill material is available for the Phase 4a Project, potential borrow sites in addition to the Fisherman's Lake Borrow Area have been identified. The I-5 Borrow Area is close to the proposed improvements in Reaches 10–12 of the Sacramento River east levee and could supplement the borrow material available from the Fisherman's Lake Borrow Area. The I-5 Borrow Area is fully analyzed in this EIS/EIR. The Brookfield borrow site, which was previously disclosed and analyzed as part of the Phase 2 and 3 Projects, would be used as a source of material for the proposed construction on the NCC south levee.

Previously disclosed and analyzed sites that could be used to supplement borrow material for work in Reaches 10–15 of the Sacramento River east levee are listed in **Table 2-10** and shown in **Plate 2-7**. The Elkhorn Borrow Area and the South Sutter, LLC borrow site were previously identified and analyzed in the Phase 3 DEIS/DEIR as areas that could serve as additional sources of borrow material to augment the supplies available from the Airport north bufferlands as necessary to complete the levee improvements in Sacramento River east levee Reaches 4B–9B. Although the Phase 3 FEIR indicates that SAFCA had narrowed the focus of its planning for the Elkhorn Borrow Area to the area south of Elkhorn Boulevard and north of I-5 (SAFCA 2009b:2-1), all of the parcels in this area, including South Sutter, LLC, are close enough to Sacramento River east levee Reaches 10–12 to contribute to the large quantity of borrow material that would be needed to construct the adjacent levee and seepage berms that comprise the Phase 4a Project improvements in these reaches (see **Plate 2-6a**). The Krumenacher borrow site and the Twin Rivers Unified School District stockpile site on the east side of the Natomas Basin could also be used to supply soil borrow material for work on the Sacramento River east levee. Environmental analyses for borrow sites previously identified in the Phase 2 and 3 Projects are reviewed and incorporated by reference in Section 4.1.3, "Summary of Previous NEPA and CEQA Analyses of Borrow Sites." As indicated in **Table 2-10**, these borrow areas are currently used as croplands and would be reclaimed to this use following the temporary borrow operations.

These additional borrow sites would be selected consistent with the criteria listed below in Section 2.3.3.5, "Environmental Commitments for Borrow Sites," and would be developed and reclaimed in the same manner as the proposed borrow sites identified within the Fisherman's Lake Borrow Area. Mitigation measures for borrow site impacts described in Chapter 4.0, "Environmental Consequences and Mitigation Measures," would apply to any newly developed borrow sites.

2.3.3.3 BORROW QUANTITIES

The borrow sites shown in **Table 2-10** would provide material for the proposed levee improvements and modifications to irrigation infrastructure. After excavation of the borrow material, these sites would be reclaimed for postconstruction uses. **Table 2-10** also shows the depth of excavation, depth upon reclamation, and final postreclamation use. **Plate 2-7** shows the locations of the currently identified borrow areas.

2.3.3.4 BORROW SITE CONSTRUCTION

The excavation limits on the borrow sites would provide a minimum buffer of 50 feet from the edge of the borrow site boundary or any irrigation or drainage feature. From this setback, the slope from existing grade down to the bottom of the excavation would be no steeper than 3H:1V. Excavation depths for the borrow sites would be as listed in **Table 2-10**. After excavation, disturbed areas would be finish graded in compliance with criteria for drainage of reclaimed land uses.

Excavated soils not used for borrow material, such as the organic surface layer or soils considered unsuitable for levee construction, would be stockpiled and respread on-site after excavation. Any unsuitable borrow material would be stockpiled on-site and graded back into the restored site, which would result in a finish grade elevation somewhat higher than the final design grades. The borrow-site excavation operations would use water for dust control and to maintain proper moisture content in the borrow material. Revegetation activities would include erosion control on excavated slopes (i.e., hydroseeding), application of fertilizer, and seeding. It is anticipated that no unsuitable material would be hauled off-site. Debris encountered during excavation would be hauled off-site.

Employee vehicles and construction equipment would be parked off street, either in the construction staging areas for the levee work, within the borrow site, or in designated parking areas. Construction equipment would be restricted to designated haul routes between the borrow operations and the construction sites. The haul route for a portion of the Elkhorn Borrow Area may include segments of Elkhorn Boulevard within the immediate vicinity of the borrow sites. The haul route for the Fisherman's Lake Borrow Area borrow sources may include segments of Del Paso Road, Powerline Road, Radio Road, and San Juan Road within the immediate vicinity of the borrow sources. Hauling on public roads would occur for short distances as required to transport material to levee toe. Distribution of material along the levee alignment would take place within the levee footprint. Garden Highway would not be used either as a haul route or for off-street parking.

2.3.3.5 ENVIRONMENTAL COMMITMENTS FOR BORROW SITES

Although it is assumed that several parcels within the I-5, Fisherman's Lake, South Sutter, LLC, and Elkhorn Borrow Areas could supply the required earthen fill material for Phase 4a Project construction, the specific locations of borrow removal are currently unknown because investigations to determine which locations are most suitable are ongoing. This document performs project-level NEPA/CEQA analysis to the extent feasible for the entire potential borrow areas, and also provides a checklist in **Appendix B2** to determine if borrow sites selected from within these areas after the approval of the Phase 4a Project would be consistent with identified impacts, and thus can be approved as within the Phase 4a Project and under the NLIP. Any borrow site that would be selected within these areas will be subject to the adopted mitigation measures and other applicable environmental commitments. SAFCA would ensure that the following environmental commitments are met before the start of ground-disturbing activities on these borrow sites, to the extent practicable and feasible:

- minimize land use fragmentation;
- submit a Notice of Intent to the Central Valley Regional Water Quality Control Board (RWQCB), prepare and implement standard best management practices and a storm water pollution prevention plan, and comply with conditions of the National Pollutant Discharge Elimination System permit;
- obtain and comply with applicable regulations and permits or exemptions (e.g., Section 7 of the Federal Endangered Species Act, Section 1602 of the California Fish and Game Code, Section 2081 of the California Endangered Species Act permit condition, Section 404 of the Clean Water Act, and California Surface Mining and Reclamation Act permit or exemption);
- complete a wetland delineation, and complete detailed design and habitat creation components and management agreements to ensure compensation for any fill of waters of the United States;
- conduct focused surveys of special-status species and habitats, develop detailed designs to ensure adequate compensation for loss of habitat, and implement all management agreements;
- survey for cultural resources (historic and prehistoric), document alterations made to cultural resources, and distribute the information to the appropriate repositories;
- as required, prepare and implement a historic properties treatment plan;
- prepare and implement a traffic safety and control plan for construction-related truck trips and detours;
- implement applicable air quality district–recommended control measures to minimize temporary emissions of reactive organic gases, oxides of nitrogen, and respirable particulate matter with an aerodynamic diameter of 10 micrometers or less during construction;
- implement noise-reducing construction practices, prepare and implement a noise control plan, and monitor and record construction noise near sensitive receptors;
- coordinate with users of irrigation water before and during all modifications to irrigation infrastructure and reduce interruptions of supply;
- verify utility locations, coordinate with utility providers, prepare and implement a service-interruption response plan, and conduct worker training with respect to accidental utility damage;
- complete Phase I and/or Phase II environmental site assessments and implement required measures;
- coordinate work in the Airport's Critical Zone with Airport operations and restrict night lighting within and near the runway approaches;
- conduct a wildlife-aircraft strike analysis and develop and implement mitigation for earthmoving activities within the Critical Zone; and
- prepare and implement a wildfire control and management plan to minimize potential for wildland fires.

Appendix B2 provides a detailed discussion of the criteria that would apply to the selection of borrow sites for the Phase 4a Project.

2.3.4 HABITAT IMPROVEMENTS

The habitat development and management plan for the Landside Improvements Project was first introduced at a program level in the Phase 2 EIR. Since 2007, SAFCA has elaborated on the ecosystem benefits and conservation strategies of this plan and more fully evaluated habitat creation targets and opportunities. The habitat development and management components of the Phase 4a Project are intended to compensate for effects on existing habitat from the project's flood-risk reduction and canal improvements. These components are also meant to further the Landside Improvements Project's goal to enhance habitat values by increasing the extent and connectivity of Natomas Basin lands managed to provide habitat for giant garter snake, Swainson's hawk, and other special-status species. To provide an update on the development of this plan and to put the Phase 4a Project's habitat components in a broader context, this section first introduces the habitat conservation goals and strategy of the Landside Improvements Project, then describes the proposed Phase 4a Project habitat components.

2.3.4.1 OVERVIEW OF THE LANDSIDE IMPROVEMENTS PROJECT'S HABITAT CONSERVATION GOALS AND STRATEGY

The Landside Improvements Project includes a conservation plan and habitat improvements intended to substantially contribute to the emergence of an urban habitat refuge in the Natomas Basin. This refuge is projected to occupy approximately 15,000 acres once the NBHCP's objectives are met and other proposed conservation programs are completed. Through habitat creation, restoration, and preservation, the Landside Improvements Project would increase the amount of protected habitat available for NBHCP-covered species. Further, SAFCA's proposed project would consolidate large areas of habitat, which would help to expand TNBC reserve blocks in the northwestern and southwestern regions of the Natomas Basin. Finally, constructing new canals and establishing woodland corridors would greatly improve the connectivity between core habitat reserves that are distributed throughout the Natomas Basin, and substantially increase acreage and patch size of these critical habitats.

Habitat Impact Avoidance

Although the Landside Improvements Project would result in loss and reconfiguration of landside habitats adjacent to the widened levees in the Natomas Basin, the project has been designed to minimize impacts on these landside habitats and to avoid significant impacts on riparian habitats along the Sacramento River east levee. Constructing an adjacent levee and installing seepage cutoff walls would enable SAFCA to retain the mature riparian tree corridor and numerous Swainson's hawk nests that are located along the waterside of the Natomas Basin levees. Potential nest disturbance during levee construction would be minimized by phasing and timing of the grading sequence.

Habitat Creation

An objective of the Landside Improvements Project is to increase the amount of protected habitat for NBHCP-covered species. These habitats would be managed for wildlife and protected in perpetuity. Existing habitats that are affected by the flood-risk reduction footprint are not currently protected. The overall project's conservation plan includes the preservation, enhancement, and creation of more than 1,300 acres of compensatory habitats, including:

- up to 120 acres of created, managed marsh;
- approximately 840 acres of created, managed grasslands;
- approximately 66 acres of canals with 75 acres of associated uplands;
- approximately 150 acres of managed agricultural uplands;
- at least 150 acres of preserved and created landside valley oak woodlands and savanna; and
- up to 175 acres of preserved rice fields.

Woodland Creation

The Landside Improvements Project would preserve and create woodland groves throughout the western Natomas Basin near the Sacramento River. Much of the created woodland acreage would be located in 100- to 200-foot-wide corridors just inland of the adjacent levee and seepage berms. SAFCA would also enhance woodland areas farther away from the levee—one south of Sankey Road and one immediately south of Riego Road—by supplementing existing woodland groves with additional plantings and oaks transplanted from the footprint area that would be developed. The groves created by the Landside Improvements Project would have larger patch sizes, a wider range of age classes, and a greater diversity of woodland species than existing woodland groves in the Natomas Basin, increasing the probability that native bird species would have nesting success and providing refuge and habitat diversity for many other wildlife species that depend on woodlands and oak savanna.

Marsh Creation

The Landside Improvements Project would create up to 120 acres of managed marsh near Fisherman's Lake in the southwestern area of the Natomas Basin. Giant garter snakes have been recorded on TNBC lands in this area that were converted from rice to managed marsh. TNBC recently enhanced a rice field into a managed marsh complex on which giant garter snake were subsequently recorded, thus demonstrating that giant garter snake would use restored managed marsh habitats. Further enhancement in this area would help to sustain the southern Natomas Basin's giant garter snake population. SAFCA's proposed expansion of managed marsh habitat in and around Fisherman's Lake provides an opportunity to assist TNBC in achieving its goals—specifically, to sustain giant garter snake populations in the southern reserve area.

Managed Grassland

To partially mitigate impacts on cropland and grassland suitable for Swainson's hawk foraging habitat, SAFCA would create managed native perennial grassland habitats on the new levee slopes, seepage berms, access rights-of-way, and canal embankments. This grassland, which would total up to 840 acres, would be drill-seeded with a mix of native perennial grasses, then managed to minimize colonization by ruderal annual grasses and broad-leaved weeds. This grassland would provide moderate-quality Swainson's hawk foraging habitat. In addition, grasslands on and adjacent to canal banks would provide basking and aestivation habitat for giant garter snake.

Agricultural Uplands

To partially mitigate impacts on cropland and grassland suitable for Swainson's hawk foraging habitat, SAFCA would create, enhance, and preserve croplands. Biologists have determined that particular types of foraging habitat, particularly alfalfa and hay crops, provide higher value Swainson's hawk foraging habitat than other habitat types (Woodbridge 1998). Although the Landside Improvements Project would result in the creation of many more acres of foraging habitat than acres of affected foraging habitat, much of the affected acreage is higher value cropland and most of the mitigation acreage would be moderate-value native grassland. Therefore, SAFCA would create or enhance approximately 150 acres of cropland to be preserved in perpetuity.

Habitat Consolidation and Connectivity

An important ecosystem benefit of the habitat created by the Landside Improvements Project would be the consolidation of large areas of existing habitat, which would expand and fill in gaps between TNBC reserve blocks in the northwestern and southwestern regions of the Natomas Basin. SAFCA would acquire or secure binding agreements on several properties to provide compensatory habitats such as preserved rice and agricultural crop fields or created managed marsh, managed grasslands, or landside woodlands. Many of these properties are contiguous with existing TNBC reserves or other completed or planned mitigation habitats. Protecting habitat adjacent to existing TNBC reserves and other mitigation sites would create a larger contiguous area than currently exists that would be managed for the giant garter snake, Swainson's hawk, and other wildlife species. This

expansion of contiguous habitat areas would substantially increase the value, sustainability, and functions of these habitats and contribute to the recovery of giant garter snake and Swainson's hawk in the Natomas Basin.

The Landside Improvements Project would reconfigure habitat and connective corridors in the Natomas Basin at a landscape scale. The quality and viability of this emerging urban reserve would be protected in perpetuity under public and conservancy management. The aggregate effect of the conservation and mitigation plan that SAFCA proposes to implement through the Landside Improvements Project represents substantial enhancement and would help to secure the long-term viability of the Natomas Basin ecosystem. All the collective elements of the plan would aid in NBHCP implementation, providing TNBC with an opportunity to improve its overall performance toward the goals of the NBHCP. The scale and the financial and real estate resources of the Landside Improvements Project enable SAFCA to achieve a Basinwide habitat creation and conservation plan that would span and join miles of existing and future habitat, encompassing the entire west side of the Natomas Basin, and bordering the riparian forest of the Sacramento River.

The Landside Improvements Project would improve and ensure permanent connectivity between core giant garter snake populations and habitat preserves distributed throughout the Natomas Basin by constructing new canals, and enhancing major existing canals that serve as giant garter snake movement corridors. Several new and enhanced canal corridors—the GGS/Drainage Canal, the relocated Elkhorn and Riverside Canals, and the improved West Drainage Canal—would provide enhanced habitat functionality by permanently linking known giant garter snake population centers and TNBC properties that are managed for giant garter snake habitat. The viability of the Lone Tree Canal as a central giant garter snake movement corridor has been greatly diminished, and other important canal corridors linking former rice habitat in the Natomas Basin have been abandoned or filled. In the future, the proposed GGS/Drainage Canal north of I-5 and substantially improved bank habitat along the West Drainage Canal may represent the only continuous, north/south movement corridor connecting the northern and southern giant garter snake population centers. Unlike the tenuous water supply to many existing canals, the new, relocated, and improved canals on the west side of the Basin would provide a permanent, reliable water supply and feature much greater marsh conditions along both banks throughout the entire length of the canal system.

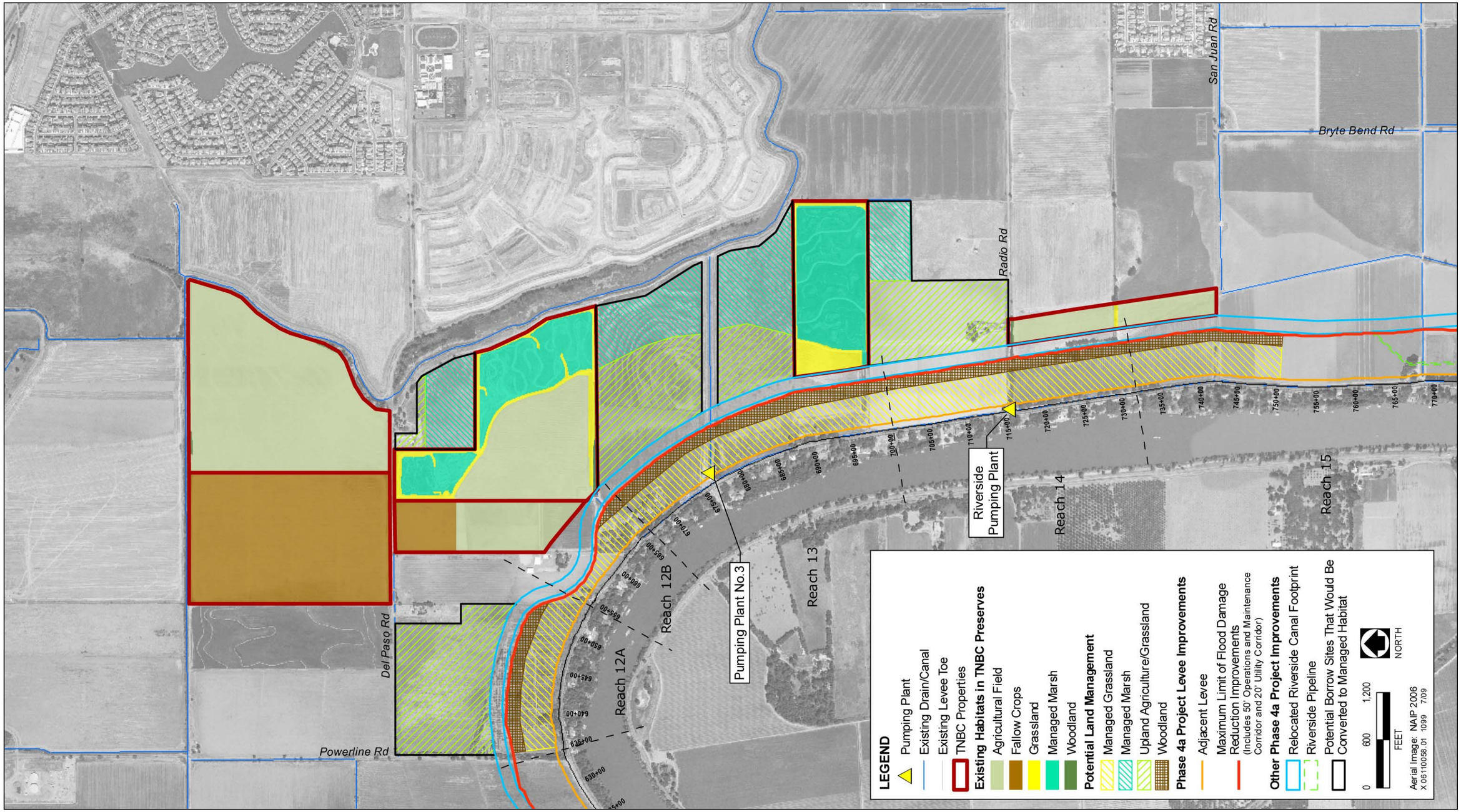
Long-Term Management

With implementation of the Landside Improvements Project, SAFCA would acquire large areas of private land for habitat purposes, or exercise co-management legal agreements to sustain habitats on lands owned or controlled by three Natomas Basin public agencies (NCMWC, RD 1000, and SCAS). Some of the Landside Improvements Project's mitigation habitat areas would likely be turned over to TNBC. Furthermore, SAFCA's legal agreements with the three public agencies would modify the way overlapping facilities (canals, rights-of-way, levee slopes, and berms) are managed, to the betterment of habitat values and functions.

2.3.4.2 FISHERMAN'S LAKE HABITAT COMPLEX

The area west and south of Fisherman's Lake (Reaches 12A–14 of the Sacramento River east levee) represents a unique opportunity to establish a large and interconnected block of diversified habitat on the west side of the Natomas Basin that would create multiple benefits for NBHCP-covered species. This complex (**Plate 2-12**) would be developed beginning in the Phase 4a Project (see Section 2.3.4.3, "Construction of Phase 4a Habitat Elements," below), with other improvements to continue in the Phase 4b and Phase 4c Projects. The proposed habitat developments would benefit the Fisherman's Lake Habitat Complex by:

- more than doubling TNBC's preserve holdings west of Fisherman's Lake by creating up to 120 acres of managed marsh, preserving approximately 140 acres of managed agricultural uplands, and establishing up to 40 acres of oak woodland groves;



Source: Footprints (EDAW, February 23, 2009); Riverside Canal (Mead & Hunt, March 9, 2009); Borrow Sites (Mead & Hunt, March 2, 2009); Woodland Corridor (EDAW, March 4, 2009); Proposed Habitats (EDAW, February 16, 2009)

Potential Fisherman's Lake Habitat Complex Development

Plate 2-12

- connecting currently fragmented giant garter snake habitat by filling in the gaps between existing TNBC marsh preserves with new marsh habitat to establish a continuous block of up to 250 acres of managed marsh adjacent to the Fisherman's Lake slough;

- enhancing canal habitat to promote greater migration of giant garter snake between the northern and southern populations in the Natomas Basin, thereby increasing the odds of long-term survival of the species in the Fisherman's Lake area;

- adding a new habitat component to the Fisherman's Lake area—large oak woodland groves on the landside of the Sacramento River east levee—that would complement waterside woodland patches and provide native bird species greater opportunities to nest, find refuge from predators, and forage in nearby grassland and upland agriculture; and

- improving water quality for the Fisherman's Lake Habitat Complex by increasing water circulation in and out of the area through reconfiguration and reoperation of irrigation and drainage canals.

TNBC owns several properties west of Fisherman's Lake on which it has developed marsh areas adjacent to the lake; however, these marshes are separated from each other by private property. Created managed marsh near Fisherman's Lake (see "Managed Marsh Creation" in Section 2.3.4.3 below) would be situated adjacent to or near existing TNBC marsh preserves, thereby providing for greater contiguous management areas and enhancing the overall habitat value of the adjacent preserves for giant garter snake. Portions of existing irrigation and drainage canals near Fisherman's Lake, including the West Drainage Canal, would enhance bank habitat for giant garter snake. Bank conditions would be modified and shoreline marsh plants would be planted to improve conditions for movement of giant garter snake between existing and proposed rice and marsh habitats, and Fisherman's Lake.

Other canal improvements could improve water quality in the Fisherman's Lake Habitat Complex, where the water can stagnate in late summer and into the fall. For marsh that it manages, TNBC currently supplements its supply of surface water with groundwater to prevent eutrophic conditions, in which excessive plant growth and decay can lead to lack of oxygen, adversely affecting giant garter snake and other aquatic species. A series of improvements and operational changes, including extending the Riverside Canal upstream to Powerline Road, could increase the movement of water out of Fisherman's Lake while increasing the inflow of freshwater to Fisherman's Lake from other areas. With the exception of extending the Riverside Canal upstream of Powerline Road, these improvements would be addressed as part of the Phase 4b Project, which will be the subject of a future, separate EIS/EIR.

Immediately west of this emerging block of marsh are agricultural areas that can be preserved by the Landside Improvements Project to provide high-quality foraging habitat for Swainson's hawk and other raptors. This upland agriculture, the development of which is analyzed as part of the Phase 4a Project, would connect other areas managed by TNBC to create a larger, more continuous block of high-quality Swainson's hawk foraging habitat. This block of foraging habitat would be adjacent to a 100- to 200-foot-wide zone, with blocks ranging from several hundred to several thousand feet in length, in which SAFCA would create landside riparian woodland habitat. The establishment of these woodland groves is analyzed as part of the Phase 4a Project.

The riverside forest that borders the Sacramento River in the vicinity of Fisherman's Lake is patchy and contains considerable gaps. Establishing landside woodland corridors in these reaches would compensate for gaps in the riverside forest community and increase the interface of landside woodlands connected to the riverside riparian forest. This connection would enhance daily- and seasonal-movement corridors for wildlife and avian populations between habitat types, and between foraging and breeding areas. The woodland groves would provide superior refuge, habitat diversity, and cover for many wildlife species. These woodland groves would also promote successful nesting by a variety of native birds deeper within the grove canopy, where nest parasitism by crows, cowbirds, and starlings is less of a factor in breeding success. Establishing larger woodland groves would likely

also attract oak woodland bird species, such as oak titmouse, acorn and Nutall's woodpecker, western scrub-jay, and raptor species.

2.3.4.3 PHASE 4A PROJECT HABITAT ELEMENTS

To compensate for loss and reconfiguration of landside habitats adjacent to the widened levees, the approximate habitat acreages shown in **Table 2-11** would be preserved or created as part of the Phase 4a Project (**Plate 2-12**).

Table 2-11
Proposed Habitat Creation/Preservation in the Phase 4a Project Area

Habitat Type	Created (acres)
Managed marsh/canals (giant garter snake habitat)	Up to 120
Agricultural uplands[1]	136
Managed grassland[2]	400
Woodlands[3]	58

[1] Includes Novak borrow site, which was previously analyzed as part of the Phase 3 Project.

[2] Located on levee slopes, seepage berms, and rights-of-way.

[3] Approximately 38 acres of woodlands would be established in Reaches 12A–14 of the Sacramento River east levee (**Plate 2-12**) and approximately 20 acres of woodlands would be established in Reach 4A of the Sacramento River east levee (**Plate 2-14**).

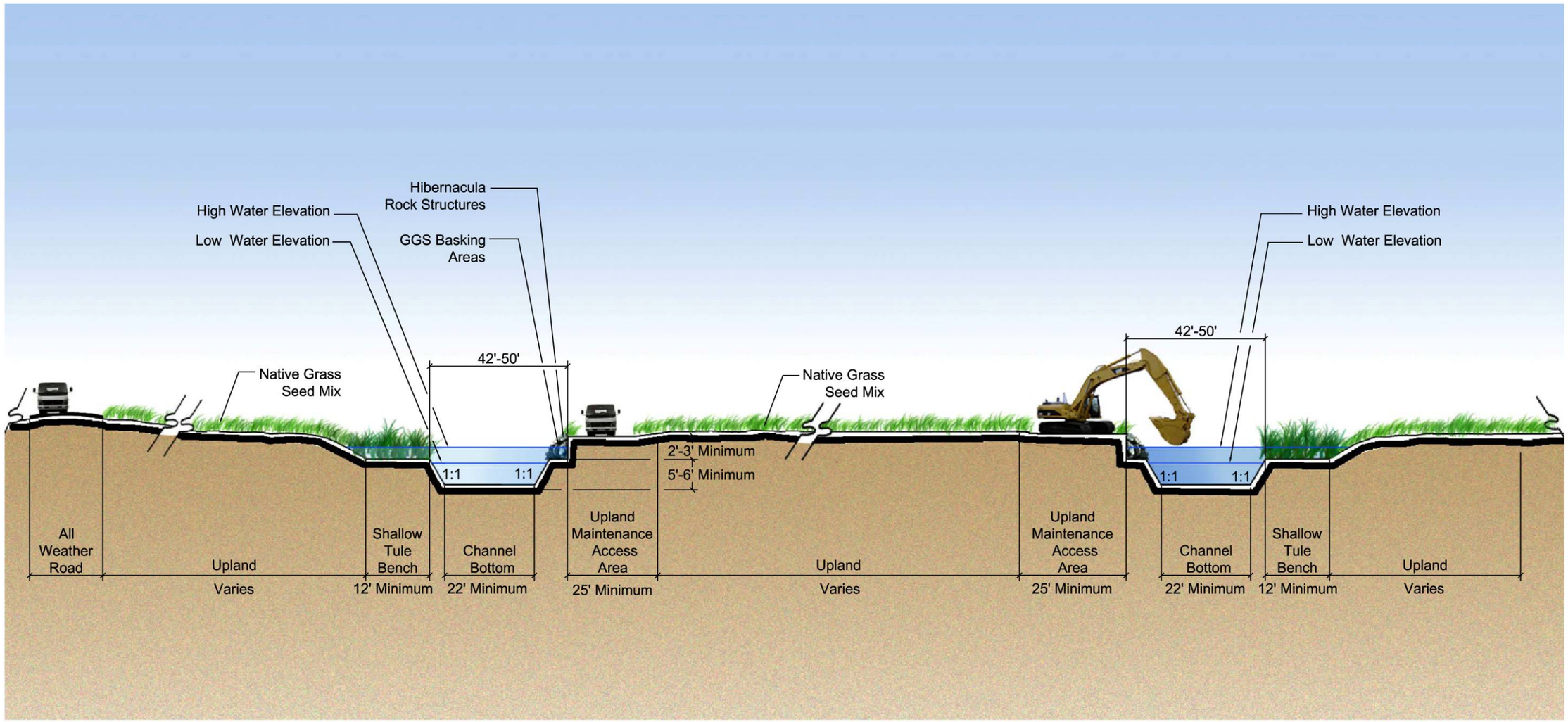
Source: Data provided by SAFCA in 2009 and compiled by EDAW in 2009

Some of the habitat created as part of the Phase 4a Project would compensate for habitat impacts resulting from previous project phases. Additionally, some of the proposed Phase 4a Project habitat creation would occur at the same time as construction (and, thus, environmental impacts) of the Phase 3 Project. Impacts and compensation for the different types of habitat under the Phase 2, 3, and 4a Projects are analyzed in Section 4.7, "Biological Resources."

Managed Marsh Creation

To mitigate adverse project effects on giant garter snake habitat adversely affected by the project, SAFCA would create up to 120 acres of managed marsh, consisting of open-water channels, freshwater marshes, and upland plant communities, in the vicinity of Fisherman's Lake in the Natomas Basin (**Plate 2-12**). This habitat would provide giant garter snake with basking areas, vegetative cover from predators, and foraging habitat. In addition, the managed marsh habitat would compensate for losses of waters of the United States associated with the project. The marsh would be situated near and be functionally connected to TNBC's created marshes located on the Natomas Farms and Cummings Preserves, thereby providing for greater contiguous management areas and enhancing the value of the adjacent preserves to sustain the giant garter snake population. After establishment of the Phase 4a Project marsh, SAFCA would grant TNBC a conservation easement and enter into a stakeholder-specific management agreement with TNBC, ensuring the permanent protection and management of these sites as habitat and open space.

This habitat would be created on either cultivated or fallowed rice fields that would be acquired by SAFCA. During construction of the Phase 4a Project, these parcels would be temporarily used as a source of soil borrow material for levee and berm construction, with excavation removing up to 5 feet of soil from each of the borrow sites. These sites would then be converted to managed marsh. The marsh would consist of a mosaic of aquatic and upland habitats, and an upland buffer between the restoration sites and adjacent roads. This created marsh would maximize habitat edge transitions to provide for shorter distances between burrow, basking, and foraging areas. A typical cross section of the preliminary concept design of the proposed managed marsh habitat is shown in **Plate 2-13a**, and a plan view of the created marsh concept is shown in **Plate 2-13b**. Marsh design and



NOTE: Schematic representation - not to scale

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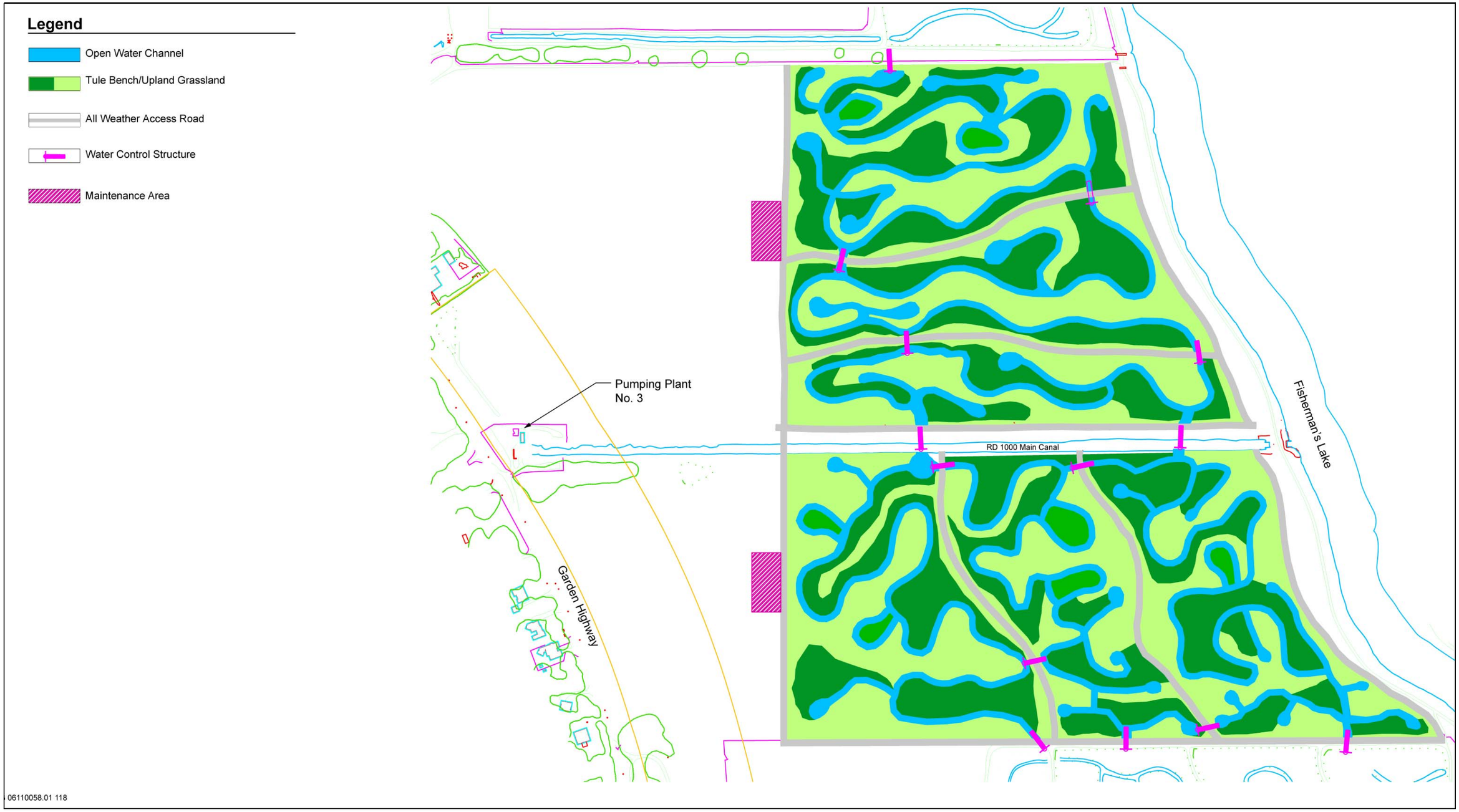
Source: Prepared by EDAW in 2009

Typical Cross Section of Managed Marsh and Giant Garter Snake Habitat **Plate 2-13a**



Source: Prepared by EDAW in 2009

Conceptual Plan for Managed Marsh and Giant Garter Snake Habitat in the Fisherman's Lake Habitat Complex **Plate 2-13b**

management would optimize the values of giant garter snake habitat but minimize the attraction to wildlife species (e.g., flocks of waterfowl, starlings, pheasants) considered potentially hazardous to aircraft at low elevations as they approach or depart from runways.

Design of the managed marshes would follow the templates established by TNBC on recent projects, the design of SCAS's Willey mitigation site being developed in the northeast part of the Basin, and the existing SCAS marsh mitigation project at Prichard Lake. These design templates feature a combination of uplands and shallow water bodies, sinuosity of swales, and water control structures to manage target water levels at different times of the year. The marsh would have perimeter fences to control and protect grazing animals, such as goats. Grazing by goats is a management technique successfully used by TNBC to reduce invasions of weedy thatch and exotic plants while retaining sufficient cover for giant garter snake and other semiaquatic species that rely on grassy uplands adjoining the wetland ponds. An essential component of the managed marsh would be procuring a firm, reliable water supply and good water quality throughout the giant garter snake's active season of April–October.

General Construction Plan for the Managed Marsh

The managed marsh site would be constructed at excavated borrow sites within the Fisherman's Lake Borrow Area. The excavation limits for the borrow sites would be a minimum of 50 feet from the edge of the site boundary or any irrigation or drainage feature. From this setback, the slope from existing grade down to the bottom of the excavation would be no steeper than 3H:1V. Approximate cut depths for all the borrow sites would be as listed in **Table 2-10**. After excavation, disturbed areas would be finish graded to allow creation of the marsh habitat. Finish grading and installation of operational facilities and habitat features would take place from August through October.

Excavated soils not used for borrow material, such as the 1-foot-deep organic surface layer, or soils considered unsuitable for levee construction would be stockpiled and respread on-site after excavation. Soil graded back into the site would result in a finish grade elevation somewhat higher than the final design grades. The borrow-site excavation operations would use water for dust control and to maintain proper moisture content in the borrow material. Any excess groundwater generated during temporary dewatering activities would be discharged into adjacent irrigation and drainage canals after application of appropriate water quality best management practices. Revegetation activities would include erosion control on excavated slopes (e.g., straw mulch, hydroseeding), application of fertilizer as needed, and seeding of an initial cover crop on the finish grade of the bottom of the borrow site. Marsh plantings would then be installed and the borrow site flooded. It is anticipated that no unsuitable soil material would be hauled off-site. Debris encountered during excavation would be hauled off-site.

Other construction components are as follows:

- **Maintenance and access roads.** All-weather roads up to 15 feet wide would be constructed between the open-water channels and the upland areas in 25-foot-wide maintenance access areas.
- **Water supply and control facilities.** A well to provide a backup source of water would be installed in a location where it could supply water to the network of channels if it is needed to replace or supplement the surface-water supply. Water control facilities, such as riser boards, would be installed at key points in the channels to allow maintenance of desired water levels.
- **Habitat features for giant garter snake.** At points along the channels, clusters of rocks would be installed above the water line to provide basking areas for the snakes. Tule benches would be planted between upland areas and the channels to provide cover for the snakes.

The construction crew size would be up to 10 workers. Construction equipment would include one excavator, one bulldozer, and two backhoes. Employee vehicles and construction equipment would be parked off street, either in the construction staging areas for the levee work, within the borrow site, or in designated parking areas. Construction equipment would be restricted to designated haul routes between the borrow operations and the

construction sites. The haul route for a portion of this work may include the use of Radio Road. Garden Highway would not be used as a haul route.

Foraging Habitat

Agricultural Uplands

To compensate for the permanent loss of foraging habitat within the foraging range of potentially affected Swainson's hawk nest locations, SAFCA would create or preserve approximately 60 acres of high-quality foraging habitat in perpetuity. This habitat would be created or preserved primarily by acquiring sites near Fisherman's Lake used for borrow material and reclaiming those sites to a mixture of cropland and grassland managed specifically to maximize foraging opportunities for Swainson's hawk. Agricultural Upland could also be created or preserved at the Novak and South Sutter, LLC borrow sites and in the Elkhorn and I-5 Borrow Areas to the extent that these areas are used as sources of borrow material for the Phase 4a Project. Crop types and crop rotations would be managed to optimize the seasonal variation of prey availability for Swainson's hawks and other raptors.

Managed Grassland on Levee Slopes, Seepage Berms, and Rights-of-Way

The proposed levee improvements would result in landside slopes that are less steep than the existing slopes, and several reaches of the Sacramento River east levee would have adjoining 100- to 500-foot-wide earthen seepage berms with a nearly flat slope (50H:1V or less). Parallel to the landside toe of enlarged levees and seepage berms would be maintenance setbacks, gravel access roads, and utility corridors, and relief wells would be installed in some locations. Additional setback bufferland (sometimes composed of woodland corridors, canal corridors, or field crops) would flank some of these features. Property acquisition for the Phase 4a Project may leave SAFCA with remnant portions of acquired parcels that are nonessential to flood damage reduction uses. With the exception of the crown of the levee, the seepage berm access road, and woodland corridors, these areas would be managed as native perennial grassland. Most grassland would be mowed or grazed throughout the growing season, with an emphasis on mowing procedures and stubble height that optimize these areas for Swainson's hawk foraging habitat. However, the primary purpose and management priority of levees and seepage berms would continue to be flood protection, for which RD 1000 has principal management and maintenance responsibility.

A mitigation monitoring plan (MMP) would include a monitoring program with performance criteria that would be developed to determine the progress of the managed grasslands toward achieving its goals. The MMP would include methods to create the grasslands, including native-grass mixes that would be seeded along new levee slopes and seepage berms, staging areas, and adjacent maintenance and utility rights-of-way. Seed material would be purchased from a reputable nursery and must be from local genetic stock within 200 miles of the project site unless otherwise approved by a qualified ecologist. The native grass mix would include but not be limited to the following:

- purple needlegrass (*Nassella pulchra*),
- creeping wildrye (*Leymus triticoides*),
- six weeks grass (*Vulpia microstachys*),
- slender wheatgrass (*Elymus trachycaulus*), and
- meadow barley (*Hordeum brachyantherum*).

An initial baseline assessment of grassland mitigation sites would be conducted after the initial seeding program, and then a monitoring program with performance criteria would be developed to determine the progress of the grassland habitats toward providing adequate mitigation. The criteria for measuring performance would be used to determine how well the mitigation is being established and to assess the need for adaptive management (e.g., changes in mitigation design or maintenance revisions). These criteria must be met for the mitigation site to be declared successful, both during a particular monitoring year and at the end of the establishment period. These

performance criteria, which would be developed in consultation with USACE, USFWS, and DFG, would include but not be limited to:

- percent cover of invasive species (<1%),
- percent cover of nonnative herbaceous plants (<10–25%), and
- percent absolute cover of native species (>50–80%).

Woodlands

Woodlands consisting of native riparian and valley oak woodland species would be planted within a 100- to 200-foot-wide corridor adjacent to the relocated Riverside Canal in Reaches 12A–14 (**Plate 2-12**). SAFCA would also plant woodland groves in Reach 4A on the properties shown in **Plate 2-14**, north and south of the Lausevic woodland planting area. The Lausevic woodland planting area is a portion of the woodland mitigation that was addressed under the Phase 2 Project. Combined, the Reach 4A woodland planting areas would create a nearly 30-acre block of nesting habitat south of Riego Road adjacent to both existing woodland habitat on the waterside of the levee and foraging habitat on surrounding farmland.

Groves would generally be at least 50 feet wide and several hundred feet long, depending on location constraints. Portions of the created woodlands would be at least 100 feet wide to promote successful nesting by a variety of native birds deeper within the grove canopy, where nest parasitism by crows, cowbirds, and starlings is less of a factor in breeding success. At maturity, stand structure would vary from closed-canopy woodland to valley oak savanna vegetation types, with a native perennial grassland understory.

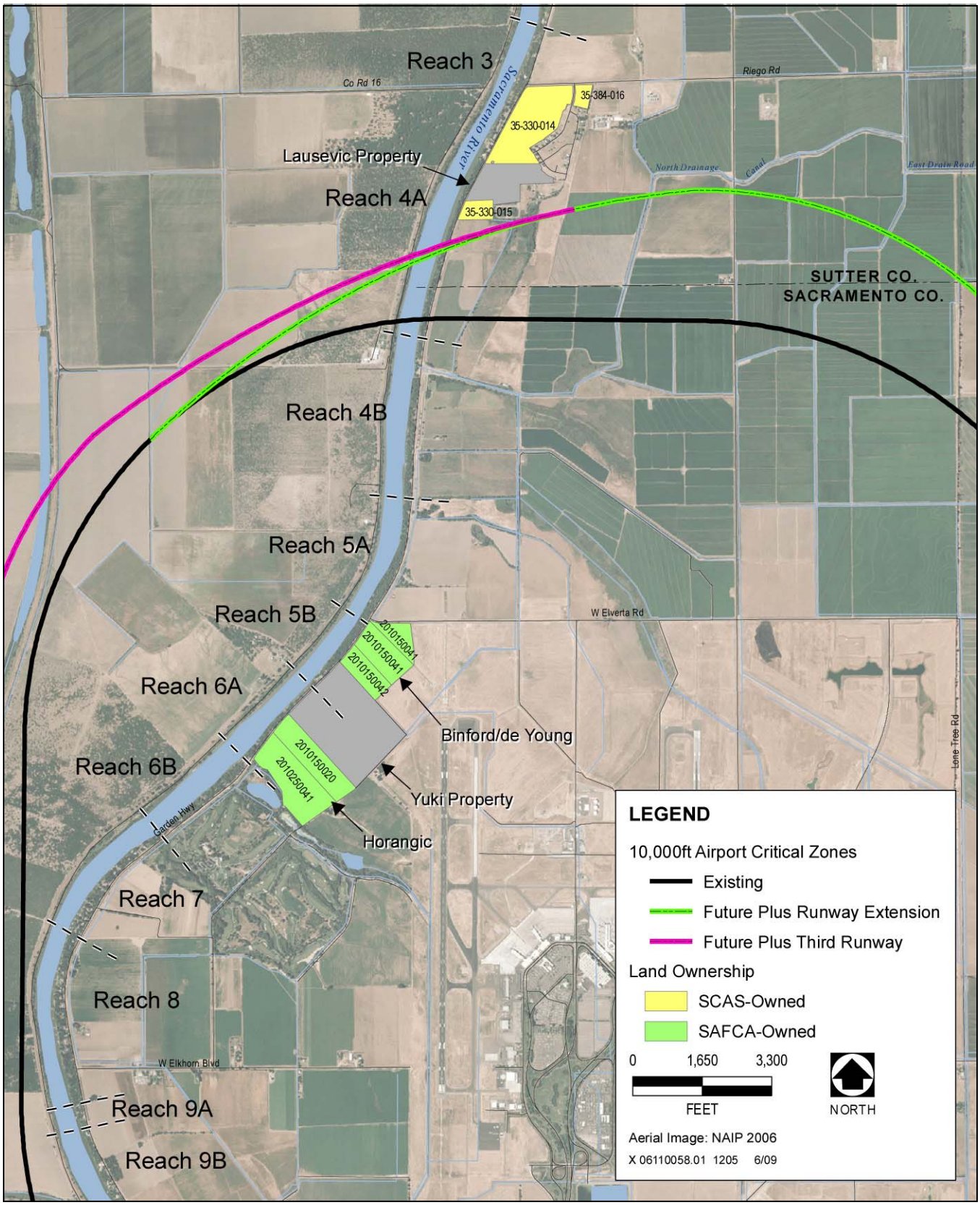
Planting sites would require suitable soil conditions, irrigation water during a 3- to 5-year establishment phase, reduced risk of wildfire, and minimal depth to seasonally high groundwater or other natural water sources to sustain trees once irrigation ceases. To provide irrigation water, groundwater wells would likely need to be drilled in the vicinity of the plantings. Drilling of well holes would take 72 hours or more. Because the drilling process must be continuous once started, 24/7 operation of the drill rig would be required. Wells would be located 1,000 to 1,500 from sensitive receptors to minimize the disturbance from 24/7 construction.

A mixture of native riparian and woodland species would be planted, but the predominant species would be valley oak, the primary tree species that would be affected by the proposed improvements to the Sacramento River east levee; and cottonwood, which is a preferred nest tree for Swainson's hawks in the Basin and is faster growing than valley oak. Establishing woody vegetation would likely require more than one technique, including planting nursery stock, live cuttings, and acorn planting in winter, sustained by flood irrigation, drip, or agricultural-scale spray heads. Taking into account predictable and unavoidable mortality within the first 5 years of establishment, the intent is to have an average stem density of approximately 50–100 trees and shrubs per acre within 5–10 years of growth. Wherever possible, groves would be bordered by restricted-access public lands and rights-of-way to reduce the risk of vandalism and other inappropriate uses that may threaten wildlife values or risk wildfires from human sources.

The botanical species composition of individual clusters and rows would mimic vegetation types commonly found along the Sacramento River, including:

- valley oak woodland,
- mixed riparian forest, cottonwood-dominant,
- shallow scrub (at moist soil sites or depressions),
- sycamore and oak savanna (with native perennial grassland), and
- elderberry shrub/scrub.

A monitoring plan with performance criteria would be developed to determine the progress of the woodland habitats towards providing adequate mitigation. The criteria for measuring performance would be used to determine if the conservation component is trending toward sustainability (reduced human intervention) and to



Source: Data provided by Mead & Hunt in 2008

Proposed Land Exchange **Plate 2-14**

assess the need for adaptive management (e.g., changes in design or maintenance revisions). These criteria must be met for the conservation component to be declared successful, both during a particular monitoring year and at the end of the establishment period. These performance criteria, which would be developed in consultation with USFWS and DFG, would include, but are not limited to:

- percent survival of planted trees (from 65–85%),
- percent survival of transplanted trees (from 60–85%), and
- percent relative canopy cover (from 5–35%).

Field assessments of woodland planting areas would be conducted once per year. The timing of these assessments would be adjusted according to annual site-specific conditions, but assessments would generally occur in late summer. To measure percent survival of trees and shrubs, each plant would be inspected and the species of each live plant would be recorded. Qualitative assessments would be recorded to track the health and vigor of each species for adaptive management of the conservation components.

To determine the success of the woodland plantings as a functioning ecosystem, percent canopy would be estimated each fall by recording the extent of woodland habitat on aerial photographs, or using repeat transects or fixed radius plots at ground level. The timing of these assessments would be adjusted according to annual site-specific conditions, but assessments would generally occur in late summer or early fall while trees are still in full foliage. The results of these assessments would also be used to determine where replanting should occur to maintain suitable Swainson's hawk habitat. All monitoring would occur for the full monitoring period or until the performance criteria are met, whichever is longer.

2.3.4.4 MONITORING OF HABITAT COMPONENTS

Overall, after implementation of mitigation components, the mitigation sites would be monitored throughout the year for 3–8 years depending on the type of habitat and as developed in negotiation with the appropriate resource agencies. SAFCA would be responsible for providing success monitoring, which, as required by the appropriate resource agencies, would be conducted by a qualified ecologist, botanist, or biologist. The monitor would be objective and independent from the installation contractor responsible for maintenance of the site.

All habitat types and mitigation sites would receive quantitative and qualitative monitoring. Quantitative monitoring would be performed in accordance with the performance criteria described in the following sections (e.g., percent cover). Qualitative monitoring would provide an opportunity to document general plant health, overall plant community composition, hydrologic conditions, damage to the site, infestation of weeds, signs of excessive herbivory, signs of wildlife use, erosion problems, and signs of human disturbance and vandalism. These criteria would be assessed and noted for use in adaptive management of the mitigation sites, but they would not be used to determine project success. In addition, a complete list of all wildlife species encountered would be compiled for each mitigation site during each monitoring visit. Particular attention would be given to looking for evidence of giant garter snake, valley elderberry longhorn beetle exit holes, and Swainson's hawk.

SAFCA would prepare an annual report in conjunction with the resource managers that would be submitted to USACE, the USFWS, DFG, and the Central Valley RWQCB by December 31 of each year during the success monitoring period, or until the agencies have verified that final success criteria have been met. The report would assess the attainment of or progress toward meeting the success criteria for the mitigation sites.

2.3.4.5 LONG-TERM MANAGEMENT OF HABITAT COMPONENTS

A Phase 4a Project Long-Term Management Plan (LTMP) would be implemented by SAFCA in connection with the Phase 4a Project MMP. The LTMP would establish the long-term management practices (post-establishment period success criteria) and land protection mechanisms that would be implemented as each project phase of the NLIP Landside Improvements Project is approved and permitted. Land ownership and management responsibilities would be held by SAFCA, RD 1000, NCMWC, and TNBC.

2.3.5 AVIATION SAFETY COMPONENTS

The Airport experiences a high rate of aircraft/bird strikes, which pose a substantial hazard to flight safety. In accordance with the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5200-33B, Hazardous Wildlife Attractants on or Near Airports (FAA 2007), the Airport has been directed by the FAA to reduce wildlife attractants in the Airport Critical Zone, the area within a 10,000-foot radius from the centerline of the two parallel runways for turbine-powered aircraft. Additionally, the FAA recommends that no land uses deemed incompatible with safe airport operations be maintained in the General Zone, a radius of 5 miles from the edge of the Airport Operations Area, if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace. Open water and agricultural crops are recognized as being the greatest wildlife attractants in the Airport vicinity, and rice cultivation is considered the most incompatible agricultural crop because of its flooding regime. The following describes the aviation safety components associated with the project:

- Work within the Critical Zone would be coordinated with Airport operations and night lighting would be restricted within and near the runway approaches.
- A wildlife-aircraft strike analysis would be conducted and mitigation for earthmoving activities within the Airport's Critical Zone would be developed and implemented.

2.3.6 OPERATIONS AND MAINTENANCE

Agencies and organizations that would have management responsibility for proposed Phase 4a Project features are SAFCA, RD 1000, NCMWC, SCAS, and TNBC, as described below.

2.3.6.1 SACRAMENTO AREA FLOOD CONTROL AGENCY

SAFCA would be responsible for the design and construction of all levee improvements, maintenance access, inspection roads, and rights-of-way, replacement canals and associated drainage and irrigation structures, and habitat creation sites. In addition, SAFCA would be responsible for all necessary land acquisitions and easements to construct the project features and achieve the project objectives. However, once these project features are completed, most of the land or land management responsibility would be conferred by SAFCA to the other management entities described below. Memoranda of agreement, land ownership transfers, or management endowments and contracts would be used by SAFCA to transfer land management responsibility to the appropriate public agency or nonprofit land management organization. At the end of the project construction period, all project lands would be in public ownership and/or would be under the permanent control of a natural resource conservation entity.

2.3.6.2 RECLAMATION DISTRICT 1000

The mission and purpose of RD 1000 is to operate and maintain the flood protection levees surrounding the Natomas Basin and operate and maintain the internal drainage system to evacuate agricultural and urban stormwater and incidental runoff. RD 1000 would be responsible for the management of the proposed levee improvements, when complete; the new GGS/Drainage Canal; and reconfigured Pumping Plant Nos. 3 and 5. Typical activities include mowing grassland along levee slopes and berms, canal banks, and rights-of-way; managing canal bank vegetation, including noxious weeds; maintaining relief wells and other drainage features; periodically removing sediment from drainage canals; and maintaining and repairing canal and levee patrol roads.

2.3.6.3 NATOMAS CENTRAL MUTUAL WATER COMPANY

NCMWC is a nonprofit mutual water company with the primary focus of keeping the water conveyance system functioning to serve the company shareholders. Intensive maintenance to maximize agricultural irrigation services throughout the Basin is generally limited to only 10% annually of the approximately 100 miles in the Natomas

Basin canal system operated by NCMWC. NCMWC would be responsible for maintaining and managing the relocated Elkhorn and Riverside Canals and existing irrigation canals. The relocated canals would be maintained in the same manner as the existing canals. Typical maintenance activities include operating and repairing water control structures and barrier gates, periodically removing sediment and noxious aquatic weeds from the canals, repairing canal roads, managing bank vegetation, and mowing grassland along canal and road rights-of-way. However, compared to the existing Elkhorn and Riverside Canals, the relocated canals would have improved embankments, better water control structures, better vegetation cover, and wider roads and rights-of-way. These improvements are expected to ease annual canal management efforts, allowing for a proportionately greater focus on maintenance and operations and less need for repair and dredging.

2.3.6.4 SACRAMENTO COUNTY AIRPORT SYSTEM

SCAS manages the Sacramento County–owned bufferlands outside the Airport Operations Area. All Phase 4a Project components on land under SCAS management would remain in public ownership.

2.3.6.5 THE NATOMAS BASIN CONSERVANCY

TNBC acquires and manages land for the purpose of meeting the objectives of the NBHCP. To meet the mitigation goals of the NBHCP, developers of projects pay a mitigation fee to TNBC when they apply for building permits. TNBC then uses the mitigation fees to acquire, restore, and manage mitigation lands to provide habitat for protected species and maintain agriculture in the Natomas Basin. TNBC owns approximately 30 mitigation properties totaling more than 4,000 acres. Private land acquired by SAFCA and converted to managed marsh, preserved as agricultural uplands (field crops), or used for woodland establishment as part of the Phase 4a Project would be protected by conservation easements conveyed to TNBC. After completion of reclamation activities, SAFCA would contract with TNBC for management of these habitat features.

2.3.7 ADDITIONAL ACTIONS TO MEET FEMA, USACE, AND STATE DESIGN REQUIREMENTS: ENCROACHMENT MANAGEMENT

USACE levee guidance requires the removal of vegetation greater than 2 inches in diameter on the levee slopes and within 15 feet of the waterside and landside levee toes (USACE 2000). USACE levee guidance also requires an assessment of encroachments on the levee slopes, including utilities, fences, structures, retaining walls, driveways, and other features that penetrate the levee prism. Substantial encroachments are present on the Sacramento River east levee with a smaller number of encroachments on the other Natomas levees. One of the objectives of constructing an adjacent levee along the Sacramento River east levee is to facilitate acceptable management of existing vegetation and structural encroachments along the waterside of this levee.

By moving the theoretical waterside slope of the levee (the “levee template”) landward, the adjacent levee would substantially reduce most of the conflicts between these encroachments and applicable USACE levee operation and maintenance requirements. Should any of these existing encroachments be determined to reduce the integrity of the levee, increase flood risk unacceptably, or impede visibility or access to the waterside levee slope, the encroachments would need to be removed. Removal of some waterside slope encroachments may be required by the end of 2010 to ensure that the levee system meets FEMA criteria for the 100-year level of protection. Along the landside of the proposed adjacent levee, encroachment removal would typically be accomplished as part of the landside levee improvements. The relocation of power poles located on the existing landside slope of the levee in Reaches 10–15 of the Sacramento River east levee is anticipated to be conducted as part of the Phase 4a Project to prepare for levee improvement work.

The adjacent levee proposed as part of the Phase 4a Project would be designed to significantly reduce conflicts between waterside encroachments and applicable USACE levee operation and maintenance requirements. Following completion of the proposed levee improvements, USACE, the State, SAFCA, and RD 1000 would inspect and evaluate whether there are any remaining encroachments that would affect levee integrity. To the

extent that removal of these identified encroachments may cause significant environmental effects, future, separate environmental compliance and review would be required.

2.3.8 LANDS, EASEMENTS, RELOCATIONS, AND RIGHTS-OF-WAY

Several of the project components described above would require substantial land acquisition to accommodate the expanded levee, seepage berm, and canal footprints. In the context of the Phase 4a Project, the acquired lands would support construction of an adjacent levee along the Sacramento River east levee in Reaches 10–15 and relocation and extension of the Riverside Canal. In addition, sufficient land would be acquired to establish a minimum 50-foot-wide O&M access corridor at the landside toes of all the improved levees to prevent encroachment into the levee and seepage berm improvements, and to preserve the land for possible future expansion of levee facilities.

In addition, land would be acquired to establish a woodland corridor to replace trees that are removed from the levee footprint, maintenance access areas, and irrigation and drainage canal relocation areas, and to provide habitat compensation. Land would also be acquired for use as borrow areas that would be reclaimed to create or preserve agricultural uplands.

Finally, as discussed previously, the Proposed Action would require relocation of many existing irrigation and drainage facilities, a number of power poles serving residences along the levees, several rural roadway intersections (including Powerline Road and San Juan Road with Garden Highway), and several private residential and nonresidential structures.

Privately owned lands would be acquired in fee. Easements would be obtained where the project features would be on Airport land (owned by Sacramento County). Where the SAFCA project footprint would overlie land owned and managed by other agencies (i.e., TNBC), either acquiring the land in fee or obtaining and securing easements would be required.

Real property acquisition and relocation services would be accomplished in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC 4601 et seq.) and implementing regulation, 49 CFR Part 24; and California Government Code Section 7267 et seq. Refer to Section 6.19 in Chapter 6.0, “Compliance with Federal Environmental Regulations,” and to Section 3.16.1, in Section 3.16, “Socioeconomics, Population and Housing” for more details regarding these regulations.

2.3.9 LAND EXCHANGE BETWEEN SACRAMENTO AREA FLOOD CONTROL AGENCY AND SACRAMENTO COUNTY AIRPORT SYSTEM

SAFCA and SCAS would carry out a land exchange that would support expansion of Airport bufferlands along the eastern edge of the proposed new Elkhorn Irrigation Canal and provide SAFCA additional habitat mitigation land along the upper portion of the Sacramento River east levee outside of the 10,000 foot Airport Critical Zone. The parcels involved in the land exchange are shown in **Plate 2-14**. This exchange would involve SAFCA’s acquisition of three SCAS properties on each side of SAFCA’s Lausevic property in Reach 4A of the Sacramento River east levee. These properties total approximately 68 acres and would be developed by SAFCA as woodland planting areas (see 2.3.4.3, “Phase 4a Project Habitat Elements”). In exchange, SCAS would acquire the remainder of the Horangic and Binford-DeYoung properties that would not be developed as part of the Phase 2 and 3 Projects. This remainder, totaling approximately 45 acres, is located on each side of SCAS’s Yuki property within the 10,000 foot Airport Critical Zone. SCAS would manage these properties in accordance with FAA AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports* (FAA 2007). Any changes in land use required to comply with AC 150/5200-33B that may affect agricultural resources or habitat would be addressed by SCAS through future, separate environmental review.

2.4 RAISE AND STRENGTHEN LEVEE IN PLACE ALTERNATIVE

All elements of the RSLIP Alternative would be the same as described for the Proposed Action except the method of raising and rehabilitating the Sacramento River east levee, the extent of levee degradation required to construct cutoff walls, and the extent of encroachment removal along the levee. Differences from the Proposed Action are shown in italicized text below.

- **Sacramento River east levee Reaches 10–15: Levee raising/rehabilitation and seepage remediation**—*For Reaches 10–11B, raise the existing levee and flatten the existing landside slope, and construct cutoff walls within the existing levee section, seepage berms, and relief wells, where required, to reduce seepage potential. For Reaches 12–15, widen the levee crown, flatten landside slopes, construct cutoff walls within the existing levee section, and construct seepage berms and relief wells, where required, to reduce seepage potential.* Cutoff wall construction would continue 24/7.
- **Sacramento River east levee Reach 4B: Seepage remediation**—Same as the Proposed Action.
- **Riverbank erosion control**—*Implement erosion control improvements along approximately 5,400 feet of riverbank at the waterside toe of the Sacramento River east levee at River Miles 68.8 through 70.0 (Sites I, J, K, L, M in Reaches 10–11B of the Sacramento River east levee).*
- **NCC south levee: Levee raising and seepage remediation at two locations**—Same as the Proposed Action.
- **Replacement of South Lauppe Pump**—Same as the Proposed Action.
- **Riverside Canal (highline irrigation canal) relocation and extension**—Same as the Proposed Action, *except a piped section would be constructed in Reaches 12B–13, in addition to Reaches 15–18B.*
- **Modifications to NCMWC Riverside Pumping Plant**—Same as the Proposed Action.
- **Modifications to RD 1000 Pumping Plants Nos. 3 and 5**—Same as the Proposed Action.
- **Development of new and replacement groundwater wells**—Same as the Proposed Action.
- **Borrow site excavation and reclamation**—Same as the Proposed Action.
- **Habitat creation and management**—Same as the Proposed Action.
- **Infrastructure relocation and realignment**—Same as the Proposed Action.
- **Landside vegetation removal**—Same as the Proposed Action.
- **Waterside vegetation removal—***In Reaches 10–15 of the Sacramento River east levee, clear waterside vegetation to meet USACE vegetation guidance criteria (estimated 21 acres of lost Shaded Riverine Aquatic [SRA] habitat).*
- **Right-of-way acquisition**—Same as the Proposed Action.
- **Encroachment management**—*Remove substantial encroachments from the waterside and landside of the Sacramento River east levee (Reaches 10–15) to ensure that the levees can be certified as meeting the minimum requirements of the National Flood Insurance Program and USACE encroachment guidance*.
- **Exchange of properties between SAFCA and SCAS in Reaches 4A, 5B, and 6 of the Sacramento River east levee—**Same as the Proposed Action.

2.4.1 FLOOD RISK REDUCTION COMPONENTS

2.4.1.1 SACRAMENTO RIVER EAST LEVEE

Levee Raising

The Sacramento River east levee would be raised along a distance of approximately 3.2 miles (Reaches 10–11B) to provide sufficient levee height (3 feet) above the 200-year design water surface, with no levee raise in Reaches 12–15. The levee raise would consist of an embankment raise from the waterside hinge point of the existing levee upward to the increased crown elevation. This would require partially excavating the landside levee slope to provide a working platform for equipment, typically 10 feet wide, and rebuilding the levee to the appropriate elevation by benching the new embankment material into the existing embankment material. The typical cross sections would be as follows:

- In Reaches 10–11B, the levee would be extended at a 3H:1V slope from the existing Garden Highway waterside hinge point to the required elevation, across a 32-foot-wide crown built to current roadway standards, and down to the landside toe at a 5H:1V slope.

- In Reaches 12–15, the levee would be widened to include the 32-foot crown width and a 5H:1V landside slope to existing grade at the landside toe of the levee.

Seepage Remediation

The seepage remediation components of this alternative would be the same as those of the Proposed Action, except along the Sacramento River east levee, where employing soil-bentonite cutoff walls would likely not be feasible. In lieu of this measure, a combination of soil-cement-bentonite or cement-bentonite walls, seepage berms, and/or relief wells would be employed.

Approximately 3.5 million cubic yards of soil borrow would be required to construct these levee improvements. The sources for this material are discussed in Section 2.3.3, "Borrow Sites," above. The average round-trip distance for truck hauls would be 4 miles. Using 14-cubic-yard haul trucks, up to 1,900 trips per day would be required to transport this material over the 140 work days available during the 156-day construction season. However, most of these trips would take place off-road using scrapers rather than haul trucks. Short sections of Powerline Road, Radio Road, and San Juan Road may be used for some trips (see **Plate 2-7**). Approximately 98,300 tons of aggregate base and 30,500 tons of asphalt concrete would be hauled from commercial sources up to 30 miles away.

Table 2-12 shows the quantity of each fill type needed and the expected source for the RSLIP Alternative. The levee fill, seepage berm fill, and excavation quantities include a 25% shrinkage factor to account for volume loss during excavation, placement, and compaction. Note that for some locations, it may be possible to use a scrape-and-place method, employing paddle-wheel scrapers, which would reduce the number of haul trucks needed. Potential haul routes from the borrow sources to the Sacramento River east levee work area for the Phase 4a Project are shown in **Plate 2-7**. Hauling from the Fisherman's Lake Borrow Area would take place off local roadways, passing through the borrow areas to the levee maintenance area and construction sites. Short sections of Powerline Road and San Juan Road may be used for some trips.

Delivering the materials listed in **Table 2-12** would require about 1,900 haul trips per day for the RSLIP Alternative. These estimates are based on the assumption that the work would be performed in a 6-month construction period with 140 days out of the 156-working-day window being used to haul material. These estimates are based on conservative assumptions of truck capacities of 14 cubic yards and 24 tons, and the use of haul trucks (rather than a combination of haul trucks and scrapers) to move all borrow material from the Fisherman's Lake Borrow Area and other potential borrow sites.

Table 2-12 Quantities of Fill Required for the RSLIP Alternative		
Material Type	Quantity	Primary Source (Average Round-Trip Haul Distance)
Levee fill	1,546,000 cy	Fisherman's Lake (4 miles)
Seepage berm fill	1,627,000 cy	Fisherman's Lake (4 miles)
Stability berm/inspection trench/degrade excavation	351,000 cy	On-site
Aggregate base	98,300 tons	Commercial source (30 miles)
Asphalt concrete	30,500 tons	Commercial source (30 miles)
Total	**3,524,000 cy** **128,800 tons**	
Notes: cy = cubic yards Source: Data provided by HDR in 2009		

Table 2-13 summarizes the types of equipment that may be used throughout the construction sequence, along with an approximation of the duration of each activity.

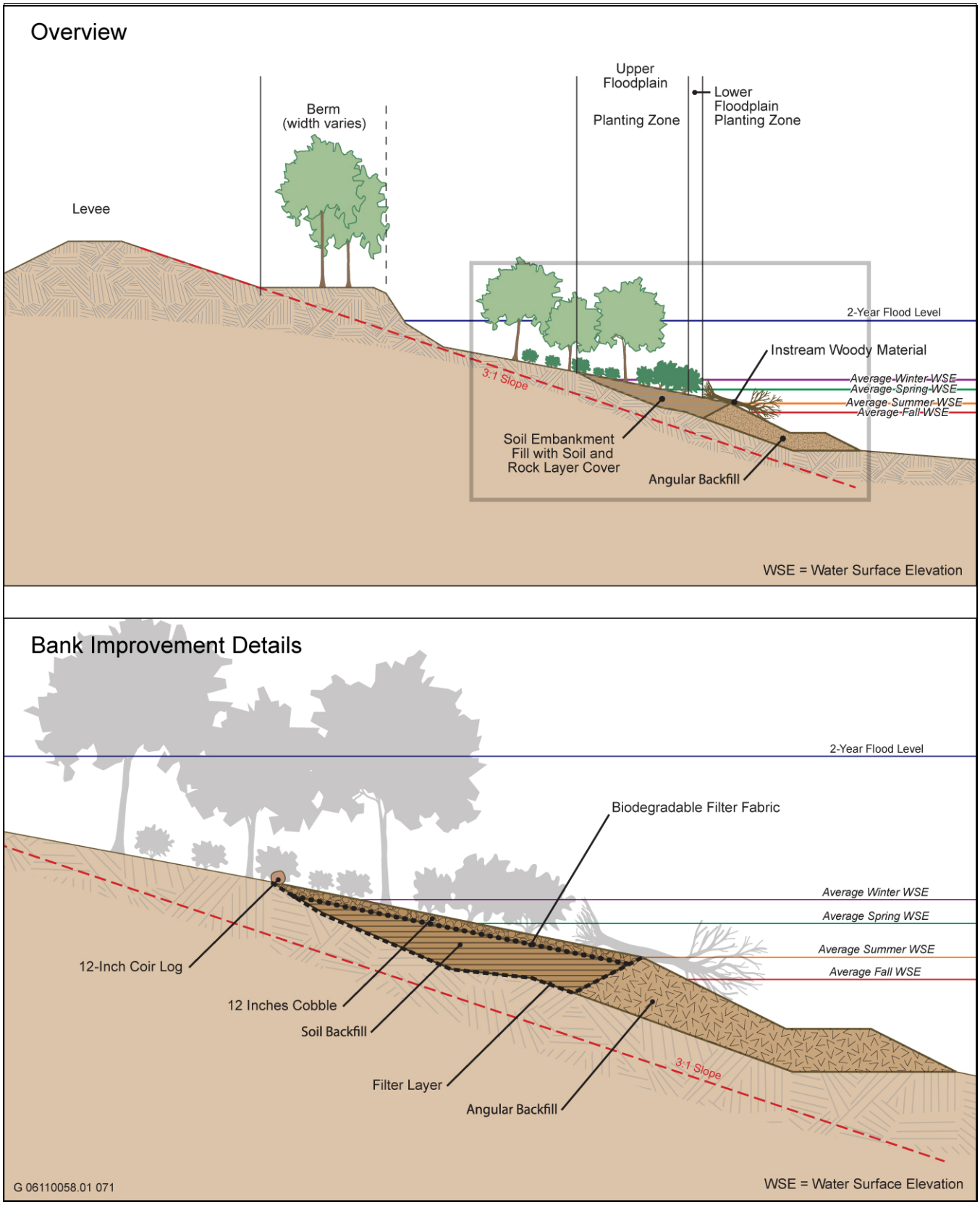
Table 2-13 Anticipated Equipment Types and Duration of Use for the RSLIP Alternative		
Construction Phase	Equipment Type and Number of Each Type	Estimated Duration (Work Days)
Mobilization	–	27
Site preparation (tree removal, clearing, grubbing, stripping)	Scrapers (6) Front-end loaders (2) Crawler/tractors (tree pushers) (2) Water trucks (2) Motor graders (2) Chippers/grinders (4) Haul trucks (10)	27–54 27–54 27–54 27–54 27–54 27–54 54
Removal of landside structures and other facilities	Excavators (2) Haul trucks (24) Front-end loaders (1)	48 48 48
Excavation of stability berm	Excavators (10) Scrapers (5) Haul trucks (12) Bulldozers (4) Graders (4) Water trucks (2)	14 14 14 14 14 14
Construction of adjacent levee and seepage berms (includes borrow site activities)	Scrapers (10) Excavators (10) Front-end loaders (10) Haul trucks (14 cubic yards) (190) Bulldozers (10) Sheepsfoot compactors (8) Motor graders (8) Water trucks (5)	140 140 140 140 140 140 140 140
Construction of cutoff wall	Front-end loaders (6) Bulldozers (25) Extended-boom pallet loaders (6) 300-kilowatt generators (6) Slurry pumps (6)	60 60 60 60 60

Table 2-13 Anticipated Equipment Types and Duration of Use for the RSLIP Alternative		
Construction Phase	Equipment Type and Number of Each Type	Estimated Duration (Work Days)
	Pickup trucks (8) Haul trucks (8) Excavators (6) Deep Soil Mixing rigs (6)	60 60 60
Reconstruction of Garden Highway at two intersections	Backhoes (2) Smooth drum compactors (2) Asphalt pavers (1) Haul trucks (6) Striping trucks (1) Truck-mounted augers (1)	27 27 27 27 27 27
Installation of surface drainage outlets across Garden Highway	Backhoes (2) Front-end loaders (2) Concrete trucks (3) Roller compactors (2) Asphalt paver (1) Haul truck (1)	21 21 21 21 21 21
Site restoration and demobilization	Hydroseeding trucks (6) Water trucks (6) Haul trucks (6)	34 34 34
Source: Data provided by HDR in 2009 and compiled by EDAW in 2009		

Riverbank Erosion Control

Because this alternative would raise the existing levee in place, rather than widening it with an adjacent levee and shifting the theoretical levee section landward, as under the Proposed Action, a higher risk would remain that further bank erosion would shorten the seepage path beneath the waterside and landside of the levee and destabilize the waterside slope through erosion encroachment into the levee template, particularly in Reaches 10–11B. Therefore, this alternative includes bank protection improvements at the moderate- and high-risk erosion sites listed in **Table 2-14** and shown in **Plate 2-15**.

Table 2-14 Moderate- and High-Risk Erosion Sites, Reaches 10–11B of the Sacramento River East Levee			
Erosion Site	River Mile	Length (feet)	Erosion Risk
I	70.0	400	Moderate
J	69.8	690	High
K	69.4	1,170	Moderate
L	69.1	660	Moderate
M	68.8	2,490	High
—	—	5,410	—
Source: Data provided by Northwest Hydraulic Consultants in 2006 and adapted by EDAW in 2009			



Source: SAFCA 2007

Bank Protection Improvement Concept **Plate 2-15**

These improvements would include the measures described below.

- Rock riprap would be placed on the existing or restored levee-foundation slope from the channel bed to about the average summer water level on the bank. Toe protection would be used as required to resist and accommodate scour of the channel bed.

- Cobble-covered soil slopes would extend from the riprap up the slope to about the average winter water-surface elevation. The maximum slope of the surface of the soil fill would be 3H:1V and the minimum would be 10H:1V. A layer of cobbles and filter material would be placed on top of the soil to protect the levee foundation from catastrophic scour and the soil surface from erosion. Riparian vegetation would be planted through the cobbles, with species varying according to the elevation above the average summer water-surface elevation.

- Existing riparian vegetation would be retained above the cobble slope (i.e., above the average winter water level) as a result of limiting the height of the structure up the bank. Providing construction access by barge rather than clearing vegetation on the berm to provide construction access from Garden Highway would further limit the removal of riparian vegetation where this construction method is practical. Where larger diameter trees are present near where the cobble slope joins the natural upper-bank slope, these trees would be marked and avoided during construction to the extent feasible. Where trees exist within the area of the proposed cobble slope and the thickness of the soil-cobble layers is less than 2 feet, the existing trees may be retained.

- Instream woody material structures would be included in the design of the bank protection improvements to enhance near-term habitat function. These structures would consist of whole-tree and/or rootwad clusters anchored into the revetment on the lower portion of the cobble-covered soil slope, such that portions of the instream woody material typically would be submerged even during the low-flow season.

Operations and Maintenance and Utility Corridors

A 50-foot-wide O&M access corridor would be established adjacent to the landside levee or seepage berm toe. Beyond this corridor, a 20-foot-wide corridor would be established for relocated power lines and other utility infrastructure.

Garden Highway Drainage

Because the existing Sacramento River east levee in Reaches 10–11B would be raised in place, stormwater runoff from Garden Highway would continue to drain to both the landside and waterside of the levee as it does now. Therefore, unlike the Proposed Action, waterside drainage outfalls would not be required under the RSLIP Alternative.

Reconstruction of Intersections

The Garden Highway intersections at Powerline Road, Radio Road, and San Juan Road would require reconstruction to accommodate the wider levee and flatter landside slopes. Intersecting road embankments would be raised and would be designed to meet Sacramento County roadway design criteria, typically extending the approach embankment approximately 600 feet outward from the levee toe.

Construction Sequence

With the exception of riverbank erosion control, construction activities for the RSLIP Alternative would be similar to those of the Proposed Action. Construction of the cutoff walls under the RSLIP Alternative would require removal of Garden Highway and excavation of the top one-third to one-half of the levee embankment to

provide a suitable working surface to construct the cutoff walls and reduce the potential for hydrofracture of the levee during cutoff wall construction.

2.4.1.2 NATOMAS CROSS CANAL SOUTH LEVEE

Improvements to the NCC south levee would be the same as for the Proposed Action.

2.4.2 IRRIGATION AND DRAINAGE COMPONENTS

The irrigation-canal relocation and drainage-canal construction components of this alternative would be the same as for the Proposed Action.

2.4.3 BORROW SITES

Activities associated with selecting and excavating borrow sites would be similar to those for the Proposed Action. Total borrow needs for the RSLIP Alternative would be 3.5 million cubic yards of earthen material as compared to 4.2 million cubic yards for the Proposed Action.

2.4.4 HABITAT IMPROVEMENTS

The habitat improvements for this alternative would be the same as for the Proposed Action (see **Table 2-11**), with one exception: Credits would be purchased from a local mitigation bank to offset the removal of trees from the waterside of the existing levee to meet USACE design criteria.

2.4.5 AVIATION SAFETY COMPONENTS

Aviation safety components would be the same as for the Proposed Action.

2.4.6 OPERATIONS AND MAINTENANCE

O&M activities would be the same as for the Proposed Action.

2.4.7 ADDITIONAL ACTIONS TO MEET FEMA, USACE, AND STATE DESIGN REQUIREMENTS: ENCROACHMENT MANAGEMENT

To meet USACE requirements (USACE 2000), a substantial number of structural features and trees may need to be removed along the waterside of the Sacramento River east levee.

2.4.8 LANDS, EASEMENTS, RELOCATIONS, AND RIGHTS-OF-WAY

Right-of-way acquisition would be similar to acquisition for the Proposed Action, except less land would be needed to accommodate the narrower levee footprint in Reaches 10–15 of the Sacramento River east levee. However, implementation of the flood damage reduction works protection corridor would not result in a narrow right-of-way acquisition footprint.

2.4.9 LAND EXCHANGE BETWEEN SAFCA AND SCAS

The land exchange would be the same as for the Proposed Action.

2.5 COMPARISON OF THE IMPACTS OF THE ALTERNATIVES

Table 2-15 shows the overall level of significance for each issue area, and provides a comparison of significance determinations among the No-Action Alternative (No Project Construction and Potential Levee Failure) and the two action alternatives (Proposed Action and RSLIP Alternative) for each of the 15 environmental issues evaluated in this EIS/EIR. As noted in the table, significance conclusions for this alternatives comparison are the result of the combination of all environmental impacts associated with a particular issue area.

Table 2-15
Comparison of the Environmental Impacts (After Mitigation Implementation) of the Phase 4a Project Alternatives[1]

Environmental Issue Area	Phase 4a Project Alternative			
	No-Action Alternative		Proposed Action	RSLIP Alternative
	No Project Construction	Potential Levee Failure		
Agricultural Resources	NI	Too Speculative	**SU**	**SU**
Land Use, Socioeconomics, Population and Housing	NI	Too Speculative	**SU**	**SU**
Geology, Soils, and Mineral Resources	NI	Too Speculative	**SU**	**SU**
Hydrology and Hydraulics	NI	**SU**	LTS	LTS
Water Quality	NI	Too Speculative	LTS	LTS
Biological Resources				
Fisheries	NI	Too Speculative	LTS	LTS
Sensitive Aquatic Habitats	NI	Too Speculative	LTS (B)	LTS (B)
Vegetation and Wildlife	**SU**	Too Speculative	**SU**	**SU**
Special-Status Terrestrial Species	NI	Too Speculative	**SU**	**SU**
Implementation of NBHCP	SU	Too Speculative	LTS	**SU**
Cultural Resources	NI	Too Speculative	**SU**	**SU**
Paleontological Resources	NI	LTS	LTS	LTS
Transportation and Circulation	NI	Too Speculative	**SU**	**SU**
Air Quality	NI	Too Speculative	**SU**	**SU**
Noise	NI	LTS	**SU**	**SU**
Visual Resources	**SU**	Too Speculative	**SU**	**SU**
Utilities and Service Systems	NI	Too Speculative	LTS	LTS
Hazards and Hazardous Materials	NI	Too Speculative	LTS	LTS
Environmental Justice	NI	Too Speculative	LTS	LTS

Notes: B = Beneficial, NI = no impact, LTS = less than significant, S = significant, SU = significant and unavoidable

[1] The overall impact conclusion for each issue area for each alternative was determined as follows: Separate tables were created for each issue area, and within each alternative, the number of appearances of each significance conclusion—LTS, LTS (B), SU—after the implementation of mitigation measures was totaled. The significance conclusion that occurred the greatest number of times within each issue area was determined to be the overall impact conclusion for that alternative. For example, if four impacts were determined to be LTS and two impacts were determined to be SU, the impact conclusion would be LTS. In cases where the numbers were the same (i.e., two impacts determined to be LTS and two impacts determined to be SU), the more severe impact was used; in the case of this example, it would be SU. The No-Action Alternative (for both No Project Construction and Potential Levee Failure) is not subject to mitigation, and often a precise determination of significance was not possible and could be made; therefore, in these cases the impact was determined to be too speculative for meaningful consideration ("Too Speculative").

Source: Data compiled by EDAW in 2009

As shown in **Table 2-15**, no direct construction-related impacts would be associated with the No-Action Alternative (No Project Construction scenario). However, as described in Section 2.2.1, "No-Action Alternative—No Flood Damage Reduction Measures," USACE's evaluation of geotechnical information and other data indicates that without improvements to the Natomas perimeter levee system (i.e., implementation of one of the action alternatives), an approximately 3% per year or greater probability exists that a flood could cause levee failure (Potential Levee Failure scenario). As described in Chapter 4.0, "Environmental Consequences and Mitigation Measures," under the analyses of the No-Action Alternative: Potential Levee Failure, impacts associated with a potential levee failure are largely unknown and would depend on the location and extent of flooding; therefore, many of these potential impacts are considered too speculative for meaningful consideration.

Although a larger number of significant and unavoidable impacts would result from implementing the RSLIP Alternative than from implementing the Proposed Action, these impacts would occur as a result of the same mechanisms (e.g., habitat loss, traffic increases).

To further compare and contrast the significant and unavoidable impacts that would result from implementing either action alternative, **Table 2-16** provides a comparison of the quantifiable environmental impacts associated with the action alternatives.

Implementation of the Phase 4a Project would substantially lessen the probability of a flood in the Basin due to levee failure. However, the Natomas Basin would remain subject to a residual risk of flooding. All of the action alternatives would have the same residual risk of flooding, with the current risk being reduced from approximately a one-in-three chance of a levee failure in a reach of the Phase 4a Project under the No-Action Alternative, to a 1-in-200 chance under both action alternatives. As described throughout Chapter 4.0, "Environmental Consequences and Mitigation Measures," the potential environmental impacts of a levee failure, as would occur under the No-Action Alternative, would be significant and unavoidable. Under all action alternatives, SAFCA would be required to maintain an ongoing residual risk management program, as described below.

2.5.1 RESIDUAL RISK OF FLOODING

In recognition of the need to incorporate management of this residual risk into local land use planning efforts, as part of the cost sharing agreement between the State of California and SAFCA that will facilitate non-Federal funding of the project, SAFCA will be obligated to provide the State with a safety plan that is consistent with recently adopted requirements of State law. Under these requirements, the safety plan, at a minimum, must include all of the following elements:

- a flood preparedness plan that includes storage of materials that can be used to reinforce or protect a levee when a risk of failure exists;
- a levee patrol plan for high-water situations;
- a flood-fight plan for the period before Federal or State agencies assume control over the flood fight;
- an evacuation plan that includes a system for adequately warning the general public in the event of a levee failure, and a plan for the evacuation of every affected school, residential care facility for the elderly, and long-term health care facility;
- a flood water removal plan; and
- a requirement, to the extent reasonable, that new buildings in which the inhabitants are expected to be essential service providers is either located outside an area that may be flooded or is designed to be operable shortly after the floodwater is removed.

Table 2-16
Summary of Quantifiable Environmental Impacts of the Action Alternatives[1]

Environmental Impact	Proposed Action	RSLIP Alternative
Permanent Conversion of Important Farmland	**676 acres**	593 acres
Potential Permanent Loss of Habitat		
Rice	1 acre	1 acre
Canals	6 acres	6 acres
Landside Woodlands	18 acres	18 acres
Waterside Woodlands (SRA habitat)	4 acres	**21 acres**
Cropland	473 acres	**546 acres**
Grasslands	**66 acres**	61 acres
Loss of Elderberry Shrub	surveys in progress	surveys in progress
Potential Wetlands Filled		
Temporary	1 acre	1 acre
Permanent	19.76 acres	**28.35 acres**
Potential Temporary Traffic Increases		
Sacramento River east levee	**2,200 trips/day**	1,900 trips/day
NCC south levee	20 trips/day	20 trips/day
Construction-Related Garden Highway Closures	Temporary/intermittent closure of approximately 1,000 feet of one lane and 1,200 feet of both lanes of Garden Highway for approximately 8–12 weeks; closure of Garden Highway (to through traffic) at three locations for up to 60 days; detours required	**Full closure of 1.5- to 2-mile segments of Garden Highway, for approximately 8–12 weeks per segment**; closure of Garden Highway (to through traffic) at three locations for up to 60 days in three locations; detours required
Potential Temporary Air Pollutant Emissions (total mitigated emissions in 2010, combined Phase 2, 3, and 4a Projects)		
Sacramento County:		
ROG	**287.6 lb/day**	266.5 lb/day
NO_X	**1,476.8 lb/day**	1,394.8 lb/day
PM_{10}	**3,846.9 lb/day**	3,395.1 lb/day
Sutter County:		
ROG	**101.7 lb/day**	68.2 lb/day
NO_X	**527.0 lb/day**	341.0 lb/day
PM_{10}	**1,259.5 lb/day**	822.4 lb/day

Notes: SRA = shaded riverine aquatic; lb/day = pounds per day; NO_X = oxides of nitrogen; PGCC = Pleasant Grove Creek Canal; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases

[1] All values are approximate. Refer to Chapter 4.0, "Environmental Consequences and Mitigation Measures," for more detail including significance criteria, mitigation measures, and other aspects of the environmental analysis. Some quantifiable environmental impacts are not presented in this table because there is no significant difference between the impacts, or data are not quantifiable. Values in **bold** denote the greater impact.

Source: Data compiled by EDAW in 2008 and 2009

Moreover, even with these measures in place, SAFCA recognizes that the consequences of an uncontrolled flood would greatly increase over time as planned new development occurs in the Natomas Basin in accordance with the Sacramento Area Council of Governments' regional blueprint. If no additional risk reduction measures are implemented, the result would be a steady rise in expected annual damages that would undermine the risk reduction accomplishments of the project.

To address this potential increase in residual risk, SAFCA has implemented a development impact fee program that applies to all new structures placed anywhere in the 200-year floodplain of SAFCA's capital assessment district, including the Natomas Basin. The objective of this program is to avoid any substantial increase in the expected damage of an uncontrolled flood, as new development proceeds in the floodplain, through a continuing flood risk reduction program for the Natomas Basin and the lower American and Sacramento Rivers that will consist of the measures described below.

- **Waterside Levee Strengthening.** This measure would consist of a long-term program of waterside bank and levee protection improvements along the lower American and Sacramento Rivers, including the Natomas Basin, designed to arrest retreat of the upper bank, preserve waterside berm width, and reduce the potential for destabilization of the adjacent levee foundation due to erosion or ground shaking. In addition, this measure would minimize the long-term loss of mature trees and vegetation located along the affected berms and provide opportunities for expansion of the Central Valley's remnant riparian forest while enhancing the public safety purposes of the levee system.

- **Landside Levee Strengthening.** This measure would focus on improvements to the crown and landside slope of critical segments of the levee system along the NCC, PGCC, and the lower American and Sacramento Rivers to increase the resistance of these levees to overtopping and extended elevated river stages. In the Natomas Basin, these improvements would involve flattening the landside slope of the NCC south levee, the PGCC west levee, and the Sacramento River east levee to a 5H:1V dimension. Along the lower American River (outside of the Natomas Basin), these improvements would involve hardening the crown and landside slope of portions of the north and south levees between Howe Avenue and Watt Avenue.

- **Acquisition of Agricultural Preservation Easements.** This measure would focus on acquiring agricultural preconservation easements from willing landowners occupying the levee-protected floodplains upstream and immediately downstream of the Fremont Weir located outside of the Natomas Basin. The purpose of these easements would be to compensate the participating landowners for abandoning the development rights associated with their property. These easements would remove the incentive to improve the levees protecting the property beyond the minimum design requirements of the Sacramento River Flood Control Project (SRFCP) and would thus ensure that these levees are not raised above the design of the SRFCP, which is governed by the "1957 profile." This would reinforce the 200-year design of the early implementation project and the NLIP as a whole, which assumes that upstream levees are improved to the SRFCP top of levee design and overtop without failing when water surface elevations exceed this design. It is assumed that SAFCA's development impact fee revenue would constitute only a portion of the revenue devoted to this measure, with the balance coming from the Federal and State governments as part of a comprehensive update of the plan of flood damage reduction for the Sacramento Valley (**Plate 1-2**).

- **Improved System Operations.** This measure would focus on opportunities to improve the operation of the SRFCP to reduce water-surface elevations in the lower American and Sacramento Rivers and in the drainage channels around the Natomas Basin. These opportunities would include implementing weather forecast–based operations at Folsom Dam and Reservoir and increasing the conveyance capacity of the Yolo and Sacramento Bypass systems. It is assumed that SAFCA's development impact fee revenue would constitute only a portion of the revenue devoted to this measure, with the balance coming from the Federal and State governments as part of a comprehensive update of the plan of flood damage reduction for the Sacramento Valley.

2.6 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines require identification of an environmentally superior alternative from among the proposed project (i.e., Proposed Action) and the alternatives evaluated. If the No-Project Alternative (i.e., No-Action Alternative) is environmentally superior, CEQA requires identification of the "environmentally superior alternative" other than the No-Project Alternative and the alternatives evaluated. Federal NEPA guidelines also recommend that an environmentally preferred alternative be identified; however, under NEPA, that alternative does not need to be identified until the final record of decision is published. Therefore, the discussion in this section of the environmentally superior alternative is intended to satisfy CEQA requirements.

Under the No-Action Alternative (Potential Levee Failure), without improvements to the Natomas perimeter levee system, the risk of a levee failure would remain high, resulting in the potential for multiple unavoidable significant adverse effects on environmental resources (see **Table 2-15**).

As described in **Appendix B1** development of the action alternatives included consideration of potential effects on environmental resources (e.g., waters of the United States, woodlands, and habitat). Accordingly, levee improvements were designed to avoid or minimize such effects where practicable. However, agricultural canals and seasonal wetlands present near the toe of the levees would require filling under either of the action alternatives because of their proximity to the existing levees. Quantification of these and other impacts is provided above in **Table 2-16**. Significant impacts on certain environmental issue areas (e.g., noise, cultural resources, visual resources) cannot be quantified, and would result in similar impacts regardless of the action alternative selected.

There are two primary differences between the action alternatives in terms of their potential environmental impacts. The first is that the RSLIP Alternative could result in significant and unavoidable effects on shaded riverine aquatic habitat function associated with the removal of as much as 21 acres of riparian vegetation—compared to 1 acre under the Proposed Action—on the waterside of the Sacramento River east levee, that would be needed to conform with USACE guidance regarding levee encroachments (USACE 2000). Removal of this vegetation would likely result in the loss of a substantial amount of nesting habitat for Swainson's hawk and adverse impacts on fish. The second difference between the impacts of the action alternatives is that the RSLIP Alternative would require levee degradation of the existing Sacramento River east levee (to accommodate installation of the proposed cutoff walls) and reconstruction of the existing Garden Highway in accordance with currently applicable roadway standards. The anticipated closure of Garden Highway would result in severe access restrictions and traffic delays. Construction of the adjacent levee under the Proposed Action would preclude the need for this extensive vegetation removal and extensive roadway reconstruction, and thus would avoid these impacts.

Based on the conclusions in **Tables 2-15** and **2-16** and from conclusions presented in the Local Funding EIR, Phase 2 EIR, Phase 2 SEIR, Phase 2 EIS, and Phase 3 DEIS/DEIR incorporated by reference, the Proposed Action would have the fewest overall environmental impacts, as well as the least environmentally damaging impacts, and therefore would be the environmentally superior alternative under CEQA.

SAFCA completed cost estimates for the entire NLIP as part of its Proposition 1E Early Implementation Program NLIP Capital Outlay Grant Application (SAFCA 2009c). The adjacent levee alternative (preferred alternative for the entire NLIP) would have an estimated first cost of $618 million, whereas the raise levee in place with setback alternative (alternative considered for the entire NLIP) would have an estimated first cost of $709.1 million (a difference of $91.1 million or approximately 15% more). These costs apply to the entire NLIP, and are not broken down by project phase; however, an estimate for the Phase 4a Project can be derived as a cost per linear foot.[2]

[2] Phase 4a Project cost per linear foot = (cost for the Sacramento River east levee portion of the entire NLIP / total linear feet in Reaches 1–20 of the Sacramento River east levee) * Phase 4a Project linear feet in Reaches 10–15 of the Sacramento River east levee.

Using this method, the Phase 4a Project Proposed Action would have an estimated first cost of $145.6 million[3], whereas the Phase 4a Project RSLIP Alternative would have an estimated first cost of $175.1 million[4] (a difference of $29.5 million or approximately 20% more).

[3] Phase 4a Project Proposed Action cost per linear foot: ($448.9 million / 96,048 feet) * 31,152 feet = $145.6 million.
[4] Phase 4a Project RSLIP Alternative cost per linear foot: ($540 million / 96,048 feet) * 31,152 feet = $175.1 million.

3 AFFECTED ENVIRONMENT

The baseline environmental conditions assumed in this EIS/EIR consist of the existing physical environment as of March 27, 2009, the date when USACE published the notice of intent (NOI) to prepare an EIS in the *Federal Register* and SAFCA published the notice of preparation (NOP) to prepare an EIR with the State Clearinghouse. Under CEQA, baseline environmental conditions are set at the time the NOP is distributed. Even though this chapter is titled "Affected Environment" for the purposes of NEPA, it also constitutes the "Environmental Setting" required under CEQA.

3.1 GENERAL SITE CONDITIONS

3.1.1 NATOMAS BASIN

The Natomas Basin (**Plate 1-1**) is located at the confluence of the American and Sacramento Rivers. Encompassing approximately 53,000 acres, the Basin extends northward from the American River and includes portions of the city of Sacramento, Sacramento County, and Sutter County. In addition to the American and Sacramento Rivers, the Natomas Basin is bordered on the north by the Natomas Cross Canal (NCC) and on the east by the Pleasant Grove Creek Canal (PGCC) and the Natomas East Main Drainage Canal (NEMDC) (also known as Steelhead Creek). The NCC diverts the runoff from a large watershed in western Placer and southern Sutter Counties around the Natomas Basin and is a contributor to the flows in the upper reach of the Sacramento River channel in SAFCA's jurisdiction. The NEMDC is an engineered channel along the southeastern flank of the Natomas Basin. Tributaries to the NEMDC include Dry Creek, Arcade Creek, Rio Linda Creek, Robla Creek, and Magpie Creek Diversion Channel. The Natomas Basin is protected from high flows in these water bodies and in the American and Sacramento Rivers by an interconnected perimeter levee system. This levee system was originally created to promote agricultural development. Today, however, the Natomas Basin contains three major public transportation facilities (Interstate 5 [I-5], Interstate 80 [I-80], and State Route [SR] 99/70) and is the site of the Sacramento International Airport (Airport). Airport lands account for a little over 10% of the total acreage in the Basin. Half of the Airport lands lie outside of the Airport Operations Area and consist of "bufferlands" devoted to agricultural or open space use (see **Plate 1-7**). About 30% of the Basin consists of developed urban uses mostly located south of Elkhorn Boulevard in the city of Sacramento. The remaining 60% of the Basin is in some form of developed agricultural or open space use in unincorporated areas of Sacramento and Sutter Counties, including 4,000 acres under the management of The Natomas Basin Conservancy (TNBC) (see **Plate 1-8**).

3.1.2 LEVEE IMPROVEMENT AREAS

The general characteristics of the areas along the NCC south levee and Sacramento River east levee are described below. The PGCC west levee and NEMDC west levee, while not part of the Phase 4a Project, are also described below to provide overall context of the existing conditions in the NLIP study area because they are important components of the other Landside Improvements Project phases. See also **Plate 2-7**.

3.1.2.1 NATOMAS CROSS CANAL SOUTH LEVEE

The NCC is a 5.3-mile-long channel that carries water from several tributary watersheds in western Placer County and eastern Sutter County to the Sacramento River. The NCC begins at the PGCC and East Side Canal and extends southwest to its confluence with the Sacramento River near the Sankey Road/Garden Highway intersection. During periods of flooding, the Sutter Bypass, Sacramento River, and NCC all contribute to raised water elevations that can affect the NCC levees. For engineering analysis purposes, the levee is divided into seven reaches, as shown in **Plate 1-3**. In the pre-NLIP project condition, much of the south levee contained a stability berm with an internal drainage system. Levee slopes were approximately 3H:1V on the waterside and 2H:1V on the landside, with an approximately 80- to 100-foot maintenance access area on the landside of the levee through

most of the NCC's length. The Phase 2 Project widened the levee footprint by raising the levee, flattening the landside levee slope, and constructing a cutoff wall.

Farms and rural residences are located on both sides of the NCC, with rice the primary crop under cultivation. The Lucich North and Frazer Habitat Preserves, maintained by TNBC, lie south of the NCC south levee from the eastern end of Reach 2 through the western end of Reach 6. A few residences are situated 700–1,000 feet north of the NCC south levee in Reach 1, and a few residences are situated 50–200 feet south and west of the levee along Reach 6. At Reach 7, a residence and several ranch buildings are situated within 25 feet of the levee's landside toe. Other nearby land uses include the Verona Village Resort, a small trailer campground, marina, restaurant, and store on the west side of Garden Highway, approximately 660 feet southwest of the west end of the NCC levee at the north end of Reach 1 of the Sacramento River east levee.

A drainage canal, referred to as the Vestal Drain, runs parallel to the NCC south levee through much of Reach 2, approximately 100 feet from the landside levee toe. There is a private irrigation pump and irrigation canal at the landside levee toe in Reach 1. Natomas Central Mutual Water Company's (NCMWC's) Bennett Pump Station and Reclamation District (RD) 1000's Pumping Plant No. 4 are located in Reach 2, and the NCMWC Northern Pump Station is located in Reach 3. NCMWC's North Main Canal runs parallel to the levee through Reaches 4 and 5, approximately 100 feet from the landside levee toe.

3.1.2.2 SACRAMENTO RIVER EAST LEVEE

Table 3.1-1 contains a description of the areas along the Sacramento River east levee. The Phase 4a Project includes improvements to the Sacramento River east levee Reaches 10–15 only; however, all reaches are included in the table below for completeness and because these reaches are part of the Phase 2, 3, 4a, and 4b Projects.

Table 3.1-1
Description of the Sacramento River East Levee Area by Reach and by NLIP Phase

Reach	Landside	Waterside
	Phase 2 Project	
1	Sankey Road intersects Garden Highway near the start of Reach 1. Oak woodland and a rural residence are located approximately 3,000 feet south of the start of Reach 1; the rural residence is located within 50 feet of the landside toe of the levee. Rice and field crops border the levee throughout the reach.	Verona Village Resort (a small trailer campground, marina, restaurant, and store) is located on the west side of Garden Highway bordering the start of the reach. Small clusters of woodland are scattered along the highway to the south.
2	A rural residence adjacent to the existing levee is located approximately one-third mile south of the start of Reach 2. Field crops border the levee throughout the reach. The northern part of the TNBC Huffman West Habitat Preserve borders the levee in the southern end of the reach.	Small clusters of woodland are scattered along the highway. Eight residences are located at the end of Reach 2 adjacent to Garden Highway.
3	A field used for row crops, part of the TNBC Huffman West Habitat Preserve, covers the entire reach.	Six residences are located adjacent to Garden Highway.
4A and 4B	Field crops or open space border the levee throughout the reach. Most of the parcels bordering the levee are TNBC land (Huffman West and Atkinson Habitat Preserves) or Airport land. Riego Road intersects Garden Highway approximately 1,500 feet from the start of Reach 4A. Agricultural facilities at the end of a narrow paved road are located approximately 2,000 feet south of Riego Road.	Approximately nine residences, interspersed among woodland, are located adjacent to Garden Highway. Several docks and private marinas, including the Rio Ramaza Marina, are located along the bank. The NCMWC's Prichard Lake Pumping Plant and pump tender's residence are located at the North Drainage Canal.

Table 3.1-1
Description of the Sacramento River East Levee Area by Reach and by NLIP Phase

Reach	Landside	Waterside
	The RD 1000 Pumping Plant No. 2 is located on the North Drainage Canal. The Elkhorn Canal closely parallels the levee from the North Drainage Canal south. A highline canal perpendicular to the levee is located approximately 2,000 feet south of the North Drainage Canal. A cluster of woodlands is located just south of the canal. A line of trees perpendicular to the levee is located near the southern end of the reach.	
	Phase 3 Project	
5A and 5B	Field crops and fallow Airport north bufferlands border the levee throughout the reach on Airport land. A cluster of woodlands is located at the start of the reach. A rural residence with outbuildings and surrounding woodland is located approximately 1,600 feet south of the start of the reach. West Elverta Road intersects Garden Highway approximately 1,500 feet north of the end of the reach. The Elkhorn Canal closely parallels the levee throughout the reach.	Woodland covers the entire reach west of Garden Highway.
6A and 6B	Field crops border the levee throughout the reach. The West Drainage Canal, which borders Teal Bend Golf Club on the north, intersects the levee approximately 1,400 feet south of the orchard. Reservoir Road intersects Garden Highway approximately 1,000 feet south of the West Drainage Canal. The golf course covers the remaining 2,800 feet of the reach. The Elkhorn Canal closely parallels the levee throughout the reach.	Approximately eight residences, interspersed among woodland, are located adjacent to Garden Highway. Several docks are located along the bank. NMCWC's Elkhorn Pumping Plant is located at the start of Reach 6A.
7	Teal Bend Golf Club extends approximately 600 feet beyond the start of the reach. Field crops border the levee for the remaining 2,400 feet of the reach. The Elkhorn Canal closely parallels the levee throughout the reach.	Approximately 14 residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank.
8	Field crops border the levee throughout the reach. A rural residence with outbuildings and surrounding woodland is located at the start of the reach. Another rural residence with outbuildings and surrounding woodland is located approximately 1,200 feet south of the first residence. West Elkhorn Boulevard intersects Garden Highway approximately 800 feet north of the end of the reach. A woodland cluster is located at the end of the reach. The Elkhorn Canal closely parallels the levee throughout the reach, ending approximately 1,200 feet south of Elkhorn Boulevard.	Approximately eight residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank.
9A and 9B	A woodland cluster is located approximately 1,300 feet south of the start of the reach. Two rural residences are located within 1,000 feet of Bayou Road and the I-5 overpass. A woodland cluster is located on the south side of the I-5 overpass. Another woodland cluster is located approximately 700 feet further south. A woodland cluster is located at the end of Reach 9. Field crops border the levee throughout the reach.	Approximately 10 residences are located adjacent to Garden Highway interspersed among woodland. Several private docks are located along the bank. Two restaurant/ marina facilities are located within 800 feet of the intersection of Bayou Road and Garden Highway. The Elkhorn Boat Launch Facility operated by Sacramento County Regional Parks Department is located adjacent to the marinas.

Table 3.1-1
Description of the Sacramento River East Levee Area by Reach and by NLIP Phase

Reach	Landside	Waterside
	Phase 4a Project	
10	A rural residence is located at the start of the reach. A woodland cluster is located approximately 1,100 feet farther south. A large ranch occupies Reach 10 from approximately 1,700 feet south of the start of the reach to the end of the reach. Field crops border the levee throughout the reach. RD 1000's Pumping Plant No. 5 is located in the middle of the reach.	Approximately five residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank.
11A and 11B	Reach 11 contains the remaining 400 linear feet of the large ranch in Reach 10. Field crops border the levee throughout the reach. A rural residence is located approximately two-thirds mile from the start of Reach 11. Another rural residence is located another 2,000 feet south. Approximately one-half mile farther south, the river bends to the east. A cluster of trees is located approximately 1,600 feet west of the end of the reach. Field crops border the levee throughout the reach. RD 1000's Pumping Plant No. 3 is located within the reach.	Approximately 12 residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank.
12	An orchard covers much of Reach 12, at which point the river trends south again. A rural residence is located approximately one-half mile south of the start of the reach. A rural residence and the Kimura Ditch are located 500–700 feet north of the end of the reach, followed by two more residences. A highline ditch starts at the Kimura Ditch and closely parallels the levee to the south. Field crops border the levee throughout the reach.	Approximately 14 residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank.
13	A residence is located at the start of Reach 13. Pumping Plant No. 3 and a large drainage ditch perpendicular to the levee are located 800 feet south of the start of the levee. Another 1,400 feet farther south is a woodland cluster. A highline ditch closely parallels the levee for the length of the reach. Field crops border the levee throughout the reach. The TNBC Cummings preserve includes mitigation plantings for valley elderberry longhorn beetle.	Approximately 13 residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank.
14	Radio Road intersects Garden Highway approximately 1,600 feet south of the start of Reach 14 at the end of a large field used for row crops. A rural residence is located approximately 800 feet farther south. The southern part of the reach is bordered by the TNBC Alleghany preserve.	Approximately 14 residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank. NCMWC's Riverside Pumping Plant is located in the middle of the reach.
15	Reach 15 starts at the intersection of San Juan Road and Garden Highway. Two residential estates are located 600 and 1,200 feet farther south. Scattered trees are located adjacent to the levee. The northern part of the reach is bordered by the TNBC Alleghany preserve.	Approximately 21 residences, interspersed among woodland, are located adjacent to Garden Highway. More than a dozen private docks are located along the bank.
	Phase 4b Project	
16	Eight rural residences amid scattered trees are located in the first 1,600 feet of Reach 16. The next 2,000 feet are a mixture of open fields, rural residences, farm buildings, and scattered trees. Dense woodland makes up the remaining 1,200 feet of the reach. The reach contains approximately 20 residences.	Approximately 12 residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank.

Table 3.1-1
Description of the Sacramento River East Levee Area by Reach and by NLIP Phase

Reach	Landside	Waterside
17	A rural residence is located at the start of Reach 17, approximately 600 feet inland from the levee toe. A rural residence with outbuildings is located approximately 800 feet south of the start of the reach.	Approximately seven residences, interspersed among woodland, are located adjacent to Garden Highway. Several private docks are located along the bank.
18	Reach 18 contains four to five rural residences among small orchards north of the I-80 overcrossing. A woodland cluster is located on the east side of the I-80 overcrossing, where the river bends east.	Approximately six residences, interspersed among woodland, are located northwest of the I-80 overcrossing, adjacent to Garden Highway. Several private docks are located along the bank.
19A and 19B	Two rural residences are located within 800 feet of the start of Reach 19, with scattered trees along and adjacent to the levee. The rest of the reach contains a subdivision of several hundred homes, the Swallows Nest Golf Course and condominium complex, and a subdivision of approximately 90 homes. Scattered trees are located on or adjacent to the levee. The City of Sacramento's Willow Creek Pump Station is located in Reach 19B.	Sand Cove Park (37 acres) is located southeast of the I-80 overcrossing. Woodland occupies the first 1,700 feet of Reach 19. The remaining mile to the east is a mixture of homes, private docks, and businesses, including the River View Marina and the City of Sacramento's Willow Creek Pump Station in Reach 19B.
20A and 20B	Reach 20 contains an office park and the 13-acre Natomas Oaks Park. Scattered trees are located on or adjacent to the levee. RD 1000's Pumping Plant No. 1 is located in Reach 20A.	The first two-third mile east of Reach 19 contains a mixture of homes, private docks, and businesses, including the Riverbank Marina. The remaining 2,000 feet contains Discovery Park woodland and RD 1000 Pump Plant No. 1 in Reach 20A.

Notes: I-5 = Interstate 5; I-80 = Interstate 80; NCMWC = Natomas Central Mutual Water Company; RD = Reclamation District; TNBC = The Natomas Basin Conservancy
Source: Data compiled by EDAW in 2008

3.1.2.3 PLEASANT GROVE CREEK CANAL WEST LEVEE (NOT PART OF THE PHASE 4A PROJECT)

The area along the PGCC west levee contains primarily agricultural uses along with minimal industrial, manufacturing, and rural residential uses.

3.1.2.4 NATOMAS EAST MAIN DRAINAGE CANAL WEST LEVEE (NOT PART OF THE PHASE 4A PROJECT)

The area west of and adjacent to the NEMDC ranges from agricultural uses to the north to urban uses to the south. The area adjacent to the northern portion of the NEMDC, between Sankey Road and Elkhorn Boulevard, contains primarily agricultural uses with scattered farm residences and associated structures. The area between Elkhorn Boulevard and Del Paso Road contains agricultural uses with scattered large-lot residential. South of Del Paso Road and north of San Juan Road, land uses are more urbanized with a mix of commercial, business parks, and manufacturing uses. The area south of San Juan Road is primarily single-family residential.

3.2 AGRICULTURAL RESOURCES

3.2.1 REGULATORY SETTING

3.2.1.1 FEDERAL

The following Federal law related to agricultural resources is relevant to this analysis and is described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

- Farmland Protection Policy Act.

3.2.1.2 STATE

California Important Farmland Inventory System and Farmland Mapping and Monitoring Program

The California Department of Conservation, Office of Land Conservation, maintains a statewide inventory of farmlands. These lands are mapped by the Division of Land Resource Protection as part of the Farmland Mapping and Monitoring Program (FMMP). The maps are updated every 2 years with the use of aerial photographs, a computer mapping system, public review, and field reconnaissance. Farmlands are divided into the following five categories based on their suitability for agriculture:

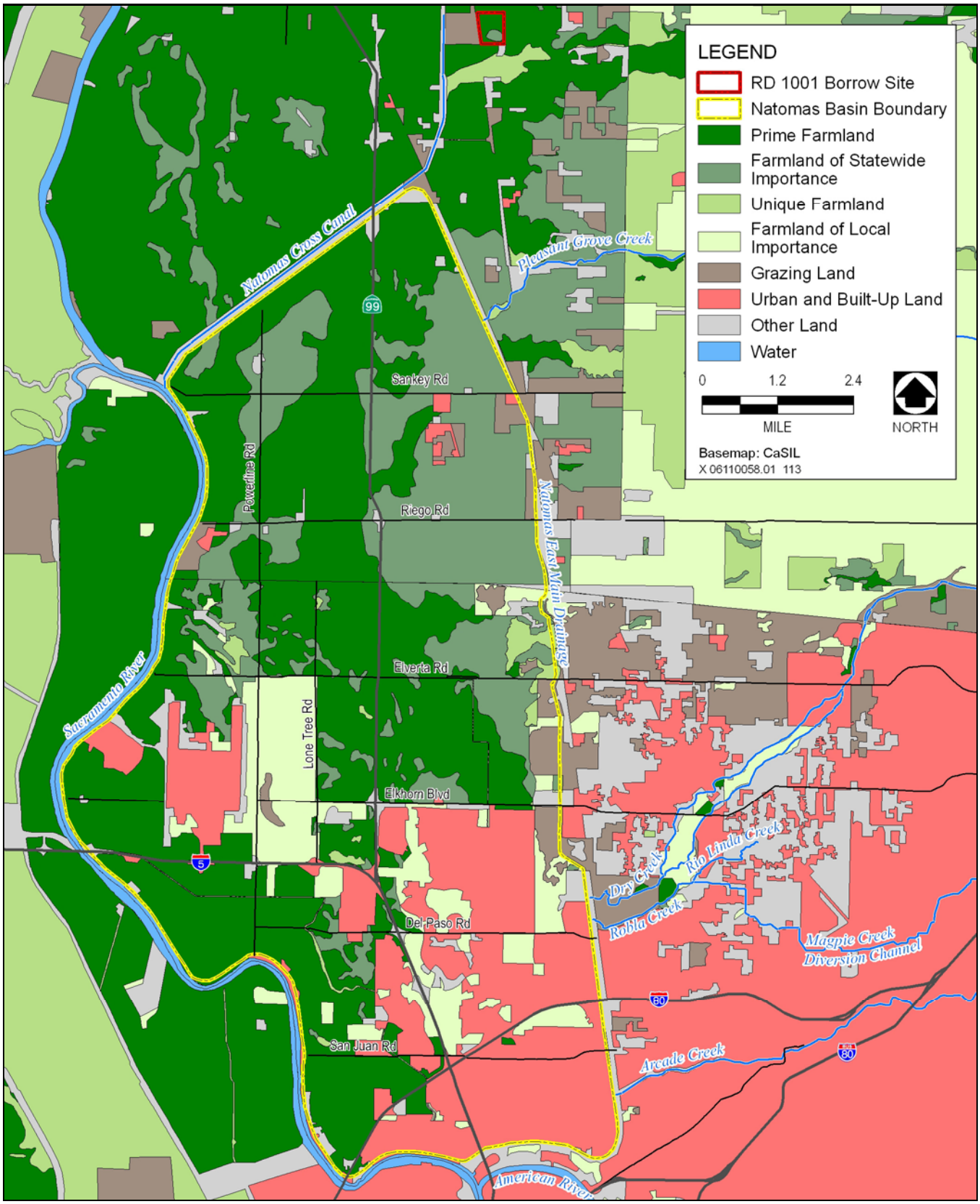
- **Prime Farmland**—land that has the best combination of physical and chemical characteristics for crop production. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed.
- **Farmland of Statewide Importance**—land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production.
- **Unique Farmland**—land that does not meet the criteria for Prime Farmland or Farmland of Statewide Importance, but that has been used for the production of specific crops with high economic value.
- **Farmland of Local Importance**—land that is either currently producing crops or has the capability of production, but that does not meet the criteria of the categories above.
- **Grazing Land**—land on which the vegetation is suited to the grazing of livestock.

These categories are sometimes referred to as Important Farmland. Other categories used in the FMMP mapping system are "urban and built-up lands," "lands committed to nonagricultural use," and "other lands" (land that does not meet the criteria of any of the other categories).

Much of the farmland in the Natomas Basin is designated by the FMMP as Prime Farmland and Farmland of Statewide Importance (California Department of Conservation 2008). **Plate 3-1** shows the designated farmland within and surrounding the Natomas Basin according to the latest data available from FMMP.

California Land Conservation Act of 1965 (Williamson Act)

The California Land Conservation Act of 1965, commonly known as the Williamson Act (California Government Code Section 51200 et seq.), enables local governments to enter into contracts with private landowners for the purpose of promoting the continued use of the relevant land in agricultural or related open space use. In return, landowners receive property tax assessments that are based on farming and open space uses instead of full market



Source: California Department of Conservation 2008

Important Farmland in the Project Area **Plate 3-1**

value. Local governments receive an annual subvention (subsidy) of forgone property tax revenues from the state via the Open Space Subvention Act of 1971.

The Williamson Act empowers local governments to establish "agricultural preserves" consisting of lands devoted to agricultural uses and other compatible uses. Upon establishment of such preserves, the locality may offer to owners of included agricultural land the opportunity to enter into annually renewable contracts that restrict the land to agricultural use for at least 10 years (i.e., the contract continues to run for 10 years following the first date upon which the contract is not renewed). In return, the landowner is guaranteed a relatively stable tax rate, based on the value of the land for agricultural/open space use only and unaffected by its development potential.

As a public agency that may acquire lands within agricultural preserves, including lands under contract, SAFCA is exempt from the normal cancellation process for Williamson Act contracts, because the contract is nullified for the portion of the land actually acquired (California Government Code Section 51295). SAFCA must provide notice to the California Department of Conservation prior to acquiring such lands (California Government Code Section 51291[b]). A second notice is required within 10 working days after the land is actually acquired (California Government Code Section 51291[c]). As the land would be acquired for flood damage reduction measures, SAFCA is exempt from the findings required in California Government Code Section 51292 (California Government Code Section 51293[e][1]) because the proposed project consists of flood control works. The preliminary notice to the California Department of Conservation, provided before lands are actually acquired, would demonstrate the purpose of the project and the exemption from the findings.

Much of the farmland in the Natomas Basin is in an agricultural preserve, with portions of those lands within the Phase 4a Project area currently held in Williamson Act Contracts (**Plate 3-2**).

3.2.1.3 REGIONAL AND LOCAL

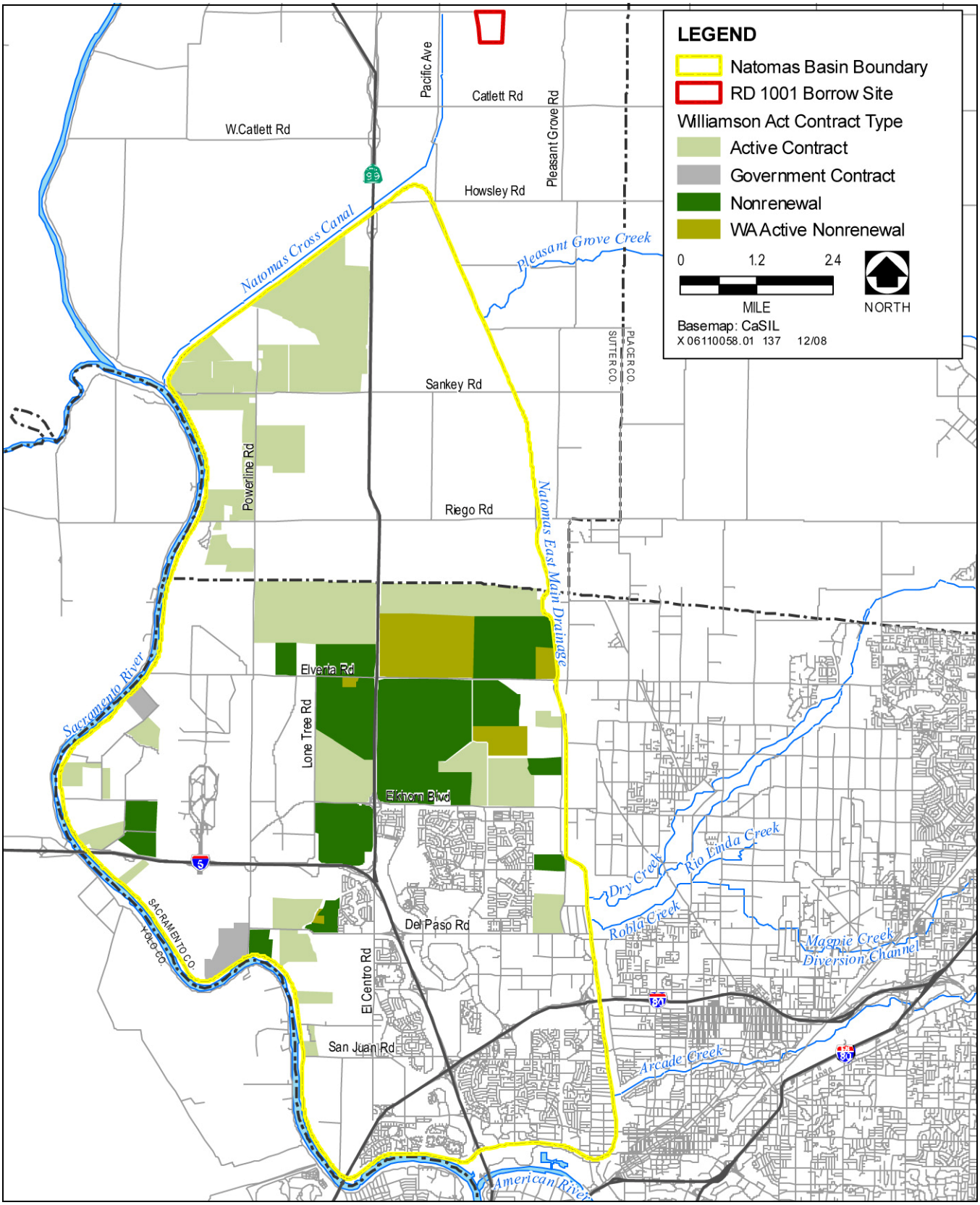
SAFCA, acting as a Joint Exercise of Power Agency (California Government Code Section 65000), is exempt from plans, policies, and regulations adopted by local agencies (California Government Code Section 53090). Nevertheless, this EIS/EIR provides relevant local plans and policies in order to describe the land use planning and policy context in which the Phase 4a Project exists and how local agency plans and policies address resource issues in the Phase 4a Project area.

Sacramento County General Plan

The *Sacramento County General Plan* is currently being updated and is scheduled to be adopted in winter 2009. The Agricultural and Conservation Elements of the current *Sacramento County General Plan* (Sacramento County 1993) contain the following goals, objectives, and policies that may be relevant to this project:

Agricultural Element

- **Goal:** Protect important farmlands from conversion and encroachment and conserve agricultural resources.
- **Objective:** Prime farmlands (as defined by the California Department of Conservation) and lands with intensive agricultural investments (such as orchards, vineyards, dairies, and other concentrated livestock or poultry operations) protected from urban encroachment.
    - **Policy AG-5:** Mitigate loss of prime farmlands or lands with intensive agricultural investments through CEQA requirements to provide in-kind protection of nearby farmland.



Source: Base map from CASIL Layers; adapter by EDAW in 2008 with data from California Department of Conservation 2007

Parcels Subject to Williamson Act Contracts **Plate 3-2**

- **Objective:** Retain agricultural land holdings in units large enough to guarantee future and continued agricultural use.

    - **Policy AG-7:** Agricultural zoning district boundaries shall be rational and shall respect parcel boundaries.

    - **Policy AG-8:** Agricultural land divisions shall not adversely affect the integrity of agricultural pursuits. Agricultural land divisions may be denied if the reviewing authority finds that the division of land is likely to create circumstances inconsistent with this policy.

Conservation Element

- **Goal:** Preserve and protect long-term health and resource value of agricultural soils.

- **Objective:** Loss of important agricultural soils compensated for by long-term protection of land with similar productivity value.

    - **Policy CO-54:** Direct development away from prime or statewide importance soils or otherwise provide for mitigation that slows the loss of additional farmland conversion to other uses.

    - **Policy CO-55:** Projects resulting in the conversion of more than fifty (50) acres of prime or statewide in importance farmland shall be deemed to have a significant environmental effect, as defined by CEQA.

3.2.2 ENVIRONMENTAL SETTING

Approximately 60% of the Natomas Basin is in some form of developed agricultural or open space use in unincorporated areas of Sacramento and Sutter Counties. Rice is the most common crop and is generally grown over large areas of contiguous land north of Elkhorn Boulevard, although the amount of land in active rice production has greatly diminished in recent years and many former rice fields are now fallow or support grain crops, such as wheat. Agricultural lands in the southern and western portions support other crops (field crops and orchards) (City of Sacramento, Sutter County, and TNBC 2003). **Table 3.7-1** summarizes information compiled for the most recent categorization of land cover types in the Natomas Basin conducted for TNBC.

According to the Sacramento County 2007 Crop Report, for the year 2007, the gross value of agricultural production in Sacramento County was $364,859,000 (Sacramento County Agricultural Commissioner 2008). Of the crops grown in the Natomas Basin, alfalfa hay and corn (silage and field) were among the ten leading farm commodities produced in Sacramento County (Sacramento County Agricultural Commissioner 2008). The contribution that agricultural production makes to the economy in Sacramento County, with its diverse economic base, is relatively small, making up 1% (ratio of sales value of farm commodities to personal income) (Lee et al. 2001).

The Local Funding EIR, which was certified by SAFCA in February 2007, anticipates that as part of SAFCA's comprehensive strategy for reducing the risk of flooding along the Sacramento River, SAFCA could acquire agricultural preservation easements from willing sellers in Sutter and Yolo Counties. In October 2007, the Governor signed into law Assembly Bill 930 amending the Sacramento Area Flood Control Agency Act of 1990 to make explicit SAFCA's authority to acquire agricultural preservation easements from willing sellers outside its jurisdiction, provided such acquisition is consistent with applicable county plans and the State Plan of Flood Control.

Pursuant to this authority, SAFCA recently cooperated with Yolo County, the California Department of Water Resources (DWR), the Yolo Land Trust, and the Sacramento Valley Conservancy in acquiring and recording agricultural conservation easements on approximately 1,660 acres of agricultural land in the Elkhorn Basin of Yolo County. The Elkhorn Basin is an agricultural area located directly across the Sacramento River from the Natomas Basin and is classified as Prime Farmland by the FMMP. It is protected from flooding by the

Sacramento River west levee and the Yolo Bypass east levee. Preservation of this farmland is consistent with the *Yolo County General Plan* and zoning for this area and with recently enacted state legislation (Senate Bill 5) recognizing that "the level of flood protection afforded rural and agricultural lands by the original flood damage reduction system would not be adequate to protect those lands if they are developed for urban uses, and that a dichotomous system of flood protection for urban and rural lands has developed through many years of practice." SAFCA will assist in upgrading and maintaining levees at a standard suitable for agriculture.

3.2.2.1 CALIFORNIA IMPORTANT FARMLAND SYSTEM AND FARMLAND MAPPING AND MONITORING PROGRAM

Plate 3-1 shows the designated farmland within the Natomas Basin and the area northeast of the Basin according to the latest data available from FMMP (Farmland Mapping and Monitoring Program 2006). As shown in **Plate 3-1**, much of the farmland in the Natomas Basin, including the farmland in areas where project features would be located, is designated by the FMMP as Prime Farmland and Farmland of Statewide Importance (California Department of Conservation 2008). The mapping indicates that Important Farmland in the Natomas Basin totaled approximately 40,000 acres in 2006. This represents approximately 6% of the total of approximately 715,000 acres of Important Farmland mapped by the FMMP in Sutter and Sacramento Counties in 2006 (California Department of Conservation 2008).

The Land Evaluation and Site Assessment (LESA) system is a tool used to rank lands for suitability and inclusion in the Federal Farmland Protection Program (FPP) administered by the Natural Resources Conservation Service (NRCS). LESA evaluates several factors, including soil potential for agriculture, location, market access, and adjacent land use. In general, because of the soil qualities, availability of irrigation water, and proximity of markets for agricultural products, agricultural lands in the Phase 4a Project area that are designated by the State of California as Important Farmlands would also receive a high ranking in the LESA system.

3.2.2.2 WILLIAMSON ACT CONTRACTS

The California Land Conservation Act of 1965, commonly known as the Williamson Act (California Government Code Section 51200 et seq.), is described above.

Within the Natomas Basin, a total of approximately 7,586 acres are under Williamson Act Contract with an additional 1,534 acres filed for nonrenewal. Properties included in the Phase 4a Project area include approximately 13 properties under Williamson Act Contract. Of these properties, 11 are immediately adjacent to the Sacramento River east levee, and three of these properties also extend into proposed borrow areas. Two additional properties are in the proposed Fisherman's Lake Borrow Area (**Plate 3-2**).

3.3 LAND USE, SOCIOECONOMICS, AND POPULATION AND HOUSING

3.3.1 REGULATORY SETTING

3.3.1.1 FEDERAL

The following Federal law related to socioeconomics and population and housing is relevant to this analysis and is described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

- Executive Order 11988, Floodplain Management, and
- Uniform Relocation Assistance and Real Property Acquisition Policies Act.

3.3.1.2 STATE

Relocation Assistance and Property Acquisition

The State of California's Government Code Section 7260, et seq. brings the California Relocation Act into conformity with the Federal Uniform Act. In the acquisition of real property by a public agency, both the Federal and state acts seek to (1) ensure consistent and fair treatment of owners of real property, (2) encourage and expedite acquisition by agreement to avoid litigation and relieve congestion in the courts, and (3) promote confidence in public land acquisition.

The Relocation Assistance and Real Property Acquisition Guidelines (Guidelines) were established by 25 CCR 1.6. The Guidelines were developed to assist public entities with developing regulations and procedures implementing Title 42, Chapter 61 of the United States Code – the Uniform Act, for Federal and Federally assisted programs. The Guidelines are designed to ensure that uniform, fair, and equitable treatment is given to people displaced from their homes, businesses, or farms as a result of the actions of a public entity. Under the Act, persons required to relocate temporarily are not considered "displaced," but must be treated fairly. Such persons have a right to temporary housing that is decent, safe, and sanitary and must be reimbursed for all reasonable out-of-pocket expenses. In accordance with these Guidelines, people shall not suffer disproportionate injury as a result of action taken for the benefit of the public as a whole. Additionally, public entities must ensure consistent and fair treatment of owners of such property, and encourage and expedite acquisitions by agreement with owners of displaced property to avoid litigation.

Project implementation would (1) require acquisition of property to construct flood damage reduction facilities (applies to both the Proposed Action and the Raise and Strengthen Levee in Place [RSLIP] Alternative); and (2) require closure of Garden Highway in 1.5 to 2-mile segments for approximately 8 to 12 weeks at a time, preventing access to residences in these areas and, thus, potentially requiring affected residents to relocate during that time period (applies only to the RSLIP Alternative).

Property acquisition and relocation services and compensation for living expenses for temporarily relocated residents would be accomplished in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act and California Government Code Section 7267 et seq.

3.3.1.3 REGIONAL AND LOCAL

SAFCA, acting as a Joint Exercise of Power Agency (California Government Code Section 65000), is exempt from plans, policies, and regulations adopted by local agencies (California Government Code Section 53090). Nevertheless, this EIS/EIR provides relevant local plans and policies in order to describe the land use planning and policy context in which the project exists and how local agency plans and policies address resource issues in the Phase 4a Project area.

Sacramento International Airport Master Plan

The Sacramento International Airport Master Plan (Sacramento County Airport System 2007) was adopted by the Sacramento County Board of Supervisors in August 2007. This plan represents the first full-scale master planning effort for the Airport since the mid-1970s. The master plan includes an evaluation of current conditions; definition of objectives, obstacles, and alternatives; an extensive public involvement program; and an implementation plan. The master plan is intended to guide airport development for at least the next 20 years. Phase 1 of the Master Plan (2007–2013) has been permitted. Among the Phase 1 improvements are the following:

- replacement of the existing Terminal B;
- construction of a new concourse from the replacement Terminal B, with a capacity of 23 contiguous gates;

- hotel/parking garage;
- new parallel Taxiway Y;
- new full-length parallel Taxiway A, hold pads, and high-speed taxiway exits for Runway 16R/34L (west runway);
- new airport traffic control tower north and west of Cy Homer Road and airport, airfield, and equipment maintenance buildings;
- general aviation area including corporate hangars, fixed base operator facility, and apron;
- expanded surface rental car parking lot between Airport Boulevard and Earhart Drive;
- expanded rental car terminal facility east of Airport Boulevard and McNair Circle;
- extension of Elkhorn Boulevard from Metro Air Park to Airport Boulevard;
- surface employee parking lot north of I-5 and west of Airport Boulevard to accommodate 1,500 automobile parking spaces;
- new remote economy parking and rental car overflow facility south of I-5 to accommodate 13,800 automobile parking spaces;
- extension of Airport Boulevard to the new parking facility;
- new ground-service equipment maintenance building east of Aviation Drive;
- new community fire station at the northwest corner of Lindbergh Drive and Crossfield Drive; and
- acquisition of two areas (48 acres and 313 acres) north of I-5 for buffers.

Included in future phases of the master plan are the following (Sacramento County Department of Environmental Review and Assessment 2007):

- extension of the east runway from the current 8,600 feet to 11,000 feet to accommodate nonstop transcontinental flights;
- construction of a new, 8,600-foot-long north-south runway 1,200 feet to the west of the current west runway;
- further expansion of Terminal B and a new Terminal B parking garage;
- extension of Terminal A concourse;
- 2,400-foot extension of Runway 16L/34R (east runway) to provide a total runway length of 11,000 feet;
- addition of a localizer, instrument landing system glide slope, and high-intensity approach lighting system with sequenced flashing lights for new instrument landing system approach to Runway 16L/34R perpendicular taxiway exits for parallel Taxiway A;
- construction of additional taxiways;

- improvement of off-airport roadway access to the airport, including extension of Elkhorn Boulevard to the airport, where it would connect to the airport road system; and

- extension by the Sacramento Regional Transit District of the proposed Downtown-Natomas-Airport light rail line to the airport, with a light rail stop at one of the Airport terminals.

Sacramento International Airport Comprehensive Airport Land Use Plan

The 2002 *California Airport Land Use Planning Handbook* (California Department of Transportation [Caltrans] 2002) is the guiding document for establishing, preparing, and modifying local airport land use compatibility plans (ALUCPs) (formerly known as comprehensive airport land use plans [CLUPs]) and their policies and procedures. ALUCP policies are intended to increase the awareness of residents, in any future residential communities that are approved, of their possible exposure to aircraft operations; to limit the potential for conflict between the airport and adjacent communities; and to protect future airport development and aircraft operations. The Sacramento Area Council of Governments (SACOG) serves as the Airport Land Use Commission (ALUC) for Sacramento, Sutter, Yolo, and Yuba Counties. It is responsible for developing and maintaining ALUCPs to protect public health and safety and ensure compatible land uses in the areas around each airport.

The Sacramento International Airport (formerly the Sacramento Metropolitan Airport) CLUP (ALUC 1994) was adopted by the Sacramento County Board of Supervisors in October 1984 and amended in January 1994. The CLUP establishes planning boundaries for the airport and defines compatible types and patterns of future land use. The purpose of the CLUP is to provide the Sacramento International Airport land area with compatibility guidelines for height, noise, and safety. The current Sacramento International Airport CLUP is more than 11 years old; in the time since publication of the CLUP, the level of growth in the region and expansion of operations at the airport has indicated the need for an update to the plan. (ALUC 1994)

The Sacramento International Airport CLUP describes safety compatibility standards for public use airports, which include the Clear Zone, which is near the runway and is the most restrictive; the Approach/Departure Zone, which is located under the takeoff and landing slopes and is less restrictive; and the Overflight Zone, which is the area overflown by aircraft during the normal traffic pattern and is the least restrictive (**Plate 1-7**). New land uses proposed in any of these zones must comply with the standards identified by the CLUP.

In addition, the CLUP prohibits new residential development and school uses in those areas subject to noise levels of 65 decibels (dB) community noise equivalent level (CNEL) or above. Development in areas between the 60 and 65 CNEL are subject to an aircraft noise evaluation and implementation of recommend noise reduction measures.

Natomas Basin Habitat Conservation Plan

The 2003 *Natomas Basin Habitat Conservation Plan* (NBHCP) was prepared by the City of Sacramento, Sutter County, and TNBC (City of Sacramento, Sutter County, and TNBC 2003). An HCP is a planning document required under the Federal Endangered Species Act and was developed in consultation and coordination with the U.S. Fish and Wildlife Service (USFWS) to promote biological conservation in conjunction with economic and urban development in the Natomas Basin. The NBHCP establishes a multispecies conservation program to minimize and mitigate the expected loss of habitat values and incidental take of "covered species" that could result from urban development and operation and maintenance of irrigation and drainage systems. The NBHCP authorizes incidental take associated with 17,500 acres of urban development in southern Sutter County and within the City and Sacramento County (i.e., 8,050 acres for the City of Sacramento, 7,467 acres for Sutter County, and 1,983 acres of Metro Air Park in Sacramento County).

The potential for the Phase 4a Project to conflict with this adopted plan is addressed in this EIS/EIR.

Sutter County General Plan

The Land Use Element of the *Sutter County General Plan* (Sutter County 1996) designates the proposed general distribution, location, and extent of all uses of land, including land for agriculture, and includes the following agricultural resource goal and policy that may be relevant to the project.

- **Goal 6.A:** To preserve high-quality agricultural land for agricultural purposes.
    - **Policy 6.B-3:** The County shall encourage the continued operation and expansion of existing agricultural industries.

Chapter 1500–1410 of the Sutter County zoning code states that the General Agriculture District (AG District) is established to provide areas for general farming, low-density uses, open spaces, and by use permit, limited retail service uses that the planning commission believes will support the local agricultural industry. The AG District classification may be applied to rural communities where the predominant land use is of a general agricultural nature, but the needs of the agricultural community may require the location of retail, commercial, and service establishments. This district is consistent with the Agriculture–20 Acre Minimum Parcel Size (AG-20) or Agriculture–80 Acre Minimum Parcel Size (AG-80) and Agriculture–Rural Community (AG-RC) general plan land use designations.

Sacramento County General Plan

The *Sacramento County General Plan* is currently being updated and is scheduled to be adopted in winter 2009. The Agricultural Element of the current *Sacramento County General Plan* (Sacramento County 1993) describes the goals of this element as the challenge of "maintenance of the County's agricultural lands, [and] their agricultural productivity...." The following objective and policies of the current general plan may be relevant to this project.

- **Objective:** Retain agricultural land holdings in units large enough to guarantee future and continued agricultural use.
    - **Policy AG-7:** Agricultural zoning district boundaries shall be rational and shall respect parcel boundaries.
    - **Policy AG-8:** Agricultural land divisions shall not adversely affect the integrity of agricultural pursuits. Agricultural land divisions may be denied if the reviewing authority finds that the division of land is likely to create circumstances inconsistent with this policy.

The Scenic Highways Element of the *Sacramento County General Plan* includes the objective to "take necessary steps to preserve and enhance the scenic qualities of the Garden Highway," and the Garden Highway is designated a scenic corridor by the County. Policies included in the Scenic Highways Element encourage maintenance of natural roadside vegetation. (Sacramento County 1974).

3.3.2 ENVIRONMENTAL SETTING

As described above, much of the Phase 4a Project area includes rural portions of Sacramento County. Cultivated lands and scattered rural residences exist in these areas. The rural land use pattern transitions from agricultural to urban where Sacramento County gives way to the city of Sacramento. The portion of the Natomas Basin that is within the city of Sacramento includes the North Natomas Community Plan area and the South Natomas planning area. The North Natomas Community Plan area extends generally between I-80 on the south and Elverta Road on the north, and between the West Drainage Canal, Fisherman's Lake, and SR 99/70 on the west and the NEMDC on the east. The plan area includes more than 9,000 acres, most of which is in the city of the Sacramento, and 1,600 acres of which is in Sacramento County. Approximately 3,500 acres are designated for residential use, the primary use in the plan area. The Employment Center designation has the most remaining vacant land with 890

acres of available land (City of Sacramento Planning Department 2007). The South Natomas planning area consists of more than 5,000 acres bounded by the American River on the South, the Sacramento River and I-80 on the west, I-80 on the north, and the NEMDC/Steelhead Creek on the east. Of the total, 590 acres are vacant. Close to 2,200 acres are designated for residential uses; 200 acres of the residential-designated lands are vacant (City of Sacramento Planning Department 2006). According to the 2000 U.S. Census Bureau, Sacramento County had a resident population of 1,223,499 persons. Population projections for Sacramento County are 1,725,710 by 2025, representing a gain of approximately 502,211 new residents by 2025 and an increase of slightly more than 29%. (SACOG 2005).

Within the Phase 4a Project area along the Sacramento River east levee (Reaches 10–15) and in the Fisherman's Lake and I-5 Borrow Areas, land uses are primarily agricultural. Approximately 79 residences are located on the waterside of the levee, and approximately 12 rural residences are located on the landside of the levee. Land uses adjacent to the two pump stations along the NCC where there would be levee raising and seepage remediation consist of cultivated agriculture.

The highest concentration of housing within the Natomas Basin is located within the city of Sacramento, in the communities of North and South Natomas, in the southern portion of the Basin. These communities are located to the east of the Phase 4a Project area. The Phase 4a Project area is located in the unincorporated area of Sacramento County and the NCC portion of the Phase 4a Project is located in incorporated Sutter County. The closest residential subdivisions to the project area are within the city of Sacramento, located to the immediate east of the Fisherman's Lake Area. According to the Census 2000 data for the two Census Tracts that include the Sacramento River east levee in the Phase 4a Project area, the minority populations with the largest representations in these areas are of Asian and Hispanic origin. These groups make up approximately 5% and 10% of the population in these areas, respectively. This is lower than the population percentage for these groups as a whole in the city (approximately 17% and 22%, respectively) or county (13% and 16%, respectively). The NCC portion of the Phase 4a Project in Sutter County is located in a rural area. Approximately 16% of the population in the Census Tract Block Groups near the south levee of the NCC is Hispanic as compared to 22% for Sutter County (U.S. Census Bureau 2000).

The U.S. Department of Housing and Urban Development (HUD) low-income limit[1] for the Sacramento area in 2000 was at $42,300 for a family of four (HUD 2000). The U.S. Census data reported that the median family income for the city was $42,051 and for the county was $50,717. The median family income levels as reported in the 2000 U.S. Census for the two Census Tracts where the Phase 4a Project is located were $66,146 in the area north of Del Paso Road and West of Powerline Road and $59, 750 in the area east of Powerline Road and south of Del Paso Road. This indicates that the percentage of low income populations is lower in the Phase 4a Project area than in the city or county as a whole. For the Census Tract south of the NCC in Sutter County, the median family income was $50,000 and for Sutter County the Census 2000 reported a median family income of $44,300(U.S. Census Bureau 2000).

3.4 GEOLOGY, SOILS, AND MINERAL RESOURCES

3.4.1 REGULATORY SETTING

3.4.1.1 FEDERAL

The following Federal law related to geology, soils, and mineral resources is relevant to this analysis and is described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

[1] HUD defines "low income" and "very low income" for its many housing assistance programs. Generally, low income is considered to be 80% of the median income for the Metropolitan Statistical Area and adjusted for household size and the specific housing program (HUD 2003).

- Federal Earthquake Hazards Reduction Act.

3.4.1.2 STATE

California Building Standards Code

The State of California provides minimum standard for building design through the California Building Standards Code (California Code of Regulations [CCR], Title 24). Where no other building codes apply, Chapter 29 regulates excavation, foundations, and retaining walls. The CBC also applies to building design and construction in the state and is based on the Federal Uniform Building Code (UBC) used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The CBC has been modified for California conditions with numerous more detailed and/or more stringent regulations.

The state earthquake protection law (California Health and Safety Code Section 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16 of the CBC. The CBC identifies seismic factors that must be considered in structural design.

Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, and Appendix Chapter A33 regulates grading activities, including drainage and erosion control, and construction on unstable soils, such as expansive soils and liquefaction areas.

The Phase 4a Project would require reconstruction of pumping plants, excavation, and drainage and erosion control, which must conform to the California Building Standards Code.

California Seismic Hazards Mapping Act

The California Seismic Hazards Mapping Act of 1990 (Public Resources Code [PRC] Sections 2690–2699.6) addresses seismic hazards other than surface rupture, such as liquefaction and induced landslides. The Seismic Hazards Mapping Act specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils. The closest active fault to the Phase 4a Project area is located approximately 15 miles to the northwest, as listed in **Table 3.4-1**.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (PRC Sections 2621–2630) was passed by the California Legislature in 1972 to mitigate the hazard of surface faulting to structures. The act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Local agencies must regulate most development in fault zones established by the State Geologist. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults. As discussed below in Section 3.4.2.2, "Seismicity," the Phase 4a Project area does not contain any Alquist-Priolo Earthquake Fault Zones.

California Surface Mining and Reclamation Act

The California Surface Mining and Reclamation Act of 1975 (SMARA) (PRC Section 2710 et seq.) addresses surface mining operations. Surface mining operations include, "…borrow pitting, streambed skimming, segregation and stockpiling of mined materials…" (CCR, Title 14, Section 3501). Section 3501 further defines excavations for on-site construction as "earth material moving activities that are required to prepare a site for construction of structures, landscaping, or other land improvements (such as excavation, grading, compaction, and the creation of fills and embankments), or that in and of themselves constitute engineered works (such as dams,

road cuts, fills, and catchment basins)." The SMARA statute requires mitigation to reduce adverse impacts on public health, property, and the environment. Because SAFCA borrow activities would disturb more than 1 acre or remove more than 1,000 cubic yards of material through surface mining activities, including the excavation of borrow pits for soil material, SAFCA must comply with SMARA.

SMARA is implemented through ordinances adopted by local government "lead agencies" that provide the regulatory framework under which local mining and reclamation activities are conducted. The State Mining and Geology Board reviews the local ordinances to ensure that they meet the procedures established by SMARA. In general, SMARA permitting requires lead agency approval of a permit, a reclamation plan, and the posting of approved financial assurance for the reclamation of mined land.

Cities and counties have the authority to enforce SMARA and create additional regulations. Sacramento and Sutter Counties are the SMARA lead agencies for surface mining operations proposed by SAFCA in their respective counties. Compliance is achieved by either obtaining a SMARA permit or exemption.

Certain construction activities do not require a SMARA permit. As stated in PRC Section 2714, the following activities are exempt:

> b) On-site excavation and onsite earthmoving activities that are an integral and necessary part of a construction project and that are undertaken to prepare a site for construction of structures, landscaping, or other land improvements associated with those structures, including the related excavation, grading, compaction, or the creation of fills, road cuts, and embankments, whether or not surplus materials are exported from the site, subject to all of the following conditions:
>
> 1. All required permits for the construction, landscaping, or related land improvements have been approved by a public agency in accordance with applicable provisions of state law and locally adopted plans and ordinances, including, but not limited to, Division 13 (commencing with Section 21000).
>
> 2. The lead agency's approval of the construction project included consideration of the onsite excavation and onsite earthmoving activities pursuant to Division 13 (commencing with Section 21000).
>
> 3. The approved construction project is consistent with the general plan or zoning of the site.
>
> 4. Surplus materials shall not be exported from the site unless and until actual construction work has commenced and shall cease if it is determined that construction activities have terminated, have been indefinitely suspended, or are no longer being actively pursued.

Both Sacramento and Sutter Counties have granted SMARA exemptions, under the above statute, for the Airport north bufferlands and Brookfield borrow sites, respectively, for the following reasons:

- the borrow material would provide a range of improvements (i.e., construction of a canal, widening of existing and adjacent levees, and habitat creation);
- compliance with CEQA, NEPA, and other regulatory requirements would be completed prior to the start of construction activities; and
- Brookfield and the Airport north bufferlands borrow sites are zoned as agriculture, and borrow excavation is consistent with this land use designation.

SAFCA anticipates that the Fisherman's Lake Borrow Area would be the primary source of soil borrow for Phase 4a Project construction. As noted in Section 2.3.3, "Borrow Sites," however, additional borrow sites may be needed. SAFCA would obtain SMARA permits or exemptions, as appropriate, for use of Phase 4a Project borrow sites upon issuance of a record of decision on and certification of this EIS/EIR. Excavation activities would not commence until all regulatory requirements for borrow activities have been met.

SMARA also requires identification and classification of mineral resource zones (MRZs). In Sacramento County, Portland cement concrete-grade alluvial sand and gravel and kaolin clay resources are considered to be economically important industrial mineral resources. **Table 3.4-1** provides description for each MRZ classification.

Table 3.4-1
California Geological Survey Mineral Land Classification System

Classification	Description
MRZ-1	Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence
MRZ-2	Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists
MRZ-3	Areas containing mineral deposits, the significance of which cannot be evaluated from existing data
MRZ-4	Areas where available data are inadequate for placement in any other mineral resource zone

Note: MRZ = Mineral Resource Zone
Source: Dupras 1999

3.4.1.3 REGIONAL AND LOCAL

There are no local laws, regulations, policies, or ordinances related to geology, soils, and mineral resources that are relevant to the Phase 4a Project.

3.4.2 ENVIRONMENTAL SETTING

The Natomas Basin is relatively flat and open. Levees provide the only significant topographic relief in and near the Phase 4a Project area.

3.4.2.1 GEOLOGY

The Phase 4a Project area lies in the Sacramento Valley portion of the Great Valley Geomorphic Province. The Great Valley is a large valley trending northwest-southeast that is bounded by the Sierra Nevada to the east and south, the Coast Ranges to the west, and the Klamath Mountains to the north. The Great Valley is drained by the Sacramento and San Joaquin Rivers, which join and flow out of the Great Valley province through San Francisco Bay. This geomorphic province is an asymmetric trough approximately 400 miles long and 50 miles wide that is characterized by a relatively flat alluvial plain made up of a deep sequence of sediment deposits from Jurassic (180 million years ago) to recent age. The sediments in the Great Valley vary between 3 and 6 miles in thickness and were derived primarily from erosion of the Sierra Nevada to the east, with lesser material from the Coast Ranges to the west. The eastern edge of the Sacramento Valley is flanked by uplifted and tilted sedimentary strata that overlie rocks of the Foothills Metamorphic Belt and are in turn overlain on the west by younger alluvium.

The Sacramento Valley has been a depositional basin throughout most of the late Mesozoic and Cenozoic time. A vast accumulation of sediments was deposited during cyclic transgressions and regressions of a shallow sea that

once inundated the valley. Overlying the thick sequence of sedimentary rock units that form the deeply buried bedrock units in the mid-basin areas of the valley are Late Pleistocene and Holocene (Recent) alluvial deposits, consisting of reworked fan and stream materials that were deposited by streams before the construction of the existing flood damage reduction systems. The youngest geomorphic features in the program study area are low floodplains, which are found primarily along the Sacramento and American Rivers. The natural floodplains of these rivers are very wide in this area because the land is relatively flat. These major drainage ways were originally confined within broad natural levees sloping away from the rivers or streams. The natural levees formed through the deposition of alluvium during periods of flooding. As flood waters lost energy, the coarser materials settled out nearest the rivers and streams, forming the natural levees and sand bars in the vicinity of the river channel. The finer material was carried in suspension farther from the rivers or streams, and settled out in quiet water areas such as swales, abandoned meander channels, and lakes. However, because the streams have meandered and reworked the previously deposited sediments, extreme variations in material types may be found over a limited distance or depth.

Flanking the Recent alluvial deposits in the Phase 4a Project area are late Pleistocene alluvial fan and terrace deposits of the Modesto and Riverbank Formations (Helley and Harwood 1985). Stream terrace deposits, mapped as the Modesto Formation, are higher in elevation and older than floodplain sediments. Before the construction of the existing levees, these stream terraces were occasionally flooded, but only small amounts of sediment were deposited during flood events. The lower fan terraces of the Riverbank Formation are higher in elevation and older than stream terraces, and were only rarely flooded.

The major source of sediments deposited in the Natomas Basin is from the erosion of the Sierra Nevada mountain range and foothills to the east of the Sacramento Valley. Naturally occurring asbestos (NOA) is known to occur in the foothill metamorphic belt. Therefore, NOA may be present in the Phase 4a Project area; however, the likelihood of the Phase 4a Project area soils containing significant concentrations of NOA is low due to the long distance from the source rock (Anderson 2008).

3.4.2.2 SEISMICITY

The Phase 4a Project area has experienced relatively low seismic activity in the past and does not contain any Alquist-Priolo Earthquake Fault Zones (California Geological Survey 1999, Hart and Bryant 1999). Numerous earthquakes of magnitude (M) 5.0 or greater have occurred on regional faults, primarily those within the San Andreas Fault System. The west side of the Central Valley is a seismically active region. The nearest known active (Holocene or Historic) fault trace to the Phase 4a Project area is the Dunnigan Hills fault, approximately 30 miles northwest of downtown Sacramento and 15 miles from the Natomas Basin (Jennings 1994).

The closest active faults to the Phase 4a Project area are listed in **Table 3.4-2**. In addition, the approximate distance from the Phase 4a Project area, maximum moment magnitude, and fault class are identified.

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is fault ground rupture, also called surface faulting. Because there are no active faults mapped in the Phase 4a Project area by the California Geological Survey or the U.S. Geological Survey, and the area is not located within an Alquist-Priolo Earthquake Fault Zone, fault ground rupture is unlikely. Common secondary seismic hazards include ground shaking, liquefaction, subsidence, and seiches. These hazards are discussed briefly below:

- **Ground shaking.** Seismic ground shaking refers to ground motion that results from the release of stored energy during an earthquake. The intensity of ground shaking depends on the distance from the earthquake epicenter to the site, the magnitude of the earthquake, site soil conditions, and the characteristic of the source.

Table 3.4-2
Active Faults in the NLIP Area

Fault Name	Approximate Distance from Project Site (Miles)	Fault Class[1]	Maximum Moment Magnitude[2]
Dunnigan Hills	15	NA	NA
Great Valley 3	23	B	6.9
Great Valley 4	26	B	6.6
Great Valley 5	35	B	6.5
Hunting Creek-Berryessa	38	B	7.1
Concord-Green Valley	41	B	6.7
Great Valley 2	44	B	6.4
West Napa	48	B	6.5
Bartlett Springs	50	B	7.6
Great Valley 1	52	B	6.7
Collayomi	58	B	6.5
Mount Diablo Thrust	59	B	6.6
Maacama-Garberville	60	B	7.5
Greenville	61	B	6.9
Hayward–Rodgers Creek	62	A	7.2

Notes: NA = not available

[1] Faults with an "A" classification are capable of producing large magnitude (M) events (M greater than 7.0), have a high rate of seismic activity (e.g., slip rates greater than 5 millimeters per year), and have well-constrained paleoseismic data (e.g., evidence of displacement within the last 700,000 years). Class B faults are those that lack paleoseismic data necessary to constrain the recurrence intervals of large-scale events. Faults with a "B" classification are capable of producing an event of M 6.5 or greater.

[2] The moment magnitude scale is used by seismologists to compare the energy released by earthquakes. Unlike other magnitude scales, it does not saturate at the upper end, meaning that there is no particular value beyond which all earthquakes have about the same magnitude, which makes it a particularly valuable tool for assessing large earthquakes.

Sources: Jennings 1994, Petersen et al. 1996, Kleinfelder 2008

- **Ground failure/liquefaction.** Liquefaction is a process by which water-saturated materials (including soil, sediment, and certain types of volcanic deposits) lose strength and may fail during strong ground shaking, when granular materials are transformed from a solid state into a liquefied state as a result of increased pore-water pressure. Structures on ground that undergoes liquefaction may settle or suffer major structural damage. Liquefaction is most likely to occur in low-lying areas where the substrate consists of poorly consolidated to unconsolidated water-saturated sediments or similar deposits of artificial fill. Liquefaction during an earthquake requires strong shaking continuing for a long period and loose, clean granular materials (particularly sands) that may settle and compact because of the shaking. Evidence of liquefaction may be observed in "sand boils," which are expulsions of sand and water from below the surface due to increased pore-water pressure below the surface. Areas paralleling the Sacramento River that contain clean sand layers with low relative densities coinciding with a relatively high water table have generally high liquefaction potential.

- **Subsidence and settlement.** Subsidence is the gradual settling or sudden sinking of the ground surface resulting from subsurface movement of earth materials. Seismically induced settlement refers to the compaction of soils and alluvium caused by ground shaking. Fine-grained soils are subject to seismic settlement and differential settlement. Areas underlain by low-density silts and clays associated with fluvial

depositional environments are susceptible to seismically induced settlement. These environments include old lakes, sloughs, swamps, and streambeds. The amount of settlement may range from a few inches to several feet. The potential for differential settlement is highest and occurs over the largest areas during great earthquakes. A potential for differential settlement exists where low-density and unconsolidated material is encountered, such as overbank river deposits (present day and historical) common along the Sacramento River. Subsidence and settlement may also occur from construction of the adjacent levee separate from liquefaction or densification due to both immediate settlements in granular soils and the consolidation of fine grained soils.

- **Seismic seiches.** A seiche is an earthquake-induced wave within an enclosed or restricted body of water, such as a lake, reservoir, or channel. Seiches can cause a body of water to overtop and damage levees and dams and may lead to inundation of surrounding areas.

3.4.2.3 SOILS

The Sutter and Sacramento County soil surveys (NRCS 1988, 1993) identify a variety of soil map units in the Phase 4a Project area. Most of the soils in the Phase 4a Project area are shallow to moderately deep, sloping, well-drained soils with very slowly permeable subsoils underlain with hardpan. These soils have good natural drainage, slow subsoil permeability, and slow runoff (NRCS 1988, 1993).

The Natomas Basin generally consists of deep soils derived from alluvial sources, which range from low to high permeability rates and low to high shrink-swell potential. Soils range from low to high hazard ratings for construction of roads, buildings, and other structures related to soil bearing strength, shrink-swell potential, and the potential for cave-ins during excavation. Soils immediately adjacent to the Sacramento River are dominated by deep, nearly level, well-drained loamy and sandy soils. The natural drainage is good, and the soils have slow to moderate subsoil permeability. The river terraces consist of very deep, well-drained alluvial soils. (NRCS 1988, 1993.) The porous nature of the soils underneath the existing levee system is an important consideration for the Phase 4a Project.

3.4.2.4 MINERALS

Sacramento County protects aggregate (i.e., sand and gravel) from land uses that could preclude or inhibit a timely mineral extraction to meet market demand (Sacramento County 1993). According to the California Department of Conservation, Division of Mines and Geology, the Phase 4a Project footprint is zoned MRZ-1, with the exception of a small portion of the eastern edge of the Fisherman's Lake Borrow Area, which is designated MRZ-3 (see **Table 3.4-1** for MRZ definitions) (Dupras 1999).

While conducting a soil analysis for engineering purposes, Kleinfelder, Inc. discovered a clean layer of sand within the Phase 4a Project footprint, approximately 20 feet below ground surface level near the existing levee toe (Merry, pers. comm., 2009). Although this material could be used for construction aggregate, USACE regulates activities within 400 feet of the toe of Federal levees. In addition, mining activities within the proposed footprint would compromise the integrity of flood damage reduction structures. Furthermore, areas immediately adjacent to the levee in the Phase 4a Project footprint are not considered to be of value to the region or residents of the state, and are not delineated on a local general plan, specific plan, or other land use plan for containing locally important mineral resources (Sacramento County 1993).

3.5 HYDROLOGY AND HYDRAULICS

3.5.1 REGULATORY SETTING

3.5.1.1 FEDERAL

The following Federal laws related to hydrology and hydraulics are relevant to this analysis and are described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

- Executive Order 11988, Floodplain Management;
- Federal Emergency Management Agency Code of Federal Regulations Title 44, Section 65.10 (Levee Requirements) and FEMA Flood Zone Designations; and
- Rivers and Harbors Act of 1899, As Amended (Sections 14 and 10).

3.5.1.2 STATE

California Executive Order S-01-06, Identification and Repair of Critical Erosion Sites

On February 24, 2006, Governor Arnold Schwarzenegger declared a state of emergency for California's levee system. Soon after, he signed Executive Order S-01-06, directing DWR to identify and repair eroded levee sites on the Federal/state levee system to prevent catastrophic flooding and loss of life. To date, nearly 250 levee repair sites have been identified, and more than 100 of the most critical sites have been completed. Two of the sites are along the bank of the Sacramento River east levee between the NCC and the American River. Rock toe protection has been installed at these sites. These improvements do not overlap temporally with construction of the action alternatives.

Central Valley Flood Control Act of 2008

The Central Valley Flood Control Act of 2008, passed in 2007, recognizes that the Central Valley of California, which includes the Natomas Basin, is experiencing unprecedented development, resulting in the conversion of historically agricultural lands and communities to densely populated residential and urban centers. Because of the potentially catastrophic consequences of flooding, the Act recognizes that the Federal government's current 100-year flood protection standard is not sufficient to protect urban and urbanizing areas within flood-prone areas throughout the Central Valley and declares that the minimum standard for these areas is a 200-year level of flood protection. To continue with urban development, cities and counties must develop and implement plans for achieving this new standard by 2025. With respect to flood risk reduction, the Central Valley Flood Control Act also calls upon DWR to develop a comprehensive Central Valley Flood Protection Plan by the end of 2012 for protecting the lands currently within the Sacramento–San Joaquin River Flood Management System.

Central Valley Flood Protection Board Encroachment Permit

The California Central Valley Flood Protection Board (CVFPB, formerly The Reclamation Board) requires an encroachment permit for any non-Federal activity along or near Federal flood damage reduction project levees and floodways or in Board-designated floodways to ensure that proposed local actions or projects do not impair the integrity of existing flood damage reduction systems to withstand flood conditions. The permits are conditioned upon SAFCA receipt of permission from USACE for alteration of the Federal project works pursuant to Section 408.

3.5.1.3 REGIONAL AND LOCAL

Sacramento County General Plan

The *Sacramento County General Plan* is currently being updated and is scheduled to be adopted in winter 2009. The Safety Element of the existing *Sacramento County General Plan* (Sacramento County 1993) contains the goal, "Minimize the loss of life, injury and property damage due to flood hazards." Policies in support of this goal generally require that the County work with USACE, SAFCA, and other Federal, state, and local government entities to provide for flood protection within the County and discourage development within the 100-year floodplain. Policy SA-6 requires the County to participate through SAFCA in obtaining Federal authorization for construction of flood control projects on the Sacramento and American Rivers to provide 200-year flood protection; Policy SA-10 requires the County to continue local efforts that encourage implementation of the Federal Flood Insurance Program; Policy SA-13 requires the County to prohibit urban uses on unprotected flood land; and Policy SA-14 requires the County to participate with the City of Sacramento and USACE and other Federal, state, regional, and local governments and agencies to develop policies to finance, construct, and plan flood improvements to eliminate flooding in Sacramento County.

3.5.2 ENVIRONMENTAL SETTING

3.5.2.1 SURFACE WATER HYDROLOGY

The Phase 4a Project area lies just north of the confluence of the Sacramento and American Rivers. The Sacramento River drainage basin covers approximately 26,150 square miles and includes the Feather River drainage basin, which totals approximately 5,500 square miles. Despite its relatively small size, the Feather River has the potential to generate very high peak floods. **Table 3.5-1** compares the runoff characteristics of these drainage basins.

Table 3.5-1
Basin Runoff Characteristics

Basin	Watershed Area (square miles)	Flood of Record (year)	Unregulated Flow Record 1-Day Flow (cfs)	Flow per Square Mile (cfs)
Sacramento River at Latitude of Verona	21,251	1997	624,000	29
Feather River at Shanghai Bend	5,313	1997	534,000	101
Sacramento River at Latitude of Sacramento	26,150	1997	840,000	32

Note: cfs = cubic feet per second
Source: SAFCA 2007 (data provided by MBK Engineers)

Total annual precipitation within the Sacramento River watershed falls as both rain and snow. Precipitation in winter falls primarily as snow in the higher elevations. Annual, monthly, and daily precipitation varies widely within the watershed, with the highest precipitation totals generally falling in the winter, in the Sierra Nevada, and in the northern part of the watershed. The high variability in precipitation, snowfall, and snowmelt results in highly variable runoff patterns each year and month during the late fall, winter, and spring. The number of high-water events in the waterways surrounding the Natomas Basin each year varies widely as well, and ranges from no events to five or more events.

The American and Feather Rivers produce about 90% of the flood flows approaching Sacramento from the north and the east. Both historically and as part of the design of the Sacramento River Flood Control Project (SRFCP), flood flows approaching from the north are split between the Sacramento River and the Yolo Basin (Bypass). Under the current design of the SRFCP, the Yolo Bypass absorbs about 70% of this flow at the latitude of Verona

and 80% at the latitude of Sacramento. To the east, the entire flow of the American River must be passed through the urban core of Sacramento. Improved flood protection for the Sacramento area is thus dependent on the strength of the levee system along the lower Sacramento and American Rivers and on the capability of Folsom Dam to limit American River flows to the design capacity of the American River levee system.

The SRFCP was designed based on the flows and water surface elevations produced by the great floods of 1907 and 1909. The project design considered that areas inundated by these floods would be protected by levees, thus increasing flood flows downstream due to the elimination of floodplain storage. Because the 1907 and 1909 floods were the largest to occur since 1862, it was assumed that floods of this magnitude would recur very infrequently throughout the watershed. In fact, based on the continuous record of streamflow data since the SRFCP was approved, it appears that the 1907 and 1909 floods are approximately equal to a 10-year flood (10% annual exceedance probability) along the American and Feather Rivers. Consequently, the original plan of flood damage reduction has been modified numerous times to account for changes in the SRFCP design flood and the flood risk associated with the urban areas in the American and Feather River basins. The most recent modifications have involved the construction of Folsom Dam and the extension of the levee along the north side of the American River (completed 1955) and the construction of Oroville Dam and New Bullards Bar Dam in the Feather River basin (completed 1969).

3.5.2.2 LEVEE DESIGN

When the SRFCP was conceived, river navigation was an important element of the Sacramento Valley's transportation infrastructure. Hydraulic mining debris (sand, gravel, and cobbles) had clogged river channels and added significant uncertainty and cost to navigation. The SRFCP was designed in part to address this problem. Thus, the mainstem river levees were placed close to the channel to confine river flows in flood stage and use the energy of the river to drive hydraulic mining sediments out of the system. This design also reduced the cost of levee construction by taking advantage of the high ground built up by the river over time along its banks and by making it possible for existing technology (the clam shell dredge and hydraulic suction dredge) to efficiently use the sediment in the channel as a borrow source for the levees.

This design, although well suited to address the technical and financial challenges of a previous era, has left a succeeding generation of flood managers with two systemic problems and levee risk factors: chronic erosion and seepage. Because of the use of relatively porous hydraulic mining sediments in many parts of the mainstem levee system, the levees have a propensity to seep when subjected to prolonged high water surface elevations such as occurred during the floods of 1986 and 1997. Through-seepage was deemed a levee system design deficiency in the aftermath of the 1986 flood, and a substantial capital improvement program has been under way since the early 1990s to address this deficiency. Additionally, because the mainstem levees are constructed on high berms relatively close to the river channel, the same energy that was harnessed to drive hydraulic mining sediment from the system also exerts itself against the sandy alluvial soil layers that lie beneath the levees. In high river stage conditions, this energy is strong enough to push water through these layers in volumes great enough to exert an uplift force capable of fracturing the soil mantel on the landside of the levee. This "underseepage" can occur where levees are constructed on low-permeability foundation soil (silt and clay) underlain by a higher-permeability layer (sand and gravel), and makes the levee susceptible to failure during periods of high river stage.

3.5.2.3 FREQUENCY OF FLOODING

The Natomas Basin is subject to flooding from a combination of flows in the Sacramento and American River channels and in the tributary streams east of the Basin. Along the northern and western perimeters of the Basin, the greatest threat is from a large flood in the Sacramento/Feather River basin combined with high runoff in the creeks and streams of southern Sutter and western Placer Counties that drain through the NCC. The probability (or frequency) of an uncontrolled flood in the Natomas Basin is linked to the hydrology of the lower Sacramento Valley and the performance of the levees comprising the SRFCP, including the levees upstream of the Natomas Basin. The hydrology of the lower Sacramento Valley was extensively analyzed by USACE and the State of

California Reclamation Board (now the Central Valley Flood Protection Board) as part of the Sacramento and San Joaquin River Basins California Comprehensive Study. These data have been used to create hydraulic models that route the estimated runoff for various flood events through the river and stream channels comprising the SRFCP and estimate the resulting water surface elevations. In very large floods that exceed the design capacity of the SRFCP, these calculated water surface elevations are highly sensitive to assumptions about the performance of upstream SRFCP levees. If the SRFCP levees upstream of the Natomas Basin are assumed to fail when overtopped, these very large floods produce much lower water surface elevation in the channels around the Natomas Basin (by 1 to 2 feet) than if it is assumed the upstream levees will not fail when overtopped.

3.5.2.4 IRRIGATION AND DRAINAGE FACILITIES

Reclamation of the Natomas Basin for agricultural development required construction of two major ditch and canal systems in the Natomas Basin: an irrigation system owned and operated by NCMWC and a drainage system owned and operated by RD 1000. NCMWC pumps water into the Basin to provide irrigation water to its shareholders for agricultural use within the Basin. During winter (October through April), drainage is primarily rainfall runoff; during summer (May through September), drainage water from agricultural fields is typically recirculated for irrigation. Because the Basin is surrounded by levees, all excess drainage within the Basin must be pumped out. In general, water is pumped into the Basin from the Sacramento River and NCC as irrigation water and returned to the perimeter drainage channels via RD 1000's interior drainage system.

Several irrigation canals, pipelines, wells, and pump stations exist along the Sacramento River east levee. These include the Elkhorn Main Irrigation Canal (Elkhorn Canal), which runs parallel to the Sacramento River east levee from the North Drainage Canal to just south of West Elkhorn Boulevard, and the Riverside Main Irrigation Canal (Riverside Canal), which runs parallel to the east levee from approximately 1 mile north of San Juan Road to approximately Orchard Lane. These NCMWC canals are fed by three pumping plants on the Sacramento River (**Plate 1-9**). They have earthen embankments that allow water levels to be maintained above surrounding ground surfaces so that water can be delivered to agricultural receiving lands by gravity flow. The NCMWC also operates two pumps along the NCC south levee that provide irrigation water to agricultural lands in the northern portion of the Basin. NCMWC irrigation systems and several other landowner-operated systems along the Sacramento River east levee will need to be relocated to accommodate improvements to these levees. The new facilities along the Sacramento River east levee could provide a sustainable long-term source of agricultural irrigation water in the western and northern portions of the Basin that are expected to remain in some form of agriculture or open space use to accommodate the Airport and two of the three major blocks of habitat being assembled by TNBC.

RD 1000 operates several drainage pumping plants that could be affected by levee improvement activity. Pumping Plant No. 2, located in Sacramento River east levee Reach 4B, pumps drain water from the lower end of the North Drainage Canal; Pumping Plant No. 5, located in Sacramento River east levee Reach 10, pumps water from the West Drainage Canal; Pumping Plant No. 3, located in Sacramento River east levee Reach 13, pumps drain water from the West Drainage Canal; Pumping Plant No. 1, located in Sacramento River east levee Reach 20A, pumps drain water from the Main Drainage Canal; and Pumping Plant No. 4, located in NCC Reach 2, pumps drain water from the upper end of the North Drainage Canal; Pumping Plant No. 5, located in Sacramento River east levee Reach 10, pumps drain water from the West Drainage Canal; Pumping Plant No. 8, located on the NEMDC west levee between Del Paso Road and North Market Boulevard, pumps drain water from the C-1 Drain; and Pumping Plant No. 6, located on the NEMDEC west levee between Elverta Road and Elkhorn Boulevard, pumps drain water from the E Drain. These pumping facilities include discharge pipelines that would need to be relocated as part of the levee improvements in these locations. The City of Sacramento operates the Willow Creek drainage pumping station that is located in Sacramento River Reach 19B; Pump Station 58, which is located on the American River north levee at Asuza Street; and Pump Station 102, which is located on the NEMDC west levee in Gardenland Park.

The major irrigation and drainage facilities that would be affected by the project are discussed in Section 2.3.2, "Irrigation and Drainage Components."

3.5.2.5 GROUNDWATER HYDROLOGY

Basin and Aquifer Description

The Natomas Basin lies in the North American Subbasin within the Sacramento Groundwater Basin. The North American Subbasin is bounded on the north by the Bear River, on the west by the Feather and Sacramento Rivers, and on the south by the Sacramento River in the west and the American River in the east. The eastern boundary is a north-south line extending from the Bear River south to Folsom Lake, which passes about 2 miles east of the town of Lincoln (see **Plates 1-1** and **1-2** for general locations). The eastern boundary represents the approximate edge of the alluvial basin, where little or no groundwater flows into or out of the groundwater basin from the rock of the Sierra Nevada (DWR 1997). The eastern portion of the subbasin is characterized by low, rolling dissected uplands. The western portion is nearly a flat flood basin for the Bear, Feather, Sacramento and American Rivers, and several small east side tributaries. The general direction of drainage is west-southwest at an average grade of about 5% (DWR 2003).

DWR Bulletin 118 (DWR 2003) describes the aquifer system in the subbasin as heterogeneous and consisting of many discontinuous beds of clay, silt, sand and gravel. The water-bearing materials of the subbasin are dominated by unconsolidated continental deposits of Late Tertiary and Quaternary age deposits that include Miocene/ Pliocene volcanics, older alluvium, and younger alluvium. Younger alluvium consisting of alluvial flood basin and stream channel deposits is present in the upper 100 feet in areas along and adjacent to the Sacramento and American Rivers. Sand and gravel zones, along with dredger tailings that are found sporadically along the American River, are highly permeable and yield significant quantities of water to wells. Older alluvium, deposited during Pliocene and Pleistocene times and occurring over the area between the Sierra foothills and the valley axis, consists of loosely to moderately compacted sand, silt and gravel. Permeability varies considerably in these alluvial deposits (Valley Springs, Laguna, and Fair Oaks formations), which occupy the upper 200 to 300 feet of the aquifer system. Groundwater in the older alluvium is typically unconfined, although semiconfined conditions exist on localized levels. The Mehrten and older geologic units can be characterized as composing the lower aquifer system, which is generally deeper than 300 feet toward the west side of the subbasin. Typically, the level of confinement increases with depth. The cumulative thickness of these deposits increases from a few hundred feet near the Sierra Nevada foothills on the east to over 2,000 feet along the western margin of the subbasin. Most of the groundwater is produced in the northern portion of the subbasin. (DWR 2003.)

Groundwater Recharge and Local Levels

Major recharge to the local aquifer system generally occurs along active river and stream channels where extensive sand and gravel deposits exist, particularly in the American River and Sacramento River channels (Sacramento Groundwater Authority [SGA] 2002). Where surface water is hydrologically disconnected from groundwater, it percolates through the unsaturated zone beneath the streambed to the groundwater and is a function of the underlying aquifer materials and water levels in the stream. Some evidence suggests this occurs in parts of the Sacramento River in northern Sacramento County (SGA 2003). In Western Placer County (northeast section of the subbasin), the rivers adjacent to the subbasin, including the Sacramento and Bear Rivers, and the major streams, ravines, and creeks that cross the valley floor are the main sources of recharge (Placer County Water Agency 2003). Other sources of recharge within the system include inflow of groundwater generally from the northeast; subsurface recharge from fractured geologic formations to the east; and deep percolation from applied surface water, precipitation, and small streams. The extensive agricultural operations in the Natomas Basin have also contributed to recharge there, with the portion of applied irrigation water in excess of crop demands becoming recharge water through deep percolation (SGA 2003).

Groundwater levels average 10 to 25 feet below ground surface in the Natomas Basin (MWH 2001). According to the Sacramento Groundwater Authority, hydrographs for wells in the western part of the North American Subbasin show groundwater levels varying between -5 and 20 feet mean spring groundwater level between wells.

Groundwater Storage

DWR's Bulletin 118 assumed a specific yield of 7% and an aquifer thickness of 200 feet for 200,000 acres within the North American Subbasin. Storage capacity can be estimated for the North American Subbasin by applying the same assumptions as previous DWR studies (DWR 1997a), which indicated a specific yield of 7% and an assumed thickness of 200 feet over the entire 351,000-acre subbasin. The result is an estimated storage capacity of approximately 4.9 million acre-feet (DWR 2003).

Groundwater Budget

Luhdorff & Scalmanini Consulting Engineers (LSCE) prepared a report in November 2008 evaluating the potential groundwater impacts of the NLIP (see **Appendix C2**) (LSCE 2008). The report includes a groundwater budget for existing conditions (without SAFCA construction activities) in the Natomas Basin based on the final water year of the 1970–2004 calibration period for the Sacramento County Integrated Groundwater and Surface Water Model. The model results for 2004, shown in **Table 3.5-2**, are grouped into inflow and outflow components, with the change in storage representing the difference between the inflow and the outflow. The simulated change in storage shows a decline of almost 5,000 AFY. Divided by the area of the Natomas Basin, this represents a small decrease in storage on a per acre basis of less than 0.1 acre-foot per acre per year.

Table 3.5-2
Simulated Groundwater Budget for Natomas Basin—Existing Conditions

	Water Budget Component	2004 Simulation (AFY)
Inflow	Deep Percolation (including Canal Seepage)	31,429
	Recharge from Sacramento River	6,469
	Recharge from American River	1,086
	Boundary Inflow from West	10,365
	Subsurface Inflow from North and South	2,955
	Total Inflow	**52,304**
Outflow	Groundwater Pumping	35,537
	Subsurface Outflow to East	21,738
	Subsurface Outflow to South	0
	Total Outflow	**57,275**
Inflow minus Outflow	**Change in Storage**	**-4,971**

Note: AFY = acre-feet per year
Source: Data adapted from LSCE 2008

3.6 WATER QUALITY

3.6.1 REGULATORY SETTING

3.6.1.1 FEDERAL

The following Federal law related to water quality is relevant to this analysis and is described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

- Clean Water Act (Section 404).

3.6.1.2 STATE

Clean Water Act (Section 401)

Under Federal law, EPA has published water quality regulations under Volume 40 of the Code of Federal Regulations (40 CFR). Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. As defined by the CWA, water quality standards consist of two elements: (1) designated beneficial uses of the water body in question, and (2) criteria that protect the designated uses. Section 304(a) requires EPA to publish advisory water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. In California, EPA has delegated responsibility to the State Water Resources Control Board (SWRCB) and its nine regional water quality control boards (RWQCBs) for identifying beneficial uses and adopting applicable water quality objectives.

Under CWA Section 401(a)(1), 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 with a Federal component that may affect state water quality (including projects that require Federal agency approval such as issuance of a Section 404 permit) must also comply with CWA Section 401. The Section 401 water quality certification certifies that the proposed activity will not violate state water quality standards. The RWQCBs administer the Section 401 program with the intent of prescribing measures necessary to avoid, minimize, or mitigate adverse impacts of proposed projects on water quality.

SAFCA is applying to the Central Valley RWQCB for Section 401 water quality certification for the Proposed Action.

Porter-Cologne Water Quality Control Act and Clean Water Act (Section 402)

The SWRCB and RWQCBs regulate discharges of waste into waters of the state through National Pollutant Discharge Elimination System (NPDES) permits, authorized under Section 402 of the CWA for waste discharges to waters of the United States, and through waste discharge requirements (WDRs), authorized under the state's Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The RWQCBs issue NPDES permits and WDRs to ensure that projects that may discharge wastes to land or water conform to water quality objectives and policies and procedures of the applicable water quality control plans. The Porter-Cologne Act defines waters of the state as "any surface water or ground water, including saline waters, within the boundaries of the state." Some waters that qualify as waters of the state, such as isolated wetlands, do not necessarily qualify as waters of the United States.

The RWQCBs issue NPDES permits for waste discharges to surface water from both point and nonpoint sources. The NPDES permit system includes an individual permit system for municipal wastewater treatment plants and several categories of stormwater discharges. General NPDES stormwater permits apply to industrial facilities and any general ground-disturbing construction activity greater than 1 acre. Before construction of such projects, applicants must submit a Notice of Intent (NOI) to the RWQCB and prepare a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP generally describes proposed construction activities, receiving waters, stormwater discharge locations, and best management practices (BMPs) that will be used to reduce project construction effects on receiving water quality. A number of "good housekeeping" BMPs are also generally included in a SWPPP to control waste discharges during the dry months. An appropriate selection of post-construction permanent pollution control and treatment measures must also be considered for implementation where necessary to prevent long-term water quality impairment.

Under the Porter-Cologne Act ,the RWQCBs issue WDRs to regulate activities of entities subject to the state's jurisdiction that would discharge waste that may affect groundwater quality or that may discharge waste in a diffused manner (e.g., through erosion from soil disturbance). WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

The RWQCB administers a general WDR/NPDES permit process for low-threat discharges from construction dewatering activities that discharge to surface waters (i.e., removal of accumulated water during excavation). SAFCA will be required to submit a NOI for discharge to the RWQCB before commencement of construction activities. The general order contains a set of standard terms and conditions for compliance with discharge prohibitions, specific effluent and receiving water limitations, required solids disposal activities, water quality monitoring protocols, and applicable water quality criteria. When numerous discharge locations are anticipated, the general order allows the applicant to submit a Pollution Prevention, Monitoring, and Reporting Plan that provides for consolidated identification of discharges, monitoring, and reporting procedures. The RWQCB can also issue a waiver to dewatering discharges if the discharge would not enter a water body.

SAFCA would implement BMPs, prepare and implement a SWPPP, and comply with NPDES permit conditions.

Basin Plan

Pursuant to the Porter-Cologne Act, the Central Valley RWQCB prepares and updates the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Basin Plan) every 3 years; the most recent update was completed in February 2007 (Central Valley RWQCB 2007). The Basin Plan describes the officially designated beneficial uses for specific surface water and groundwater resources and the enforceable water quality objectives necessary to protect those beneficial uses. The Natomas Basin is located within the Central Valley RWQCB jurisdiction and is subject to the Basin Plan.

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Numerical objectives are set for temperature, dissolved oxygen, turbidity, and pH; total dissolved solids, electrical conductivity, bacterial content, and various specific ions; trace metals; and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, biostimulatory substances (e.g., nitrogen and phosphorus), oil and grease, color, taste, odor, and aquatic toxicity. Narrative objectives are often precursors to numeric objectives. The primary method used by the Central Valley RWQCB to ensure conformance with the Basin Plan's water quality objectives and implementation policies and procedures is to issue WDRs for projects that may discharge wastes to land or water. WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

3.6.1.3 REGIONAL AND LOCAL

There are no regional or local laws, regulations, policies, or ordinances related to water quality that are relevant to the Phase 4a Project.

3.6.2 ENVIRONMENTAL SETTING

The East Drainage Canal and the West Drainage Canal drain the Natomas Basin. Currently, seven pumping sites remove stormwater from the Natomas Basin. Five sites pump into the Sacramento River, one pumps into the NCC, and four RD 1000 sites (Pumping Plant No. 6, Pumping Plant No. 8 and City of Sacramento Gardenland and Azuza Pump Stations) pump into the NEMDC.

3.6.2.1 SURFACE WATER QUALITY

Surface water quality in the hydrologic region is generally good. Possible types of contamination that can affect water quality include turbidity; pesticides and fertilizers from agricultural runoff; water temperature exceedances;

and toxic heavy metals, such as mercury, copper, zinc, and cadmium from acid mine drainage (USGS 2000, DWR 2005). The portion of the Sacramento River forming the western boundary of the Phase 4a Project area is part of a 16-mile segment from Knights Landing to the Sacramento–San Joaquin Delta that is on the Section 303(d) list for diazinon from agricultural sources, mercury from abandoned mines, and toxicity from unknown sources (Central Valley RWQCB 2002).

As defined by the Basin Plan (Central Valley RWQCB 2007), the following are the designated beneficial uses for the Sacramento River and all tributaries from the Colusa Basin Drain, upstream of the Phase 4a Project area, to the I Street Bridge in Sacramento:

- municipal, industrial, and agricultural supply;
- irrigation;
- contact and noncontact recreation;
- coldwater fish habitat, migration, and spawning;
- warm water fish habitat, migration, and spawning;
- wildlife habitat;
- power generation; and
- navigation.

3.6.2.2 GROUNDWATER QUALITY

The Phase 4a Project area is in the North American Groundwater Subbasin, which lies in the eastern central portion of the Sacramento Valley Groundwater basin (see description in Section 3.5.2.5, "Groundwater Hydrology").

Although there are many areas of good quality groundwater in the North American Subbasin, some areas within the subbasin have shown elevated levels of total dissolved solids (TDS), chloride, sodium, bicarbonate, boron, fluoride, nitrate, iron manganese, and arsenic, based on applicable water quality standards and guidelines for domestic and irrigation uses. An area between the Airport and the Bear River to the north has high levels of TDS, chloride, sodium, bicarbonate, manganese, and arsenic (DWR 2006).

3.7 BIOLOGICAL RESOURCES

3.7.1 REGULATORY SETTING

3.7.1.1 FEDERAL

The following Federal laws related to biological resources are relevant to this analysis and are described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

- Fish and Wildlife Coordination Act of 1934, as Amended;
- Endangered Species Act of 1973, as Amended;
- Migratory Bird Treaty Act of 1918;
- Bald Eagle Protection Act of 1940;
- Wild and Scenic Rivers Act;
- Executive Order 11990, Protection of Wetlands; and
- Sustainable Fisheries Act.

3.7.1.2 STATE

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from the Department of Fish and Game (DFG) is required for projects that could result in the take of a plant or animal 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, but the CESA definition of take does not include "harming" or "harassing," as the Federal ESA definition does. As a result, the threshold for take is higher under CESA than under ESA. SAFCA will coordinate with DFG to discuss CESA compliance requirements and will apply to DFG for take authorization under Section 2081 of the California Fish and Game Code. SAFCA will obtain a Section 2081 permit prior to construction and comply with its conditions.

California Fish and Game Code Section 1602—Streambed Alteration Agreement

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by DFG under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying DFG:

- substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake; or

- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

A stream is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG streambed alteration agreement must be obtained for any project that would affect a river, stream, or lake. SAFCA is applying for a Section 1602 Streambed Alteration Agreement for the Phase 4a Project.

California Fish and Game Code Sections 3503 and 3503.5—Protection of Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction. This statute does not provide for the issuance of any type of incidental take permit.

California Fish and Game Code—Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and do not provide for authorization of incidental take of fully protected species. DFG has informed non-Federal agencies and private parties that their actions must avoid take of any fully protected species.

3.7.1.3 REGIONAL AND LOCAL

Sacramento County General Plan

The *Sacramento County General Plan* is currently being updated and is scheduled to be adopted in winter 2009. The Conservation Element of the existing *Sacramento County General Plan* (Sacramento County 1993) provides overall guidance for resource conservation in Sacramento County and includes several resource conservation goals and objectives. It includes a specific goal to preserve and protect fisheries in county waterways and describes policies and programs under four objectives:

1. Water flows monitored and maintained, when climatic conditions allow, to promote fish propagation and migration.

2. Maintenance of channelized areas to reduce detritus accumulation and increase fish populations.

3. Water quality and runoff levels maintained to provide a healthy aquatic environment for fisheries.

4. Riparian vegetation and topographic diversity maintained by stream channel and bank stabilization projects.

The Conservation Element of the existing *Sacramento County General Plan* (Sacramento County 1993) includes policies concerning native trees, flood channels, stream courses, and waterways. Policies CO-130 through CO-136, which apply to discretionary projects, are intended to conserve native oaks and other native tree species. To preserve the natural characteristics of these areas, policies in the Conservation Element call for maintenance of riparian vegetation, buffer zones adjacent to stream corridors that contain riparian vegetation, and unlined watercourses. Policy CO-107 requires that topographic diversity and variation be retained when channels are realigned or modified, including maintaining meandering characteristics, varied berm width, and naturalized side slope. In addition, the Open Space Element contains general policies related to the protection of open space areas. Policy OS-1 calls for the permanent protection, as open space, of areas of natural resource value, including wetland preserves, riparian corridors, woodlands, and floodplains. Policy OS-2 promotes the maintenance of open space and natural areas that are interconnected and of sufficient size to protect biodiversity, accommodate wildlife movement, and sustain ecosystems (Sacramento County 1993).

Natomas Basin Habitat Conservation Plan

The NBHCP (City of Sacramento, Sutter County, and TNBC 2003) was developed to promote biological conservation in conjunction with economic and urban development in the Natomas Basin. The NBHCP establishes a multispecies conservation program to minimize and mitigate the expected loss of habitat values and incidental take of "covered species" that could result from urban development and operation and maintenance of irrigation and drainage systems. Mitigation lands established in the Natomas Basin in accordance with the NBHCP are managed by TNBC.

Local Tree Ordinances

The Tree Preservation Ordinance of Sacramento County (Sacramento County Code 480 Section 1, 1981) requires the protection of native oak trees within Sacramento County. This ordinance requires a permit for the removal of trees or for grading, excavating, or trenching within the dripline of a tree within the jurisdictional boundaries of the ordinance. A "tree" is defined as any living native oak tree having at least one trunk of 6 inches or more in diameter or a multitrunked native oak tree having an aggregate diameter of 10 inches or more. Removing woodlands during the Phase 4a Project would adversely affect native oaks within this size range as well as other trees that occur within Sacramento County; however, the NLIP is not located within the jurisdictional boundaries of the ordinance and, therefore, a permit is not required. The *Sacramento County General Plan* (Sacramento County 1993), described above, contains policies related to the conservation of native trees, with which the NLIP would be required to comply.

3.7.2 ENVIRONMENTAL SETTING

3.7.2.1 GENERAL BIOLOGICAL RESOURCES

Land Use and Vegetation

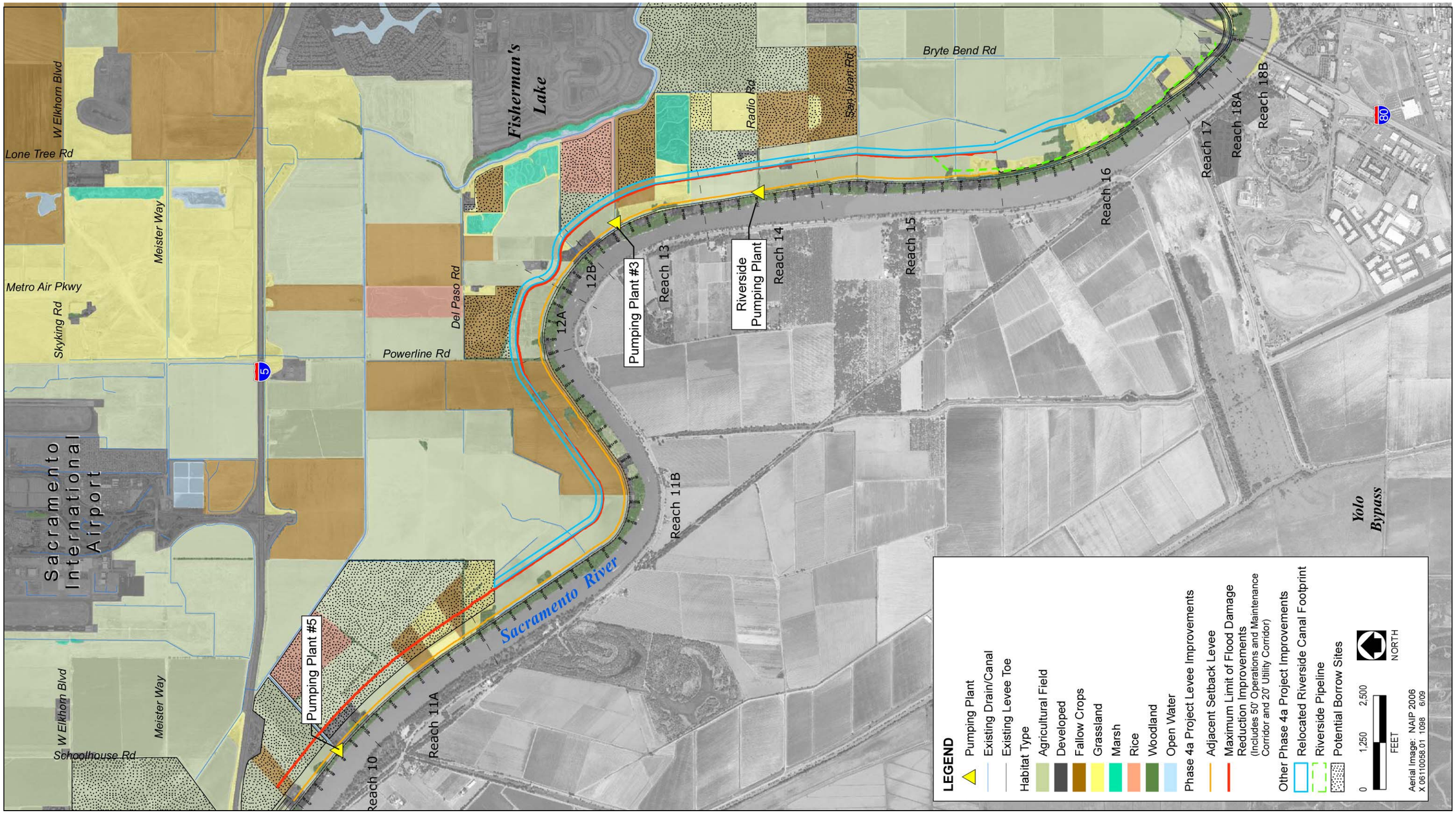
Before 1850, vegetation in the Natomas Basin and the remainder of the Sacramento Valley bore little resemblance to its current state. The Sacramento River dominated the area, its banks lined by a riverine growth of oak, western sycamore, Fremont cottonwood, willow, and Oregon ash, up to a mile in width. Drainage from the western slopes of the Sierra Nevada resulted in regular flooding of the Sacramento Valley, rendering the Natomas Basin an area of highly fertile, alluvial soils. The southern portion of the Basin was part of the overlapping American and Sacramento River floodplains. This large floodplain supported large tracts of riparian woodland and scrub, permanent freshwater marsh, and seasonal wetland. It is likely that vernal pools also existed historically in the Natomas Basin, particularly in upland areas in the eastern portion (USFWS, City of Sacramento, and Sutter County 2003).

Currently, the Natomas Basin supports a wide array of land uses and habitat types, including urban, suburban, and rural development; agricultural fields; and remnant and restored native habitat (**Plate 3-3**). **Table 3.7-1** summarizes information compiled for the most recent categorization of land cover types in the Natomas Basin conducted for TNBC.

Table 3.7-1
Land Cover Types in the Natomas Basin

Habitat Type	Acres
Alfalfa	1,189
Fallow rice	7,970
Fallow row and grain crops	2,065
Fresh emergent marsh	154
Fresh emergent marsh (created)	674
Grass hay	2,212
Grassland (created)	68
Irrigated grassland	451
Nonhabitat land uses (developed, disturbed/bare, ruderal)	14,226
Nonnative annual grassland	5,192
Nonriparian woodland	51
Open water	340
Orchard	184
Rice	14,590
Riparian scrub	114
Riparian woodland	357
Row and grain crops (milo, tomatoes, sunflower, wheat)	4,067
Seasonal wetland	108
Valley oak woodland	192
Total	**54,207**

Source: Habitat mapping by Jones & Stokes in 2007; data compiled by EDAW in 2008



Source: Project Footprint (EDAW February 3, 2009), Riverside Canal (Mead & Hunt March 9, 2009), Borrow Sites (Mead & Hunt March 9, 2009), Woodland Corridor and Potential Marsh Habitat Sites (EDAW March 4, 2009), Habitats (Jones & Stokes 2007)

Existing Habitat in the Phase 4a Project Area **Plate 3-3**

The southern portion of the Natomas Basin is largely developed, particularly south of Elkhorn Boulevard and east of El Centro Road. The western and northern portions, in contrast, are dominated by agricultural lands. The primary crops produced in the Natomas Basin are rice, corn, grain, and tomatoes. Rice, the most common crop, is generally grown over large areas of contiguous land north of Elkhorn Boulevard, although the amount of land in active rice production has greatly diminished in recent years and many former rice fields are now fallow or support grain crops, such as wheat. Agricultural lands in the southern and western portions support other crops and urban land uses (City of Sacramento, Sutter County, and TNBC 2003).

Only small fragments of native habitat persist in the Natomas Basin. Riparian habitat is primarily restricted to a narrow strip along the levees of the Sacramento River and NEMDC. Small patches of woodland, scrub, and wetland habitats dominated by native species are scattered throughout the Natomas Basin, most relatively close to the Sacramento River or adjacent to other features that support surface water. An extensive network of irrigation and drainage ditches also traverses the Natomas Basin and a growing number of restored marsh habitat patches are being created, primarily in the north. Most of these are owned and managed by TNBC; others are separately managed as Airport mitigation sites.

The Phase 4a Project area is largely undeveloped. Residential properties are scattered along the northern and middle reaches of the Phase 4a Project area and increase in density along the southern reaches. Reaches south of the Phase 4a Project area become increasingly urbanized. Levee slope maintenance zones along the landside levee toe are dominated by weedy ruderal vegetation that is regularly maintained via mowing and/or burning. Irrigation/drainage ditches and canals are present along many levee reaches, landward of the maintenance zones. These ditches generally support little native vegetation and are regularly maintained. Within the Phase 4a Project area, the Riverside Canal (a concrete-lined canal with earthen embankments) runs parallel to the levee along the landside levee toe. The canal flows south to approximately Bryte Bend Road. The canal south of Bryte Bend Road is abandoned. Lateral ditches and canals also extend into the Phase 4a Project area. Some of the limited native vegetation within the Phase 4a Project area is associated with these lateral ditches and remnant woodland and scrub patches scattered along the landside of the Sacramento River east levee. Additional native valley riparian vegetation is found along Fisherman's Lake, a natural slough that lies just over one half mile to the east of the Sacramento River east levee Reaches 12 and 13. To the west of Fisherman's Lake lie several TNBC tracts that comprise the TNBC's Fisherman's Lake preserve; these tracts include the Natomas Farms, Souza, Rosa East, Rosa Central, Cummings, and Alleghany tracts. The Fisherman's Lake Borrow Area in the Phase 4a Project area includes parcels that lie adjacent to and between TNBC Fisherman's Lake tracts and private parcels that include a mix of rice and row/field crops and managed marshland (**Plate 2-12**). Portions of the borrow site also border Fisherman's Lake itself. The dominant habitat landward of levee maintenance zones and irrigation/drainage features is agricultural. Aside from the urbanized areas, along the southern reaches of the Sacramento River, areas along the Sacramento River are predominantly row and field crops.

Wildlife

Before European settlement, the Sacramento area floodplains supported a wide variety and large numbers of wildlife species associated with its riparian habitats, permanent and seasonal wetlands, and oak woodlands and savannas. Much of this habitat has been lost, locally and regionally. Initially, land within the Natomas Basin was converted to agriculture, though more recent land use conversions have been to urban development. As a result, there have been shifts in wildlife use as land uses and habitats have changed. With the conversion to agriculture, the abundance of species restricted to natural habitats likely decreased, and in some cases particular species ceased to occur (City of Sacramento, Sutter County, and TNBC 2003). However, remnant native habitat patches and created habitat associated with drainage and agricultural supply ditches and habitat reserves have allowed remnant wildlife populations to persist within the Natomas Basin, most notable of which are giant garter snake and the Swainson's hawk populations. The presence of ditches among the mosaic of agricultural fields and remnant riparian and wetland patches provides important nesting, feeding, and migration corridor habitat for a variety of wildlife species that inhabit the Natomas Basin.

Wildlife use is also linked to the Natomas Basin's position in the Pacific Flyway, the westernmost of North America's four flyways, or migration routes. These flyways are defined as geographic regions with breeding grounds in the north, wintering grounds in the south, and a system of migration routes in between. The Central Valley lies at the southerly end of the Pacific Flyway migratory route. Historically, the Central Valley contained approximately 4 million acres of wetlands, including permanent marshes and seasonal wetlands created by winter rains and spring snowmelt from the Sierra Nevada. Today, approximately 300,000 acres remain, providing wintering habitat for 60% of the Pacific Flyway's current waterfowl population and migration habitat for an additional 20% of the population. All together, approximately 10–12 million ducks and geese, along with millions of other water birds, winter in or pass through the Central Valley each year (City of Sacramento, Sutter County, and TNBC 2003). Although most marshes and seasonal wetlands in the Natomas Basin have been converted to agricultural and urban uses, flooded rice fields continue to attract and support migrant waterfowl. Some species also utilize pasture, harvested rice, and other croplands for foraging (USFWS, City of Sacramento, and Sutter County 2003).

The Phase 4a Project area provides habitat for a variety of wildlife species, ranging from those that use the widely distributed agricultural fields and levee maintenance zones to species that are restricted to remnant patches of native vegetation and the system of irrigation/drainage ditches and canals. Many common wildlife species use the Phase 4a Project area, and a number of sensitive species also have potential to occur within and adjacent to the levee improvement areas. These sensitive species are discussed further in Section 3.7.2.2, "Sensitive Biological Resources."

Fisheries

Two primary waterways supporting fish habitat occur in and/or immediately adjacent to the Phase 4a Project area: the NCC and the lower Sacramento River. The NCC is a tributary to the lower Sacramento River near Verona. These waterways are indirectly connected to the irrigation and drainage canals and ditches in the Phase 4a Project area by a number of pumping facilities. These waterways provide important habitat for native anadromous and resident Central Valley fishes, including species that are listed under ESA and CESA, and perform other important ecological functions, as described in Section 3.7.2.2, "Sensitive Biological Resources."

The lower Sacramento River and NCC provide fish spawning, rearing, and/or migratory habitat for a diverse assemblage of native and nonnative species (**Table 3.7-2**). The use of different areas of these waterways by fish species is influenced by variations in habitat conditions, each species' habitat requirements, life history, and daily and seasonal movements and behavior.

Anthropogenic changes to the flow regimes of the lower Sacramento River have had an effect on many aspects of the habitat quality for fish. Altered flow regimes have resulted in reduced physical processes (e.g., sediment transport and deposition) and artificial seasonal flows (i.e., generally decreased water in winter and increased water in summer) relative to natural conditions. Past modifications of channels for agricultural water conveyance and flood damage reduction purposes have resulted in homogenous, trapezoidal channels lacking in-stream structure with narrow and sparse bands of riparian vegetation that provide only limited shaded riverine aquatic habitat (SRA)[2] habitat functions. Combined, the alterations to the lower Sacramento River have resulted in marginal conditions that provide only limited habitat functions for most native fish species.

[2] SRA vegetation and instream tree and shrub debris provide important riverine fish habitat along the lower Sacramento River and its tributaries. SRA habitat is defined as the nearshore aquatic habitat occurring at the interface between a river and adjacent woody riparian habitat. The principal attributes of this cover type are: (1) an adjacent bank composed of natural, eroding substrates supporting riparian vegetation that either overhang or protrude into the water; and (2) water that contains variable amounts of woody debris, such as leaves, logs, branches, and roots and has variable depths, velocities, and currents. Riparian habitat provides structure (through SRA habitat) and food for fish species. Shade decreases water temperatures, while low overhanging branches can provide sources of food by attracting terrestrial insects. As riparian areas mature, the vegetation sloughs off into the rivers, creating structurally complex habitat consisting of large woody debris that furnishes refugia from predators, creates higher water velocities, and provides habitat for aquatic invertebrates. For these reasons, many fish species are attracted to SRA habitat.

Table 3.7-2
Fish Present in the Lower Sacramento River and NCC

Common Name	Scientific Name	Native (N) or Introduced (I)
Sacramento River winter-run chinook salmon	*Oncorhynchus tshawytscha*	N
Central Valley spring-run chinook salmon	*Oncorhynchus tshawytscha*	N
Central Valley fall-/late fall–run chinook salmon	*Oncorhynchus tshawytscha*	N
Central Valley steelhead/rainbow trout	*Oncorhynchus mykiss*	N
Green sturgeon	*Acipenser medirostris*	N
White sturgeon	*Acipenser transmontanus*	N
Pacific lamprey	*Lampetra tridentate*	N
Sacramento pikeminnow	*Ptychocheilus grandis*	N
Sacramento splittail	*Pogonichthys macrolepidotus*	N
Sacramento sucker	*Catostomus occidentalis*	N
Hardhead	*Mylopharodon conocephalus*	N
California roach	*Lavinia symmetricus*	N
Striped bass	*Morone saxatilus*	I
American shad	*Alosa sapidissima*	I
Largemouth bass	*Micropterus salmoides*	I
Smallmouth bass	*Micropterus dolomieui*	I
White crappie	*Pomoxis annularis*	I
Black crappie	*Pomoxis nigromaculatus*	I
Channel catfish	*Ictalurus punctatus*	I
White catfish	*Ameiurus catus*	I
Brown bullhead	*Ictalurus nebulosus*	I
Bluegill	*Lepomis macrochirus*	I
Green sunfish	*Lepomis cyanellus*	I
Golden shiner	*Notemigonus crysaleucas*	I

Source: Moyle 2002

Native species present in the lower Sacramento River and/or NCC can be separated into anadromous species (i.e., species that spawn in fresh water after migrating as adults from marine habitat) and resident species. Native anadromous species include four runs of chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*O. mykiss*), green and white sturgeon (*Acipenser medirostris* and *A. transmontanus*), and Pacific lamprey (*Lampetra tridentata*). Of these species, relatively low numbers of chinook salmon and steelhead seasonally use channels bordering the Natomas Basin during adult upstream and juvenile downstream migrations. The channels also may provide limited rearing habitat functions for juvenile salmon and steelhead during these seasonal outmigration periods. All of these anadromous species are expected to use habitats in the lower Sacramento River and, to a lesser extent, the NCC.

Native resident species include Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento splittail (*Pogonichthys macrolepidotus*), Sacramento sucker (*Catostomus occidentalis*), hardhead (*Mylopharodon conocephalus*), California roach (*Lavinia symmetricus*), and rainbow trout (*O. mykiss*). Pikeminnow, splittail, sucker, hardhead, and roach may be present in relatively low numbers in all channels year-round, while resident rainbow trout is generally expected to be found primarily in the lower Sacramento River.

Nonnative anadromous species include striped bass (*Morone saxatilis*) and American shad (*Alosa sapidissima*). Striped bass and American shad are known to use the lower Sacramento River in the Phase 4a Project Area. Nonnative resident species include largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*), white and black crappie (*Pomoxis annularis* and *P. nigromaculatus*), channel catfish (*Ictalurus punctatus*), white catfish (*Ameiurus catus*), brown bullhead (*Ictalurus nebulosus*), bluegill (*Lepomis macrochirus*), green sunfish (*L. cyanellus*), and golden shiner (*Notemigonus crysaleucas*). With the exception of the lower Sacramento River, habitat conditions in channels bordering the Natomas Basin, including the NCC, are most favorable for nonnative warm water resident species; therefore, these species are anticipated to be the most abundant in these channels.

3.7.2.2 SENSITIVE BIOLOGICAL RESOURCES

Sensitive biological resources include those that are afforded special protection through CEQA, the California Fish and Game Code (including but not limited to CESA), ESA, and CWA. Special-status species include plants and animals that are legally protected or that are otherwise considered sensitive by Federal, state, or local resource conservation agencies and organizations. These include:

- plant and wildlife species that are listed by CESA and/or ESA as rare, threatened, or endangered;
- plant and wildlife species considered candidates for listing or proposed for listing;
- wildlife species identified by DFG as California Species of Special Concern; and
- plants considered by CNPS to be rare, threatened, or endangered.

Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, Section 404 of the CWA, and the Porter-Cologne Water Quality Control Act.

Sensitive Habitats

Sensitive habitats include sensitive woodland habitat and sensitive aquatic habitat.

Sensitive Woodland Habitat

Riparian and landside woodlands in the Natomas Basin provide important nesting and roosting habitat for a wide variety of wildlife species (including special-status species such as Swainson's hawk) and serve as movement corridors for these species within the Basin. As such, they are considered sensitive habitats. Riparian woodlands in particular are rich in biological fauna and flora and provide valuable resources and protection for aquatic habitats. They are considered sensitive habitats subject to DFG jurisdiction California Fish and Game Code Section 1602. Other habitats considered sensitive by DFG include those identified as "rare and worthy of consideration" in natural communities recognized by the California Natural Diversity Database (CNDDB). These sensitive communities provide essential habitat to special-status species that are often restricted in distribution or decreasing throughout their range. Some woodland patches within the Phase 4a Project area could be categorized as Great Valley cottonwood riparian forest, which is a natural community documented in the CNDDB. Trees protected by county and city policies and ordinances, including native oaks, are also considered sensitive.

Sensitive Aquatic Habitat

Sensitive aquatic habitat includes those habitats that are of special concern to resource agencies or that are afforded specific consideration through ESA, CEQA, Section 1602 of the California Fish and Game Code, Section 404 and 401 of the CWA, or the Sustainable Fisheries Act (as amended). These habitats are of special concern because they may be of high value to plants, wildlife, and fish species and may have a higher potential to support special-status species. They also provide other important ecological functions, such as enhancing flood and erosion control and maintaining water quality. Other sensitive aquatic habitats, including Essential Fish Habitat, are described below.

Irrigation/drainage canals and ditches in the Phase 4a Project area are anticipated to be considered waters of the United States and subject to regulation under CWA Section 404. Other permanently and/or seasonally wet habitats, such as freshwater marsh and seasonal wetland, could qualify as jurisdictional waters of the United States subject to Section 404 regulation if they are adjacent or abutting other jurisdictional waters of the United States.

Previous delineation reports verified by USACE that cover portions of the Phase 4a Project footprint include a wetland delineation completed in 2007 that covers areas on the landside of the Sacramento River east levee along Reaches 1–20 (USACE Reference ID #200700211) and a delineation completed in 2006 for the NCC within the NLIP footprint (USACE Reference ID #200600795). These delineations identified the following features that fall within the Phase 4a Project area as jurisdictional: irrigation/drainage ditches and canals along the toe of the levee and those that connect with these, freshwater marsh habitat, and irrigated wetlands in rice fields. Delineations of jurisdictional waters of the United States elsewhere in the Phase 4a Project are currently in process. Jurisdictional features within this area are expected to include primarily irrigation/drainage ditches and some portions of irrigated rice fields.

In addition, the riverbank erosion control element of the RSLIP Alternative at erosion sites along the Sacramento River east levee would be within USACE jurisdictional areas, and some of the discharge pipes conveying filtered stormwater drainage from the east levee to the east bank of the Sacramento River under the Proposed Action might extend to areas within CWA Section 404 and/or Section 10 of the Rivers and Harbors Act jurisdiction.

The functional quality of an aquatic resource is considered by USACE as part of the CWA Section 404 regulatory process. Habitat quality may be generally categorized as low, moderate, or high, defined herein as follows:

- **Low:** High levels of disturbance (e.g., vegetation disking for fire clearance purposes, dominance of monotypic stands of nonnative vegetation, presence of human-made structures)
- **Moderate:** Moderate levels of disturbance (e.g., natural plant communities intact with some evidence of nonnative vegetation, low-intensity developments such as trails, selective vegetation management for flood damage reduction purposes)
- **High:** Natural structure and function of biotic community exists, with minimal changes in structure or function evident—i.e., zero to low levels of human disturbance (e.g., natural plant communities intact, no artificial structures present, sensitive plant and/or wildlife species utilization)

All of the aquatic habitats described above are also anticipated to qualify as waters of the state and be regulated under the Porter-Cologne Water Quality Control Act. In addition, waterways and associated riparian habitats are likely subject to regulation under Section 1600 et seq. of the California Fish and Game Code. Within the footprint of the Phase 4a Project, riparian habitat occurs in scattered patches along the waterside of the Sacramento River east levee.

Sensitive Plants and Wildlife

Sensitive plants and wildlife include special-status plant species and special-status wildlife species.

Special-Status Plant Species

Nine special-status plant species were evaluated for their potential to occur in the Phase 4a Project area. These are species that are covered under the NBHCP and/or are considered by the California Native Plant Society (CNPS) to be rare, endangered, or threatened and are considered to have suitable habitat in the project region. **Table 3.7-3** summarizes for each species the regulatory or CNPS listing status, including coverage in the NBHCP; habitat association; and potential for occurrence in the Phase 4a Project area.

Table 3.7-3
Special-Status Plant Species Evaluated for Potential to Occur in the Phase 4a Project Footprint

Common Name	Scientific Name	Status	Habitat	Potential for Occurrence
Dwarf downingia	*Downingia pusilla*	CNPS: 2	Vernal pools and lakes	No suitable habitat is present
Bogg's Lake hedge-hyssop	*Gratiola heterosepala*	CA: endangered CNPS: 1B NBHCP: covered	Vernal pools and lake margins	No suitable habitat is present
Rose mallow	*Hibiscus lasiocarpus*	CNPS: 2	Freshwater marshes and swamps	Low potential to occur in ditches and ponds
Delta tule pea	*Lathyrus jepsonii jepsonii*	CNPS: 1B NBHCP: covered	Freshwater and brackish marshes and sloughs	Low potential to occur in ditches and ponds
Legenere	*Legenere limosa*	CNPS: 1B NBHCP: covered	Vernal pools	No suitable habitat is present within the Phase 4a Project Area
Colusa grass	*Neostapfia colusana*	Federal: threatened CA: endangered CNPS: 1B NBHCP: covered	Vernal pools	No suitable habitat is present
Slender orcutt grass	*Orcuttia tenuis*	Federal: threatened CA: endangered CNPS: 1B NBHCP: covered	Vernal pools	No suitable habitat is present
Sacramento orcutt grass	*Orcuttia viscida*	Federal: endangered CA: endangered CNPS: 1B NBHCP: covered	Vernal pools	No suitable habitat is present
Sanford's arrowhead	*Sagittaria sanfordii*	CNPS: 1B NBHCP: covered	Freshwater ponds, marshes and ditches	Low potential to occur in ditches and ponds

Notes: CA = California; CNPS = California Native Plant Society; NBHCP = Natomas Basin Habitat Conservation Plan
California Native Plant Society Listing Categories:
1B Plants considered rare, threatened, or endangered in California and elsewhere
2 Plants considered rare, threatened, or endangered in California but more common elsewhere
Source: CNPS 2007; CNDDB 2007; City of Sacramento, Sutter County, and TNBC 2003; USFWS 2005; Data compiled by EDAW in 2009

Three of the nine species were determined to have potential to occur in the Phase 4a Project area: rose mallow, Delta tule pea, and Sanford's arrowhead. All of these species occur in freshwater habitats, including marshes, swamps, sloughs, and ditches. Potentially suitable habitat for them is provided by irrigation and drainage canals within the Phase 4a Project area. In general, these areas provide low-quality habitat and are unlikely to support these three special-status plants. Rose mallow and Delta tule pea are not known to occur in the Phase 4a Project area (CNDDB 2008).

The remaining six species included in **Table 3.7-3** are not addressed further in this section, because the Phase 4a Project area does not support the vernal pool and seasonal wetland habitats in which they occur. Potential habitat for these species is generally concentrated in the eastern portion of the Natomas Basin, between Del Paso Road and Riego Road, along the northern portion of the NEMDC, where construction is not proposed under the Phase 4a Project.

EDAW botanists surveyed the Phase 4a Project Area July 1–2, 2009 for the potential presence of sensitive plant species, including all areas of the Phase 4a Project footprint where suitable marsh and wetland habitat for Rose mallow, Delta tule pea, and Sanford's arrowhead is found. The survey followed protocol outlined in DFG's "*Guidelines for Assessing the Effects of Proposed Development on Rare, Threatened, and Endangered Plants and Plant Communities"* (DFG 2000). The survey was conducted within the flowering period of these three species. No special status species were found during the survey.

Special-Status Wildlife Species

A programmatic Biological Opinion (BO) was issued by USFWS for the NLIP in October 2008 and an amended BO was issued in May 2009 (**Appendix D1**).

Twenty special-status wildlife species, including all species covered by the NBHCP, were evaluated for their potential to occur in the Phase 4a Project area. **Table 3.7-4** summarizes for each species the regulatory status, including coverage in the NBHCP; habitat association; and potential for occurrence in the Phase 4a Project area. Six of these species (four invertebrate species and two amphibian species) are not addressed further in this section because the Phase 4a Project area does not support the habitats in which they occur. Three of the bird species listed in **Table 3.7-4** have been documented in the area in the past but are not known to nest in the Phase 4a Project area and are not discussed further. The remaining eleven species were determined to have potential to occur in the Phase 4a Project area during at least part of the year and are discussed below.

Table 3.7-4
Special-Status Wildlife Species Evaluated for Potential to Occur in the Phase 4a Project Footprint

Common Name	Scientific Name	Status	Habitat	Potential for Occurrence
Invertebrates				
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Federal: threatened NBHCP: covered	Elderberry shrubs, typically in riparian habitats	Elderberry shrubs are present within and adjacent to the Sacramento River east levee
California linderiella	*Linderiella occidentalis*	Federal: endangered NBHCP: covered	Vernal pools and other seasonal wetlands	No suitable habitat is present
Vernal pool tadpole shrimp	*Lepidurus packardi*	Federal: endangered NBHCP: covered	Vernal pools and swales	No suitable habitat is present
Midvalley fairy shrimp	*Branchinecta mesovallensis*	NBHCP: covered	Vernal pools	No suitable habitat is present
Vernal pool fairy shrimp	*Branchinecta lynchi*	Federal: threatened NBHCP: covered	Vernal pools and other seasonal wetlands	No suitable habitat is present
Amphibians				
California tiger salamander	*Ambystoma californiense*	Federal: threatened CA: species of special concern NBHCP: covered	Vernal pools and seasonal wetlands in upland with burrows and other belowground refuge	No suitable habitat is present
Western spadefoot	*Spea hammondii*	CA: species of special concern NBHCP: covered	Vernal pools and seasonal wetlands in upland with burrows and other belowground refuge	No suitable habitat is present
Reptiles				
Giant garter snake	*Thamnophis gigas*	Federal: threatened CA: threatened NBHCP: covered	Streams, sloughs, ponds, and irrigation/ drainage ditches; also require upland refugia not subject to flooding during the snake's inactive season	The Natomas Basin supports a key population; rice fields, ditches, and ponds

Table 3.7-4
Special-Status Wildlife Species Evaluated for Potential to Occur in the Phase 4a Project Footprint

Common Name	Scientific Name	Status	Habitat	Potential for Occurrence
Northwestern pond turtle	*Actinemys marmorata marmorata*	CA: species of special concern NBHCP: covered	Ponds, marshes, rivers, streams, sloughs; nest in nearby uplands with suitable soils	Ditches and ponds
Birds				
White-faced ibis	*Plegadis chihi*	CA: species of special concern NBHCP: covered	Forage and roost in shallow water and flooded fields; nest in freshwater marshes	Rice fields provide foraging habitat; the only nesting colony in the Natomas Basin is approximately 3 miles from the nearest levee improvement area
Aleutian Canada goose	*Branta canadensis leucopareia*	NBHCP: covered	Forage in agricultural fields and roost in aquatic habitats	Could be a winter visitor, but no recent documented occurrences
White-tailed kite	*Elanus leucurus*	CA: fully protected	Forage in grasslands and agricultural fields; nest in isolated trees or small woodland patches	Known to nest and forage in the area
Northern harrier	*Circus cyaneus*	CA: species of special concern	Forage and nest in grassland, agricultural fields, and marshes	Known to nest and forage in the area
Cooper's hawk	*Accipiter cooperii*	CA: species of special concern	Forage and nest in open woodlands and woodland margins	Known to nest and forage in the area
Swainson's hawk	*Buteo swainsoni*	CA: threatened NBHCP: covered	Forage in grasslands and agricultural fields; nest in open woodland or scattered trees	Known to nest and forage in the area
American peregrine falcon	*Falco peregrinus anatum*	CA: endangered and fully protected NBHCP: covered	Forage in a variety of open habitats, particularly marshes and other wetlands	Likely to occasionally forage in the area, but no suitable nesting habitat is present
Burrowing owl	*Athene cunicularia*	CA: species of special concern NBHCP: covered	Grasslands and agricultural fields	Agricultural fields, grasslands, and ditches provide potentially suitable nesting and foraging habitat
Bank swallow	*Riparia riparia*	CA: threatened NBHCP: covered	Forage in various habitats; nest in banks or bluffs, typically adjacent to water	Could forage in the area, but no colonies have been documented nearby within the past 10 years
Loggerhead shrike	*Lanius ludovidianus*	CA: species of special concern NBHCP: covered	Forage in grasslands and agricultural fields; nest in scattered shrubs and trees	Known to nest and forage in the area
Tricolored blackbird	*Agelaius tricolor*	CA: species of special concern NBHCP: covered	Forage in grasslands and agricultural fields; nest in freshwater marsh, riparian scrub, and other dense shrubs and herbs	Known to nest and forage in the area

Notes: CA = California; NBHCP = Natomas Basin Habitat Conservation Plan

Source: CNDDB 2007; City of Sacramento, Sutter County, and TNBC 2003; USFWS 2005; USFWS 2006; Data compiled by EDAW in 2009

- **Valley Elderberry Longhorn Beetle**. The valley elderberry longhorn beetle is Federally listed as threatened and is covered under the NBHCP. These beetles are patchily distributed throughout the remaining riparian forests of the Central Valley, from Redding to Bakersfield, and appear to be only locally common (i.e., found in population clusters that are not evenly distributed across the Central Valley). Valley elderberry longhorn beetles require elderberry shrubs (*Sambucus* sp.) for reproduction and survival, and are rarely seen because they spend most of their life cycle as larvae within the stems of the shrubs. It appears that in order to function as habitat for the valley elderberry longhorn beetle, host elderberry shrubs must have stems that are 1.0 inch or greater in diameter at ground level. Use of the shrubs by the beetle is rarely apparent; often the only exterior evidence is an exit hole created by the larva just before the pupal stage.

  USFWS released a 5-year status review for the valley elderberry longhorn beetle on October 2, 2006 (USFWS 2006). This review reported an increase in known beetle locations from 10 at the time of listing in 1980 to 190 in 2006. Because of the presumed increase in the estimated population and the concurrent protection and restoration of several thousand acres of riparian habitat suitable for valley elderberry longhorn beetles, the USFWS status review determined that this species is no longer in danger of extinction, and recommended that the species no longer be listed under ESA. This recommendation is not a guarantee that the species will be delisted, however, because formal changes in the classification of listed species require a separate USFWS rulemaking process distinct from the 5-year review. If valley elderberry longhorn beetles are removed from the ESA list, it will likely be more than a year before this decision is finalized.

  There are no known documented occurrences of the beetle in the Phase 4a Project area, but the species is known to occur in the nearby American River Parkway and on the west bank of the Sacramento River (CNBBD 2008). Elderberry shrubs that could support beetles are relatively sparsely scattered throughout the Phase 4a Project area, primarily in riparian vegetation on the waterside of the Sacramento River east levee. Elderberry shrubs are also scattered in some remnant riparian and oak woodland clumps on the landside of the levee, but they are relatively uncommon in these locations.

- **Giant Garter Snake**. The giant garter snake is Federally and state listed as threatened and is a primary covered species under the NBHCP. This species formerly ranged throughout the wetlands of California's Central Valley but appears to have been extirpated from the southern San Joaquin Valley (Hansen and Brode 1980, USFWS 1999) and has suffered serious declines in other parts of its former range. The primary cause of decline, loss or degradation of aquatic habitat caused by agricultural development, has been compounded by the loss of upland refugia and bankside vegetation cover (Thelander 1994).

  Giant garter snakes inhabit agricultural wetlands and other waterways, such as irrigation and drainage canals, rice fields, marshes, sloughs, ponds, small lakes, low-gradient streams, and adjacent uplands in the Central Valley (USFWS 1999). **Table 3.7-1** lists the overall acreages of habitat types in the Natomas Basin; ditches and canals are included in the "open water" designation. Rice fields and their adjacent irrigation and drainage canals serve an important role as aquatic habitat for giant garter snake. During the summer, giant garter snakes use the flooded rice fields as long as their prey is present in sufficient densities. In late summer, rice fields provide important nursery areas for newborns. In late summer/fall, water is drained from the rice fields and giant garter snake prey items become concentrated in the remaining pockets of standing water, which allows the snakes to gorge before their period of winter inactivity (USFWS 1999). It appears that the majority of giant garter snakes move back into the canals and ditches as the rice fields are drained, although a few may overwinter in the fallow fields, where they hibernate within burrows in the small berms separating the rice checks (Hansen 1998).

  Managed marsh in TNBC reserves also provides important habitat for giant garter snake. In contrast to rice, managed marsh provides year-round habitat, and habitat elements to meet all of the giant garter snake's daily and seasonal needs, such as dense cover, basking sites, and refugia. TNBC reserves have been designed to provide habitat elements throughout the marsh; by contrast, the limited availability of the same elements in

rice fields contributes to giant garter snake use occurring primarily around the perimeter of the rice fields. Total acres of created marsh habitat present in the Natomas Basin, are shown in **Table 3.7-1**.

The width of uplands used by giant garter snake varies considerably. Many summer basking and refuge areas used by this snake are immediately adjacent to canals and other aquatic habitats, and may even be located in the upper canal banks. Giant garter snakes have also been found hibernating as far as 820 feet (250 meters) from water, however, and any land within this distance may be important for snake survival in some cases (Hansen 1988). USFWS considers 200 feet to be the width of upland vegetation needed to provide adequate habitat for giant garter snake along the borders of aquatic habitat (USFWS 1997).

The Natomas Basin supports one of the most significant of the remaining giant garter snake populations in California. Recent occurrences of the species have generally been concentrated in the central and northern portions of the Basin, with giant garter snakes becoming increasingly uncommon at Fisherman's Lake in the south (TNBC 2008). There are a number of likely causes for this disparity, including limited opportunities for exchange of individuals between key populations in the northern concentration of TNBC reserves and the population at Fisherman's Lake in the south (TNBC 2008). Despite this, habitat provided by Fisherman's Lake and associated TNBC preserve tracts supports one of the three major population clusters in the Natomas Basin. Irrigation and drainage ditches and canals throughout the Phase 4a Project area provide habitat of varying quality for giant garter snake, depending on the location. Large waterways, such as the Sacramento and American Rivers, do not provide suitable habitat for giant garter snake.

- **Northwestern Pond Turtle**. Northwestern pond turtle is a DFG species of special concern and is covered under the NBHCP. This species is generally associated with permanent or near-permanent aquatic habitats, such as lakes, ponds, streams, freshwater marshes, and agricultural ditches. They require still or slow-moving water with instream emergent woody debris, rocks, or similar features for basking sites. Pond turtles are highly aquatic but can venture far from water for egg laying. Nests are typically located on unshaded upland slopes in dry substrates with clay or silt soils (Jennings and Hayes 1994).

  Ditches, ponds, and marshes throughout the Natomas Basin provide potential habitat for northwestern pond turtle. Basinwide acreages of these habitats are shown in **Table 3.7-1** in the categories "Open water" and "Fresh emergent marsh." Potential breeding habitat is very limited because of the predominance of agriculture and development, but turtles could occur along ditches and margins of other aquatic habitat. Limited information is available on the status and distribution of the northwestern pond turtle in the Basin. Surveys conducted in 2004–2007 for TNBC documented only 17 occurrences of northwestern pond turtle in the Natomas Basin; nearly half of these were in the Fisherman's Lake area (TNBC 2008).

- **Swainson's Hawk**. Swainson's hawk is state listed as threatened and is a primary covered species under the NBHCP. As many as 17,000 Swainson's hawk pairs may have nested in California at one time (DFG 1994). Currently, there are 700–1,000 breeding pairs in California, of which 600–900 are in the Central Valley (Estep 2003). Swainson's hawks typically occur in California only during the breeding season (March–September) and winter in Mexico and South America. The Central Valley population migrates only as far south as central Mexico. Swainson's hawks begin to arrive in the Central Valley in March; nesting territories are usually established by April, with incubation and rearing of young occurring through June (Estep 2003).

  Swainson's hawks are found most commonly in grasslands, low shrublands, and agricultural habitats that include large trees for nesting. Nests are found in riparian woodlands, roadside trees, trees along field borders, and isolated trees. Corridors of remnant riparian forest along drainages contain the majority of known nests in the Central Valley (England, Bechard, and Houston 1997; Estep 1984; Schlorff and Bloom 1984). Nesting pairs frequently return to the same nest site for multiple years and decades.

  Prey abundance and accessibility are the most important features determining the suitability of Swainson's hawk foraging habitat. In addition, agricultural operations (e.g., mowing, flood irrigation) have a substantial

influence on the accessibility of prey and thus create important foraging opportunities for Swainson's hawk. Crops that are tall and dense enough to preclude the capture of prey do not provide suitable habitat except around field margins, but prey animals in these habitats are accessible during and soon after harvest. Swainson's hawks feed primarily on small rodents but also consume insects and birds. Although the most important foraging habitat for Swainson's hawks lies within a 1-mile radius of each nest (City of Sacramento, Sutter County, and TNBC 2003), Swainson's hawks have been recorded foraging up to 18.6 miles from nest sites (Estep 1989). Any habitat within the foraging distance may provide food at some time in the breeding season that is necessary for reproductive success. In a dynamic agricultural environment such as the Natomas Basin, the area required for Swainson's hawk foraging habitat depends on time of season, crop cycle, crop type, and disking/harvesting schedule, as these factors affect the abundance and availability of prey (City of Sacramento, Sutter County, and TNBC 2003).

The most recent survey published by TNBC (2008) documented that 44 of the 103 known nesting territories in the Natomas Basin and along adjacent waterways were active in 2007. Most nest sites are located in the western portion of the Basin along the Sacramento River. Along the Sacramento River, the majority of nest sites are located on the waterside of the levees, and the relatively few nest sites on the landside of the Sacramento River east levee are typically located at least several hundred feet or more from the levee. In addition to the scattered nest sites adjacent to the Phase 4a Project area, agricultural fields and levee maintenance zones throughout the Phase 4a Project area provide suitable foraging habitat for Swainson's hawk. Basinwide acreages of grasslands and alfalfa, row, and grain crops that may provide foraging habitat for Swainson's hawks are shown in **Table 3.7-1**.

The Phase 4a Project area is within a densely populated and important component of the Central Valley Swainson's hawk population. Nesting pairs in the Natomas Basin may represent as much as 10% of the Swainson's hawks that are found in the Central Valley. Most nest sites are located in the western portion of the Basin along the Sacramento River; nest sites are also known to occur in trees in the vicinity of the Fisherman's Lake area. Nesting habitat includes riparian and non-riparian woodlands. In addition to nest sites that are adjacent to the Phase 4a Project area, there are agricultural fields and grassland habitats (including levee and canal maintenance zones) throughout the Phase 4a Project area that provide suitable foraging habitat for Swainson's hawk.

Alfalfa and other irrigated field crops can generally provide higher quality foraging habitat than uncultivated annual grasslands and ruderal areas due to prey abundance and availability. The crops can provide abundant cover and food for prey populations. Periodic disturbances such as harvesting, tilling, and flooding can increase prey availability. Certain crops provide better foraging than others due to crop height and the frequency of the disturbance regime. Generally, alfalfa crops are considered the highest value foraging habitat for Swainson's hawk. Next in order of preference is grass hay, fallow crops, row and grain crops, and finally annual grasslands (Estep 2007, Woodbridge 1998).

- **Burrowing Owl**. Burrowing owl is a DFG species of special concern and is covered under the NBHCP. Burrowing owls and their nests are also protected under Section 3503.5 of the California Fish and Game Code, which states that it is unlawful to take, possess, or destroy any raptors, including their nests or eggs. Burrowing owls typically inhabit grasslands and other open habitats with low-lying vegetation. They are also known to nest and forage in idle agricultural fields, ruderal fields, and the edges of cultivated fields, although these areas provide lower-quality habitat than native grasslands. Burrow availability is an essential component of suitable habitat. Burrowing owls are capable of digging their own burrows in areas with soft soil, but they generally prefer to adopt those excavated by other animals, typically ground squirrels. In areas where burrows are scarce, they can use pipes, culverts, debris piles, and other artificial features.

  Burrowing owl sightings are generally in the eastern half of the Natomas Basin, with the highest concentration along the far eastern edge (TNBC 2008). However, potentially suitable burrowing owl burrows and foraging habitat occurs within the Phase 4a Project area.

- **Northern Harrier**. Northern harrier is a California Species of Special Concern and a year-round resident in California. This species is not covered under the NBHCP. Northern harriers are likely to nest in grain crops and fallow agricultural fields in and adjacent to the Phase 4a Project area. Three harrier nests were documented by a project biologist in 2007 in fallow fields and upland adjacent to Prichard Lake.

- **Other Nesting Birds**. Several bird species identified in **Table 3.7-4** have the potential to nest in or adjacent to the Phase 4a Project area. Species associated with riparian and other woodland habitats, such as Cooper's hawk and white-tailed kite, are most likely to nest along the Sacramento River (Cooper's hawk) and in remnant woodland and suitable trees on the landside of the levees (white-tailed kite). In general, these two raptor species are relatively uncommon in the Phase 4a Project area. Loggerhead shrikes are known to nest at several TNBC reserves and elsewhere in the Natomas Basin (TNBC 2008) and are likely to nest in small trees and shrubs within the Phase 4a Project area, particularly on the landside of the Sacramento River east levee and along Fisherman's Lake.

  Tricolored blackbirds have been known to nest on a preserve in TNBC's Central Basin Reserve Area and in the extreme northeast corner of the Basin (TNBC 2008). There is also potential for this species to nest in areas of suitable habitat elsewhere adjacent to the Phase 4a Project area, including several TNBC reserves. White-faced ibis were not known to nest anywhere in the Natomas Basin until 2007, when a new nesting colony became established at a preserve in TNBC's Central Basin Reserve. Although foraging tricolored blackbird and white-faced ibis have been observed in the Fisherman's Lake area, occurrences of these species are uncommon in the southern portion of the Natomas Basin and no known nesting sites occur near the Phase 4a Project area.

Special-Status Fish

Seven special-status fish species have the potential to occur in the lower Sacramento River and/or NCC as described below (**Table 3.7-5**). Of the seven species, Central Valley steelhead distinct population segment (DPS; formerly Evolutionarily Significant Unit [ESU]), Sacramento River winter-run Chinook salmon ESU, Central Valley spring-run Chinook salmon ESU, and the Southern DPS of North American green sturgeon are Federally listed as endangered or threatened species. Sacramento River winter-run Chinook salmon ESU (endangered) and Central Valley spring-run Chinook salmon ESU (threatened) are also listed under CESA. The National Marine Fisheries Service (NMFS) determined that listing is not warranted for Central Valley fall-/late fall-run Chinook salmon. However, this species is still designated a species of concern by NMFS and a species of special concern by DFG because of concerns about specific risk factors. The remaining two species, hardhead and Sacramento splittail, are considered species of special concern by DFG. Delta smelt, which is Federally and state listed as threatened, and longfin smelt, which was recently state listed as threatened, are found in the tidally influenced reaches of the Sacramento River downstream of the confluence with the American River, and therefore are not expected to be found in the Sacramento River near the Phase 4a Project area or in the NCC. Summary descriptions for those species that have the potential to occur in the Phase 4a Project area are provided below.

- **Fall-/ Late Fall-Run Chinook Salmon ESU**. Adult fall–/late fall-run Chinook salmon enter the Sacramento and San Joaquin River systems from July through April and spawn from October through February. During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Optimal water temperatures for egg incubation are 6.7 degrees Celsius (ºC) to 12.2ºC Newly emerged fry remain in shallow, lower-velocity edgewaters, particularly where debris congregates and makes the fish less visible to predators (DFG 1998). The duration of egg incubation and time of fry emergence depends largely on water temperature. In general, eggs hatch after a 3- to 5-month incubation period, and alevins (yolk-sac fry) remain in the gravel until their yolk-sacs are absorbed (2–3 weeks).

Table 3.7-5
Special-Status Fish Species Potentially Occurring in the Lower Sacramento River and/or NCC

Species	Status[1]		Habitat	Potential to Occur
	USFWS/ NMFS	DFG		
Central Valley fall-/late fall–run Chinook salmon ESU *Oncorhynchus tshawytscha*	SC	SSC	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Sacramento River; could occur in the NCC
Sacramento River winter-run Chinook salmon ESU *Oncorhynchus tshawytscha*	E	E	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the Sacramento River; while unlikely, juveniles could stray into the NCC
Central Valley spring-run Chinook salmon ESU *Oncorhynchus tshawytscha*	T	T	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the Sacramento River and certain tributaries; while unlikely, adults and juveniles could stray into the NCC
Central Valley steelhead DPS *Oncorhynchus mykiss*	T	–	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, and tributaries, and in the Delta	Occurs in the lower Sacramento River; could also occur in the NCC
North American Green sturgeon Southern DPS *Acipenser medirostris*	T	–	Requires cold, freshwater streams with suitable gravel for spawning; rears in seasonally inundated floodplains, rivers, tributaries, and Delta	Occurs in the lower Sacramento River; unlikely to stray into the NCC
Sacramento splittail *Pogonichthys macrolepidotus*	–	SSC	Spawning and juvenile rearing from winter to early summer in shallow weedy areas inundated during seasonal flooding in the lower reaches and flood bypasses of the Sacramento River, including the Yolo Bypass	Occurs in the lower Sacramento River; may also occur in the NCC
Hardhead *Mylopharodon conocephalus*	SC	SSC	Spawning occurs in pools and side pools of rivers and creeks; juveniles rear in pools of rivers and creeks, and in shallow to deeper water of lakes and reservoirs	Occurs in the lower Sacramento River; could also occur in the NCC

Notes: Delta = Sacramento–San Joaquin Delta; DFG = California Department of Fish and Game; ESU = Evolutionarily Significant Unit; DPS = Distinct Population Segment; NCC = Natomas Cross Canal; NMFS = National Marine Fisheries Service; USFWS = U.S. Fish and Wildlife Service

[1] Legal Status Definitions

Federal Listing Categories (USFWS and NMFS)
- E Endangered (legally protected)
- T Threatened (legally protected)
- SC Species of Concern

State Listing Categories (DFG)
- E Endangered (legally protected)
- T Threatened (legally protected)
- SSC Species of Special Concern (no formal protection)

Source: Data compiled by EDAW in 2009

Juveniles typically rear in freshwater (in their natal streams, the Sacramento River system, and the Sacramento–San Joaquin Delta [Delta]) for up to 5 months before entering the ocean. Juveniles migrate downstream from January through June. Juvenile Chinook salmon prefer water depths of 0.5–3.3 feet and velocities of 0.26–1.64 feet per second (Raleigh et al.1986). Important winter habitat for juvenile Chinook salmon includes flooded bars, side channels, and overbank areas with relatively low water velocities. Juvenile Chinook salmon have been found to rear successfully in floodplain habitat, which routinely floods but is dry at other times. Growth rates appear to be enhanced by the conditions found in floodplain habitat.

Cover structures, space, and food are necessary components for Chinook salmon rearing habitat. Suitable habitat includes areas with instream and overhead cover in the form of undercut banks; downed trees; and large, overhanging tree branches. The organic materials forming fish cover also help provide sources of food, in the form of both aquatic and terrestrial insects. Growth of juvenile Chinook salmon in floodplain habitat is fast relative to growth in river habitat. Juvenile salmon have been found to have growth rates in excess of 1 millimeter (mm) per day when they rear in flooded habitat and as much as 20 mm in 2–3 weeks (Jones & Stokes 2001). The water temperature in floodplain habitat is typically higher than that in main channel habitats. Although increased temperature increases metabolic requirements, the productivity in flooded habitat is also increased, resulting in higher growth rates (Sommer et al. 2001). The production of drift invertebrates in the Yolo Bypass has been found to be one to two times greater than production in the river (Sommer et al. 2001). Also, grasses that are flooded support invertebrates that are also a substantial source of food for rearing juveniles. Increased areas resulting from flooded habitat can also reduce the competition for food and space and potentially decrease the possible encounters with predators (Sommer et al. 2001). Juvenile Chinook salmon that grow faster are likely to migrate downstream sooner, which helps to reduce the risks of predation and competition in freshwater systems.

Juvenile Chinook salmon in the Sacramento River system move out of upstream spawning areas into downstream habitats in response to many factors, including inherited behavior, habitat availability, flow, competition for space and food, and water temperature. The number of juveniles that move and the timing of movement are highly variable. Storm events and the resulting high flows appear to trigger movement of substantial numbers of juvenile Chinook salmon to downstream habitats. In general, juvenile abundance in the Delta increases as flow increases (USFWS 1993a).

Fall-/late fall-run Chinook salmon emigrate as fry and subyearlings and remain off the California coast during their ocean migration (63 *Federal Register* [FR] 11481, March 9, 1998). Fall-/late fall-run Chinook salmon occur in the lower Sacramento River and could also occur in the NCC.

- **Winter-Run Chinook Salmon ESU**. Adult winter-run Chinook salmon leave the ocean and migrate through the Delta into the Sacramento River system from November through July. These salmon migrate upstream past the Red Bluff Diversion Dam (RBDD) on the Sacramento River from mid-December through July, and most of the spawning population has passed RBDD by late June. Winter-run Chinook salmon spawn from mid-April through August, and incubation continues through October. The primary spawning grounds in the Sacramento River are above RBDD. Adult winter-run Chinook salmon generally do not enter the American River.

  Juvenile winter-run Chinook salmon rear and emigrate in the Sacramento River from July through March (Hallock and Fisher 1985). Juveniles descending the Sacramento River above RBDD from August through October and possibly November are mostly pre-smolts (smolts are juveniles that are physiologically ready to enter seawater) and probably rear in the Sacramento River below RBDD. Juveniles have been observed in the Delta between October and December, especially during high Sacramento River discharge caused by fall and early-winter storms.

  Triggers for downstream movement are similar to those described above for fall-run Chinook salmon. Winter-run salmon smolts may migrate through the Delta and bay to the ocean from December through as late as June

(Stevens 1989 cited in USFWS 1993b). The Sacramento River channel is the main migration route through the Delta. Adult winter-run Chinook salmon spend 1–4 years in the ocean. Winter-run Chinook salmon occur in the lower Sacramento River adjacent to the Phase 4a Project area.

- **Spring-Run Chinook Salmon ESU**. Spring-run Chinook salmon historically were the second most abundant run of Central Valley Chinook salmon (Fisher 1994). They occupied the headwaters of all major river systems in the Central Valley where there were no natural barriers. Adults returning to spawn ascended the tributaries to the upper Sacramento River, including the Pit, McCloud, and Little Sacramento Rivers. They also occupied Cottonwood, Battle, Antelope, Mill, Deer, Stony, Big Chico, and Butte Creeks and the Feather, Yuba, American, Mokelumne, Stanislaus, Tuolumne, Merced, San Joaquin, and Kings Rivers. Spring-run Chinook salmon migrated farther into headwater streams where cool, well-oxygenated water is available year round.

  Surveys indicate that remnant, nonsustaining spring-run Chinook salmon populations may be found in Cottonwood, Battle, Antelope, and Big Chico Creeks (DWR 1997). More sizable, consistent runs of naturally produced fish are found only in Mill and Deer Creeks. The Feather River Fish Hatchery sustains the spring-run population on the Feather River, but the genetic integrity of that run is questionable (DWR 1997). Estimates since 1953 on the Feather River indicate that numbers returning to the hatchery average around 2,115, although the estimates have increased dramatically since 1990 (DFG 2006).

  Historical records indicate that adult spring-run Chinook salmon enter the mainstem Sacramento River in February and March and continue to their spawning streams, where they then hold in deep, cold pools until they spawn. Spring-run Chinook salmon are sexually immature during their spawning migration. Some adult spring-run Chinook salmon start arriving in the Feather River below the Fish Barrier Dam in June. They remain there until the fish ladder is opened in early September. Spawning and rearing requirements for the species are similar to those identified above for fall-run Chinook salmon.

  Spawning occurs in gravel beds from late August through October, and emergence takes place in March and April. Spring-run Chinook salmon appear to emigrate at two different life stages: fry and yearlings. Fry move between February and June, while the yearling spring-run emigrate October to March, peaking in November (Cramer and Demko 1997).

  Juveniles display considerable variation in stream residence and migratory behavior. Juvenile spring-run Chinook salmon may leave their natal streams as fry soon after emergence or rear for several months to a year before migrating as smolts or yearlings (Yoshiyama et al. 1998). Triggers for downstream movement are similar to those described above for fall-run Chinook salmon.

  On March 9, 1998 (63 FR 11481), NMFS issued a proposed rule to list Central Valley spring-run Chinook salmon ESU as endangered; however, it designated the species as threatened on September 16, 1999 (64 FR 50393). On February 5, 1999, the California Fish and Game Commission listed it as threatened under CESA. Critical habitat originally had been designated for Central Valley spring-run Chinook salmon by NMFS (65 FR 7764, February 16, 2000). However, following a lawsuit (*National Association of Home Builders et al. v. Donald L. Evans, Secretary of Commerce, et al.*), NMFS rescinded the listing. After further review, critical habitat for the Central Valley spring-run Chinook salmon ESU was designated on August 12, 2005. Critical habitat is designated to include select waters in the Sacramento and San Joaquin River basins. Spring-run Chinook salmon occur in the lower Sacramento River adjacent to the Phase 4a Project area.

- **Central Valley Steelhead DPS**. Historically, steelhead spawned and reared in most of the accessible upstream reaches of Central Valley rivers, including the Sacramento and American Rivers and many of their tributaries. Compared with Chinook salmon, steelhead generally migrated farther into tributaries and headwater streams where cool, well-oxygenated water is available year-round. In the Central Valley, steelhead are now restricted to the upper Sacramento River downstream of Keswick Reservoir; the lower

reaches of large tributaries downstream of impassable dams; small, perennial tributaries of the Sacramento River mainstem; and the San Francisco Bay/Sacramento–San Joaquin Delta (Bay-Delta) system.

The upstream migration of adult steelhead in the mainstem Sacramento River historically started in July, peaked in September, and continued through February or March. Central Valley steelhead spawn mainly from January through March, but spawning has been reported from late December through April (McEwan and Jackson 1996). During spawning, the female digs a redd (gravel nest) in which she deposits her eggs, which are then fertilized by the male. Egg incubation time in the gravel is determined by water temperature, varying from approximately 19 days at an average water temperature of 15.5ºC to approximately 80 days at an average temperature of 14.5ºC (McEwan and Jackson 1996).

Steelhead fry usually emerge from the gravel 2–8 weeks after hatching, between February and May, sometimes extending into June (Barnhart 1986, Reynolds et al. 1993). Newly emerged steelhead fry move to shallow, protected areas along streambanks but move to faster, deeper areas of the river as they grow. Juvenile steelhead feed on a variety of aquatic and terrestrial insects and other small invertebrates.

Juvenile steelhead rear throughout the year and may spend 1–3 years in freshwater before emigrating to the ocean. Smoltification, the physiological adaptation that juvenile salmonids undergo to tolerate saline waters, occurs in juveniles as they begin their downstream migration. Smolting steelhead generally emigrate from March to June (Barnhart 1986, Reynolds et al. 1993).

NMFS completed a status review of steelhead populations in Washington, Oregon, Idaho, and California and identified 15 DPSs in this range. On August 9, 1996, NMFS issued a proposed rule to list five of these DPSs (including the Central Valley steelhead) as endangered and five as threatened under the ESA (61 FR 155). The Central Valley steelhead DPS was later listed as threatened (downgraded from its proposed status of endangered) (63 FR 13347, March 19, 1998), and critical habitat (which included the lower Feather and Yuba Rivers) was designated for this DPS (65 FR 7764, February 16, 2000). However, after the lawsuit referenced above (*National Association of Home Builders et al. v. Donald L. Evans, Secretary of Commerce, et al.*), NMFS rescinded the listing. After further review, critical habitat for the Central Valley steelhead DPS was designated on August 12, 2005. This habitat includes select waters in the Sacramento and San Joaquin River basins. Steelhead occur in the lower Sacramento River and could occur in the NCC.

- **North American Green Sturgeon Southern DPS**. On April 7, 2006 NMFS listed the Southern DPS of the North American green sturgeon as threatened under the ESA (71 FR 17757). The Southern DPS includes individual reproductive populations south of the Eel River. The populations north of the Eel River, grouped as the Northern DPS, currently do not warrant listing. Green sturgeon are found in the lower reaches of large rivers, including the Sacramento–San Joaquin River basin, and in the Eel, Mad, Klamath, and Smith Rivers. Green sturgeon adults and juveniles are found throughout the upper Sacramento River, as indicated by observations incidental to winter-run Chinook monitoring at Red Bluff Diversion Dam in Tehama County (NMFS 2005). Green sturgeon spawn predominantly in the upper Sacramento River and are found primarily in the mainstem Sacramento River.

  The green sturgeon is a primitive, bottom-dwelling fish found from Ensenada, Mexico, to the Bering Sea and Japan (Wang 1986). It is characterized by its large size (up to 7 feet long and 350 pounds), a long, round body, and "scutes," or plates along dorsal and lateral sides. It is known to migrate up to 600 miles between freshwater and saltwater environments and is commercially caught in the Columbia River and coastal Washington (Pacific States Marine Fisheries Commission [PSMFC] 1996). Very little is known about the life history of the green sturgeon relative to other fish species. It is an anadromous fish that spends most of its life in salt water and returns to spawn in freshwater. It is slow growing and late maturing and may spawn as little as every 4 to 11 years. Individuals congregate in the bays of these systems in summer, while some may travel upstream to spawn in spring and summer.

Spawning occurs in the lower reaches of large rivers with swift currents and large cobble. In the Sacramento River they spawn in the upper river, and are thought to spawn every 3-5 years (Tracy 1990). Their spawning period is March to July, with a peak in mid-April to mid-June (Moyle et al. 1992). Adults broadcast spawn in the water column and fertilized eggs sink and attach to bottom substrate until they hatch (PSMFC 1996). Flow has been identified as the key determinant to larval survival, therefore water diversions and low dam releases may negatively impact green sturgeon survival rates (PSMFC 1996). Juveniles feed on algae and small invertebrates and migrate downstream before they enter their third year of life. Juveniles inhabit the estuary until they are approximately 4–6 years old, when they migrate to the ocean to feed on benthic invertebrates and fish (Kohlhorst et al. 1991).

NMFS proposed critical habitat for the Southern DPS of North American green sturgeon on September 8, 2008 and extended the comment period until December 22, 2008. The final rule is scheduled to be completed by NMFS by June 30, 2009. North American green sturgeon are found primarily in the Sacramento River and occasionally in the Feather River.

- **Sacramento Splittail**. Recent data indicate that Sacramento splittail occur in the Sacramento River as far upstream as RBDD (Sommer et al. 1997) and that some adults spend the summer in the mainstem Sacramento River rather than returning to the estuary (Baxter 1999). The distribution and extent of spawning and rearing along the mainstem Sacramento River is unknown.

  Sacramento splittail spawn over flooded terrestrial or aquatic vegetation (Moyle 2002, Wang 1986). Sacramento splittail spawn in early March and May in lower reaches of the Sacramento River (Moyle et al. 1995). Spawning has been observed to occur as early as January and to continue through July (Wang 1986). Larval splittail are commonly found in the shallow, vegetated areas where spawning occurs. Larvae eventually move into deeper, open water habitats as they grow and become juvenile. During late winter and spring, young-of-year juvenile splittail (i.e., those less than 1 year old) are found in floodplain habitat, sloughs, rivers, and Delta channels near spawning habitat. Juvenile splittail gradually move from shallow, nearshore habitats to the deeper, open water habitats of Suisun and San Pablo Bays (Wang 1986). In areas upstream of the Delta, juvenile splittail can be expected to be present in the flood basins (i.e., Sutter and Yolo Bypasses and the Sacramento River) when these areas are flooded during winter and spring.

  In 1999, after 4 years of candidate status, the splittail was listed as threatened under the ESA (64 FR 25, March 10, 1999). On September 22, 2003, USFWS withdrew splittail from the list of threatened species, indicating that habitat restoration actions implemented through the CALFED Bay-Delta Program and the Central Valley Project Improvement Act are likely to keep the splittail from becoming endangered in the foreseeable future (68 FR 55139, September 22, 2003). Sacramento splittail occur in the lower Sacramento River and could also occur in the NCC.

- **Hardhead**. Hardhead are widely distributed throughout the low- to mid-elevation streams in the main Sacramento–San Joaquin drainage, including the Sacramento River system. Undisturbed portions of larger streams at low to middle elevations are preferred by hardhead. Hardhead are able to withstand summer water temperatures above 20ºC; however, they will select lower temperatures when they are available. Hardhead are fairly intolerant of low-oxygenated waters, particularly at higher water temperatures. Pools with sand-gravel substrates and slow water velocities are the preferred habitat; adult fish inhabit the lower half of the water column, while the juvenile fish remain in the shallow water closer to the stream edges. Hardhead typically feed on small invertebrates and aquatic plants at the bottom of quiet water (Moyle 2002). Hardhead is a Federal species of concern and a state species of special concern. Hardhead occur in the lower Sacramento River and could also occur in the NCC.

Designated Essential Fish Habitat

The lower Sacramento River and NCC have also been designated as Essential Fish Habitat by the Pacific Fishery Management Council to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries. Essential Fish Habitat is defined as waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. Under the Pacific Coast Salmon Fisheries Management Plan (Pacific Fishery Management Council 2003), the NCC has been designated as Essential Fish Habitat for fall-run Chinook salmon, and the Sacramento River has been designated as Essential Fish Habitat for spring-, fall-, late fall-, and winter-run Chinook salmon ESU.

3.8 CULTURAL RESOURCES

3.8.1 REGULATORY SETTING

3.8.1.1 FEDERAL

The following Federal law related to cultural resources is relevant to this analysis and is described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

- National Historic Preservation Act of 1966, as Amended.

3.8.1.2 STATE

California Register of Historic Places

The CRHR includes resources that are listed in or formally determined eligible for listing in the National Register of Historic Places (NRHP) as well as some California State Landmarks and Points of Historical Interest (PRC Section 5024.1, 14 CCR Section 4850). Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (State CEQA Guidelines California Code of Regulations [CCR] Section 15064.5[a][2]). The eligibility criteria for listing in the CRHR are similar to those for NRHP listing but focus on the importance of the resources to California history and heritage. A cultural resource may be eligible for listing in the CRHR if it:

(1) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(2) is associated with the lives of persons important in our past;

(3) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

(4) has yielded, or may be likely to yield, information important in prehistory or history.

See 14 CCR Section 4852.

Numerous historical resources are located within or near to the Phase 4a Project area. For a listing of these sites, refer to **Tables 3.8-3** and **3.8-4**, below.

Native American Heritage Commission

The NAHC identifies and catalogs places of special religious or social significance to Native Americans and known graves and cemeteries of Native Americans on private lands, and performs other duties regarding the preservation and accessibility of sacred sites and burials and the disposition of Native American human remains and burial items. Section 7.2.2, "Native American Consultation Under CEQA," details correspondence between SAFCA and the NAHC.

3.8.1.3 REGIONAL AND LOCAL

There are no regional or local laws, regulations, policies, or ordinances related to cultural resources that are relevant to the Phase 4a Project.

3.8.2 ENVIRONMENTAL SETTING

This section describes the prehistoric, ethnographic, and historic setting for the Phase 4a Project area. Known cultural resources identified in previous studies are also described. Section 4.8, "Cultural Resources," describes the regulatory setting for the project, as well as identified resources that may be affected by the Phase 4a Project.

3.8.2.1 PREHISTORIC AND ETHNOGRAPHIC SETTING

The Phase 4a Project area is situated within the lands traditionally occupied by the Nisenan, or Southern Maidu. The language of the Nisenan, which includes several dialects, is classified within the Maiduan family of the Penutian linguistic stock (Kroeber 1925). The western boundary of Nisenan territory was the western bank of the Sacramento River and the area between present-day Sacramento and Marysville. In the Sacramento Valley, the tribelet, consisting of a primary village and a few satellite villages, served as the basic political unit (Moratto 1984). Valley Nisenan territory was divided into three tribelet areas, each populated with several large villages (Wilson and Towne 1978), generally located on low, natural rises along streams and rivers or on slopes with a southern exposure. One important village, Pusune, near Discovery Park, appears to have been recorded as CA-Sac-26. Other villages—Wollok, Leuchi, Wishuna, Totola, and Nawrean—were located east of the confluence of the Feather and Sacramento Rivers, near the northwestern portion of the Natomas Basin.

Euro-American contact with the Nisenan began with infrequent excursions by Spanish explorers and Hudson Bay Company trappers traveling through the Sacramento and San Joaquin Valleys in the early 1800s. In general, Nisenan lifeways remained stable for centuries until the early to middle decades of the 19th century. With the coming of Russian trappers and Spanish missionaries, cultural patterns began to be disrupted as social structures were stressed. An estimated 75% of the Valley Nisenan population died in the malaria epidemic of 1833. With the influx of Europeans during the Gold Rush era, the population was further reduced by disease and violent relations with the miners. However, today the Maidu are reinvesting in their traditional culture and, through newfound political, economic, and social influence, now constitute a growing and thriving native community in California.

3.8.2.2 HISTORIC SETTING

In what is now known as the Sacramento and Sutter County region, agriculture and ranching were the primary industries during the historic period. Regional ranching originated on the New Helvetia rancho in the early 1840s. The Gold Rush precipitated growth in agriculture and ranching, as ranchers and farmers realized handsome returns from supplying food and other goods to miners.

In the early part of the 20th century, the California Legislature established The Reclamation Board to exercise jurisdiction over reclamation districts and levee plans. That year, the state approved and began implementation of the SRFCP. The ambitious project included the construction of levees, weirs, and bypasses along the river to channel floodwaters away from population centers. Under the SRFCP, new reclamation districts were created,

including RD 1000, consisting of approximately 55,000 acres in the Natomas Basin. RD 1000 was largely controlled by the Natomas Company, which had access to more money than any individual landowner. The infrastructure of RD 1000 was completed in the 1920s. It includes levees, drainage canals, pumps, irrigation systems, agricultural fields, roads, and remnant natural features. The originally constructed features included levees and exterior drainage canals, an interior drainage canal system, nine pumping plants, a series of levee and interior roads, and unpaved rights-of-way between the farm fields.

RD 1000 has been previously evaluated as a Rural Historic Landscape District on behalf of USACE and was found eligible for NRHP and CRHR listing (Dames & Moore 1994a). Dames & Moore determined that RD 1000 appears to be eligible for listing as a Rural Historic Landscape District at the state level of significance for the period from 1911 to 1939 under Criterion A of the NRHP. The area of significance is reclamation and the historical context is flood damage reduction and reclamation of the Sacramento River basin within the SRFCP as an important part of the history of reclamation and flood damage reduction. The district retains much of its historic integrity, including location design, setting, materials, workmanship, feeling, and association. The contributing and noncontributing elements of the district were defined as part of this effort. Contributing elements were described as follows:

- **Drainage System:** East Levee, River Levee, NCC Levee; NEMDC; NCC; PGCC; Pumping Plant Nos. 1-A, 2, and 3; and the drainage ditches within the areas of contributing large scale land patterns.

- **Road System:** Garden Highway from Orchard Lane north to the NCC; East Levee/Natomas Road; Sankey Road; Riego Road; Elverta Road; Elkhorn Boulevard from Garden Highway to the western boundary of the Sacramento Airport; Del Paso Road from Powerline Road to its intersection with I-5; San Juan Road from Garden Highway to its intersection with I-5; Powerline Road; El Centro Road from north of I-80 to its intersection with Bayou Way; and the road rights-of-way within fields in the areas of contributing large scale land patterns.

- **Large-Scale Land Patterns:** Land area that is comprised of open fields formed by the intersection of the canals and roads in the area bounded as follows: west of the East Levee; west of Sorento Road; north of Del Paso Road between the East Levee and I-5, west of I-5 from its intersection with Del Paso Road to its intersection with I-80; north of I-80 from its intersection with I-5 to the Sacramento River Levee; east of the Sacramento River Levee; and south of the NCC Levee.

3.8.2.3 RECORDS SEARCH RESULTS

Records searches for recorded cultural resources and studies were conducted in 2006 and 2007. Most of the searches were conducted at the North Central Information Center (NCIC) of the California Historical Resources Information System, located at California State University, Sacramento. The NCIC records search covered portions of the project area in Sacramento County. Records searches were also conducted at the Northeast Information Center (NEIC), which maintains cultural resource records for Sutter County. The records searches included the levee ring around the Basin as well as all the lands inside the Natomas Basin so that changing project needs (e.g., the identification of alternate borrow sites) would be covered by the records searches.

The NEIC and NCIC reported that several cultural resource inventories have been conducted within the NLIP area. These are listed in **Tables 3.8-1** and **3.8-2**, respectively.

Numerous archaeological investigations have covered portions of the Natomas Basin. These have generally focused on areas closest to the rivers and levees. There has been very little archaeological inventory of lands more than 100 feet from the levee toes, and ground surface visibility has frequently been poor even in surveyed areas.

Table 3.8-1
Previous Cultural Resources Surveys Conducted in the NLIP Area in Sutter County

NEIC Report No.	Author(s)	Title	Date
1135	Bass, H. O.	*Department of Transportation Negative Archaeological Survey Report: State Route 99*	1983
7173	Cultural Resources Unlimited	*A Cultural Resources Study for Sutter Bay Project, Sutter County, California*	1992
7175	Cultural Resources Unlimited	*A Cultural Resources Study for Sutter Bay Project Highway 99/70 Interchange/Crossroad Improvements Sutter County, California*	1992
3469B	Dames & Moore	*Rural Historic Landscape Report for Reclamation District 1000 for the Cultural Resources Inventory and Evaluations for the American River Watershed Investigation, Sacramento and Sutter Counties, California*	1996
5777	Dames & Moore	*Historic Property Treatment Plan for Reclamation District 1000 Rural Historic Landscape District for the Cultural Resources Inventory and Evaluations for the American River Watershed Investigation, Sacramento and Sutter Counties, California*	1994
4197	Dames & Moore	*Archaeological Inventory Report, Natomas Locality, Cultural Resources Inventory and Evaluation, American River Watershed Investigation, El Dorado, Placer, Sacramento, and Sutter Counties, California*	1994
6892	Derr, E. H.	*American Basin Fish Screen and Habitat Improvement Project, Feasibility Study: Alternative 1C, 2C, 3, Sacramento and Sutter Counties, California*	2002
6944	Ebasco Environmental	*Cultural Resources Survey of the Sacramento Energy Project Sacramento County, California*	1992
5655	Egherman, R., and B. Hatoff	*Roseville Energy Facility Cultural Resources Appendix J-1 of Application for Certification*	2002
6945	Foster, J. W., and D. G. Foster	*An Archaeological Survey of the South Sutter Industrial Center Property, Sutter County, California*	1992
2987	Jensen, P.	*Historic Properties Survey Report for the Proposed Fifield Road at Pleasant Grove Creek Canal, Caltrans District 3, Sutter County, California*	1999
6893	Kaptain, N.	*Historic Property Survey Report for the State Route 99/Riego Road Interchange Project Sutter and Sacramento Counties*	2005
4658	Nelson, W. J., M. Carpenter, and K. L. Holanda	*Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project. Segment WPO4: Sacramento to Redding*	2000
3469A	Peak & Associates	*Historic American Engineering Record Reclamation District 1000 HAER No. CA-187*	1997
1141	Wilson, K. L.	*Sacramento River Bank Protection Unit 34 Cultural Resources Survey Final Report*	1978

Note: NEIC = Northeast Information Center
Source: Data provided by the Northeast Information Center in 2007 and compiled by EDAW in 2007

Table 3.8-2
Previous Cultural Resources Surveys Conducted in the NLIP Area in Sacramento County

NCIC Report No.	Author(s)	Title	Date
–	Banek, B.	*An Archaeological Reconnaissance of the South Natomas Area for the River Bank Holding Company, Sacramento County, California*	1982
4188	Billat, L. B.	*Nextel Communications Wireless Telecommunications Service Facility—Sacramento County*	2001
–	Bouey, P. D.	*Cultural Resources Inventory and Evaluation: Sacramento River Bank Protection (Unit 44) Project*	1989
4206, part 1	Bouey, P. D., and R. Herbert	*Intensive Cultural Resources Survey and National Register Evaluation: Sacramento Urban Area Flood Control Project*	1990
6519	Bouey, P., J. Berg, J., and C. A. Hunter	*Cultural Resources Test Excavations, Sacramento Urban Area Flood Control Project, Sacramento County, California*	1991
4457	California Department of Transportation	*Negative Historic Property Survey Report for the Proposed Installation of Automatic Vehicle Census Systems on Interstate 80 East of the West El Camino Over-Crossing and on Highway 51 East of the "E" Street Ramps, Sacramento County, California*	2003
4194	Chavez, D., L. H. Shoup, C. Desgrandchamp, and W. G. Slater	*Cultural Resources Evaluations for the North Natomas Community Plan Study Area, Sacramento, California*	1984
4193	County of Sacramento Department of Environmental Review and Assessment	*Draft Environmental Impact Report for Teal Bend Golf Course Use Permit*	1995
4190	CRS Archaeological Consulting and Research Services	*Sacramento Metro Airport Airmail Facility*—letter report	1988
3409	Cultural Resources Unlimited	*A Cultural Resources Study for Sacramento Area Flood Control Agency Borrow Sites Project Sacramento County*	1993
4463	Cultural Resources Unlimited	*A Cultural Resources Survey and Archival Review for the Arden-Garden Connector Project Sacramento County, California*	1992
3469B	Dames & Moore	*Rural Historic Landscape Report for Reclamation District 1000 for the Cultural Resources Inventory and Evaluations for the American River Watershed Investigation, Sacramento and Sutter Counties, California*	1996
4197	Dames & Moore	*Archaeological Inventory Report, Natomas Locality, Cultural Resources Inventory and Evaluation, American River Watershed Investigation, El Dorado, Placer, Sacramento, and Sutter Counties, California*	1994
5777	Dames & Moore	*Historic Property Treatment Plan for Reclamation District 1000 Rural Historic Landscape District for the Cultural Resources Inventory and Evaluations for the American River Watershed Investigation, Sacramento and Sutter Counties, California*	1996
4195	Derr, E.	*Cultural Resources Report: North Natomas Comprehensive Drainage Plan; Levee Improvements, Canal Widening and Additional Pumping Capacity*	1997
4466	Derr, E.	*Historic Resource Evaluation Report for the Arden-Garden Connector Project CT-03-30274.B1 Sacramento County, California*	1983

Table 3.8-2
Previous Cultural Resources Surveys Conducted in the NLIP Area in Sacramento County

NCIC Report No.	Author(s)	Title	Date
6892	Derr, E. H.	*American Basin Fish Screen and Habitat Improvement Project, Feasibility Study: Alternative 1C, 2C, 3, Sacramento and Sutter Counties, California*	2002
6944	Ebasco Environmental	*Cultural Resources Survey of the Sacramento Energy Project Sacramento County, California*	1992
5655	Egherman, R., and B. Hatoff	*Roseville Energy Facility Cultural Resources Appendix J-1 of Application for Certification*	2002
3489A	Far Western Anthropological Research Group	*Report on the First Phase of Archaeological Survey for the Proposed SMUD Gas Pipeline Between Winters and Sacramento Yolo and Sacramento Counties, California*	1993
3489B	Far Western Anthropological Research Group	*Addendum to the Report on the First Phase of Archaeological Survey for the Proposed SMUD Gas Pipeline Between Winters and Sacramento Yolo and Sacramento Counties, California*	1993
4206, part 2	Far Western Anthropological Research Group	*Intensive Cultural Resources Survey and National Register Evaluation: Sacramento Urban Area Flood Control Project*—letter report to SHPO	2005
–	Foster, J. W.	*A Cultural Resource Investigation of the Blue Oaks Skilled Nursing Facility Site Auburn, California*	1995
–	Glover, L. C., and P. D. Bouey	*Sacramento River Flood Control System Evaluation, Mid-Valley Area Cultural Resources Survey, Colusa, Sacramento, Sutter, Yolo, and Yuba Counties, California*	1990
4449	Herbert, R. F.	*Report on the National Register Eligibility of the Sacramento River Docks Building 37 McClellan Air Force Base, Sacramento, California*	1995
5803	Herbert, R. F.	*Report on the National Register Eligibility of the Sacramento River Dock Complex including Building 4635 (Dock) and Building 4637 (Warehouse) McClellan Air Force Base, Sacramento, California*	1995
4202	Humphreys, S., and L. McBride	*A Review of the Work Carried Out at Sacramento 16, the Bennett Mound*	1966
4178	Jones & Stokes	*Archaeological Survey Report for the North Natomas Drainage System's San Juan Pump Station*	1992
2956	Nadolski, J. A.	*Archaeological Survey Report for the Jibboom Street Bridge Project Sacramento, California*	2001
4435	Nadolski, J. A.	*Archaeological Investigations for the Sacramento-KOVR Diverse Lateral Overbuild in Sacramento and Yolo Counties*	2001
5810	PAR Environmental Services, Inc.	*Northgate Boulevard/Arden-Garden Intersection Cultural Resources Investigation, City of Sacramento, Sacramento County, California*	n.d.
4187	Pastron, A. G., and R. K. Brown	*Historical and Cultural Resource Assessment Proposed Telecommunications Facility Natomas Park, Site No. SA-750-01 2450 Del Paso Road, Sacramento County, California*	2001
173	Peak, A. S.	*American River Parkway An Archaeological Perspective*	1973
2764	Peak & Associates	*Historic Property Survey Report and Finding of No Adverse Effect for the Proposed American River Parkway Bike Trail Improvement Project, City and County of Sacramento, California*	2001

Table 3.8-2
Previous Cultural Resources Surveys Conducted in the NLIP Area in Sacramento County

NCIC Report No.	Author(s)	Title	Date
2765	Peak & Associates	*Archaeological Survey Report for the Proposed American River Parkway Bike Trail Improvement Project, City and County of Sacramento, California*	2001
3469A	Peak & Associates	*Historic American Engineering Record Reclamation District 1000 HAER No. CA-187*	1997
4173	Peak & Associates	*Report on the Archaeological Testing Within the Riverbend Classics Project Area, City of Sacramento, California*	1999
4181	Peak & Associates	*Cultural Resources Overview for the North Natomas Long-Term Planning Area, Sacramento County, California*	2000
6830	Peak & Associates	*Determination of Eligibility and Effect for the Natomas Panhandle Annexation Project Area Sacramento County, California*	2005
4201	Peak, A. S., H. L. Crew, and R. Gerry	*The 1971 Archaeological Salvage of the Bennett Mound, CA-SAC-16, Sacramento, CA*	1984
4456	Ritchie, M.	*Finding of Effect for the Proposed Safety Improvements and Rehabilitation of the Jibboom Street Bridge on Jibboom Street, Bridge No. 24C-022, Sacramento, Sacramento County, California*	2001
–	Snyder, J. W.	*Historic Property Survey Report (Positive) for the Jibboom Street Bridge Safety Improvements and Rehabilitation Project Jibboom Street, Sacramento County, California*	2003
4441	Sonoma State Anthropological Studies Center	*Archaeological Surface Reconnaissance and Backhoe Testing for the South Natomas Projects (P92-122, P92-160) Sacramento County, California*	1992
3408	Theodoratus Cultural Research	*Discovery Park Construction Site Examination for Archaeological Resources in the Area of CA-Sac-26*—letter report	1981
4458	True, D. L.	*8-Acre Survey at 1801 Garden Highway, Sacramento, California*	1983
1141	Wilson, K. L.	*Sacramento River Bank Protection Unit 34 Cultural Resources Survey Final Report*	1978

Note: NCIC = North Central Information Center; SHPO = State Historic Preservation Officer
Source: Data provided by the North Central Information Center and compiled by EDAW in 2007

Numerous cultural resources were identified in the course of previous survey efforts, including ranches and farms; agricultural, transportation, and reclamation features; and debris scatters, as well as prehistoric occupation and burial sites, frequently seen as mounds or the disturbed remnants of mounds.

The most comprehensive of these investigations were completed by Dames & Moore and Far Western Anthropological Research Group (Far Western). In 1994, Dames & Moore (1994b) conducted a broad survey in the Natomas Basin as part of the American River Watershed Investigation. A survey of selected parcels along the Sacramento River identified 17 primarily historic sites. During the same effort, Dames & Moore visited an additional 10 previously identified cultural resources to update site records for those locations. At the same time, Dames & Moore (1994a) prepared a draft historic property treatment plan that explored the history and elements of RD 1000. In 1996, Dames & Moore completed its evaluation of RD 1000, concluding that it appeared to be eligible for listing on the NRHP under Criterion A at a state level of significance as an example of reclamation and flood damage reduction in the Sacramento River basin during the period 1911–1939 (see Section 3.8.2.2). This report extensively documents both the contributing and noncontributing resources of RD 1000. Previously,

in 1990, Far Western had conducted surveys of areas along the same route surveyed by Dames & Moore in 1994 (Dames & Moore 1994b), as well as of additional areas (Bouey and Herbert 1990). Far Western (Bouey, Berg, and Hunter 1991) followed up with limited test excavations of two sites south of the Airport.

3.8.2.4 Previously Recorded Cultural Resource Sites in the Sutter County Portion of the Natomas Levee Improvement Program Area (As of September 2006)

This section describes cultural resources identified in previous studies on file at the NEIC. The known cultural resource sites in or near the Sutter County portion of the NLIP area are listed in **Table 3.8-3** and described below.

Table 3.8-3
Cultural Resources in the Sutter County Portion of the NLIP Area

Trinomial or Temporary Designation	P-No.	Historic/ Prehistoric	Description	Date Recorded	Quadrangle
CA-Sut-84H	51-000084	Historic	NCC/PGCC levees	1994	Pleasant Grove, Verona
	51-000096H	Historic	1950s-era ranch	2002	Taylor Monument

Notes: NCC = Natomas Cross Canal; PGCC = Pleasant Grove Creek Canal
Source: Data provided by the North Central Information Center and compiled by EDAW in 2007

- **CA-Sut-84H (P-51-000084)**. This trinomial includes both the NCC south levee and the PGCC west levee, the northernmost contributing resources to RD 1000. The NCC levee measures approximately 25 feet wide at the top and 75 feet wide at the base, and is 15 feet high. The top has been graded and graveled for vehicle traffic. The PGCC levee is smaller, measuring approximately 20 feet wide at the top, 60 feet wide at the base, and 10 feet high. There is also an associated retention basin, constructed of concrete and measuring 50 feet by 35 feet across and 15 feet deep. A concrete and steel pump foundation is located within the basin. Concrete footings running from a hole in the side of the basin to the top of the NCC levee indicate that a large pipe once connected the two features.

  Archaeologists reported that the one of the levees was raised and strengthened twice, after flooding during 1938–1939 and after flooding in RD 1001 during 1955. However, records fail to specify if the changes were made to the NCC or the PGCC. RD 1000 modified the NCC south levee and its adjacent canals in 1987 and SAFCA modified them in 1996. SAFCA completed cutoff wall construction in the western portion of the NCC south levee in fall 2007.

- **P-51-000096H**. Located on the Sacramento/Sutter County line and at the edge of a proposed borrow area, this resource consists of a historic ranch complex that includes two residences, four sheds or barns, and a trailer. The archaeological survey crew was not allowed on the property to record updates to the existing records.

3.8.2.5 Previously Recorded Cultural Resource Sites in the Sacramento County Portion of the Natomas Levee Improvement Program Area (as of May 2008)

This section describes cultural resource sites identified in previous studies on file at the NCIC in the Sacramento County portion of the project area (listed in **Table 3.8-4** and described below). The listing does not include several known sites in the southeastern portion of the Natomas Basin (located mainly along the NEMDC) because there are no proposed project elements in that part of the Natomas Basin.

- **CA-Sac-15/H**. This site, near the Sacramento River east levee south of I-5, consists of a prehistoric occupation midden mound with a concentration of debitage, flaked stone tools, shell artifacts, faunal remains, fire-cracked rock, and baked clay objects. The mound has been heavily affected by farming and ranching

Table 3.8-4
Cultural Resources in the Sacramento County Portion of the NLIP Area

Trinomial	P-No.	Historic/ Prehistoric	Description	Date Recorded	Quadrangle
CA-Sac-15/H	34-000042	Both	Occupation mound with historic debris	1934, 1990, 1993	Taylor Monument
CA-Sac-16/H	34-000043	Both	Occupation/burial mound with historic debris and foundations	1934, 1966, 1984, 1987, 1990, 1993	Taylor Monument
CA-Sac-17	34-000044	Prehistoric	May have been destroyed	1934, 1990	Taylor Monument
CA-Sac-18	34-000045	Prehistoric	Lithic scatter	1934, 1994	Taylor Monument
CA-Sac-160/H	34-000187	Both	Occupation/burial mound with historic farm	1947, 1949, 1994	Taylor Monument
CA-Sac-164	34-000191	Prehistoric	Occupation/burial site nominated to NRHP	1972, 1982, 1988, 1989, 1990, 1991, 2001–2007	Sacramento West
CA-Sac-430H	34-000457	Historic	West drainage canal	1991, 1993, 1997	Taylor Monument
CA-Sac-483/H	34-000510	Historic	Krumenacher Ranch complex and relocated prehistoric artifacts	1994	Rio Linda
CA-Sac-484H	34-000511	Historic	Historic debris	1994	Rio Linda
CA-Sac-485/H	34-000512	Both	Occupation/burial mound and historic home site	1994	Taylor Monument
CA-Sac-486H	34-000513	Historic	Historic home site	1994	Taylor Monument
CA-Sac-487H	34-000514	Historic	Historic debris and vegetation	1994	Taylor Monument
CA-Sac-488H	34-000515	Historic	Historic debris and vegetation	1994	Taylor Monument
CA-Sac-489H	34-000516	Historic	Historic debris and vegetation	1994	Taylor Monument
CA-Sac-490H	34-000517	Historic	Historic debris and vegetation	1994	Taylor Monument
CA-Sac-491H	34-000518	Historic	Historic debris and vegetation	1994	Taylor Monument
CA-Sac-492H	34-000519	Historic	Historic well, pipes and vegetation	1994	Taylor Monument
CA-Sac-493H	34-000520	Historic	Historic debris	1994	Taylor Monument
CA-Sac-494H	34-000521	Historic	Historic debris	1994	Taylor Monument
CA-Sac-517H	34-000641	Historic	Historic debris	2001	Rio Linda
CA-Sac-518H	34-000647	Historic	Concrete bridge abutment	2001	Rio Linda
CA-Sac-569H	34-000741	Historic	Paved road	1994, 1998	Taylor Monument, Rio Linda
CA-Sac-836H	34-001354	Historic	Farm Complex	2005	Taylor Monument
	34-000883	Historic	Paved road	1998	Taylor Monument
	34-000884	Historic	Paved road	1998	Taylor Monument
	34-000886	Historic	Paved road	1998	Rio Linda, Taylor Monument
	34-001552	Historic	House	2002	Taylor Monument
	34-001557	Historic	Pumping plant	2006	Taylor Monument
	34-001558	Historic	Pumping plant	2006	Taylor Monument
	34-001559	Historic	Pumping plant	2006	Taylor Monument

Note: NRHP = National Register of Historic Places

Source: Data provided by the North Central Information Center and compiled by EDAW in 2007 and 2008

activities. There is a ranch complex including a bunkhouse, garden, shed, chicken coop, water tower, garage, and driveway on the mound; historic debris on the site includes glass and broken ceramic fragments. A limited auger testing program was carried out west of the mound along the Sacramento River east levee and found no cultural materials along that transect (Bouey and Herbert 1990).

- **CA-Sac-16/H (P-34-000043)**. CA-Sac-16/H is in the Airport north bufferlands south of the Airport Operations Area. This site has been variously called the Bennett Mound, Mound Ranch, Willey Mound, and S-16. It includes the remains of a prehistoric occupation mound, possibly the largest in the Sacramento Valley, but has been leveled in stages by agricultural activities. The site location corresponds to the ethnographic village of Nawrean. What remains today consists of dark midden soils in plowed fields with fragments of human remains, shell, fire-cracked rock, baked clay objects, ground stone, faunal bone, flaked stone artifacts, and debitage. A few historic artifacts, such as brick and ceramic fragments, are also on this site. Today, two separate loci have been identified and recorded as CA-Sac-16/H; the larger, Locus 1, represents the approximate original location of the mound. Locus 2 is an area of redeposited soil taken from the mound in the past. There is also a historic-era component of the site from the remnants of a slaughterhouse and brick factory present before the 1930s. Historic artifacts noted include bricks, sawed mammal bone, a filled-in privy, bottles, ceramic and metal fragments, and glass.

  The site was originally described as very large, up to 7 acres in area, and 20 feet high. The earliest investigations were conducted in 1923 by Zallio, who excavated at the site a number of times and recovered projectile points, bone tools, Haliotis ornaments, and other artifacts (Bouey, Berg, and Hunter 1991). It was first formally recorded in 1934 by Heizer, who identified it as a large mound with stone artifacts and freshwater shell on the surface. Sacramento Junior College excavated pits and trenches up to 18 feet deep in 1936–1937. The main focus of this effort was on recovery of mortuary remains; however, considerable quantities of nonburial associated artifacts were also documented. More excavations were conducted by Sacramento State College in 1953 and by American River College between 1966 and 1971, and more artifacts and burials were salvaged by Peak, Crew, and Gerry (1984) when what was left of the mound was leveled. At that time, Peak, Crew, and Gerry estimated that as much as 13 feet of the mound might still be present below the plowed surface. As an interesting side note—and as an indication of the original CA-Sac-16/H mound's prominence—Peak, Crew, and Gerry mention that Heinrich Schliemann (an amateur archaeologist and later the discoverer of Troy) visited the site in 1851–1852.

  More recently, Bouey and Herbert (1990) completed a surface survey and excavated two auger holes at the toe of the levee that forms the western boundary of the site; they reported evidence of subsurface cultural deposits, including shell midden. Larger-scale excavations (Bouey, Berg, and Hunter 1991), dug within 100 feet of the levee toe and the ramp leading up to Garden Highway, confirmed that midden deposits still exist; however, agricultural activity seems to have destroyed any stratigraphic integrity the deposits might have had that close to the levee. It may be that Bouey and Herbert were looking strictly at redistributed mound soils.

  The summary of the research done by 1991 (Bouey, Berg, and Hunter 1991) agreed with the conclusions of Derr (1983) that the site was a large, permanent habitation locus occupied from the Upper Archaic (ca. 1000 B.C.) to just after the beginning of European contact. Derr found that the upper 20–60 centimeters of soil (in the areas he examined near the levee) consisted of redistributed midden with artifacts and isolated human remains. What appears to be missing from any of these analyses is an attempt to define the original mound or to find intact elements of the site that may have been located beyond the original mound. If there are intact subsurface deposits associated with CA-Sac-16/H, then the site may be eligible for listing on the CRHR or NRHP because of the potential information contained in those deposits.

  The earliest documentation, Heizer's site record form from 1934, does not give dimensions for the mound and does not contain specific enough information to provide for relocation of the original boundaries of the mound. It is presumed that the dispersed midden from the mound now covers a larger surface area than the

mound used to occupy. However, it is unclear exactly how large an area that is because various investigations have reported Locus 1 (the larger site deposit) as measuring 110 meters by 185 meters (Bouey and Herbert 1990), 250 meters by 250 meters (Kauffman and Kauffman 1987), and 450 meters by 850 meters (Dames & Moore 1993). The Dames & Moore site record form appears to be the only one that maps out the secondary Locus 2 area, northeast of the main deposit and east of a drainage ditch (as of 1993).

- **CA-Sac-17 (P-34-000044)**. This is the location of a mound site reported by Heizer in 1934 west of Fisherman's Lake; however, none of the mound remains. In 1990, Bouey and Herbert attempted to locate any cultural remains but could not find any evidence of cultural deposits on the surface or in auger holes.

- **CA-Sac-18 (P-34-000045)**. This site, landward of the Sacramento River east levee located north of San Juan Road, consists of a sparse scatter of basalt debitage, one cryptocrystalline biface fragment, a polished stone, and possible fire-cracked rock. It was originally described by Heizer as a mound 30 yards in diameter and 5 feet high; however, Heizer may have misinterpreted a natural rise in the landscape as a mound. CA-Sac-18 appears to be lacking the intensive cultural deposits that are the hallmark other nearby known mound sites (Dames & Moore 1994b).

- **CA-Sac-160/H (P-34-000187)**. This is a multicomponent site near the Sacramento River east levee located north of San Juan Road. It includes a prehistoric occupation mound with a farm complex situated on top. Excavations in the 1940s removed numerous burials and artifacts, including ground stone, flaked stone tools, shell beads and ornaments, fire-cracked rock, baked clay objects, stone beads, faunal remains, bone awls, bird bone tubes and whistles, obsidian drills, quartz crystals, charmstones, and historic glass trade beads, as well as historic debris related to farming and occupation of the top of the mound.

- **CA-Sac-164 (P-34-000191)**. CA-Sac-164 is a very large, deeply stratified prehistoric occupation and burial mound near Sand Cove Park on the Sacramento River that has been explored a number of times using archaeological techniques; however, in spite of these efforts, the true boundaries of the site remain unknown. The site includes shell midden with abundant cultural materials including fire-cracked rock, flaked and ground stone tools, charmstones, polished bone implements, debitage, quartz crystals, bone and shell beads, baked clay objects, and plentiful faunal remains. Large fire-cracked rock features and hearths have also been noted. Because of its significant scientific value and the integrity, CA-Sac-164 was nominated for NRHP listing in 2001.

  The site was first recorded in 1951, after a newspaper article reported that human remains and stone tools were eroding out of the cutbank and into the Sacramento River. Observers who walked along the edge of the cutbank in summer and fall when the river was at its lowest noted that site deposits, interspersed with flood-deposited silt, extended at least 4 meters below the current-day surface. Excavations in the 1970s, 1980s, and 1990s confirmed the depth of intact and resource-bearing cultural strata at the site. Work on the landside of the Sacramento River levee indicated that downward-trending cultural strata might be found there as well, beginning well over a meter below the ground surface.

  Annual river height fluctuation, wave action resulting from boat wakes, and looting combined to cause continual erosion and collapse of the cutbank. This resulted in artifacts and remains falling onto the beach area below, where they either washed into the river or collected by the public. To address this issue, a site stabilization program was implemented in 2005 that included placing dirt and plantings over the cutbank and creating a wave break near the river's edge of the site.

- **CA-Sac-430H (P-34-000457)**. This feature is the West Drainage Canal, a relatively unmodified canal that originates at Fisherman's Lake and flows southeast to the NEMDC.

- **CA-Sac-483H (P-34-000510)**. This site consists of two loci containing a historic ranch complex with a small prehistoric component. The ranch complex (Locus 1) includes barns, sheds, shops and residences, farm equipment, and glass, ceramic, and metal debris. The prehistoric component consists of a relocated collection

of mortars, pestles, and a mano located in a flower garden. The property owner reported that the prehistoric artifacts may have been collected from an eroding knoll near Locus 2.

- **CA-Sac-484H (P-34-000511)**. This site comprises a light scatter of historic debris located along the north side of a small knoll. The debris is associated with a house that was built for a security guard; the house has been demolished. The debris includes fragments of water pipe, concrete, milled lumber, metal, and glass.

- **CA-Sac-485/H (P-34-000512)**. This site, between the Sacramento River's east levee and the proposed location of the relocated Elkhorn Canal, was once a prehistoric occupation and burial mound that has been leveled by agricultural activities and was documented by Dames & Moore in 1994. The remains of a historic-era homestead, consisting mainly of ornamental vegetation, driveway, and historic debris, were noted on top of the prehistoric site. Dames & Moore archaeologists noted that the prehistoric component was large, measuring 220 meters by 160 meters with two depositional loci—a larger area near Garden Highway and a smaller deposit to the east. Prehistoric artifacts noted at the time included obsidian and basalt flakes and tools, shell beads and ornaments, faunal remains, ground-stone fragments, charmstones, baked clay, imported exotic tool stone, and shell.

  In August 2007, archaeologists undertook a limited shovel testing program at CA-Sac-485/H to determine whether there was an undisturbed subsurface deposit that could be affected by the proposed canal construction near this site. The 2007 investigation began with a survey of the site area where a sparse assortment of artifacts was visible; because no concentrations of artifacts were identified on the surface, the Dames & Moore archaeological site map was used to guide the placement of shovel test pits (STPs). Brian Padilla, of the El Dorado Miwok, was present while the STPs were excavated.

  During the course of excavations, archaeologists uncovered artifacts including obsidian and basalt flakes; clamshell disk beads; burned earth; faunal remains, including freshwater mussel shell; and fire-cracked rock. Human remains were uncovered in three of the STPs; the Sacramento County coroner and Native American Heritage Commission were contacted, excavation of each of those three STPs was halted immediately, and the remains were reburied where they were found. None appeared to be part of a larger, intact burial and all were found in the upper 50 centimeters of soil. (SAFCA 2007.)

  In general, site soils consisted of dry compact silts with a small sand and clay content; excavation and screening were difficult because the soils were very dry and hard. If artifacts were recovered, excavation generally proceeded to 100 centimeters below surface (cmbs); where no artifacts were found, excavations terminated around 80 cmbs. A deeply buried midden layer was identified in each of the four STPs (Numbers 4, 6, 21, and 24) closest to the levee, beginning anywhere from 55 cmbs to 80 cmbs. Excavation halted at approximately 100 cmbs in these STPs without reaching the bottom of the midden deposit; a split-spoon probe was used in STP No. 21 to find the bottom of the deposit, which was reached at approximately 160 cmbs. Although the northern and southern edges of the midden deposit were not located, the STP program was halted on the assumption that a more formal testing program, using a combination of test units and additional STPs, would be implemented as part of more detailed design of the proposed project.

- **CA-Sac-486H (P-34-000513)**. This site near the Sacramento River east levee located south of the North Drainage Canal consists of the remains of a historic-era homestead. The structure that once stood on the site has been demolished. Remnant landscape plantings and debris consisting of ceramic fragments, bottle glass, ceramic, bricks, mortar, and metal fragments were noted. The structures were visible in a 1937 aerial photograph and were depicted on the 1967 U.S. Geological Survey topographic quadrangle map. The archaeologists who identified the site in 1994 noted that some of the trees appeared to be less than 30 years old, although a fragment of amethyst glass (generally associated with the turn of the century) was noted.

- **CA-Sac-487H (P-34-000514)**. Like CA-Sac-486H, this location near the Sacramento River east levee located south of the North Drainage Canal includes historic debris, such as concrete fragments, milled lumber, metal

fence posts, wire, farm machinery parts, clear and green glass, window glass, and ornamental plantings, all of which indicate that a structure existed at the site at one point but has since been demolished. Also like the previous site, a structure was visible in this location in a 1937 aerial photograph; several structures were indicated on the 1950 and 1975 topographic quadrangle maps for the area.

- **CA-Sac-488H (P-34-000515)**. This is another site near the Sacramento River east levee located south of the North Drainage Canal where a structure appeared on a 1937 aerial photograph and 1950 topographic quadrangle map, although no building is on the site today. Historic debris, ornamental vegetation, and a fence line remain. The debris included various concrete fragments, corrugated metal, wire, culvert pipe, and a large section of iron pipe.

- **CA-Sac-489H (P-34-000516)**. This is another site near the Sacramento River east levee located south of the North Drainage Canal where a structure appeared on a 1937 aerial photograph and 1950 topographic quadrangle map, although no building is on the site today. The associated debris includes a fenced-off well head, concrete fragments, lumber, window glass, wooden posts, galvanized pipes, old fencing overgrown by an oak tree, an enamelware bucket, tires, ceramic fragments, bottle glass, and a metal bucket. Ornamental landscaping plants were also noted.

- **CA-Sac-490H (P-34-000517)**. This site, near the south end of Powerline Road, had three structures that appeared on a 1937 aerial photograph and 1950 topographic quadrangle map, although no building is on the site today. The historic debris is similar to the debris found at sites CA-Sac-486H through CA-Sac-489H, including concrete, brick, iron piping, a fence post, bottle glass, ceramic fragments, and galvanized metal pipe, as well as remnant ornamental vegetation.

- **CA-Sac-491H (P-34-000518)**. This site, near the south end of Powerline Road, was likely used in association with four structures that appeared on the 1950 topographic quadrangle map. The 1937 aerial photograph associated with other sites listed here includes coverage of this property; however, only trees are clearly visible in the photograph. The artifacts consist of a sparse scatter, including a wood fence, concrete fragments, bricks, and metal fence posts. Ornamental vegetation was noted nearby.

- **CA-Sac-492H (P-34-000519)**. This site, near the south end of Powerline Road, consists of a concrete-capped well, associated water pipes, and remnant ornamental vegetation and fruit trees that were likely associated with a structure visible on the 1950 topographic quadrangle map of the area. A cluster of trees is visible in the 1937 aerial photograph, but no structures are clearly visible. The site is now used to keep honeybees.

- **CA-Sac-493H (P-34-000520)**. The 1950 topographic quadrangle map and 1937 aerial photograph of the region indicate that there was once a large barn and associated structure at this location near the Sacramento River east levee located south of I-5. Today, scattered historic debris—clear and colored glass, porcelain and earthenware, iron pipe, bone fragments, brick, and a white ceramic insulator—is all that remains.

- **CA-Sac-494H (P-34-000521)**. This is another site, west of Fisherman's Lake, where a structure appeared on a 1937 aerial photograph and 1950 topographic quadrangle map, although no building is present today. Associated debris documented by an archaeological team in 1994 included concrete and brick fragments, an iron water pipe, white ceramic insulators, and clear bottle glass. In addition, the archaeologists noted abundant modern debris on the site, making it difficult to distinguish between modern and historic artifacts.

- **CA-Sac-517H (P-34-000641)**. This is an historic trash scatter exposed on both the east and west sides of the NEMDC. Components include milk glass fragments, electric insulator fragments, and candy dish fragments.

- **CA-Sac-518H (P-34-000647)**. This is a concrete bridge abutment located just north of the Silver Eagle Road crossing of the NEMDC. The abutments have cobblestone facing over concrete.

- **CA-Sac-569H (P-34-000741)**. This is a segment of Del Paso Road, a two-lane paved road that extends from Powerline Road to East Levee Road. Del Paso Road likely originated as a dirt farm road and has subsequently been modernized, paved, and widened.

- **CA-Sac-836H (P-34-001354)**. This resource, located near the Sacramento River east levee located south of West Elverta Road, consists of the Yuki Pear Farm complex with a relocated ranch house, a 1930s barn, a 1940s bunkhouse/workshop/garage, a 1960s bunkhouse, a 1974 residence, and a mid-1970s barn. A 1903 map shows the Farmers and Merchants Bank as the property owners; no improvements were listed on any maps in the next several years. By 1939, the property belonged to the California Trust and Savings Band; it later was owned by Thomas and Nancy McDermott. The McDermotts sold the land to A. R. Galloway, who never lived on the property but rented it to Masami Yuki as a tenant farmer. The Yuki family originally grew asparagus at the farm but switched to tomatoes in 1968 and planted the pear orchard in 1969.

- **P-34-000883H**. This is El Centro Road, a north-south, paved two-lane road that dates to the period before 1921. It runs between I-80 to the south and Bayou Road to the north. It is likely that this was originally a dirt farm road that has been paved a number of times.

- **P-34-000884H**. This is San Juan Road, an east-west, paved two-lane road that dates to the period before 1921. It runs between I-80 and the Sacramento River east levee. It is likely that this was originally a dirt farm road that has been paved a number of times in the past.

- **P-34-000886H**. This is Elkhorn Boulevard, an east-west, paved two-lane road that dates to the period before 1921. It runs between the Sacramento River east levee and the NEMDC. It is likely that this was originally a dirt farm road that has been paved a number of times in the past.

- **P-34-001552H**. This site includes a 1950s-era house and shed, surrounded by a chain link fence. The house is located along Garden Highway, near the northern Sacramento County line.

- **P-34-001557H**. This structure is a concrete valve tank associated with the Prichard Lake Pumping Plant at the end of the North Drainage Canal.

- **P-34-001558H**. This resource consists of a concrete-lined sump 50 feet long and 25 feet wide associated with the Prichard Lake Pumping Plant.

- **P-34-001559H**. This is a concrete pad near the P-34-001558H sump. It is also associated with the Prichard Lake Pumping Plant.

3.9 PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants that are 10,000 years old or older.

3.9.1 REGULATORY SETTING

3.9.1.1 FEDERAL

There are no Federal laws, regulations, policies, or ordinances related to paleontological resources that are relevant to the Phase 4a Project.

3.9.1.2 STATE

There are no state laws, regulations, policies, or ordinances related to paleontological resources that are relevant to the Phase 4a Project. No state or local agencies have specific jurisdiction over paleontological resources on private lands. No state agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earthmoving on state or private land at a project site.

3.9.1.3 REGIONAL AND LOCAL

There are no regional or local laws, regulations, policies, or ordinances related to paleontological resources that are relevant to the Phase 4a Project.

Society of Vertebrate Paleontology Guidelines

The Society of Vertebrate Paleontology (1995, 1996), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. Most practicing professional paleontologists in the nation adhere to the Society of Vertebrate Paleontology assessment, mitigation, and monitoring requirements, as specifically spelled out in its standard guidelines.

3.9.2 ENVIRONMENTAL SETTING

3.9.2.1 PALEONTOLOGICAL RESOURCE INVENTORY

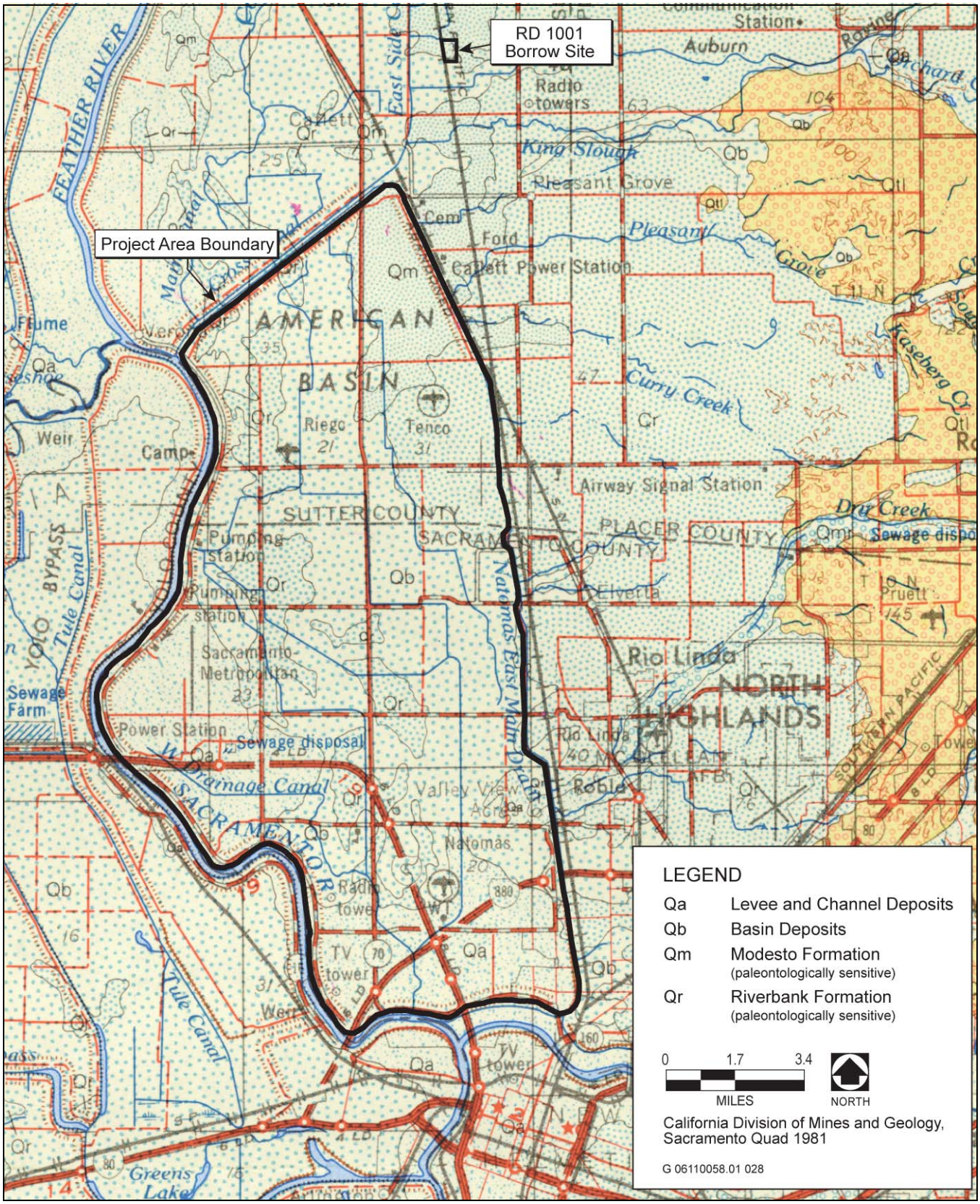
Stratigraphic Inventory

Geologic maps and reports covering the geology of the project site and surrounding study area were reviewed to determine the exposed rock units and to delineate their respective aerial distributions in the project area. Regional and local surficial geologic mapping and correlation of the various geologic units in the vicinity of the project area has been provided at a scale of 1:62,500 by Helley and Harwood (1985); and 1:250,000 by Wagner et al. (1987). The rock formations of the project area are shown in **Plate 3-4** and described below.

- **Holocene Alluvium.** Sediments adjacent to the Sacramento and American Rivers are composed of Recent (Holocene) alluvial floodplain deposits (Wagner et al. 1987). In general, these deposits consist primarily of unconsolidated sand and silt. Holocene alluvial deposits overlay an older alluvial fan system composed of Pleistocene-age sediments. Construction activities that would occur within alluvial floodplain or basin deposits would be located within Holocene sediments. By definition, sediments associated with Holocene-age alluvium are too young to contain paleontologically sensitive resources.

- **Riverbank and Modesto Formations.** Piper et al. (1939) were the first to publish detailed geologic maps in the southern Sacramento and northern San Joaquin Valley areas, and they designated the older alluvial Pleistocene deposits as the Victor Formation. However, Davis and Hall (1959) proposed a subdivision of the Victor Formation into the Turlock Lake (oldest), Riverbank (middle), and Modesto (youngest) formations.

- Marchand and Allwardt (1981) proposed that the name Victor Formation be abandoned and that the Turlock Lake, Riverbank, and Modesto Formations be adopted as formal nomenclature for Quaternary deposits in the Sacramento and San Joaquin Valleys. Most researchers have followed this recommendation.



Adapted by EDAW in 2007 based on Wagner et al. 1987

Rock Formations in the Project Area **Plate 3-4**

In the Sacramento Valley, the Modesto Formation consists of alluvial terraces, some alluvial fans, and some abandoned channel ridges of the Sacramento River. The Modesto Formation can be divided into upper and lower members. The upper member consists primarily of unconsolidated, unweathered, coarse sand and sandy silt. The age of this member has been placed at approximately 12,000–26,000 years Before Present (B.P.).

(Atwater cited in Helley and Harwood 1985). The lower member of the Modesto Formation consists of consolidated, slightly weathered, well-sorted silt and fine sand, silty sand, and sandy silt. Age estimates for the lower member range from 29,000 to 42,000 years B.P. (Marchand and Allwardt 1981, cited in Helley and Harwood 1985).

Sediments in the Riverbank Formation consist of weathered reddish gravel, sand, and silt that form alluvial terraces and fans. In the Sacramento Valley, this formation tends toward soil-profile developments that are more easily distinguishable from the Modesto Formation (Helley and Harwood 1985). The Riverbank Formation is Pleistocene in age (Wagner et al. 1987), but it is considerably older than the Modesto Formation; estimates place the age of the Riverbank between 130,000 and 450,000 years B.P. (Helley and Harwood 1985). The Riverbank Formation forms alluvial fans and terraces of the Sacramento River. The Riverbank's fans and terraces are higher in elevation and generally have a more striking topography than those formed by the Modesto Formation.

Field Survey

A field reconnaissance was conducted by EDAW in July and August 2006, on April 26–28, 2007, and in February 2008 to document the presence of any previously unrecorded fossil sites and of strata that might contain fossil remains. The surface topography was nearly flat, and no exposed road cuts or other escarpments were noted where fossils in the Riverbank or Modesto Formation could be exposed. No fossils were observed in the NLIP, including the Phase 4a Project area.

3.9.2.2 PALEONTOLOGICAL RESOURCE ASSESSMENT

Holocene Alluvium

By definition, to be considered a fossil, an object must be more than 10,000 years old; therefore, project-related activities in this rock formation would have no effect on paleontological resources.

Modesto and Riverbank Formations

Surveys of late Cenozoic land mammal fossils in northern California have been provided by Hay (1927), Lundelius et al. (1983), Jefferson (1991a, 1991b), Savage (1951), and Stirton (1939). On the basis of his survey of vertebrate fauna from the nonmarine late Cenozoic deposits of the San Francisco Bay region, Savage (1951) concluded that two major divisions of Pleistocene-age fossils could be recognized: the Irvingtonian (older Pleistocene fauna) and the Rancholabrean (younger Pleistocene and Holocene fauna). These two divisions of Quaternary Cenozoic vertebrate fossils are widely recognized today in the field of paleontology. The age of the later Pleistocene, Rancholabrean fauna was based on the presence of bison and on the presence of many mammalian species that are inhabitants of the same area today. In addition to bison, larger land mammals identified as part of the Rancholabrean fauna include mammoths, mastodons, camels, horses, and ground sloths.

The closest vertebrate fossils to the project area were recovered from Arco Arena (Hilton et al. 2000), approximately 12 miles to the south, in sediments of the Riverbank Formation. Fossils recovered from this site include Harlan's ground sloth, bison, coyote, horse, camel, squirrel, antelope, mammoth, and several plant specimens.

University of California Museum of Paleontology (UCMP) locality V-6426, approximately 16 miles north of the project area near Gilsizer Slough, is located in sediments referable to the Modesto Formation. This site yielded a vertebra from a Pleistocene (Irvingtonian) age Proboscidea, an order that includes mammoths, mastodons, and

elephants. UCMP locality V-3915 on Oswald Road, approximately 18 miles northwest of the project site, yielded remains from a Pleistocene-age bison in sediments referable to the Modesto Formation. UCMP locality V-4043 in the Sutter Buttes, approximately 22 miles north of the levee, yielded remains from a Pleistocene-age horse in sediments referable to the Riverbank Formation.

Fossil specimens from the Modesto Formation have been reported by Marchand and Allwardt (1981) near the type locality in the city of Modesto. These authors also reported fossil specimens from the Riverbank Formation near its type locality in the city of Riverbank. Other locations are also known throughout the northern and Central Valley (UCMP 2006). For example, there are several sites approximately 10–20 miles away in Yolo County, near the cities of Davis and Woodland, which have yielded Rancholabrean-age rodents, snakes, horses, antelope, Harlan's ground sloth, mammoth, and saber-toothed tiger from sediments referable to both the Modesto and Riverbank Formations (Hay 1927, UCMP 2006).

There are at least seven additional recorded Rancholabrean-age vertebrate fossils sites from the Riverbank Formation in the city of Sacramento, southeast of the levee (UCMP 2006, Kolber 2004). These sites have yielded remains of mammoth, bison, horse, and several types of reptiles.

Results of a paleontological records search at the UCMP indicated no fossil remains within the project area, and no fossils were observed during a cursory field visit. However, the occurrence of Pleistocene vertebrate fossil remains in sediments referable to the Modesto and Riverbank Formations from Sacramento; Yuba City and the town of Sutter in Sutter County; as well as Davis, Woodland, and numerous other areas throughout the northern and central valleys, suggests there is a potential for uncovering additional similar fossil remains during construction-related earthmoving activities within the Phase 4a Project area.

3.10 TRANSPORTATION AND CIRCULATION

3.10.1 REGULATORY SETTING

3.10.1.1 FEDERAL

There are no Federal laws, regulations, policies, or ordinances related to transportation and circulation that are relevant to the Phase 4a Project.

3.10.1.1 STATE

Federal highway standards are implemented in California by the California Department of Transportation (Caltrans), which is responsible for planning, designing, constructing, operating, and maintaining all state-owned roadways in the Natomas Basin. Caltrans enforces various policies and regulations related to the modification of, or encroachment on, state-owned roadways. State-owned roadways within the Phase 4a Project area consist of SR 99/70, I-5 and I-80.

3.10.1.1 REGIONAL AND LOCAL

The public works departments of Sutter County, Sacramento County, and the City of Sacramento are responsible for planning, designing, constructing, operating, and maintaining all the roadways in the Natomas Basin that are owned by these respective jurisdictions. Encroachments in county or city road rights-of-way are subject to encroachment permits and the provision of temporary traffic control systems as required by the respective public works departments. With the exception of SR 99/70, I-5, and I-80, roadways within the Natomas Basin are under the jurisdiction of their respective county.

3.10.2 ENVIRONMENTAL SETTING

The roadways in the Phase 4a Project area and surrounding area are described in **Table 3.10-1** and shown in **Plate 2-7**.

All the roadways north of I-5 in the vicinity of the levee improvement sites and borrow areas are rural two-lane roads with low traffic volumes. South and west of I-5, nearer to and within the city of Sacramento, the roads are also two-lane roadways but have higher traffic volumes. Data on traffic volumes are not available for all of the roadways listed in **Table 3.10-1**. The use of some of these roadways can also be characterized in terms of level of service (LOS). LOS is a qualitative description of operation of a roadway segment based on delay and maneuverability. LOS is often calculated by counties' agencies that manage congestion. LOS can range from "A," representing free-flow conditions, to "F," representing gridlock (**Table 3.10-2**).

Table 3.10-1
Project Area Roadway Network

Roadways	Description
SR 99/70	SR 99/70 is a primary regional transportation corridor within Sutter County and supports north-south regional travel. SR 99 extends from I-5 in the project area north through Sacramento and Sutter Counties to the Butte County line. The roadway has two to four lanes over its length and provides regional access to the Sacramento metropolitan area in the south and the cities of Gridley and Chico in the north. SR 70 serves as the north-south regional travel corridor providing connection to Butte County to the north and Sacramento County to the south. SR 70 is a two-lane roadway that extends from the Yuba County line in the north, south to a junction with SR 99. At the junction with SR 99, SR 70 continues south as SR 99/70 to the Sacramento County line. The roadway provides regional access to the cities of Sacramento and Marysville.
I-5	I-5 is a primary regional transportation corridor within Sacramento County, providing connection between the city and county of Sacramento and Yolo County. It provides primary access to the Airport just west of Powerline Road.
I-80	I-80 is a primary regional transportation corridor within the city and county of Sacramento, intersecting I-5 just south of San Juan Road.
Garden Highway	Garden Highway is a north/south two-lane roadway that extends north from the Sacramento city limits along the Sacramento River to Yuba City. Garden Highway serves as an alternative north/south route to SR 99. It provides primary access for residences along the waterside of the Sacramento River east levee. Bicyclists also use Garden Highway for recreation and commuting.
Howsley Road	Howsley Road is an east/west two-lane roadway that intersects SR 99/70 at the NCC. It crosses the PGCC and connects with Pleasant Grove Road just west of the Sutter/Placer County line.
Natomas Road	Natomas Road is a north/south two-lane roadway on top of the west levee of the PGCC in Sutter County. It extends south from Howsley Road and becomes East Levee Road between Riego Road and West Elverta Road.
Pacific Avenue	Pacific Avenue is a north/south two-lane roadway that extends from Striplin Road to Howsley Road in Sutter County.
Powerline Road	Powerline Road is a north/south two-lane roadway that parallels SR 99/70, providing an alternate north/south route to Garden Highway and SR 99/70 from Sankey Road in Sutter County to Garden Highway in Sacramento County.
Riego Road	Riego Road is an east/west two-lane roadway extending from Garden Highway in Sutter County to Base Line Road in Placer County.
Sankey Road	Sankey Road is an east/west two-lane roadway in Sutter County that extends from Garden Highway east across SR 99/70.
Striplin Road	Striplin Road is an east/west two-lane roadway that extends from Garwood Road to Pacific Avenue in Sutter County.

Table 3.10-1
Project Area Roadway Network

Roadways	Description
West Elverta Road	West Elverta Road is an east/west two-lane roadway in Sacramento County at the north/south midpoint of the Natomas Basin that extends from Garden Highway east across SR 99/70.
Elkhorn Boulevard	Elkhorn Boulevard is an east/west two-lane roadway in Sacramento County between Powerline Road and SR 99/70 and extending into the city of Sacramento to the East Levee Road on the NEMDC.
West Elkhorn Boulevard	West Elkhorn Boulevard is an east/west two-lane roadway in Sacramento County that extends from Garden Highway to west of the Airport.
Del Paso Road	Del Paso Road is an east/west two- to four-lane roadway that extends eastward across the Basin from Powerline Road in Sacramento County across I-5 to the NEMDC in the city of Sacramento.
Radio Road	Radio Road is an east/west two-lane roadway that connects the Garden Highway to El Centro Road in Sacramento County.
San Juan Road	San Juan Road is an east/west two-lane roadway that connects the Garden Highway in Sacramento County to I-5 and the city of Sacramento.
El Centro Road	El Centro Road is a north/south two- to four-lane roadway in Sacramento County and the city of Sacramento that extends south from Del Paso Road to West El Camino Avenue.
West El Camino Avenue	West El Camino Avenue is an east/west four-lane roadway in the city of Sacramento that connects I-5 with El Centro Road. Continuing to the east, it intersects with Northgate Boulevard and continues to the east to cross the NEMDC.
Northgate Boulevard	Northgate Boulevard is a north/south four-lane road in the city of Sacramento connecting the Garden Highway in South Natomas to Del Paso Road in North Natomas.

Notes: I-5 = Interstate 5; I-80 = Interstate 80; NCC = Natomas Cross Canal; NEMDC = Natomas East Main Drainage Canal; PGCC = Pleasant Grove Creek Canal; SR = State Route

Source: Data compiled by EDAW in 2008 and 2009

Table 3.10-2
Level of Service Descriptions

LOS	Description
A	Free-flow travel with an excellent level of comfort and convenience and the freedom to maneuver.
B	Stable operating conditions, but the presence of other road users causes a noticeable, though slight, reduction in comfort, convenience, and maneuvering freedom.
C	Stable operating conditions, but the operation of individual users is substantially affected by the interaction with others in the traffic stream.
D	High-density but stable flow.
E	Operating conditions at or near capacity. Speeds are reduced to a low but relatively uniform value. Freedom to maneuver is difficult with users experiencing frustration and poor comfort and convenience. Unstable operation is frequent, and minor disturbances in traffic flow can cause breakdown conditions. Severe restriction in speed and freedom to maneuver, with poor levels of comfort and convenience.
F	Breakdown conditions. These conditions exist wherever the volume of traffic exceeds the capacity of the roadway. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion.

Source: City of Sacramento 2005

The *Sutter County General Plan Background Report* (Sutter County 1996) contains the most recent traffic count and LOS data for roadways in the northern part of the Natomas Basin. In the general plan background report, Garden Highway between Sankey Road and Riego Road was rated LOS A, with an average daily traffic (ADT) volume of 340. SR 99/70 was rated LOS C with an ADT volume of 22,000. Riego Road was rated at LOS A with an ADT volume of 540, and Sankey Road was rated LOS A with an ADT volume of 440. LOS data were not available for the Natomas Basin portion of unincorporated Sacramento County. However, given that similar land uses exist south of the Sutter County line and west of SR 99/70, traffic volumes and conditions are expected to be similar.

The most recent annual traffic counts performed for select roadways by Sacramento County Department of Transportation (August 17 and 18, 2006) show the average daily traffic volume on Powerline Road north of Elverta Road to be between 250 and 270 in each direction (Sacramento County 2007a). Data on other Sacramento County roads in the Phase 4a Project area are not available.

City of Sacramento traffic count data (City of Sacramento 2005) indicate an average one-way ADT of 381 on San Juan Road between El Centro Road and Garden Highway (April 2003 data). The *City of Sacramento General Plan Background Report* (City of Sacramento 2005) and the July 2006 draft environmental impact report for the Greenbriar Development Project (City of Sacramento and Sacramento Local Agency Formation Commission [LAFCo] 2006) contain LOS data for roadways for the portions of the southern Natomas Basin that are within Sacramento's city limits and sphere of influence. The City of Sacramento regards LOS C as unacceptable. Elkhorn Boulevard west of the SR 99/70 interchange operates at LOS A and east of SR 99/70 operates at LOS D. San Juan Road, West El Camino Avenue, and Garden Highway west of I-5 are shown as operating at LOS A through LOS C, depending on time of day. East of Truxel Road (which becomes Natomas Boulevard), West El Camino Avenue operates at LOS E and San Juan Road operates at LOS D. Northgate Boulevard in South Natomas operates at LOS A through C. North Natomas segments located north of North Market Boulevard operate at LOS E. Segments of I-80, I-5, and SR 99/70 operate at LOS D or below during commute hours, with heavy traffic occurring during the morning hours in the direction of job centers (e.g., downtown Sacramento) and in the afternoon/evening hours in the opposite direction. According to the *Draft Environmental Impact Report for the Sacramento International Airport Master Plan* (Sacramento County 2007b), I-5 between Airport Boulevard in Sacramento County and County Road 22 on the Yolo County side of the Sacramento River operates at LOS B or C in both directions during peak hours.

3.11 AIR QUALITY

3.11.1 REGULATORY SETTING

3.11.1.1 FEDERAL

The following Federal law related to air quality is relevant to this analysis and is described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

- Clean Air Act of 1963, as Amended.

3.11.1.2 STATE

California Clean Air Act

The California Air Resources Board (ARB) is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (**Table 3.11-1**). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases, the CAAQS are more

stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Other ARB responsibilities include:

- overseeing local air district compliance with California and Federal laws;
- approving local air quality attainment plans (AQAPs);
- submitting State Implementation Plans (SIPs) to EPA;
- monitoring air quality;
- determining and updating area designations and maps; and
- setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

The ambient air quality standards and attainment status designations for Sutter and Sacramento Counties are listed below in **Table 3.11-2**. Various activities necessary for implementation of the Phase 4a Project, such as use of vehicles and heavy equipment, would produce emissions regulated under ARB.

California Climate Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide greenhouse gas (GHG) emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Contributions of GHG emissions related to the Phase 4a Project is discussed in Section 5.1.8, "Project Impacts that Could Be Cumulatively Considerable."

3.11.1.3 REGIONAL AND LOCAL

Project construction activities would take place in both Sutter and Sacramento Counties. The Feather River Air Quality Management District (FRAQMD) manages air quality conditions and regulations in Sutter County, and the Sacramento Metropolitan Air Quality Management District (SMAQMD) has jurisdiction over air quality

considerations in Sacramento County. The local air quality management districts (AQMDs) attain and maintain air quality conditions in the counties affected by projects through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of the AQMDs includes the preparation of plans and programs for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. The AQMDs also inspect stationary sources, respond to citizen complaints, monitor ambient air quality and meteorological conditions, and implement other programs and regulations required by the CAA, CAAA, and the CCAA.

In an attempt to achieve the NAAQS and CAAQS and maintain healthful air quality throughout the air basin, the local AQMDs have jointly prepared and adopted AQAPs and reports. The most recent AQAP, completed in 2003, addresses:

- air quality modeling to identify the reductions needed and design effective strategies for reducing emissions,
- comprehensive programs for reducing emissions that take advantage of zero- and near-zero-emission technologies, and
- the impacts of pollutant transport in the attainment demonstration.

The AQMDs also publish CEQA guidance documents and recently have provided CEQA planning guidance on their respective Web sites to assist with identification of significant adverse air quality impacts. They suggest strategies for reducing potential project emissions early in the planning process. Because stationary sources such as industrial facilities are largely regulated, the guidelines focus on transportation and land use control measures to reduce emissions to achieve and maintain state and Federal health-based air quality standards.

All projects are subject to AQMD rules and regulations in effect at the time of construction. Specific rules applicable to the construction of the Phase 4a Project may include rules pertaining to, but not limited to, visible emissions, fugitive dust, architectural coatings, and general permit requirements.

3.11.2 ENVIRONMENTAL SETTING

3.11.2.1 OVERVIEW

The Phase 4a Project area is located within the southern portion of the Sacramento Valley Air Basin, which comprises all of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba Counties; the western portion of Placer County; and the eastern portion of Solano County. Air quality within the Phase 4a Project area and the remainder of the Natomas Basin is regulated by the EPA, ARB, FRAQMD, and SMAQMD. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent than EPA regulations.

3.11.2.2 CRITERIA AIR POLLUTANTS

Ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead are the most prevalent air pollutants known to be deleterious to human health. These pollutants are commonly referred to as "criteria air pollutants." Ozone, typically associated with poor air quality, is not emitted directly into the air, but is formed through a series of chemical reactions between reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. Motor vehicles and stationary industrial sources are major sources of emissions of both ROG and NO_X, which are also referred to as ozone precursors.

Air pollutant concentrations are measured at several monitoring stations in the Sacramento Valley Air Basin. The Sacramento–3801 Airport Road station is the closest monitoring station to the levee improvement sites with data to meet EPA and ARB criteria for quality assurance for all criteria pollutants, except for fine particulate

matter ($PM_{2.5}$). The Yuba City air quality monitoring station on Almond Street is the closest monitoring station with $PM_{2.5}$ data. In general, the ambient air quality measurements from these monitoring stations are representative of the air quality in the Phase 4a Project area.

Table 3.11-1 summarizes the air quality data from this monitoring station for the latest 3 years for which data are available, 2006–2008. Both ARB and EPA use the type of monitoring data provided in **Table 3.11-1** to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. **Table 3.11-2** summarizes the attainment status for criteria air pollutants for Sutter and Sacramento Counties.

3.11.2.3 NATURALLY OCCURRING ASBESTOS

In addition, naturally occurring asbestos (NOA), which was identified as a toxic air contaminant in 1986 by the California Air Resources Board, is located in many parts of California and is commonly associated with ultramafic rocks (Clinkenbeard et al. 2002). Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Ultramafic rocks form in high-temperature environments well below the surface of the earth. By the time they are exposed at the surface by uplift and erosion, ultramafic rocks may be partially to completely altered to serpentinite, a type of metamorphic rock. Sometimes the metamorphic conditions are right for the formation of chrysotile asbestos or tremolite-actinolite asbestos in the bodies of these rocks or along their boundaries (Churchill and Hill 2000).

For individuals in the vicinity of NOA, there are many potential pathways for airborne exposure. Exposures to soil dust containing asbestos can occur under a variety of scenarios, including dust raised from unpaved roads and driveways covered with crushed serpentine, uncontrolled quarry emissions, grading and construction, and other activities. People exposed to low levels of asbestos may be at elevated risk (e.g., above background rates) of lung cancer and mesothelioma. The risk is proportional to the cumulative inhaled dose (number of fibers), and also increases with the time since first exposure. Although there are a number of factors that influence the disease-causing potency of any given asbestos (such as fiber length and width, fiber type, and fiber chemistry), all forms are carcinogens.

The California Geological Survey (formerly the California Division of Mines and Geology) has prepared the *General Location Guide for Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos* (Churchill and Hill 2000). Although geologic conditions are more likely for asbestos formation in or near these areas, the presence thereof is not certain. According to this guide, and the report *Relative Likelihood for the Presence of Naturally Occurring Asbestos in Eastern Sacramento County, California* (Higgins 2006), the project site is located in an area that is least likely to contain NOA. Based on the distant locations of NOA locations from the project site, the potential for NOA at concentration levels above acceptable limits is low in the NLIP project area.

In July 2001, ARB adopted an Airborne Toxics Control Measure (ATCM) for construction, grading, quarrying, and surface mining operations that regulates grading and excavation activities in areas of serpentine or ultramafic rocks. The probability for encountering NOA in the Phase 4a Project area is low, and if NOA were encountered, it would be handled in accordance with state regulations. Thus, the issue is not discussed further in this EIS/EIR.

Table 3.11-1
Summary of Annual Air Quality Data

	2006	2007	2008
Sacramento–3801 Airport Road			
Ozone			
State standard (1-hour/8-hour avg., 0.09/0.07 ppm)			
National standard (8-hour avg., 0.08 ppm)			
Maximum concentration (1-hour/8-hour avg., ppm)	0.105/0.086	0.119/0.102	0.109/0.093
Number of days state standard exceeded	5/13	2/8	8/15
Number of days national 8-hour standard exceeded	5	4	9
Respirable Particulate Matter (PM_{10})			
State standard (24-hour avg., 50 µg/m^3)			
National standard (24-hour avg., 150 µg/m^3)			
Maximum concentration (µg/m^3)	84.0	98.0	71.0
Number of days state standard exceeded	4	6	3
Number of days national standard exceeded	0	0	N/A
Nitrogen Dioxide (NO_2)			
State standard (1-hour avg., 0.18 ppm)			
National standard (annual, 0.053 ppm)			
Maximum concentration (µg/m^3) (1-hour avg., ppm)	0.072	0.064	0.069
Number of days state standard exceeded	0	0	0
Carbon Monoxide (CO)			
State standard (1-hour/8-hour avg., 20/9.1 ppm)			
National standard (1-hour/8-hour avg., 35/9.5 ppm)			
Maximum concentration (1-hour/8-hour avg., ppm)	4.70/3.15	6.30/5.58	N/A /1.83
Number of days state standard exceeded	0	0	0
Number of days national 1-hour/8-hour standard exceeded	0/0	0/0	N/A /0
Yuba City–Almond Street Monitoring Station			
Fine Particulate Matter ($PM_{2.5}$)			
No separate state standard			
National standard (24-hour avg., 35 µg/m^3)			
Maximum concentration (µg/m^3)	51.6	55.8	147.1
Number of days national standard exceeded	3	6	8

Notes: µg/m^3 = micrograms per cubic meter; NA = not available; ppm = parts per million by volume
Sources: ARB 2009a, EPA 2009

Table 3.11-2
Ambient Air Quality Standards and Attainment Status Designations for Sutter and Sacramento Counties

Pollutant	Averaging Time	California		National Standards [1]		
		Standards [2,3]	Attainment Status [4]	Primary [3,5]	Secondary [3,6]	Attainment Status [7]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	N (Serious)	–	–	–
	8-hour	0.07 ppm[8] (137 µg/m^3)	Sutter: N Sacramento: N (Serious)	0.075 ppm (157 µg/m^3)	Same as Primary Standard	Sutter: N (Severe) Sacramento: N (Serious)
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/m^3)	–	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)[9]	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)	A	0.053 ppm (100 µg/m^3)	Same as Primary Standard	U/A
	1-hour	0.18 ppm (338 µg/m^3)		–		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m^3)	–	U
	24-hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m^3)	
	1-hour	0.25 ppm (655 µg/m^3)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N	– [10]	Same as Primary Standard	Sutter: U Sacramento: N (Moderate)
	24-hour	50 µg/m^3		150 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	Sutter: U Sacramento: N	15 µg/m^3	Same as Primary Standard	Sutter: N (Proposed) Sacramento: U/A
	24-hour	–		35 µg/m^3		
Lead	30-day Average	1.5 µg/m^3	A	–	–	A
	Calendar Quarter	–	–	1.5 µg/m^3	Same as Primary Standard	

Table 3.11-2
Ambient Air Quality Standards and Attainment Status Designations for Sutter and Sacramento Counties

Pollutant	Averaging Time	California		National Standards [1]		
		Standards [2,3]	Attainment Status [4]	Primary [3,5]	Secondary [3,6]	Attainment Status [7]
Sulfates	24-hour	25 µg/m^3	A	**No National Standards**		
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	U			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer—visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

[1] National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the EPA for further clarification and current Federal policies.

[2] California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California Ambient Air Quality Standards (CAAQS) are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[3] Concentration expressed first in units in which it was promulgated (i.e., parts per million [ppm] or micrograms per cubic meter [µg/m^3]). Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Unclassified (U): a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment (A): a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment (N): a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area.
Nonattainment/Transitional (NT): is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Nonattainment (N): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.
Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.
Unclassifiable (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[8] This concentration effective May 17, 2006.

[9] The CAAQS were amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.03 ppm. These changes become effective after regulatory changes are submitted and approved by the Office of Administrative Law, expected later this year.

[10] Because of a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM_{10} standard on September 21, 2006.

Source: ARB 2009b

3.11.2.4 AMBIENT AIR QUALITY STANDARDS

At the Federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in **Table 3.11-2**, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, respirable particulate matter (PM_{10}), $PM_{2.5}$, CO, NO_2, SO_2, and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The Federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA reviews all SIPs to determine conformation to the mandates of the CAA and its amendments and to determine whether implementation of the SIPs will achieve air quality goals. If EPA determines that a SIP is inadequate, a Federal Implementation Plan that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in application of sanctions to transportation funding and stationary air pollution sources in the air basin.

3.12 NOISE

3.12.1 REGULATORY SETTING

3.12.1.1 FEDERAL

There are no Federal laws, regulations, policies, or ordinances related to noise that are relevant to the Phase 4a Project.

3.12.1.2 STATE

State of California General Plan Guidelines

The Governor's Office of Planning and Research (OPR) published the *State of California General Plan Guidelines* (OPR 2003), which provide guidance for the acceptability of projects within specific day-night average noise level (L_{dn}) contours. Generally, residential uses (e.g., mobile homes) are considered to be acceptable in areas where exterior noise levels do not exceed 60 A-weighted decibels (dBA) L_{dn}. Residential uses are normally unacceptable in areas exceeding 70 dBA L_{dn} and conditionally acceptable within 55–70 dBA L_{dn}. Schools are normally acceptable in areas up to 70 dBA L_{dn} and normally unacceptable in areas exceeding 70 dBA L_{dn}. Commercial uses are normally acceptable in areas with a community noise equivalent level (CNEL) of up to 70 dBA. Commercial uses are conditionally acceptable where the L_{dn} is between 67.5 and 77.5 dBA, depending on the noise insulation features and the noise reduction requirements. The guidelines also provide adjustment factors for determining noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. Many activities associated with Phase 4a Project implementation, such as grading activities and use of heavy equipment, would result in noise levels above existing conditions.

California Code of Regulations, Title 24

Title 24 of the CCR establishes standards governing interior noise levels that apply to all new multifamily residential units in California. These standards require that acoustical studies be performed before construction begins at locations where the existing L_{dn} exceeds 60 dBA. Such acoustical studies are required to establish

mitigation measures that limit maximum L_{dn} levels to 45 dBA in any habitable room. Although no generally applicable interior noise standards are pertinent to all uses, many communities in California have adopted an L_{dn} of 45 dBA as an upper limit on interior noise in all residential units.

3.12.1.3 REGIONAL AND LOCAL

Local Government Noise Standards

Construction activities (including project-related construction vehicle traffic) associated with the Phase 4a Project could affect noise-sensitive land uses in Sutter and Sacramento Counties and the city of Sacramento. These jurisdictions have adopted standards for both transportation and nontransportation noise sources in the noise elements of their general plans and/or in noise ordinances. **Tables 3.12-1** and **3.12-2** list the nontransportation and transportation noise standards, respectively, in Sutter and Sacramento Counties and the city of Sacramento.

Table 3.12-1
Local Government Nontransportation Noise Standards (dBA)

Noise Element Jurisdiction/Land Use Category	Maximum Allowable Exterior Noise Levels					
	Daytime 7:00 a.m.–7:00 p.m.		Evening 7:00 p.m.–10:00 p.m.		Nighttime 10:00 p.m.–7:00 a.m.	
Sutter County	Daytime Hourly		Evening Hourly		Nighttime Hourly	
	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}
	50	70	50	70	45	65
	Construction noise is not exempt from Sutter County noise standards during any hours of the day.					
Sacramento County Residential Areas	Hourly		Hourly		Hourly	
	L_{50}	L_{max}	L_{50}	L_{max}	L_{50}	L_{max}
	50	70	50	70	45	65
	Construction noise is exempt from the Sacramento County noise regulations provided that construction does not take place before 6:00 a.m. or after 8:00 p.m. Monday through Friday, and before 7:00 a.m. or after 8:00 p.m. on Saturday and Sunday.					
City of Sacramento Residential Areas	Exterior L_{dn}/CNEL				Interior L_{dn}/CNEL	
	60				45	
	Construction noise is exempt from the City of Sacramento noise regulations provided that construction does not take place before 7:00 a.m. or after 6:00 p.m. Monday through Saturday, and before 9:00 a.m. or after 6:00 p.m. on Sunday.					

Notes: dBA = A-weighted decibel; L_{50} = noise level exceeded 50% of the time; L_{max} = maximum noise level; L_{dn} = day-night average noise level; CNEL = community noise equivalent level; L_{eq} = energy-equivalent noise level
Sources: City of Sacramento 2009, Sacramento County 1998, Sutter County 1996a

Sutter and Sacramento Counties and the city of Sacramento either have nontransportation noise standards based on time of day and land use sensitivity or provide exemptions for construction as long as those activities occur during the daytime. Residential areas are considered the most noise-sensitive land use, and the most restrictive noise standards apply. Other noise-sensitive land uses, such as riding stables, playgrounds, and parks, have restrictive noise standards for nontransportation noise as well. Each of the jurisdictions has established maximum allowable exterior noise standards for both daytime and nighttime hours as shown in **Table 3.12-1**.

Table 3.12-2
Local Government Transportation Noise Standards (dBA)

Noise Element Jurisdiction/Land Use Category	Maximum Allowable Noise Levels	
	Exterior L_{dn}/CNEL[1]	Interior L_{dn}/CNEL
Sutter County[2]		
Residential areas	60	45
Commercial areas—office buildings	–	–
Other sensitive areas—playground, parks and riding stables	70	–
Other sensitive areas—hospitals, nursing homes, churches, transient lodging	60	45
Sacramento County and City of Sacramento		
Residential areas	60	45

Notes: dBA = A-weighted decibel; L_{dn} = day-night average noise level; CNEL = community noise equivalent level

[1] The jurisdictions with standards for transportation noise impacts have adopted a maximum L_{dn}/CNEL noise limit of 60 dBA for residential land uses, with a potential allowable L_{dn}/CNEL exceedance level 65 dBA, if 60 dBA is not feasible in a situation given the application of the best-available noise reduction measures.

[2] Worst-case 1-hour L_{eq} noise standards for interior spaces of 35–45 dBA have been adopted for theaters, auditoriums, music halls, churches, meeting halls, office buildings, schools, libraries and museums.

Sources: City of Sacramento 2009, Sacramento County 1998, Sutter County 1996a

Noise generated by a transportation source is also regulated according to land use. All the jurisdictions with standards for transportation noise impacts have adopted a normally acceptable L_{dn}/CNEL noise standard of 60 dBA for residential land uses and a conditionally acceptable L_{dn}/CNEL noise standard of 65 dBA, provided that the best available noise reduction measures have been applied. Many of the jurisdictions have adopted a maximum L_{dn}/CNEL noise limit of 70 dBA for playgrounds and parks.

Both the City of Sacramento Noise Control Code and the Sacramento County Noise Control Code conditionally exempt construction activity, but during different times of the day and week. The City Noise Control Code exempts noise generated by construction activity that occurs during the hours of 7:00 a.m. to 6:00 p.m. Monday through Saturday, and from 9:00 a.m. to 6:00 p.m. on Sunday (8.68.080 Exemptions, Noise Control Standards, City of Sacramento Municipal Code). The Sacramento County Noise Control Code exempts noise generated by construction activity that occurs during the hours of 6:00 a.m. to 8:00 p.m. Monday through Friday, and 7:00 a.m. to 8:00 p.m. on Saturday and Sunday (Chapter 6.68 Noise Control, County of Sacramento Code). Sutter County does not have noise ordinances nor exemptions for construction noise; therefore, the performance standards contained in **Table 3.12-1** are applied in this EIS/EIR to construction noise (Follas, pers. comm., 2007).

3.12.2 ENVIRONMENTAL SETTING

3.12.2.1 SOUND AND THE HUMAN EAR

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave caused by a disturbance or vibration. Because of the ability of the human ear to detect a wide range of sound pressure fluctuations, sound pressure levels are expressed in logarithmic units called decibels (dB). The sound pressure level in decibels is calculated by taking the log of the ratio between the actual sound pressure and the reference sound pressure squared. The reference sound pressure is considered the absolute hearing threshold (Caltrans 1998: N-9).

Because the human ear is not equally sensitive to all sound frequencies, a specific frequency-dependent rating scale was devised to relate noise to human sensitivity. An dBA scale performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. The basis for

compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This dBA scale has been adopted by most authorities for the purpose of regulating environmental noise. Typical indoor and outdoor noise levels are presented in **Plate 3-5**.

Because the decibel scale is logarithmic, sound levels measured in decibels are not additive. For example, a 65-dBA source of sound, such as a truck, when joined by another 65-dBA source results in sound amplitude of 68 dBA, not 130 dBA (i.e., doubling the source strength increases the sound pressure by 3 dBA). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10-dBA increase in amplitude with a perceived doubling of loudness and establish a 3-dBA change in amplitude as the minimum difference perceptible to the average person (Caltrans 1998: N-42).

3.12.2.2 SOUND PROPAGATION

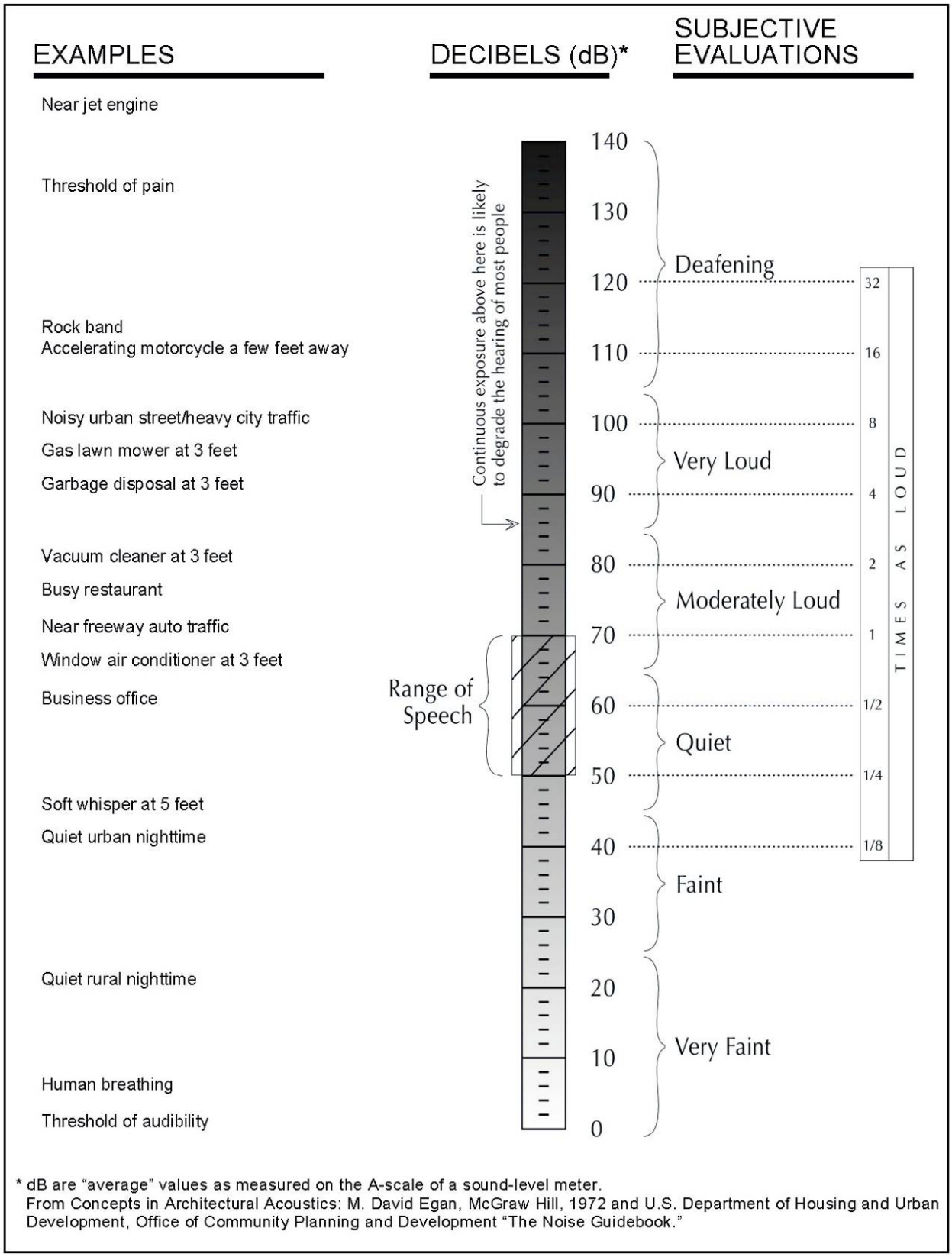
As sound (or noise) propagates from the source to the receptor, the attenuation, or manner of noise reduction in relation to distance, depends on surface characteristics, atmospheric conditions, and the presence of physical barriers. The inverse square law describes the attenuation caused by the pattern of sound traveling from the source to the receptor. Sound travels uniformly outward from a point source in a spherical pattern with an attenuation rate of 6 dBA per doubling of distance. However, from a line source (e.g., a road), sound travels uniformly outward in a cylindrical pattern with an attenuation rate of 3 dBA per doubling of distance. The surface characteristics between the source and the receptor may result in additional sound absorption and/or reflection. Atmospheric conditions such as wind speed, temperature, and humidity may affect noise levels.

Furthermore, the presence of a barrier between the source and the receptor may also attenuate noise levels. The actual amount of attenuation depends on the barrier size and frequency of the noise. A noise barrier may be any natural or human-made feature such as a hill, tree, building, wall, or berm (Caltrans 1998: N-33).

3.12.2.3 NOISE DESCRIPTORS

The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined below (Caltrans 1998: N-44 through N-45, Lipscomb and Taylor 1978: 65–68).

- **L_{max} (Maximum Noise Level):** The maximum instantaneous noise level during a specific period of time. The L_{max} may also be referred to as the "peak (noise) level."
- **L_{min} (Minimum Noise Level):** The minimum instantaneous noise level during a specific period of time.
- **L_X (Statistical Descriptor):** The noise level exceeded X% of a specific period of time. The L_{50} is the noise level exceeded 50% of the time, for example.
- **L_{eq} (Equivalent Noise Level):** The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the L_{eq}.
- **L_{dn} (Day-Night Noise Level):** The 24-hour L_{eq} with a 10-dBA "penalty" for the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. In calculating the L_{dn}, 10 dBA is added to each noise event occurring in the nighttime hours, resulting in a higher reported sound level than would occur without the penalty. The L_{dn} is intended to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.



Source: Data compiled by EDAW in 2008

Typical Noise Levels **Plate 3-5**

- **CNEL (Community Noise Equivalent Level):** Similar to the L_{dn} described above, but with an additional 5-dBA "penalty" for the noise-sensitive hours between 7:00 p.m. and 10:00 p.m., which are typically reserved for relaxation, conversation, reading, and television. If the same 24-hour noise data are used, the CNEL is typically approximately 0.5 dBA higher than the L_{dn}.

3.12.2.4 EXISTING NOISE CONDITIONS AND NOISE-SENSITIVE LAND USES IN THE PROJECT VICINITY

Noise-sensitive land uses in the Phase 4a Project area consist of waterside residential uses and landside rural residential/agricultural uses (**Plate 2-6a**). Some waterside and landside residences are located within 150 feet of construction areas. Several landside residences are located between the Sacramento River east levee and the proposed footprint of the relocated Riverside Canal. Other scattered residences are present near the two locations where construction on the NCC south levee would take place and in the general area of the proposed borrow sites, but are typically more than one-half mile from work areas.

The primary noise sources in the area include vehicle traffic, Airport operations, agricultural activities, railroad operations, machinery and activities associated with commercial and industrial uses, miscellaneous sources within residential communities, and boating operations on the Sacramento River. The major highways/roadways in the area are I-5, I-80, SR 99/70, Garden Highway, Powerline Road, Riego Road, Elverta Road, Del Paso Road, San Juan Road, and El Centro Road. The most substantial roadway traffic source within the area is vehicle traffic along the highways. Arterial roadways and stationary sources have a localized influence on the noise environment.

3.13 VISUAL RESOURCES

3.13.1 REGULATORY SETTING

3.13.1.1 FEDERAL

There are no Federal laws, regulations, policies, or ordinances related to visual resources that are relevant to the Phase 4a Project.

3.13.1.2 STATE

There are no state laws, regulations, policies, or ordinances related to visual resources that are relevant to the Phase 4a Project.

3.13.1.3 REGIONAL AND LOCAL

Sacramento County General Plan

The *Sacramento County General Plan* is currently being updated and is scheduled to be adopted in winter 2009. The Conservation Element of the existing *Sacramento County General Plan* (Sacramento County 1993) includes policies concerning native trees, flood channels, stream courses, and waterways. Policies CO-130 through CO-136, which apply to discretionary projects, are intended to conserve native oaks and other native tree species. To preserve the natural characteristics of these areas, policies in the Conservation Element call for maintenance of riparian vegetation, buffer zones adjacent to stream corridors that contain riparian vegetation, and unlined watercourses. Policy CO-107 requires that topographic diversity and variation be retained when channels are realigned or modified, including maintaining meandering characteristics, varied berm width, and naturalized side slope. In addition, the Open Space Element contains general policies related to the protection of open space areas. Policy OS-1 calls for the permanent protection, as open space, of areas of natural resource value, including wetland preserves, riparian corridors, woodlands, and floodplains (Sacramento County 1993).

The Scenic Highways Element of the existing *Sacramento County General Plan* includes the objective to "take necessary steps to preserve and enhance the scenic qualities of the Garden Highway", and the Garden Highway is designated a scenic corridor by the County. Policies included in the Scenic Highways Element encourage maintenance of natural roadside vegetation. (Sacramento County 1974).

3.13.2 ENVIRONMENTAL SETTING

3.13.2.1 SACRAMENTO RIVER EAST LEVEE

Land uses along the landside of the Sacramento River east levee Reaches 10–15 are predominantly rural with approximately 12 rural residences (see **Table 3.3-1**) scattered along the east levee. Approximately 79 residences are located along the waterside of the levee in these reaches. The landform on the east side of the levee (landside) is almost entirely flat, with the only topographic variation consisting of the levees and a few low rises where residences and agricultural buildings are located.

In Reaches 10–15 of the Sacramento River east levee, the land to the east is largely rural and agricultural. Houses and agricultural structures are in scattered locations along the levee system. Urbanized areas within the City of Sacramento are located to the east of the Sacramento River east levee and come within approximately one half mile to a mile of the levee in Reaches 12–15. Stands of mature trees, mainly oaks, and numerous individual mature trees of various sizes grow along the landside levee toe and are scattered throughout the Phase 4a Project area. Where very large, mature oaks grow near Garden Highway, they often tower above all surrounding elements of the viewscape and are striking natural features both individually and as parts of overall views.

The Sacramento International Airport runway is located approximately 2 miles north of the Phase 4a Project area and arriving and departing aircraft are visible features in the Phase 4a Project area. I-5 bridge, which rises to cross the Sacramento River just north of the Phase 4a Project area, is a dominant feature in views of the levee area in Reach 10.

The main viewer groups in the Phase 4a Project area are local residents and travelers on Garden Highway, which is on the crown of the Sacramento River east levee and, therefore, elevated above the Basin. Much of the viewscape is typical of local rural areas, consisting mainly of scattered rural residences, agricultural outbuildings, rural roads, disturbed areas of ruderal vegetation bordering roadways, utility poles and overhead utility lines, and the existing levees. Approximately 25 feet high on average, the existing levee blocks views of the Sacramento River from the east. The existing levee and adjacent berms are an integral part of the visual setting to regular viewers, including residents, area farmers, recreationists, and other travelers on local county roads. The portions of the levee nearer to I-5 in Reach 10 are visible from I-5; however, in the remainder of the Phase 4a Project area the levee is generally not visible from I-5, which runs in an east-west direction and is 1-2 miles north of the Sacramento River east levee. When looking toward the Sacramento River from the north and east, trees in the riparian area along the Sacramento River's west levee are visible above the top of the levee.

Garden Highway is used by local residents, agricultural workers and by recreationists traveling to private marinas, the public boat launch ramp, and Teal Bend Golf Club located to the north of the Phase 4a Project area. Residents and recreationists are considered sensitive viewer groups. Overall, numbers of recreationists using the landside of the levee in this area are low; however, residents have frequent and extended views of the area.

In addition, sweeping views of the Basin are afforded to travelers on I-5 where the roadway is elevated; however, these views are of short duration, and freeway travelers are not considered a sensitive viewer group. Overall views of the Basin in the Phase 4a Project area lack vividness and are neither striking nor distinctive. The rural reclamation features of the western Natomas Basin south of I-5 (levees and berms, irrigation and drainage canals, and well-established agricultural elements) form a cohesive whole, and the area therefore has moderate intactness and unity of visual aesthetic features.

Within the Phase 4a Project area, the waterside of the Sacramento River east levee is lined with residences and private docks among remnants of mature riparian woodland. The woodland consists mainly of oaks, cottonwoods, and ornamental trees associated with the houses there. Travelers along the length of Garden Highway, which is located on top of the Sacramento River east levee, have intermittent views of the Sacramento River through the trees and houses on the waterside of the levee.

The waterside of the Sacramento River east levee is visible to boaters and other recreationists using the Sacramento River. However, all views of the interior of the Basin from the Sacramento River channel are blocked by the levee, waterside structures, and waterside trees. Views of the river corridor itself are distinctive and moderately vivid, with the meandering river channel and dense riparian growth forming striking and harmonious visual elements. However, the riparian growth is interrupted throughout the length of the Phase 4a Project area by residences, private docks and adjacent clearings. These features and the east levee limit the extent of the riparian growth and detract from the natural appearance of the corridor, reminding viewers of the presence of nearby urban and agricultural areas. The views have a moderate degree of both intactness and unity. Recreationists are generally considered a sensitive viewer group, but because the number of recreationists in this area is only moderate, the sensitivity of views is moderate. Overall, area views along the Sacramento River east levee are of moderate aesthetic value.

3.13.2.3 RIVERSIDE CANAL

The Riverside Canal is located adjacent and to the east of the Sacramento River east levee in Reaches 12A–18B. As described above for the Sacramento River east levee, land uses in this area are predominantly rural and the landform is almost entirely flat. Stands of mature trees and rural residences are visible from the canal alignment. Overall, views along the Riverside Canal are of moderate aesthetic value.

3.13.2.3 NATOMAS CROSS CANAL SOUTH LEVEE

The areas along the NCC south levee, near the pump stations, are rural and agricultural. The surrounding lands are almost entirely flat, and there are few trees in the landscape except those on the waterside of the levee. Views of these areas lack vividness, but the visual components of the agricultural landscape are largely uninterrupted by built features. Views of the NCC south levee are therefore intact and unified. There are no major roadways along these facilities, from which viewers would have near-distance views of the project site. Views of these project areas are therefore of low sensitivity, and the quality of the views is low to moderate.

3.13.2.4 BORROW SITES

As noted above, the topography of the Natomas Basin is flat, with the only topographic relief provided by the Sacramento River and drainage canal levees. Views of the potential borrow sites are typical of the Natomas Basin, flat topography and uninterrupted by human-made features. The potential Phase 4a Project borrow sites are all located near the Sacramento River east levee, are in active agricultural use or are fallowed fields, and are generally adjacent to similar cover types. Potential borrow sites in the Fisherman's' Lake area are adjacent to TNBC lands, some of which are managed for habitat. The Elkhorn and I-5 Borrow Areas consists predominantly of agricultural land, with scattered rural structures, trees, and canals. Views of these areas lack vividness, but the visual components of the agricultural or open space landscapes are largely uninterrupted by built features and present views of moderate aesthetic value.

Rural residences are present near these sites and the borrow site areas are visible from the Garden Highway. Sensitive viewer groups consist of rural residents, and residents of the Garden Highway who regularly view the areas as they travel to and from their homes.

3.14 UTILITIES AND SERVICE SYSTEMS

This section addresses the following public utilities and service systems: water and wastewater, solid waste, electrical and natural gas, telephone and cable, and fire and police protection services. Drainage systems are described in Section 3.5, "Hydrology and Hydraulics."

3.14.1 REGULATORY SETTING

3.14.1.1 FEDERAL

There are no Federal laws, regulations, policies, or ordinances related to utilities and service systems that are relevant to the Phase 4a Project.

3.14.1.2 STATE

There are no state laws, regulations, policies, or ordinances related to utilities and service systems that are relevant to the Phase 4a Project.

3.14.1.3 REGIONAL AND LOCAL

There are no local laws, regulations, policies, or ordinances related to utilities and service systems that are relevant to the Phase 4a Project.

3.14.2 ENVIRONMENTAL SETTING

3.14.2.1 WATER SUPPLY

Agricultural irrigation water is provided in the Natomas Basin in Sutter and Sacramento Counties by Natomas Central Mutual Water Company (NCMWC), a private purveyor of irrigation water to farmlands, and through on-site wells and private river pumps. NCMWC provides water to more than 33,000 acres of land through pipelines, pumps, and more than 50 miles of canals.

The Sacramento County Water Agency provides municipal and industrial water service within Sacramento County, although much of the Natomas Basin receives only agricultural and irrigation water service supplied by NCMWC.

3.14.2.2 WASTEWATER

The Sacramento Regional County Sanitation District provides regional sewage services in the unincorporated areas of Sacramento County. The Sacramento Area Sewer District is responsible for providing and maintaining sewer services in incorporated Sacramento County.

Septic systems within the Phase 4a Project area are under the jurisdiction of the Sacramento County Environmental Management Department in Sacramento County and the Sutter County Environmental Health Services in Sutter County.

3.14.2.3 SOLID WASTE

The nearest landfills in the project region that could be used for waste disposal during project construction are listed in **Table 3.14-1**. No landfills are located in Sutter County.

Table 3.14-1 Major Landfills in the Project Region		
Facility (County)	**Location**	**Capacity**
Yolo County Landfill (Yolo County)	County Road 28h and County Road 104 Woodland, CA 95776	Maximum permitted capacity: 49,035,200 cubic yards Remaining capacity (as of January 1, 2008): 37,308,000 cubic yards
Sacramento County Landfill (Sacramento County)	12701 Kiefer Boulevard Sloughhouse, CA 95683	Maximum permitted capacity: 117,400,000 cubic yards Remaining capacity (as of September 12, 2005): 112,900,000 cubic yards
Western Regional Landfill (Placer County)	3195 Athens Road Lincoln, CA 95648	Maximum permitted capacity: 36,350,000 cubic yards Remaining capacity (as of June 30, 2005): 29,093,819 cubic yards
Source: California Integrated Waste Management Board 2009; Data compiled by EDAW in 2008		

3.14.2.4 ELECTRICAL AND NATURAL GAS SERVICE

The Sacramento Municipal Utility District provides electrical service to customers in the city of Sacramento and the Sacramento County portion of the Natomas Basin (Sacramento LAFCo 2007). The Pacific Gas and Electric Company provides electrical and natural gas services in Sutter County. Standard 12-kilovolt electrical distribution lines supported overhead by wooden poles are located roughly parallel to the Sacramento River east levee.

3.14.2.5 TELEPHONE AND CABLE

Communications service in the Phase 4a Project area is provided by multiple providers, including AT&T, Sprint, Comcast, SBC Communications, and SureWest.

3.14.2.6 FIRE AND POLICE PROTECTION

The Sutter County Fire Department and the Sutter County Sheriff's Department provide fire and police protection, respectively, for Sutter County. The Natomas Fire Protection District of the City of Sacramento provides fire protection services for the portion of the Natomas Basin south of Sutter County by contract between the City and County of Sacramento (Sacramento LAFCo 2007). The unincorporated areas of Sacramento County are under the jurisdiction of the Sacramento County Sheriff's Department, and the City of Sacramento Police Department provides police protection services within the Sacramento city limits.

3.14.2.7 UTILITY ENCROACHMENTS

The Phase 4a Project would encroach upon multiple types of utility equipment, including wells, electric conduits, telephone conduits, conductors, irrigation pipes, electrical power lines, and street lights, along the Sacramento River east levee Reaches 10–15. As described in Section 2.3.1.1, "Levee Raises, Widening, and Slope Flattening," to the extent feasible, mainline utility infrastructure, such as power poles, would be relocated beyond the landside levee toe or berms. Similarly, irrigation facility conveyance, distribution boxes, wells, and standpipes within the project footprint would be demolished and replaced as needed; and, underground structures, such as wells and septic tanks, would be abandoned according to state and local regulations.

3.14.2.8 SACRAMENTO INTERNATIONAL AIRPORT FACILITIES

A 12-inch jet fuel pipeline, owned and operated by Wickland Pipeline, LLC, generally travels 5–10 feet below ground surface level (bgs) from the Port of Sacramento to the Airport through the Phase 4a Project footprint. To

pass below the Sacramento River, an approximately 1,500 foot passageway was directionally bored under the existing levees to a depth of approximately 70 feet bgs (Butler, pers. comm., 2009). Construction of this pipeline, and an associated fuel tank farm was opened for use in 2004, ending the importation of fuel by trucks to the Airport (SCAS 2004).

3.15 HAZARDS AND HAZARDOUS MATERIALS

3.15.1 REGULATORY SETTING

3.15.1.1 FEDERAL

Hazardous Materials Handling

At the Federal level, the principal agency regulating the generation, transport, and disposal of hazardous substances is the EPA, under the authority of the Resource Conservation and Recovery Act (RCRA). The RCRA established an all-encompassing Federal regulatory program for hazardous substances that is administered by EPA. Under the RCRA, EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous substances. The RCRA was amended in 1984 by the Hazardous and Solid Waste Amendments of 1984, which specifically prohibits the use of certain techniques for the disposal of various hazardous substances. The Federal Emergency Planning and Community Right to Know Act of 1986 imposes hazardous-materials planning requirements to help protect local communities in the event of accidental release of hazardous substances. EPA has delegated much of the RCRA requirements to the California Department of Toxic Substances Control (DTSC). The Toxic Substances Control Act authorizes the EPA to regulate the manufacture, use, distribution in commerce, and disposal of chemical substances.

Implementation of the Phase 4 Project would require use, storage, and transportation of hazardous materials such as fuels, lubricants, and solvents.

The U.S. Department of Transportation, Pipeline and Hazardous Material Safety Administration is charged with ensuring safe transport of natural gas, petroleum and other hazardous materials by pipeline. Operations and maintenance of pipelines, including the design, extension, and safety are regulated under the Hazardous Liquid Pipeline Safety Act by the U.S. Department of Transportation.

Worker Safety Requirements

The U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) is responsible at the Federal level for ensuring worker safety. OSHA sets Federal standards for implementation of workplace training, exposure limits, and safety procedures for the handling of hazardous substances (as well as other hazards). OSHA also establishes criteria by which each state can implement its own health and safety program.

Implementation of the Phase 4a Project would require numerous employment opportunities, some of which may involve the handling of hazardous substance as well as other hazards.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) created a trust fund and broad Federal authority to remedy releases or threatened release of hazardous substance that could endanger public health or the environment. CERCLA created the Superfund hazardous substance cleanup program (CERCLA, P.L. 96-510, enacted December 11, 1980). It was enlarged and reauthorized by the Superfund Amendments and Reauthorization Act of 1986 (SARA, P.L. 99-499). EPA compiles a list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants

throughout the United States and its territories, known as the National Priorities List. These locations are commonly referred to as "Superfund sites."

Clean Air Act

The Federal Clean Air Act (CAA) was enacted in 1970. The most recent major amendments made by Congress were in 1990. The CAA required EPA to establish primary and secondary national ambient air quality standards. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). Section 112 of the CAA defines hazardous air pollutants and sets threshold limits. Asbestos-containing substances are regulated by the EPA under the CAA. Additional information about CAA is contained in Section 3.11, "Air Quality."

3.15.1.2 STATE

Hazardous Materials Handling

The California Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires preparation of hazardous materials business plans and disclosure of hazardous-materials inventories. A business plan includes an inventory of hazardous materials handled, facility floor plans showing where hazardous materials are stored, an emergency response plan, and provisions for employee training in safety and emergency response procedures (California Health and Safety Code, Division 20, Chapter 6.95, Article 1). Statewide, DTSC has primary regulatory responsibility for management of hazardous materials, with delegation of authority to local jurisdictions that enter into agreements with the State. Local agencies, including the Sutter County Environmental Health Division, administer these laws and regulations.

The California Education Code contains various provisions governing the siting of new public schools (e.g., Education Code Sections 17211, 17212, and 17212.5). In addition, to help focus and manage the site selection process, CDE's School Facilities and Planning Division has developed screening and ranking procedures based on criteria commonly affecting school selection (Education Code Section 17251[b], 5 CCR Section 14001[c]). The foremost consideration in the selection of school sites is safety. Certain health and safety requirements are governed by state statute and CDE regulations. In selecting a school site, a school district should consider the factors including proximity to airports, proximity to high-voltage power transmission lines, presence of toxic and hazardous substances, hazardous air emissions, and facilities within one-quarter mile, and proximity to railroads.

CDE requires that any school district that plans to purchase property using state funds must obtain a Phase I ESA evaluating the suitability of the soil on that site for use as a school. The Phase I ESA must be submitted to DTSC for review and approval before CDE will approve purchase of the site. If toxic or hazardous substances, including pesticides, naturally occurring asbestos, or other regulated hazardous materials, are found to be present, DTSC will require the school district to perform a Phase II Preliminary Endangerment Assessment to determine the level of risk and identify procedures for limiting the risk and/or cleaning up the contamination. In instances of substantial contamination, a Phase III remedial action may be required before the property is deemed safe for use as a school site.

Worker Safety Requirements

California OSHA (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations within California. Cal/OSHA regulations pertaining to the use of hazardous materials in the workplace (Title 8 of the CCR) include requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and preparation of emergency action and fire prevention plans. Cal/OSHA enforces hazard communication program regulations that contain training and information requirements, including procedures for identifying and labeling hazardous substances,

communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees at hazardous-waste sites. The hazard communication program requires that employers make Material Safety Data Sheets available to employees and document employee information and training programs. Construction activities near high priority subsurface installation, such as the jet fuel pipeline that travels through the project site, are regulation by CCR Title 8, Section 1541.

Emergency Response to Hazardous Materials Incidents

California has developed an emergency response plan to coordinate emergency services provided by Federal, state, and local governments and private agencies. Response to hazardous-material incidents is one part of this plan. The plan is managed by the Governor's Office of Emergency Services (OES), which coordinates the responses of other agencies, including the California Environmental Protection Agency (Cal/EPA), California Highway Patrol (CHP), California Department of Fish and Game, Central Valley Regional Water Quality Control Board (RWQCB), and Sutter County Fire Services Department.

Hazardous Materials Transport

The U.S. Department of Transportation (USDOT) regulates transportation of hazardous materials between states. State agencies with primary responsibility for enforcing Federal and state regulations and responding to hazardous materials transportation emergencies are CHP and the California Department of Transportation (Caltrans). Together, these agencies determine container types used and license hazardous-waste haulers for transportation of hazardous waste on public roads.

The USDOT Federal Railroad Administration (FRA) enforces the Hazardous Materials Regulations, which are promulgated by the Pipeline and Hazardous Materials Safety Administration for rail transportation. These regulations include requirements that railroads and other transporters of hazardous materials, as well as shippers, have and adhere to security plans and also train their employees involved in offering, accepting, or transporting hazmat on both safety and security matters.

Government Code Section 65962.5 (Cortese List)

The provisions of Government Code Section 65962.5 are commonly referred to as the "Cortese List" (after the Legislator who authored the legislation that enacted it). The Cortese List is a planning document used by the State and local agencies to comply with CEQA requirements in providing information about the location of hazardous materials release sites. Government Code Section 65962.5 requires Cal/EPA to develop an updated Cortese List annually, at minimum. DTSC is responsible for a portion of the information contained in the Cortese List. Other California state and local government agencies are required to provide additional hazardous material release information for the Cortese List.

3.15.1.3 Regional and Local

Sacramento County General Plan

The *Sacramento County General Plan* is currently being updated and is scheduled to be adopted in winter 2009. The Public Health and Safety Objective of the existing *Sacramento County General Plan* (Sacramento County 1993) is to "protect the residents of Sacramento County from the effects of a hazardous material incident via the implementation of various public health and safety programs." The following policies may be applicable to the project.

- **Policy HM-4:** The handling, storage, and transport of hazardous materials shall be conducted in a manner so as not to compromise public health and safety standards.

- **Policy HM-7:** Encourage the implementation of workplace safety programs and to the best extent possible ensure that residents who live adjacent to industrial or commercials facilities are protected from accidents and the mishandling of hazardous materials.

- **Policy HM-8:** Continue the effort to prevent ground water and soil contamination.

- **Policy HM–9:** Continue the effort to prevent surface water contamination.

- **Policy HM-10:** Reduce the occurrences of hazardous material accidents and the subsequent need for incident response by developing and implementing effective prevention strategies.

- **Policy HM-11:** Protect residents and sensitive facilities from incidents which may occur during the transport of hazardous materials in the County.

3.15.2 ENVIRONMENTAL SETTING

For purposes of this section, the term "hazardous materials" refers to both hazardous substances and hazardous wastes. A "hazardous material" is defined in the Code of Federal Regulations as "a substance or material that…is capable of posing an unreasonable risk to health, safety, and property when transported in commerce" (49 CFR 171.8). California Health and Safety Code Section 25501 defines a hazardous material as follows:

> "Hazardous material" means any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

"Hazardous wastes" are defined in California Health and Safety Code Section 25141(b) as wastes that:

> because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause, or significantly contribute to an increase in mortality or an increase in serious illness[, or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

3.15.2.1 DATABASE SEARCH

Four sites in the Phase 4a Project area were listed on the State Water Resources Control Board's Geotracker Web site due to leaking underground storage tanks (see **Table 3.15-1**).

3.15.2.2 PHASE I ENVIRONMENTAL SITE ASSESSMENTS

Kleinfelder conducted Phase I Environmental Site Assessments (ESAs) in 2008 and 2009 for parcels included in the Phase 4a Project footprint (Kleinfelder 2009a). The Phase I ESAs disclose potential or existing hazardous substance or petroleum product releases to groundwater, surface water, and soil contamination based upon database searches, landowner/tenant interviews, review of historical aerial photographs and maps, review of prior environmental reports and assessments, and site reconnaissance. The following information, excerpted from Kleinfelder's Phase I ESAs (Kleinfelder 2009a), summarizes conditions that may have affected the subject sites (identified by Assessor's Parcel Number [APN]) within the Phase 4a Project area.

Table 3.15-1
Leaking Underground Storage Tanks in the Phase 4a Project Vicinity

Site	Contaminants	Cleanup Status
UC River Ranch 5191 Garden Highway Sacramento, CA 95837	Gasoline	Completed Case Closed July 18, 1996
Dagget Property 4153 Garden Highway Sacramento, CA 95834	Gasoline	Completed Case Closed March 31, 1992
Natomas Middle School 3700 Del Paso Boulevard Sacramento, CA 95834	Diesel	Open Site assessment April 22, 1992
Gary Alvernaz Trust Property 3650 El Centro Sacramento, CA 95834	Benzene Diesel Gasoline	Open Site Assessment June 21, 2007

Source: SWRCB Geotracker Database 2009; compiled by EDAW in 2009

APN 201-0330-019

APN 201-0330-019 is located in Reach 10 of the Sacramento River east levee. It is primarily used for row crops, and also contains a residence, water wells, septic systems, pole-mounted transformers, a maintenance shop, and abandoned dry hole. Because of these land uses, there is a possibility that persistent pesticides and/or herbicides, asbestos-containing building materials, lead paint, and underground irrigation pipelines are located on site. During the site reconnaissance in July 2008, farm equipment, labeled and unlabeled above ground storage tanks (ASTs), 55-gallon drums, and various smaller containers were observed. Several of these containers were rusted and leaking, resulting in stains on soil, gravel, and concrete within the parcel.

APNs 225-0010-038, 225-0010-041, and 225-0010-043

Aerial photographs indicate that since at least 1952, agriculture has been the primary land use on APNs 225-0010-038, 225-0010-041, and 225-0010-043, which are located in Reach 11A of the Sacramento River east levee. Certain aspects of the site have changed over time, as soil from off-site has been used to fill in a historical lake, and buildings have been constructed and removed. Because of these previous activities, potential hazards exist on site. Fill dirt could be contaminated with hazardous substances, residual pesticides may persist in the soil, and utilities, some of which may contain asbestos, could remain underground. Additionally, the University of California River Ranch facility, which formerly was located within APN 225-0010-038, was listed on multiple regulatory databases because of a release of petroleum hydrocarbons during removal of an underground storage tank (UST). Issues related to this facility have been remediated or otherwise addressed, and all cases are now closed.

Site reconnaissance in September 2008 indicated that numerous potentially hazardous conditions exist on this site: stained soil near a vehicle and two of 9 ASTs, a burn pile and two burn pits, a large stock pile of horse manure, pole-mounted transformers that may contain polychlorinated biphenyls (PCBs), and a pipe dripping an unknown substance found protruding from a barn. Six well permit applications have been submitted to the Sacramento County Environmental Management Department (SCEMD). At least one well remains on site, and three have been abandoned, suggesting that more may exist in unknown locations. Additionally, of three USTs known to have been installed within the site, only two have been recorded as removed. The location and status of the third is unknown.

APNs 225-0090-014 and 225-0110-050

Aerial photographs indicate that APNs 225-0090-014 and 225-0010-050, located in Reach 13 of the Sacramento River east levee, have been used for agricultural purposes (field crops, row crops, and rice paddies) for at least 5 decades. Former structures, including a house and sheds, were removed before 1984. Historic agricultural uses indicate the potential presence of pesticide residues and asbestos-containing, sub-surface irrigation piping. At the time of the site reconnaissance in October 2008, the fields within this site were fallow.

APN 225-0090-040

APN 225-0090-040, located in Reach 12A of the Sacramento River east levee, has been used as a rural residence, and historically included an orchard, coal-fueled forge, and field crops. Due to these operations, there is a potential for persistent pesticide residues, asbestos-containing underground irrigation pipelines, and spills of hazardous substances. During the site reconnaissance in April 2008, structures on site included a barn, work shed, well house, and residence. Potentially hazardous substances or petroleum products were observed within this parcel, including: ASTs and drums containing fuel, oil, grease, solvents and other hazardous materials, car batteries, burned debris piles, and water wells. A Phase II ESA, conducted to evaluate the presence of pesticide residues, is discussed below in Section 3.15.2.3, "Soil Sampling Analysis."

APN 225-0090-069

One residence and three barn structures are located on APN 225-0090-069, which is located in Reach 12B of the Sacramento River east levee, and is primarily used for agricultural purposes. Remnants of agricultural use, including pesticides, and/or asbestos-containing irrigation pipelines, may pose a hazard. In addition, buildings found on site may contain lead paint and asbestos.

APNs 225-0101-003, 225-0101-004, 225-0101-005, and 225-0101-006

APNs 225-0101-003, 225-0101-004, 225-0101-005, and 225-0101-006, which are located within Reach 11B of the Sacramento River east levee, contain fallow agricultural fields. Aerial photographs of this site depict row crops, orchards, and agriculture-related buildings. Residual pesticides, subsurface asbestos-containing irrigation piping, and building-related utilities (i.e., septic tanks, cisterns, heating oil tanks, and wells) may remain on site from previous land uses. Additionally, an Application and Water Well Job Permit provided by SCEMD suggests that an UST may exist on site.

APN 225-0101-007

APN 225-0101-007, which is located in Reach 11B of the Sacramento River east levee, consists predominately of agricultural fields. Historical aerial photographs reveal residential structures and outbuildings from 1951 to 1984. Utilities associated with these structures may still be present on site (i.e., septic tanks, cisterns, heating oil tanks, and wells). Because this site has been used for multiple decades as agricultural land, there may be residual pesticides in the soil and asbestos-containing underground irrigation piping. A jet fuel underground pipeline runs through the property in a north-south direction. In addition, a dry, plugged and abandoned oil or gas well may be located onsite.

APNs 225-0101-057 and 225-0101-058

Due to historical agricultural and rural residential land uses, this property, located in Reach 11B of the Sacramento River east levee, may contain: underground irrigation pipelines that may contain asbestos, residual pesticides, and/or domestic subsurface utilities (i.e., septic tanks, cisterns, heating oil tanks, wells). In addition, a plugged dry oil well is located on APN 225-0101-058, outside of the project footprint, approximately 700 feet from the existing levee.

APN 225-0101-061

APN 225-0101-061, located in Reaches 11A and 11B of the Sacramento River east levee, was used for agricultural purposes prior to 1973. Currently, the property owner uses this site to board horses and as a residence. Site reconnaissance in November 2008 reported the following potential hazards: a domestic water well, three septic systems with leach fields, a wood debris pile, an empty AST, a pole-mounted transformer without PCB-content labeling, and household quantities of hazardous chemicals including paint and cleaning agents were located in a locked shed.

APNs 225-0110-018 and 225-0110-051

APNs 225-0110-018 and 225-0110-051, located in Reach 13 of the Sacramento River east levee, belong to TNBC and are used as habitat mitigation sites. Before becoming TNBC property, historical aerial photographs indicate that this site was used for agricultural purposes and contained one structure. Because of previous land uses, there is a potential that residual pesticides and subsurface utilities, some of which may contain asbestos, could remain on site.

APN 225-0210-026

APN 225-0210-026, located in Reach 15 of the Sacramento River east levee, is currently and was historically used for agricultural purposes, including annual crops. Because of years of agricultural production, the site may contain agricultural pesticides, and irrigation pipes that may contain asbestos. Aerial photographs indicate that structures that formerly existed on site have been removed. There may be underground structures associated with these buildings, such as cisterns, septic tanks, and heating and oil tanks. Site reconnaissance revealed several conditions that could indicate the presence of hazardous materials: 7 ASTs, 5 trailer-mounted ASTs, a tractor containing double-mounted polyethylene tanks, and several locations of petroleum stains on surface soil (6–24 inch diameter, and several inches deep).

APNs 225-0110-019, 225-0110-020, and 225-0110-037

The Huffstutler Trust, located in the Fisherman's Lake Area (Reaches 13 and 14 of the Sacramento River east levee), has historically been used for agricultural purposes. Recognized environmental conditions disclosed in the Phase I ESA include: likely hydrocarbon contamination from automotive maintenance and a former 550-gallon underground storage tank; reported soil samples containing elevated levels of dieldrin, arsenic, and lead likely resulting from pesticide application; miscellaneous refuse, such as used automobile batteries and automobile parts. During site reconnaissance, Kleinfelder also observed numerous unlabeled containers, ranging in volume from approximately 5 to 55 gallons, which may contain hazardous chemicals. Underground utilities, such as a septic system, a domestic water well, and underground irrigation pipelines are associated with the site; and it is unknown if there are additional underground structures. Existing residential structures and various outbuildings may contain asbestos, lead, mercury, or other hazardous materials. A Phase II ESA, conducted to evaluate the presence of pesticide residues, is discussed below in Section 3.15.2.3, "Soil Sampling Analysis."

APNs 201-0250-015, 201-0270-002, and 201-0270-037

APN 201-0270-037 is the southern-most parcel of the South Sutter, LLC borrow site (Reach 8 of the Sacramento River). This parcel has been historically used for agricultural purposes and, as a result, may contain residual concentrations of pesticides. In addition, during site reconnaissance, collapsed structures were located on-site that could contain asbestos-containing or lead-based building materials (Kleinfelder 2009a). Numerous items that could contain hazardous materials were found on APNs 201-0250-015 and 201-0270-002, including: a partially buried storage tanks that may have been used for water storage, one 750 gallon diesel trailer mounted AST, two car batteries, unlabeled drums with unidentified contents, various smaller drums, buckets, cans of unknown contents, and various debris. In addition, water wells are known to exist on site, and several structures may contain asbestos-containing or lead-based building materials. Because these two parcels were used for agricultural

purposes, there is a potential for persistent pesticides and herbicides within the soil and asbestos-containing underground irrigation pipelines (Kleinfelder 2009c) Phase II ESAs, conducted to evaluate the presence of pesticide residues and the potential presence of asbestos containing or lead-based building materials, is discussed below in Section 3.15.2.3, "Soil Sampling Analysis."

3.15.2.3 SOIL SAMPLING ANALYSIS

Based on conclusions in the Phase I ESAs (Kleinfelder 2009a), Phase II ESAs (i.e., further soil sampling and analyses) were conducted on some sites that could contain residual chemicals associated primarily with past agricultural use. Three borrow sites—South Sutter, LLC, Novak, and Huffstutler Trust/Johnson (in the Fisherman's Lake Borrow Area)—were evaluated further for persistent pesticides, arsenic, copper, and lead (Kleinfelder 2009b; **Appendix I**). Analyses indicate that the South Sutter, LLC property has residual concentrations of toxaphene and dieldrin; the Novak property has residual concentrations of toxaphene; and the Huffstutler Trust/Johnson property contains elevated concentrations of arsenic and residual dieldrin. Residual concentrations were judged to be elevated when compared to pertinent screening levels for human health and ecological risk developed by EPA; the Office of Environmental Health Hazard Assessment, CalEPA; and the San Francisco Bay Regional Water Quality Control Board's (RWQCB's) environmental screening levels. The Central Valley RWQCB does not have its own environmental screening levels, and the San Francisco Bay RWQCB's environmental screening levels are frequently used for this purpose (Kleinfelder 2009b). These are thresholds to be used for preliminary screening purposes, and do not constitute policy, criteria, or clean-up levels. The following provides results of the Phase II ESAs.

APNs 201-0250-015, 201-0270-002, and 201-0270-037 (South Sutter, LLC Borrow Site)

Soil testing indicates that all three parcels of South Sutter, LLC contain concentrations of arsenic that are less than the pertinent screening levels for human health and ecological risk. While toxaphene and dieldrin concentrations in some discrete soil samples exceed ecological risk screening levels, the average concentrations do not. Further, the toxaphene and dieldrin concentrations in soil samples do not exceed human health risk screening levels. The highest concentrations of these pesticides are located within the upper one foot of topsoil, likely the result of past application to control for insects. **Table 3.15-2** provides analytical results of soil sampling on the South Sutter, LLC borrow site.

Kleinfelder completed a limited survey for the presence of asbestos-containing building materials and lead-based paint and concluded that neither of these potentially hazardous materials exist within the South Sutter, LLC property (Kleinfelder 2009d).

APN 225-0090-040 (Novak Property, located with the Fisherman's Lake Borrow Area)

As described above, this agricultural parcel has historically been used for field crop production. Soil testing indicates that the northern half of the parcel contains residues of toxaphene and arsenic in concentrations that are less than the pertinent screening levels for human health. Toxaphene concentrations in some discrete soil samples exceed ecological risk screening levels, but the average concentration does not. Similar to the South Sutter, LLC property, the highest concentrations are in the upper foot of topsoil. **Table 3.15-3** provides analytical results of soil sampling on the Novak Property.

APNs 225-0110-036 and 225-0110-020 (Huffstutler Trust/Johnson Property)

The Huffstutler Trust/Johnson property is located along the Sacramento River east levee north of Radio Road and overlaps with a portion of the Phase 4a Project footprint, including levee improvements and the Fisherman's Lake Borrow Area. APN 225-0110-036 is an agricultural field. APN 225-0110-020 is a drainage ditch that conveys rainfall runoff and irrigation tail water to Fisherman's Lake. Both parcels have been identified as potential borrow/mitigation sites for the Phase 4a Project. Soil testing indicates concentrations of arsenic are above

Table 3.15-2
South Sutter, LLC Soil Sampling Results

Analyte (San Francisco RWQCB ESL)[1]	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	Human Health Risk Levels[2] Construction Worker (mg/kg)	Ecological Risk Levels (mg/kg)[3]
Topsoil (0–6 inches)					
Arsenic (0.39 mg/kg)	6.6	9.3	7.6	15	11.3
Toxaphene (0.00042 mg/kg)	0.020	**0.19**	0.067	22	0.119
Dieldrin (0.0024 mg/kg)	0.0010	**0.0061**	0.0014	1.6	0.0024
Subsurface Soils (6–12 inches)					
Arsenic (0.39 mg/kg)	4.1	11	7.6	15	11.3
Toxaphene (0.00042 mg/kg)	Less than Detection Limits (0.020)	---	---	22	0.119
Dieldrin (0.0024 mg/kg)	Less than Detection Limits (0.0010)	---	---	1.6	0.0024

Notes: Bolded numbers indicate levels of pesticide residue concentrations that exceed pertinent human health risk and/or ecological risk levels; mg/kg = milligram per kilogram; ug/m3 = microgram per cubic meter; ESL = environmental screening level

[1] San Francisco RWQCB ESLs indicate that further analysis is needed and do not indicate unacceptable concentrations of the respective chemicals.

[2] Construction worker values are from the San Francisco RWQCB environmental screening levels for construction worker direct contact (as cited in Kleinfelder 2009b).

[3] EPA Region V ecological screening levels are used for ecological risk level concentrations for toxaphene and dieldrin. The arsenic ecological risk level concentration is the naturally occurring concentration of arsenic in Central Valley soil (as cited in Kleinfelder 2009b).

Source: Kleinfelder 2009b

Table 3.15-3
Novak Property Soil Sampling Results

Analyte (San Francisco RWQCB ESL)[1]	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	Human Health Risk Levels[2] Construction Worker (mg/kg)	Ecological Risk Levels (mg/kg)[3]
Topsoil (0–6 inches)					
Arsenic (0.39 mg/kg)	7.6	8.5	8.1	15	11.3
Toxaphene (0.00042 mg/kg)	0.046	**0.16**	0.11	22	0.119
Subsurface Soils (6–18 inches)					
Arsenic (0.39 mg/kg)	6.1	10	8.3	15	11.3
Toxaphene (0.00042 mg/kg)	0.023	**0.22**	**0.14**	22	0.119

Notes: Bolded numbers indicate levels of pesticide residue concentrations that exceed pertinent human health risk and/or ecological risk levels; mg/kg = milligram per kilogram; µg/m^3 = microgram per cubic meter; ESL = environmental screening level

[1] San Francisco RWQCB ESLs indicate the further analysis is needed and do not indicate unacceptable concentrations of the respective chemicals.

[2] Construction worker values are from the San Francisco RWQCB environmental screening levels for construction worker direct contact(as cited in Kleinfelder 2009b).

[3] EPA Region V ecological screening levels are used for ecological risk level concentrations for toxaphene and dieldrin. The arsenic ecological risk level concentration is the naturally occurring concentration of arsenic in Central Valley soil (as cited in Kelinfelder 2009b).

Source: Kleinfelder 2009b

pertinent human health and ecological risk screening levels in both the topsoil and subsurface soils. Dieldrin was found to exceed ecological risk screening levels, but not human health risk screening levels. The highest concentrations are in the upper two feet of the topsoil, likely as a result of past applications of pesticides. APN 225-0110-019 is considered to be part of the Huffstutler Trust/Johnson property, but elevated concentrations of pesticides were not detected on this parcel. **Table 3.15-4** provides analytical results of soil sampling on the Huffstutler Trust/Johnson property.

Table 3.15-4
Huffstutler Trust/Johnson Property Soil Sampling Results

Analyte (San Francisco RWQCB ESL)[1]	Minimum (mg/kg)	Maximum (mg/kg)	Mean (mg/kg)	Human Health Risk Levels[2] Construction Worker (mg/kg)	Ecological Risk Levels (mg/kg)[3]
Topsoil (0–6 inches)					
Arsenic (0.39 mg/kg)	**12**	**36**	**24**	15	11.3
Dieldrin (0.0024 mg/kg)	**0.020**	**0.10**	**0.049**	1.6	0.0024
Subsurface Soils (6–12 inches)					
Arsenic (0.39 mg/kg)	7.3	**43**	**22**	0.39	11.3
Dieldrin (0.0024 mg/kg)	Less than Detection Limits (0.0010)	---	---	0.0023	0.0024

Notes: Bolded numbers indicate levels of pesticide residue concentrations that exceed pertinent human health risk and/or ecological risk levels; mg/kg = milligram per kilogram; ug/m^3 = microgram per cubic meter; ESL = environmental screening level

[1] San Francisco RWQCB ESLs indicate the further analysis is needed and do not indicate unacceptable concentrations of the respective chemicals.

[2] Construction worker values are from the San Francisco RWQCB environmental screening levels for construction worker direct contact (as cited in Kleinfelder 2009b).

[3] EPA Region V ecological screening levels are used for ecological risk level concentrations for toxaphene and dieldrin. The arsenic ecological risk level concentration is the naturally occurring concentration of arsenic in Central Valley soil (as cited in Kleinfelder 2009b).

Source: Kleinfelder 2009b

3.15.2.4 SCHOOLS WITHIN ONE-QUARTER MILE OF THE PROJECT FOOTPRINT

The State CEQA Guidelines require EIRs to assess whether a project will emit hazardous air emissions or involve the handling of extremely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school (see PRC Sections 21151.2 and 21151.4; Appendix G of the State CEQA Guidelines). Natomas Middle School, located at 3700 Del Paso Road, is located within one-quarter mile of a portion of the Fisherman's Lake Borrow Area. In addition, the Natomas Unified School District is planning to construct a high school and middle school to be located on parcels within one-quarter mile of the Fisherman's Lake Borrow Area.

3.15.2.5 AIRPORT SAFETY

The Airport is approximately 1.5 miles east of the Sacramento River east levee and 12 miles north of downtown Sacramento. The Airport includes the Airport Operations Area and adjacent terminals, parking lots, and landscaped areas. Two 8,600-foot parallel runways are oriented roughly north–south. Three airline terminals and additional buildings are also associated with various airport operations. Approximately half of the 5,900 acres of Sacramento County–owned land at the Airport is located due south and due north of the Airport Operations Area.

Sacramento County–owned property outside of the Airport Operations Area functions as aviation "bufferlands" for the purposes of operational land use compatibility (i.e., to prevent encroachment by land uses, such as residential development, that are incompatible with aircraft operations). Agricultural leases on these bufferlands expired December 31, 2007, and they are currently managed as grassland open space.

The Airport has one of the highest numbers of reported wildlife strikes of all California airports (SCAS 2007). According to the FAA Bird Strike Database (FAA 2005), 964 wildlife strikes were recorded at the Airport between 1990 and 2004. Birds with flocking tendencies and birds of relatively large size, such as waterfowl, gulls, herons, egrets, pigeons, blackbirds, and raptors, present the greatest threat to aviation at the Airport (SCAS 2007).

The frequency of wildlife strikes at the Airport is directly related to the Airport's location. The Airport is situated in the western portion of the Natomas Basin, which is a relatively flat, low-lying area that was part of the Sacramento/American River floodplain. Historically, wetlands in the Basin attracted tremendous numbers of migratory waterfowl. Land reclamation and the extensive construction of canals, levees, and pumping stations have allowed more than 80% of the Natomas Basin to be converted to agricultural production (City of Sacramento, Sutter County, and TNBC 2003). Agricultural crops and open water are the primary wildlife attractants with the Airport's Critical Zone. Rice, wheat, safflower, corn, and alfalfa are all grown in the Critical Zone. The FAA considers rice cultivation, including flooding of the rice fields in winter and summer, as the most incompatible current land use in the Critical Zone (SCAS 2007).

Since 1996, the FAA has required SCAS to maintain and implement a *Wildlife Hazards Management Plan* (WHMP) because of the significant number of wildlife strikes that occur at the Airport. The plan emphasizes the identification and abatement of wildlife hazards and outlines steps for monitoring, documenting, and reporting potential wildlife hazards and birds strikes. Implementation of the WHMP involves an integrated approach that relies on a combination of wildlife control and land management strategies (SCAS 2007). The following land management objectives in the WHMP are relevant to the project:

- maintain grasslands in the Airport Operations Area to discourage use by hazardous wildlife,
- reduce aquatic habitat for hazardous wildlife,
- reduce hazardous wildlife use of ditches in the Airport Operations Area, and
- reduce hazardous wildlife on Sacramento County–owned agricultural land in the 10,000-foot Critical Zone.

The FAA has identified two potentially hazardous wildlife attractants on Airport land within the Critical Zone: the Airport West Ditch and the rice fields north of the Airport Operations Area. The Airport West Ditch is an open ditch that conveys irrigation and drainage water through the western portion of the Airport Operations Area. Because of its proximity to the runway, the Airport West Ditch is not only a potentially hazardous wildlife attractant; it is also a potential hazard for aircraft that may leave the runway under difficult conditions. The former rice fields occupy approximately 500 acres north of the Airport Operations Area. These fields were leveled and diked to hold water for rice production. Accordingly, they became a potentially hazardous wildlife attractants as a result of irrigation during the growing season and rainfall during the non-growing season. To reduce this extent of this hazard, SCAS has chosen not to renew the leases on these rice lands that expired December 31, 2007, as noted above.

3.15.2.6 WILDFIRE HAZARDS

Wildfires pose a hazard to both persons and property in many areas of California. Wildland fires are a particularly dangerous threat to development located in forest and shrub areas. The severity of wildland fires is primarily influenced by vegetation, topography, and weather (temperature, humidity, and wind). The California Department of Forestry and Fire Protection (CDF) has developed a fire hazard severity scale that considers vegetation, climate, and slope to evaluate the level of wildfire hazard in all State Responsibility Area lands. A State Responsibility Area is defined as part of the state where CDF is primarily responsible for providing basic

wildland fire protection assistance. Areas under the jurisdiction of other fire protection services are considered to be Local Responsibility Areas.

CDF designates three levels of Fire Hazard Severity Zones (Moderate, High, and Very High) to indicate the severity of fire hazard in a particular geographical area. According to CDF's Fire Resource Assessment Program, the majority of the land in Sacramento and Sutter Counties is located in either a "nonflammable" or "moderate" zone for wildland fires (CDF 2007a). No Very High Fire Hazard Severity Zones are located in the Phase 4a Project area within either Sacramento County or Sutter County (CDF 2007b). In addition, Sutter and Sacramento Counties are not located in a State Responsibility Area (CDF 2007c, 2007d).

3.16 ENVIRONMENTAL JUSTICE

Environmental justice is defined by the EPA's Office of Environmental Justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Fair treatment means that "no group of people, including racial, ethnic, or socioeconomic group, shall bear a disproportionate share of negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies."

3.16.1 REGULATORY SETTING

3.16.1.1 FEDERAL

The following Federal law related to environmental justice is relevant to this analysis and is described in detail in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations":

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

3.16.1.2 STATE

Most state governments have plans and policies intended to protect and expand the local and regional economies affecting the communities and residents within their jurisdictions. State plans and policies also frequently address other social and economic impact topics, including fiscal conditions and related public services that affect local residents' quality of life.

Within California, Senate Bill (SB) 115 (Chapter 690, Statutes of 1999) was signed into law in 1999. The legislation established OPR as the coordinating agency for state environmental justice programs (California Government Code, Section 65040.12[a]) and defined environmental justice in statute as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Government Code Section 65040.12[e]). SB 115 further required Cal/EPA to develop a model environmental justice mission statement for boards, departments, and offices within the agency by January 1, 2001 (PRC, Sections 72000–72001).

In 2000, SB 89 (Chapter 728, Statutes of 2000) was signed, which complemented SB 115 by requiring the creation of an environmental justice working group and an advisory group to assist Cal/EPA in developing an intra-agency environmental justice strategy (PRC, Sections 72002–72003). SB 828 (Chapter 765, Statutes of 2001) added and modified due dates for the development of Cal/EPA's intra-agency environmental justice strategy and required each board, department, and office within Cal/EPA to identify and address, no later than January 1, 2004, any gaps in its existing programs, policies, and activities that may impede environmental justice (PRC, Sections 71114–71115).

Cal/EPA adopted its environmental justice policy in 2004 (PRC, Sections 71110–71113). This policy (or strategy) provides guidance to its resource boards, departments, and offices. It is intended to help achieve the state's goal of "achieving fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws and policies."

Assembly Bill (AB) 1553 (Chapter 762, Statutes of 2001) required OPR to incorporate environmental justice considerations in the *General Plan Guidelines*. AB 1553 specified that the guidelines should propose methods for local governments to address the following:

- planning for the equitable distribution of new public facilities and services that increase and enhance community quality of life,
- providing for the location of industrial facilities and uses that pose a significant hazard to human health and safety in a manner that seeks to avoid over-concentrating these uses in proximity to schools or residential dwellings,
- providing for the location of new schools and residential dwellings in a manner that avoids proximity to industrial facilities and uses that pose a significant hazard to human health and safety, and
- promoting more livable communities by expanding opportunities for transit-oriented development.

Although environmental justice is not a mandatory topic in the general plan, OPR is required to provide guidance to cities and counties for integrating environmental justice into their general plans. The 2003 edition of the *General Plan Guidelines* included the contents required by AB 1553 (see pages 8, 12, 20–27, 40, 114, 142, 144, and 260 of the revised *General Plan Guidelines*).

3.16.1.3 REGIONAL AND LOCAL

There are no local laws, regulations, policies, or ordinances related to environmental justice that are relevant to the Phase 4a Project.

3.16.2 ENVIRONMENTAL SETTING

Table 3.16-1 below summarizes relevant demographic data for the Phase 4a Project area (see **Appendix H** for the full set of 2000 Census data compiled for this EIS/EIR). This table compares the proportion of the total population that was reported in the 2000 census as low-income or as minorities for census block groups in the Natomas Basin with the same statistics for Sacramento and Sutter Counties. This comparison demonstrates that the proportion of the Natomas Basin's low-income population does not exceed 50%, nor is it significantly higher than the total proportion of the low-income population in Sacramento and Sutter Counties. The block groups in the Sacramento County portion of the Natomas Basin, however, do have a significant minority population (60.36% of the total population).

Table 3.16-1
Minority and Poverty Status for Relevant Geographic Units[1]

Percentage of the Population with Minority Status	Block Groups in Sacramento County: 60.36%	Block Groups in Sutter County: 23.34%	Sacramento County: 42.24%	Sutter County: 39.78%
Percentage of the Population with Poverty Status Under the U.S. Census 1999 Threshold	Block Groups in Sacramento County: 15.16%	Block Groups in Sutter County: 19.11%	Sacramento County: 14.13%	Sutter County: 15.54%

[1] Expressed as a percentage of the total population.

Source: Data from U.S. Census Bureau 2000 and compiled by EDAW in 2009

According to the data presented in Section 3.3.2, "Land Use, Socioeconomics, and Population and Housing," minority and/or low income populations are not disproportionately prevalent within the Phase 4a Project area. The minority population with the largest representation in the Census Tract Block Groups in which the Phase 4a Project is located is Hispanic. This group makes up approximately 16% of the Block Group population nearest the NCC as compared to 22% of the Sutter County population as a whole, and in the Sacramento County Block Groups 10% of the population, as compared to 16% of the population in Sacramento County. The median family income levels as reported in the 2000 U.S. Census for the Sacramento County Census Tracts where the Phase 4a Project is located were $66,146 in the area north of Del Paso Road and West of Powerline Road and $59, 750 in the area east of Powerline Road and south of Del Paso Road. These median income levels are above the median income level of $50,717 reported for Sacramento County. For the Census Tract south of the NCC in Sutter County, the median family income was $50,000 and for Sutter County the Census 2000 reported a median family income of $44,300. (U.S. Census Bureau 2000).

While not currently residing in the local project vicinity as a distinct population group, Native American tribes are known to have lived in the project study area in the past. Evidence of their occupation of the project study area includes known villages, midden sites, burial sites, and other artifacts as described in Section 3.8, "Cultural Resources," above. The sites of occupation by Native American tribes are considered culturally significant.

4 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

This chapter begins with a description of the general approach to the environmental analysis, followed by the analysis of the significant environmental impacts of the Phase 4a Project, organized by issue area.

4.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

An environmental document prepared to comply with the National Environmental Policy Act (NEPA) must consider the context and intensity of the environmental effects that would be caused by, or result from, the Proposed Action and other alternatives under evaluation. Under NEPA, the significance of an effect is used to determine whether an environmental impact statement must be prepared. An environmental document prepared to comply with the California Environmental Quality Act (CEQA) must identify the significance of the environmental effects of a proposed project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project (State CEQA Guidelines California Code of Regulations [CCR] Section 15382).

4.1.1 SECTION CONTENTS

Sections 4.2 through 4.16 of this EIS/EIR follow the same general format and are each organized into the following major components:

- **Methodology and Thresholds of Significance:** This subsection describes the methods, process, procedures, and/or assumptions used to formulate and conduct the impact analysis. It also presents the significance criteria (or "thresholds of significance") used to define the level at which an impact would be considered significant in accordance with CEQA. Thresholds may be quantitative or qualitative; they may be based on agency or professional standards or on legislative or regulatory requirements that are relevant to the impact analysis. Generally, however, the thresholds of significance used are derived from Appendix G of the State CEQA Guidelines, as amended; NEPA, where defined; factual or scientific information and data; and regulatory standards of Federal, state, regional, and local agencies. These thresholds also include the factors taken into account under NEPA to determine the significance of the action in terms of the context and the intensity of its effects.

- **Environmental Impacts and Mitigation Measures:** This analysis examines the impacts that would occur with implementation of the Proposed Action or an alternative under consideration. Impacts and mitigation measures are numbered sequentially in each section, with mitigation measures corresponding to the impact being addressed. For instance, impacts in Section 4.2, "Agricultural Resources," are numbered Impact 4.2-a, and Mitigation Measure 4.2-a corresponds with Impact 4.2-a. An impact statement precedes the discussion of each impact. The discussion that follows the impact statement includes substantial evidence to support the stated conclusion.

  Many of the potential impacts that may result from implementation of the action alternatives would be temporary and short-term effects resulting from construction activities, including hauling of borrow material and the movement of heavy construction equipment. However, impacts related to most agricultural land conversion; modification and loss of habitats, including fill of waters of the United States; and disturbance of cultural resources would be permanent.

  The impacts of each alternative are compared to the impacts of the Proposed Action at the end of each impact discussion in this chapter as "similar," "greater," "lesser," or "currently unknown."

Following each discussion of a significant or potentially significant impact, mitigation measures are provided to avoid, minimize, or reduce the significant or potentially significant impacts to a less-than-significant level, where available and feasible. In accordance with Public Resources Code (PRC) Section 21081.6(b), mitigation measures must be fully enforceable through permit conditions, agreements, other legally binding instruments, or by incorporating the measures into the project design. CCR Section 15370 of the State CEQA Guidelines defines mitigation as:

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree of magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by preservation and maintenance operation during the life of the action; or
- compensating for the impacts by replacing or providing substitute resources or environments.

Mitigation measures are not required for impacts identified under the No-Action Alternative because no project would be approved and SAFCA would not be required to obtain permits or enter into agreements. Additionally, USACE would not issue permission, permits, or authorizations for the No-Action Alternative. For these reasons, mitigation measures are not provided for the No-Action Alternative in Sections 4.2 through 4.16.

- **Residual Impacts:** This subsection describes which impacts would remain significant following implementation of mitigation measures. For each impact, either the impact would be reduced to a level below the significance threshold (reduced to a less-than-significant level) or it is concluded that feasible mitigation is not available or is insufficient to reduce the impact to a less-than-significant level. When an impact cannot be reduced to a less-than-significant level, it is called a "significant and unavoidable" impact on the environment. Under CEQA, if significant and unavoidable impacts remain, an agency may approve a project if it finds, pursuant to PRC Section 21081, (i) that the agency has considered and approved all feasible mitigation measures; (ii) that any alternative that would reduce the severity of the significant unavoidable impacts is infeasible; and (iii) that the overriding economic, social, or other benefits of the project outweigh the significant impacts.

4.1.2 TERMINOLOGY USED TO DESCRIBE IMPACTS

4.1.2.1 IMPACT LEVELS

The EIS/EIR uses the following CEQA terminology to denote the significance of environmental impacts:

- **No impact** indicates that the construction, operation, and maintenance of the Proposed Action or an alternative would not have any direct or indirect impacts on the environment. It means that no change from existing conditions would result. This impact level does not require mitigation.
- A **less-than-significant impact** is one that would not result in a substantial or potentially substantial adverse change in the physical environment. This impact level does not require mitigation, even if applicable measures are available.
- A **significant impact** is defined by PRC Section 21068 as one that would cause "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project." Under

CEQA, mitigation measures and alternatives to the Proposed Action must be identified, where applicable and feasible, to avoid or reduce significant impacts.

- A **potentially significant impact** is one that, if it were to occur, would be considered a significant impact as described above; however, the occurrence of the impact cannot be immediately determined with certainty. For CEQA purposes, a potentially significant impact is treated as if it were a significant impact. Therefore, under CEQA, mitigation measures and alternatives to the Proposed Action must be identified, where applicable and feasible, to avoid or reduce significant impacts.

- A **significant and unavoidable impact** is one that would result in a substantial or potentially substantial adverse effect on the environment and that cannot be reduced to a less-than-significant level even with implementation of any applicable feasible mitigation. Under CEQA, a project with significant and unavoidable impacts may proceed, but the CEQA lead agency would be required (i) to conclude in findings that there are no feasible means of substantially lessening or avoiding the significant impact in accordance with State CEQA Guidelines CCR Section 15091(a)(3) and (ii) to prepare a statement of overriding considerations, in accordance with State CEQA Guidelines CCR Section 15093, explaining why the CEQA lead agency has chosen to proceed with the project in spite of the potential for significant impacts.

- An impact may have a level of significance that is too uncertain to be reasonably determined, and would therefore be designated **too speculative for meaningful consideration** in accordance with State CEQA Guidelines CCR Section 15145. Where some degree of evidence points to the reasonable potential for a significant effect, the EIS/EIR may explain that a determination of significance is uncertain, but is still assumed to be "potentially significant," as described above. In other circumstances, after thorough investigation, the determination of significance may still be too speculative to be meaningful. This is an effect for which the degree of significance cannot be determined for specific reasons, such as unpredictability of the occurrence or the severity of the impact, lack of methodology to evaluate the impact, or lack of an applicable significance threshold.

It is important to note that under NEPA, there are no specific thresholds of significance and that environmental effects are analyzed based on their intensity and duration. Because this EIS/EIR is a joint NEPA/CEQA document, the CEQA thresholds have been applied because they are more stringent.

4.1.2.2 IMPACT MECHANISMS

Mechanisms that could cause impacts are discussed for each issue area. General categories of impact mechanisms are construction of the project and activities related to future operations and maintenance, as described in Chapter 2.0, "Alternatives."

Under CEQA, the environmental analysis compares the Proposed Action and alternatives under consideration, including the No-Project Alternative (referred to in this EIS/EIR as the No-Action Alternative), to existing conditions, defined at the time when the notice of preparation was published (March 27, 2009). Under NEPA, the effects of the Proposed Action and alternatives under consideration, including the No-Action Alternative, are determined by comparing effects between alternatives and against effects from the No-Action Alternative. Consequently, baseline conditions differ between NEPA and CEQA. Under NEPA, the No-Action Alternative (i.e., expected future conditions without the project) is the baseline to which the action alternatives are compared, and the No-Action Alternative is compared to existing conditions. Under CEQA, existing conditions are the baseline to which all alternatives are compared.

Project impacts are effects that are categorized, pursuant to NEPA and CEQA, to describe the intensity or duration of the impact. Project effects fall into the following categories:

- A **temporary impact** would occur only during construction. The environmental analysis addresses potentially significant impacts from the direct impact of construction at the project site, direct impact associated with site development, and indirect construction impacts associated with fill and wetland construction activities and construction traffic.

- A **short-term impact** would last from the time construction ceases to within 3 years following construction.

- A **long-term impact** would last longer than 3 years following construction. In some cases, a long-term impact could be considered a permanent impact.

- A **direct impact** is an impact that would be caused by an action and would occur at the same time and place as the action.

- An **indirect impact** is an impact that would be caused by an action but would occur later in time or at a distance that is removed from the project area, but is reasonably foreseeable, such as growth-inducing effects and other changes related to changes in land use patterns and related effects on the physical environment.

- A **residual impact** is an impact that would remain after implementation of mitigation.

- A **cumulative impact** is an impact that is cumulatively considerable, which means the possible effects of a project are individually limited but cumulatively considerable. As used in this paragraph, "cumulatively considerable" means that the incremental effects of an individual 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.

In accordance with PRC Section 21081.6(a), the SAFCA Board of Directors, if it approves the Proposed Action, will adopt a mitigation monitoring and reporting program (MMRP) at the time that it certifies the EIR. The purpose of the MMRP is to ensure that the mitigation measures adopted as part of project approval will be complied with during project construction and implementation. The MMRP will identify each of the mitigation measures and describe the party responsible for monitoring, the timeframe for implementation, and the program for monitoring compliance.

The SAFCA Board of Directors will also be required to adopt findings with respect to each significant impact of the project (PRC Section 21081).

4.1.3 SUMMARY OF PREVIOUS NEPA AND CEQA ANALYSES OF BORROW SITES

As noted in Section 2.3.3, "Borrow Sites," the Fisherman's Lake Borrow Area is anticipated to be the primary source of soil borrow for Phase 4a Project construction. However, additional borrow sites may be needed, including some that have been fully analyzed in previous environmental documents. The following sites, that could also be used as a source of borrow material for the Phase 4a Project, were identified as potential sources of borrow material for the Phase 2 and/or 3 Projects (these sites are also listed in **Table 2-10**):

- Brookfield (Phase 2, 3, and 4a Projects);
- Airport north bufferlands (Phase 2, 3, and 4a Projects);
- South Sutter, LLC (Phase 3 Project);
- Elkhorn Borrow Area (Phase 3 and 4a Projects);
- Novak (Phase 3 and 4a Projects);
- Krumenacher (Phase 3 and 4a Projects); and
- Twin Rivers Unified School District stockpile (Phase 3 and 4a Projects).

The purpose of this section is to review the environmental analyses for these previously identified borrow sites, and to incorporate relevant impact conclusions by reference. As previously discussed in Section 1.1.1, "Scope of Environmental Analysis," NEPA encourages incorporation by reference under the Council on Environmental Quality (CEQ) regulations, and the State CEQA Guidelines allow for incorporation by reference where project-specific analysis is tiered from previous analysis. **Table 4.1-1** provides a citation to the previous environmental documents that include discussions of these borrow sites. Because these borrow sites have been included in the project description for the overall NLIP Landside Improvement Project (programmatically) and in previous project phases (at a project level), the proposed use of these borrow sites has informed the analysis for appropriate impact topics. Accordingly, analysis of these sites in this EIS/EIR is limited to impacts not previously covered, which are unique to the Phase 4a Project.

Table 4.1-1
Borrow Site Project Description Information Contained in Previous NEPA and CEQA Documents

Borrow Site/Area	Citation	Discussion
Phase 2 EIR		
Brookfield	SAFCA 2007:2-8, 2-9	Described in Section 2.2.2, "Borrow Sites"
Brookfield	SAFCA 2007:2-28	Identified as a source of borrow material
Airport north bufferlands	SAFCA 2007:2-8, 2-9	Described in Section 2.2.2, "Borrow Sites"
Airport north bufferlands	SAFCA 2007:2-33	Identified as a major source of borrow for Sacramento River east levee improvements
Airport north bufferlands	SAFCA 2007:2-58	Identified as a source of borrow material
Novak	SAFCA 2007:2-9	Identified as a major source of borrow for Sacramento River east levee improvements
Novak	SAFCA 2007:2-33	Identified as a major source of borrow for Sacramento River east levee improvements
Novak	SAFCA 2007:2-54	Identified as a major source of borrow for Sacramento River east levee improvements
Phase 2 EIS		
Brookfield	USACE 2008:2-15	Identified as a source of borrow for Phase 2–4 Projects
Airport north bufferlands	USACE 2008:2-14	Identified as a source of borrow for Phase 2–4 Projects
Airport north bufferlands	USACE 2008:2-34	Identified as a source of borrow for work along Sacramento River east levee
Novak	USACE 2008:2-14	Identified as a source of borrow for work along Sacramento River east levee
Novak	USACE 2008:2-22	Identified as a source of borrow for work along the Sacramento River east levee
Novak	USACE 2008:2-34	Identified as a source of borrow for Phase 2–4 Projects
Phase 2 SEIR		
Airport north bufferlands	SAFCA 2009:2-15	Shown in Exhibit 2-10, "Borrow Sites and Anticipated Haul Routes"
Airport north bufferlands	SAFCA 2009:2-16	Described as a change in baseline for current land use
Phase 3 DEIS/DEIR		
Brookfield	USACE and SAFCA 2009: 2-26	Identified as a source of material for work on the Pleasant Grove Creek Canal
Brookfield	USACE and SAFCA 2009: 2-30	Presented in Table 2-2, "Potential Borrow Sites"

Table 4.1-1
Borrow Site Project Description Information Contained in Previous NEPA and CEQA Documents

Borrow Site/Area	Citation	Discussion
Airport north bufferlands	USACE and SAFCA 2009: 2-25	Described in Section 2.3.7.2, "Borrow Quantities and Material Handling;" Airport site identified as source of borrow for work on the Sacramento River east levee for the Phase 3 Project
Airport north bufferlands	USACE and SAFCA 2009: 2-30	Presented in Table 2-2, "Potential Borrow Sites"
South Sutter, LLC	USACE and SAFCA 2009: 2-30	Presented in Table 2-2, "Potential Borrow Sites"
South Sutter, LLC	USACE and SAFCA 2009: 2-31, Appendix J	Contains programmatic NEPA and CEQA analysis of potential sites within this area, checklist provided for determining if additional analysis is required
Elkhorn Borrow Area	USACE and SAFCA 2009: 2-30	Presented in Table 2-2, "Potential Borrow Sites"
Elkhorn Borrow Area	USACE and SAFCA 2009: 2-31, Appendix J	Contains programmatic NEPA and CEQA analysis of potential sites within this area, checklist provided for determining if additional analysis is required
Krumenacher	USACE and SAFCA 2009: 2-30	Presented in Table 2-2, "Potential Borrow Sites"
Twin Rivers Unified School District stockpile	USACE and SAFCA 2009: 2-30	Presented in Table 2-2, "Potential Borrow Sites"

Source: SAFCA 2007, USACE 2008, SAFCA 2009, and USACE and SAFCA 2009

The Fisherman's Lake Borrow Area was identified and analyzed at a program level in the Phase 2 EIR. The Novak property within the Fisherman's Lake Borrow Area was analyzed at a project level in the Phase 3 DEIS/DEIR. The use of the larger Fisherman's Lake Borrow Area is analyzed at a project level in this EIS/EIR.

Because the Phase 4a Project may rely on approved borrow capacity from the additional borrow sites identified above, the Phase 4a Project would indirectly contribute to impacts associated with the Phase 2 and 3 Projects. Accordingly, impacts that were identified as significant after implementation of mitigation in the relevant documents incorporated by reference (see Section 1.1.1, "Scope of Environmental Analysis," for the full document citations, including the State Clearinghouse numbers) are summarized below:

- Phase 2 EIR
  - conversion of Important Farmland to nonagricultural uses;
  - potential construction impacts on known prehistoric resources, discovery of human remains during construction, and damage to or destruction of previously undiscovered cultural resources;
  - temporary increase in traffic on local roadways during construction;
  - effects on air quality with respect to short-term construction emissions: temporary emissions of reactive organic gases (ROG), oxides of nitrogen (NO_X), and respirable particulate matter less than 10 microns in diameter (PM_{10}) (direct and cumulative), and incremental contributions to greenhouse gas emissions;

- generation of short-term construction noise, exposure of sensitive receptors to or generation of excessive groundborne vibration or noise, and exposure of residents to increased traffic noise levels from hauling activity; and
- changes in scenic vistas, scenic resources, and existing visual character of the project area.

► Phase 2 EIS

- conversion of Important Farmland to nonagricultural uses;
- potential construction effects on known prehistoric resources;
- damage to or destruction of previously undiscovered cultural resources;
- temporary increase in traffic on local roadways during construction;
- discovery of human remains during construction;
- temporary emissions of ROG, NO_X, and PM_{10} (direct and cumulative), and incremental contributions to greenhouse gas emissions;
- generation of short-term construction noise, exposure of sensitive receptors to or generation of excessive groundborne vibration or noise, and exposure of residents to increased traffic noise levels from hauling activity; and
- changes in scenic vistas, scenic resources, and existing visual character of the project area.

► Phase 2 SEIR

- potential construction impacts on CA-Sac-485/H, a prehistoric archaeological site along the Sacramento River east levee;
- damage to or destruction of other identified prehistoric cultural resources; and
- generation of temporary, short-term construction noise.

► Phase 3 DEIS/DEIR

- conversion of Important Farmland to nonagricultural uses;
- conflicts with lands under Williamson Act contracts;
- potential to physically divide or disrupt an established community;
- impacts on Swainson's hawk and other special-status birds;
- potential damage or disturbance to known prehistoric resources from ground-disturbance or other construction-related activities;
- potential damage to or destruction of previously undiscovered cultural resources from ground-disturbance or other construction-related activities;
- potential discovery of human remains during construction;

- temporary increase in traffic on local roadways;
- temporary emissions of ROG, NO_X, and PM_{10} during construction;
- generation of temporary, short-term construction noise;
- exposure of sensitive receptors to or generation of excessive groundborne vibration;
- temporary, short-term exposure of residents to increased traffic noise levels from hauling activity;
- alteration of scenic vistas, scenic resources, and existing visual character of the project area; and
- new sources of light and glare that adversely affect views.

4.2 AGRICULTURAL RESOURCES

4.2.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.2.1.1 METHODOLOGY

Evaluation of the project's potential impacts on agricultural resources was based on a review of the planning documents pertaining to the project study area, including goals and policies from the *Sutter County General Plan* (Sutter County 1996), the *Sacramento County General Plan* (Sacramento County 1993), Federal plans and regulations relating to the Sacramento County Airport System (SCAS) and Federal Emergency Management Agency (FEMA), the soil surveys of Sutter and Sacramento Counties (National Resources Conservation Service [NRCS] 1988, 1993), and consultation with appropriate agencies. In addition, the California Department of Conservation (DOC) (DOC 2008) Important Farmland maps and California Land Conservation Act (commonly known as the Williamson Act [California Government Code Section 51200 et seq.]) maps for Sutter and Sacramento Counties were used to determine the agricultural significance of the lands on the project area. For purposes of this analysis, it was assumed that reclamation of borrow sites by returning the topsoil layer to the site would not adversely affect a site's long-term agricultural productivity and, therefore, its status as Important Farmland under the Important Farmland Mapping and Monitoring Program (FMMP) would not be changed permanently. This assumption applies only to those sites that would be converted to non-agricultural habitat (e.g., managed marsh and woodlands, as opposed to row crops that can be used for foraging habitat). Non-agricultural mitigation sites would be preserved as habitat in perpetuity, permanently affecting their long-term agricultural productivity and status as Important Farmland.

4.2.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to agricultural resources if they would do any of the following:

- convert Important Farmland (i.e., Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use;
- conflict with existing zoning for agricultural use or a Williamson Act contract; or
- involve other changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland to nonagricultural use.

4.2.2 IMPACTS AND MITIGATION MEASURES

Impact 4.2-a: Conversion of Important Farmland to Nonagricultural Uses

Table 4.2-1 summarizes and compares the project's potential impacts to Important Farmland. Loss and conversion of agricultural lands on a cumulative basis is addressed in Chapter 5.0, "Cumulative and Growth-Inducing Impacts, and Other Statutory Requirements."

Table 4.2-1 Important Farmland Conversion			
Project Component/Location	No-Action Alternative	Proposed Action (Acres)	RSLIP Alternative (Acres)
Permanent Conversion			
Sacramento River east levee (adjacent levee footprint)	-	61	0
Sacramento River east levee (adjacent corridor that would accommodate seepage berms, O&M corridor, utility corridor, and other facilities)		386	364
Riverside Canal relocation and extension	-	109	109
Habitat Creation at Fisherman's Lake (marsh)	-	120	120
Total Permanent Conversion	-	**676**	**593**
Temporary Conversion[1]			
Fisherman's Lake Borrow Area (excluding marsh creation)	-	270	270
I-5 Borrow Area	-	225	225
Total Temporary Conversion[2]	-	**495**	**495**

Notes: RSLIP = Raise and Strengthen-Levee-in-Place Alternative; O&M = operations and maintenance; I-5 = Interstate 5

[1] Temporary conversion of Important Farmland; borrow sites would be reclaimed and returned to agricultural uses.

[2] Potential maximum if all borrow sites are excavated over entire acreage available.

Source: Data compiled by EDAW in 2008 and 2009

Impact 4.2-a: Conversion of Important Farmland to Nonagricultural Uses

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, the project would not convert any Important Farmland. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of a levee failure would remain high. A levee failure along the Sacramento River east levee could result in scouring of agricultural land and the long-term loss of topsoil in areas near a levee breach. This could result in a long-term loss of Important Farmland in those areas. Such a loss is evident at the locations of past levee failures, for example on the Feather River above Star Bend in Yuba County, where a large dense stand of willow riparian scrub grows in sediments deposited by floodwaters following the scouring of the agricultural soil by the force of in-rushing water. Such losses are typically limited to localized areas within several hundred feet of a levee breach. (The indirect effects of lack of flood protection on urban development and Important Farmland conversion have been addressed as part of the NLIP cumulative and growth-inducing impact analyses (see Chapter 5.0, "Cumulative and Growth-Inducing Impacts, and Other Statutory Requirements") The effects of a single or isolated levee failure on the permanent loss of Important Farmland would be localized at the point of the levee breech and would be less-than-significant. Simultaneous levee failures in more than one location in the perimeter levee system would have a more widespread effect. A precise determination of significance is not possible and cannot be made because the extent

of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

Important Farmland mapping for the Natomas Basin is shown in **Plate 3-1** and Important Farmland classifications are described in detail in Section 3.2, "Agricultural Resources."Nearly all of the agricultural lands within the footprint of flood damage reduction facilities are classified as Prime Farmland, Farmland of Statewide Importance, or Farmland of Local Importance. **Table 4.2-1** shows the potential maximum acreage of Important Farmland that would be permanently converted to nonagricultural uses for the Proposed Action. This conversion includes the levee improvements that would occur within a maximum 660-foot-wide corridor along the Sacramento River east levee (see the description of the Sacramento River east levee improvements in Section 2.3.1.1, "Sacramento River East Levee," and **Plate 2-8**). These improvements would include the footprint of the adjacent levee, seepage berms that could be up to 500 feet wide, an O&M corridor, and a utility corridor. As discussed in Chapter 2.0, "Alternatives," seepage berms would only be required in select locations along the levee, depending upon final project design; therefore, the width of the corridor adjacent to the new adjacent levee may be narrower than assumed here for purposes of worst-case analysis.

In addition to the lands that would be within the footprint of the levee improvements, land required for the relocation and extension of the Riverside Canal, and lands required for creation of non-agricultural habitat (woodland plantings to compensate for loss of woodlands primarily on the landside of the levee and marsh creation) are all classified as Important Farmland. The conversion of these areas to nonagricultural uses would be permanent, and therefore this impact is significant.

Soil borrow for construction would be obtained from the proposed borrow sites described in Section 2.3.3, "Borrow Sites," and shown in **Plate 2-7**. **Table 4.2-1** shows the total acreage of Important Farmland that would be permanently and temporarily converted to nonagricultural uses, and **Table 2-10** lists the potential borrow sites, excavation area and depth, postborrow depth, and proposed postborrow (reclaimed) use. The Fisherman's Lake Borrow Area is anticipated to be the primary source of soil borrow material for the Phase 4a Project (**Plates 2-6-b** and **2-7**). However, additional borrow sites may be needed, including the I-5 Borrow Area, the Elkhorn Borrow Area, the South Sutter, LLC and Krumenacher borrow sites, the Twin Rivers Unified School District stockpile site, and the Airport north bufferlands. For construction on the NCC south levee, the source of soil borrow would be the Brookfield borrow site. The Fisherman's Lake and I-5 Borrow Areas are fully analyzed in this EIS/EIR; all other borrow sites were analyzed in previous environmental documents as described in Section 2.3.3.2, "Other Potential Borrow Sites."

Only portions of each property and not all of the properties identified may ultimately be used for borrow. The decision as to which borrow sites would be used, and for which construction phase, has not yet been made by SAFCA. The decision would depend on the availability of material at each site; the proximity of the borrow site to the project component (length of haul route); the quality of borrow material; and avoidance and/or minimization of significant environmental effects, such as damage to cultural resources, tree removal, wetlands, and special status species habitat. The lands in the potential borrow sites in Sacramento County are classified as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. Reclamation of all borrow sites would be performed in compliance with the California Surface Mining and Reclamation Act and would entail preservation and replacement of the topsoil on these parcels, thus retaining their potential use for agriculture.

Sites that SAFCA intends to reclaim and return to agricultural use are listed in **Table 4.2-1** under "Temporary Conversion." These parcels (i.e., the I-5 Borrow Area and portions of the Fisherman's Lake Borrow Area) would be returned to upland agriculture (field crops not including rice) following the completion of soil borrow removal. South Sutter, LLC and the Elkhorn Borrow Area, which were previously addressed in the Phase 3 DEIS/DEIR, would also provide borrow for the Phase 4a Project, as described in Section 2.3.3, "Borrow Sites." The use of these sites for borrow would not represent a permanent conversion to nonagricultural uses. The majority of

borrow sites would be returned to agricultural uses, consistent with NLIP habitat conservation objectives to provide upland agriculture as high-quality foraging habitat for Swainson's hawk, an NBHCP-listed species, as compensation for project impacts. However, sites in the Fisherman's Lake Borrow Area may be permanently converted to managed, non-agricultural habitat (see Section 4.7, "Biological Resources," for additional details regarding habitat creation), including managed marsh, to implement the NLIP's conservation objective of increasing available habitat and habitat connectivity for giant garter snake, another NBHCP-listed species. These habitat improvements are intended to substantially contribute to the emergence of an urban habitat refuge in the Natomas Basin, meeting the NBHCP's objectives (see Section 2.3.4.1, "Overview of the Landside Improvements Project's Habitat Conservation Goals and Strategy").

The temporary and permanent conversion of Important Farmland to flood damage reduction features and habitat and borrow uses would be a **significant** impact.

RSLIP Alternative

The raised portion of the Sacramento River east levee under the RSLIP Alternative would have a smaller footprint than the adjacent levee in Reaches 10–15 under the Proposed Action, and therefore, would result in a smaller amount of permanent conversion of Important Farmland than under the Proposed Action, as shown in **Table 4.2-1**. However, the temporary conversion of Important Farmland under this alternative would be the same as under the Proposed Action, as shown in **Table 4.2-1**.

This alternative would result in the same conversion of Important Farmland as the Proposed Action in the footprint of the relocated and extended Riverside Canal. Because of the narrower levee footprint under the RSLIP Alternative, the overall impact to Important Farmland would be approximately 80 acres less than that of the Proposed Action. However, because of greater impacts to waterside riparian woodlands, as described in Impact 4.7-a, "Loss of Woodland Habitats," habitat creation and preservation components of this alternative would require planting of substantial woodland habitat along the landside of the adjacent Sacramento River east levee. Approximately 75 additional acres of habitat compensation sites would need to be located in the Basin or credits would need to be purchased from a local mitigation bank to offset the removal of trees from the waterside of the existing levee. A substantial amount of Important Farmland could be converted for woodland habitat creation (see Section 2.3.4, "Habitat Improvements") under the RSLIP Alternative. As described above under the Proposed Action, the creation of habitat would be consistent with the intent of the NBHCP.

Important Farmlands permanently and temporarily converted at borrow sites would be the same as under the Proposed Action. SAFCA intends to reclaim the majority of borrow sites and return these sites to agricultural use.

The temporary and permanent conversion of Important Farmland to flood damage reduction features and habitat and borrow uses under the RSLIP Alternative would be a **significant** impact. ***(Similar)***

Mitigation Measure 4.2-a: Minimize Important Farmland Conversion to the Extent Practicable and Feasible

Proposed Action and RSLIP Alternative

SAFCA shall implement the measures listed below with regard to Prime Farmland, Unique Farmland, and Farmland of Statewide Importance to minimize impacts on these lands.

(a) Borrow sites shall be configured to minimize the fragmentation of lands that are to remain in agricultural use. Contiguous parcels of agricultural land of sufficient size to support their efficient use for continued agricultural production shall be retained to the extent practicable and feasible.

(b) To the extent practicable and feasible, when expanding the footprint of a flood damage reduction facility (e.g., levee or berm) onto agricultural land, the most productive topsoil from the construction footprint shall be salvaged and redistributed to less-productive agricultural lands in the vicinity of the construction area that could benefit from the

introduction of good-quality soil. By agreement between the implementing agencies or landowners of affected properties and the recipient(s) of the topsoil, the recipient(s) shall be required to use the topsoil for agricultural purposes. SAFCA shall implement all terms and conditions of agreements.

(c) During project construction, use of utilities that are needed for agricultural purposes (including wells, pipelines, and power lines) and of agricultural drainage systems shall be minimized so that agricultural uses are not substantially disrupted.

(d) Disturbance of agricultural land and agricultural operations during construction shall be minimized by locating construction staging areas on sites that are fallow, that are already developed or disturbed, or that are to be discontinued for use as agricultural land, and by using existing roads to access construction areas to the extent possible.

(e) To the extent feasible, lands acquired for flood damage reduction purposes shall also be used as mitigation land for NBHCP programs so that agricultural land conversion is minimized.

Implementation of this mitigation measure would reduce the impact of permanent conversion of Important Farmland to habitat uses under the Proposed Action and the RSLIP Alternative, but not to a less-than-significant level because no new farmland would be made available, and the productivity of existing farmland would not resume or be improved. Conservation of 1,660 acres of Important Farmland in the Elkhorn Basin of Yolo County across the Sacramento River from the Natomas Basin as described in Section 3.2, "Agricultural Resources," would partially offset the permanent conversion of agricultural lands resulting from the Proposed Action and the RSLIP Alternative. However, because no feasible mitigation is available to fully reduce the impact of permanent conversion of Important Farmland to flood damage reduction features and habitat uses, this impact would remain **significant and unavoidable** for the Proposed Action and the RSLIP Alternative. ***(Similar)***

Implementation of these measures for borrow sites that are returned to agricultural use would reduce the impacts of temporary conversion of Important Farmland under the Proposed Action and the RSLIP Alternative, but not to a less-than-significant level. Temporary conversion of Important Farmland for borrow use is considered a **significant and unavoidable** impact in the short term, but a **less-than-significant** impact in the long term because the topsoil layer to the site would be reclaimed. Reclamation thus would not adversely affect a site's long-term agricultural productivity and, therefore, its status as Important Farmland under the FMMP would not be changed permanently. ***(Similar)***

Impact 4.2-b: Conflict with Lands under Williamson Act Contracts

Table 4.2-2 summarizes and compares the project's potential impacts on Williamson Act contracted lands.

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, the project would not cause Williamson Act contracts to be terminated as a result of levee construction or borrow activities. There would be **no impact**. ***(Lesser)***

Table 4.2-2 Williamson Act Contracted Land Conversion			
Project Component/Location	No-Action Alternative	Proposed Action (Acres)	RSLIP Alternative (Acres)
Permanent Conversion			
Sacramento River east levee	-	156	124
Riverside Canal relocation and extension	-	40	40
Habitat Creation at Fisherman's Lake Borrow Area (marsh)	-	20	20
Total Permanent Conversion	-	**216**	**184**
Temporary Conversion			
I-5 Borrow Area	-	40	40
Total Temporary Conversion[1]	-	**40**	**40**

Notes: RSLIP = Raise and Strengthen-Levee-in-Place Alternative; I-5 = Interstate 5

[1] Potential maximum if all borrow sites are excavated over entire acreage available.

Source: Data compiled by EDAW in 2008 and 2009

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Flooding in the Basin, resulting in destruction of agricultural land, would have **no impact** related to cancellation of Williamson Act contracts. ***(Lesser)***

Proposed Action

In Sacramento County, the Proposed Action would affect properties under Williamson Act contract in Reaches 10, 12A, 12B, and 15 along the Sacramento River east levee and along the alignment of the relocated and extended Riverside Canal. If the Proposed Action does not require acquisition of an entire parcel, the contract only on the portion of the parcel required for the Phase 4a Project would be terminated; the remainder of the parcel unaffected by the Proposed Action would remain under contract. **Table 4.2-2** shows the acreage lands under Williamson Act contract that would be taken out of contract.

The use of Williamson Act contracted lands as borrow sites would require cancellation of Williamson Act contracts. For lands that would be permanently converted to nonagricultural uses or acquired in fee by SAFCA, notice to DOC is required under the Act, as described under Mitigation Measure 4.2-b, below. Those contracted lands that would be returned to agricultural use, could potentially be reenrolled, providing compatibility standards contained in Government Code Sections 51238–51238.3 are met. Properties that would be converted to flood damage reduction features (lands along the Sacramento River east levee, the Riverside Canal relocation and extension) or managed habitat would no longer be eligible for Williamson Act contracting.

The temporary and permanent cancellation of lands under Williamson Act contract for flood damage reduction features and habitat and borrow uses would be a **significant** impact.

The RSLIP Alternative would have the same impacts on Williamson Act contracted lands as the Proposed Action with respect to borrow sites, habitat creation, and the canal relocation and extension. However, it would not have as great an impact on Williamson Act contracted lands adjacent to the Sacramento River east levee, because the levee footprint would not be expanded onto adjacent properties to the same extent as the Proposed Action (see **Table 4.2-2**). The temporary and permanent cancellation of lands under Williamson Act contract for flood damage reduction features, habitat and borrow uses under the RSLIP Alternative would be a **significant** impact. ***(Lesser)***

Mitigation Measure 4.2-b: Minimize Impacts on Agricultural Preserve Land and Williamson Act–Contracted Land; Comply with Government Code Sections 51290–51293; and Coordinate with Landowners and Agricultural Operators

Proposed Action and RSLIP Alternative

To reduce impacts on under Williamson Act contracts, SAFCA shall implement the measures described below.

(a) SAFCA shall comply with California Government Code Sections 51290–51295 with regard to acquisition of Williamson Act contracted lands as follows:

- The policy of the state, consistent with the purpose of the Williamson Act to preserve and protect agricultural land, is to avoid, whenever practicable, locating public improvements and any public utilities improvements in agricultural preserves. If it is necessary to locate within a preserve, it shall be on land that is not under contract (Government Code Section 51290[a][b]). More specifically, the basic requirements are:
  - Whenever it appears that land within a preserve or under contract may be required for a public improvement, the public agency or person shall notify the DOC and the city or county responsible for administering the preserve (Government Code Section 51291[b]).
  - Within 30 days of being notified, DOC and the city or county shall forward comments, which shall be considered by the public agency or person (Section 51291[b]).
- The contract shall be terminated when land is acquired by eminent domain or in lieu of eminent domain (Government Code Section 51295).
- DOC and the city or county shall be notified before project completion of any proposed substantial changes to the public improvement (Government Code Section 51291[d]).
- DOC shall be notified within 10 working days upon completion of the acquisition (Section 51291[c]).
- If, after acquisition, the acquiring public agency determines that the property will not be used for the proposed public improvement, before returning the land to private ownership, DOC and the city or county administering the involved preserve shall be notified. The land shall be reenrolled in a new contract or encumbered by an enforceable restriction at least as restrictive as that provided by the Williamson Act (Government Code Section 51295).

(b) SAFCA shall coordinate with landowners and agricultural operators to sustain existing agricultural operations, at the landowners' discretion, within the project area until the individual agricultural parcels are needed for project construction.

(c) Properties that were under Williamson Act contract prior to conversion for borrow use and that are owned by SAFCA or are acquired by SAFCA shall be reenrolled under Williamson Act contract upon reclamation to agricultural use.

Implementation of this mitigation measure would potentially reduce the impacts from temporary conversion of Williamson Act–contracted lands used as borrow sources under the Proposed Action and the RSLIP Alternative, but not to a less-than-significant level because SAFCA has no regulatory authority over ensuring that parcels are reenrolled. No feasible mitigation is available to lessen or avoid the permanent loss of land under Williamson Act contracts converted to nonagricultural use within the flood damage reduction features footprint and for habitat creation. For these reasons, this impact would remain **significant and unavoidable**. ***(Similar)***

4.2.3 RESIDUAL SIGNIFICANT IMPACTS

Under the No-Action Alternative; impacts of permanent agricultural land loss due to levee failure would remain uncertain, depending on the location and number of levee breeches. Because of this uncertainty, these potential impacts are considered too speculative for meaningful consideration.

The implementation of mitigation measures required in this section would partially reduce the impacts of permanent and temporary conversion of Important Farmland to nonagricultural uses, temporary conversion of lands in Agricultural Preserves, and loss of lands under Williamson Act contracts. However, there is no feasible mitigation available that would lessen or avoid these losses; therefore, residual significant and unavoidable impacts would occur under both the Proposed Action and the RSLIP Alternative.

4.3 LAND USE, SOCIOECONOMICS, AND POPULATION AND HOUSING

4.3.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.3.1.1 METHODOLOGY

The Proposed Action and alternatives under consideration were evaluated in the context of adopted land use plans and policies. State, regional, and local land use plans and policies contained in adopted planning documents pertaining to the project site were reviewed, including the *Sutter County General Plan* (Sutter County 1996) and zoning code, *Sacramento County General Plan* (Sacramento County 1993) and zoning code, the *Sacramento International Airport Master Plan* (Airport Master Plan) (Sacramento County Airport System 2007), the *Sacramento International Airport Land Use Compatibility Plan* (ALUCP), the *Natomas Basin Habitat Conservation Plan* (NBHCP), and field review and consultation with appropriate agencies. There are no Federal land use plans or policies that would apply to the project. SAFCA, acting as a Joint Exercise of Power Agency (California Government Code 6500), must consider relevant Federal and state land use policies, but is exempt from compliance with plans, policies, and regulations adopted by local agencies (California Government Code 53090).

The Proposed Action and alternatives under consideration were also evaluated for potential impacts related to socioeconomics (required under NEPA) and population and housing using data from the 2000 U.S. Census and a review of land use surveys of the Phase 4a Project area.

4.3.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to land use, socioeconomics, and population and housing if they would do any of the following:

- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental impact;
- conflict with any applicable habitat conservation plan or natural community conservation plan;
- physically divide an established community;
- displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere; or
- displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

The project's potential to physically divide or disrupt an established community also relates to the socioeconomic impact of removal of existing residences and structures, if unavoidable, to accommodate the Phase 4a Project under either the Proposed Action or the RSLIP Alternative. The potential removal of existing residences would require relocation of residents.

As stated in Section 2.3.6, "Lands, Easements, Relocations, and Rights-of-Way," under the Proposed Action and RSLIP Alternative, approximately 12 residences and associated structures may need to be removed from the landside of the Sacramento River east levee during implementation of the Phase 4a Project. SAFCA would minimize the project footprint to avoid these residences to the extent feasible (see Chapter 2.0, "Alternatives"). All relocations of residents would be conducted in compliance with Federal and state relocation law. Acquisition

and relocation services would be accomplished in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 United States Code [USC] 4601 et seq.), and implementing regulation, 49 Code of Federal Regulations [CFR] Part 24; and California Government Code Section 7267 et seq., California Code of Civil Procedure Sections 1263.010 to 1263.620 and 1255.010 to 1255.060, California Community and Housing Development Title 25, and State and Caltrans Right of Way Manual, Chapter 10. These laws require that appropriate compensation be provided to displaced landowners and tenants, and residents would be relocated to comparable replacement housing. Refer to Section 3.3, "Land Use, Socioeconomics, and Population and Housing," and Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations," for more details regarding these regulations. The existing housing stock in the project vicinity has sufficient available housing for rent and purchase to accommodate displaced residents from these residences. Therefore, no new construction would be required to accommodate the relocation of residences and no further discussion of the permanent displacement of housing or persons is necessary in this EIS/EIR.

4.3.2 IMPACTS AND MITIGATION MEASURES

Impact 4.3-a: Inconsistency with Airport Master Plan, Airport Land Use Compatibility Plan, and Airport Wildlife Hazard Management Plans

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to directly conflict with adopted Airport plans. This alternative would be **consistent** with adopted Airport plans. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. In the event that a major flood event affects Airport operations, the Sacramento County Board of Supervisors has approved a *Continuity of Airport Operations Flood Contingency Plan* that would transfer limited commercial transport operations to Mather Field (Sacramento County Board of Supervisors 2008). Consistency of the No-Action Alternative with the continued implementation of Airport plans would depend on the location of any future levee failure and the extent of subsequent flooding. Assuming that the Airport is still operational after levee failure, Airport north bufferlands could be temporarily altered from managed grassland and idle fields to marsh conditions, a land use considered to be incompatible near airports. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential inconsistency is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

The Airport's Critical Zone would overlap the proposed Phase 4a Project levee footprint in Reaches 10–11A of the Sacramento River east levee and the I-5 Borrow Area. The proposed flood damage reduction improvements would not modify intended land uses within those areas or include components such as the creation of water features that could attract waterfowl and thereby introduce hazards into the Critical Zone (see Section 4.15, "Hazards and Hazardous Materials"). The I-5 Borrow Area within the Airport Critical Zone would be returned to agricultural purposes following excavation activities. Therefore, the Proposed Action and RSLIP Alternative would not conflict with implementation of the adopted Airport Master Plan, ALUCP, or Airport Wildlife Hazard Management Plans. The Proposed Action and RSLIP Alternative would be **consistent** with adopted Airport plans. ***(Similar)***

Mitigation Measure: No mitigation is required.

Impact 4.3-b: Inconsistency with the Natomas Basin Habitat Conservation Plan

Consistency of the Proposed Action and the RSLIP Alternative with the NBHCP is summarized below. Refer to Impact 4.7-k in Section 4.7, "Biological Resources," for a detailed discussion of the project's potential impacts to biological resources related to implementation of the NBHCP.

No-Action Alternative

No Project Construction

Under the No-Action Alternative, without levee improvements, vegetation removal from the waterside of the levee would be required to conform to USACE guidance regarding levee encroachments, eliminating habitat for several species covered by the NBHCP, including Swainson's hawk. This habitat supports the majority of Swainson's hawk nest sites in the Natomas Basin. However, the NBHCP was put in place to promote biological conservation to compensate for habitat loss largely brought about by urban development in the Natomas Basin. Without flood risk reduction provided by the project, restrictions would be placed on new urban development and remaining habitat would not be at risk for conversion due to development. For these reasons, the No-Action Alternative would not directly conflict with implementation of the NBHCP. This alternative would be generally **consistent** with the NBHCP. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee, the risk of levee failure would remain high. The Natomas Basin Conservancy's (TNBC's) reserve infrastructure would be subject to damage in the event of levee failure; however, the extent of such damage is uncertain. Without flood protection provided by the levee improvements, restrictions would be placed on new urban development and remaining habitat would not be at risk for conversion due to development. Because there would be no habitat loss due to urban development, implementation of this alternative would not directly conflict with the implementation of the NBHCP. Impacts of the No-Action Alternative on special-status species are addressed in Section 4.7, "Biological Resources." This alternative would be generally **consistent** with the NBHCP. ***(Lesser)***

Proposed Action

The Proposed Action could encroach onto TNBC reserves and the potential for the Proposed Action to threaten the viability of populations of certain covered species, reduce the effectiveness of the NBHCP's conservation strategy, and adversely affect attainment of the goals and objectives of the NBHCP, which could jeopardize successful implementation of the NBHCP. The Proposed Action would not result in the development of land outside the NBHCP permit area, but it would result in land use conversions within the permit area. Land use conversion, however, would not cause a net loss in the habitat values provided by these lands for NBHCP-covered species in the Natomas Basin. Habitat impacts of the Proposed Action are described in Section 4.7, "Biological Resources." Although there would be a temporal loss of woodlands in the project area as the replacement woodland plantings mature within 10–15 years, the retention of the extensive mature waterside riparian woodlands coupled with the creation and preservation of landside woodlands would protect potential nesting habitat for special-status birds. The conversion of cropland to grassland would be offset through the preservation of field crops with the highest foraging value. This increase in overall habitat quality is anticipated to compensate for the loss associated with land conversions.

Compensatory habitat creation included in the Phase 4a Project is also part of SAFCA's overall programmatic conservation strategy that aims to reconfigure habitat and connective corridors in the Basin at a landscape scale to help achieve NBHCP objectives (see Section 2.3.4, "Habitat Conservation Improvements"). The collective

elements of SAFCA's conservation strategy would aid in NBHCP implementation and provide TNBC with an opportunity to improve its overall performance towards the goals of the NBHCP.

However, without proper implementation of habitat creation/preservation and creation of a management plan in consultation with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (DFG), the Proposed Action would have the potential to reduce the effectiveness of the NBHCP conservation strategy and adversely affect attainment of its goals and objectives. The Proposed Action would be **potentially inconsistent** with the NBHCP.

RSLIP Alternative

The impacts of the Proposed Action on successful implementation of the NBHCP would also occur under the RSLIP Alternative, with the exception that under this alternative, there would also be extensive removal of riparian vegetation on the waterside of the Sacramento River east levee to conform with USACE guidance regarding levee encroachments. This habitat is used by a variety of species covered by the NBHCP, and supports the majority of Swainson's hawk nest sites in the Natomas Basin. As described under Impact 4.7-f in Section 4.7, "Biological Resources," the impact of the loss of this vegetation on Swainson's hawks would be significant and may not be mitigable. Impacts on nesting habitat for Swainson's hawks in the near term (i.e., before compensation woodland plantings have matured sufficiently to provide replacement nesting habitat) could substantially affect the successful implementation of the NBHCP. Impacts of the RSLIP Alternative on biological resources, and mitigation measures required to reduce those impacts, are addressed in Section 4.7, "Biological Resources." The RSLIP Alternative would be **inconsistent** with the NBHCP. ***(Greater)***

Mitigation Measure 4.3-b: Implement Mitigation Measure 4.7-k, "Ensure that Project Encroachment Does Not Jeopardize Successful Implementation of the NBHCP and Implement Mitigation Measures 4.7-a and 4.7-c through 4.7-h"

Proposed Action and RSLIP Alternative

SAFCA shall implement Mitigation Measure 4.7-k, "Ensure that Project Encroachment Does Not Jeopardize Successful Implementation of the NBHCP and Implement Mitigation Measures 4.7-a and 4.7-c through 4.7- h," set forth in Section 4.7, "Biological Resources." In summary, this mitigation measure requires SAFCA to coordinate with TNBC, USFWS, and DFG to identify and implement actions to ensure that the project's small encroachment onto TNBC reserves does not jeopardize successful implementation of the NBHCP. With implementation of this mitigation measure, the Proposed Action would be **consistent** with the NBHCP.

Under the RSLIP Alternative, because of the likely loss of a substantial amount of nesting habitat for Swainson's hawk, the mitigation measures described above could be insufficient to ensure that the project would not jeopardize the successful implementation of the NBHCP. This Alternative would remain **inconsistent** with the NBHCP. ***(Greater)***

Impact 4.3-c Potential to Physically Divide or Disrupt an Established Community

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to divide or disrupt an established community. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Levee failure would have the potential to destroy houses located on or adjacent to the levee, and to isolate residents from nearby communities. The magnitude of the impact cannot be predicted and would depend upon the location of the levee breach, severity of the storm, and river flows at the time of flooding. Therefore, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

The primary concentration of urban development in the Natomas Basin lies in the city of Sacramento's communities of North and South Natomas, southeast of the Phase 4a Project area. The Proposed Action would have no direct impacts related to these established communities.

Within the Phase 4a Project area, approximately 91 residences are located along the Sacramento River east levee in Reaches 10–15. On the landside of the levee, approximately 12 rural residences and associated structures, and on the waterside of the levee, approximately 79 residences are located in these reaches. There are also scattered rural residences located near the I-5 and Fisherman's Lake Borrow Areas, and a residential subdivision is located to the immediate east of the Fisherman's Lake Borrow Area. The Phase 4a Project would use borrow material from the South Sutter, LLC borrow site, which was evaluated under the Phase 3 Project (see Section 4.1.3, "Summary of Previous NEPA and CEQA Analyses of Borrow Sites"). Two rural residences in Reach 8 of the Sacramento River east levee are located adjacent to this borrow site. In Reaches 12B and 13, three residences are situated between the levee (and planned haul route) and the Riverside Canal alignment and approximately 500 feet from the Fisherman's Lake Borrow Area. Approximately 27 residences are located on the landside of the levee in Reaches 15–18B where the alignment of the Riverside Canal would veer to the east to avoid these residences. Residents living along Garden Highway in the Phase 4a Project area are reliant upon the South Natomas community for some public services, such as schools, and for commerce. Garden Highway provides the only access to the nearby community for residents in this area.

The Proposed Action may require single-lane closures along portions of Garden Highway south of Powerline Road for 8–12 weeks for construction of cutoff walls. One-way traffic would be maintained during cutoff-wall construction to provide access to properties along the work area. Lane closures on the landside of Garden Highway may also be necessary in this area for installation of underground utilities. These lane closures would be minimal in duration and extent, and measures would be taken to provide access outside of construction work hours for residents on the landside of Garden Highway. Temporary pipes would be installed under Garden Highway at the Riverside Pumping Plant and Pumping Plants Nos. 3 and 5 (see **Plate 2-6a**) concurrent with cutoff wall construction. At Pumping Plant No. 5, a section of Garden Highway would be closed for 8–12 weeks to accommodate a raise of the existing levee. This raise, which is designed to reduce widening of the levee on the landside to avoid encroachment on the pumping plant, would affect approximately 600 feet of Garden Highway north and south of the pumping plant. No residential driveways would be affected by the closure. In the following construction year, permanent pipes would be installed after the levee has settled. Garden Highway would be closed to through traffic for up to 60 days in three locations for replacement of the temporary pipes; except for these closure points, Garden Highway would remain open and traffic detours would be located between Powerline Road and San Juan Road for the Riverside Pumping Plant, between Bayou Road and Powerline Road for Pumping Plant No. 5, and between Powerline Road and San Juan Road for Pumping Plant No. 3.

Although the Proposed Action would not require full closure or demolition of Garden Highway, intermittent short-duration road closures and detours would disrupt residents' access to the nearby community and would cause a temporary physical disruption to the community. Construction of the adjacent levee would also temporarily alter access to landside residences with driveways connecting to Garden Highway. These disruptions, however, would not require residents to permanently relocate. Multiple construction activities (borrow excavation

and hauling, borrow site reclamation, canal construction, cutoff wall installation and/or seepage berm or levee construction) could prolong access restrictions and disturbances at the previously-mentioned residences in Reaches 8, 12B, and 13 because of their proximity to these construction areas. The duration of construction activities near these residences would range from several weeks to several months, depending upon the extent to which the schedules are staggered over the construction season.

Relocation and extension of the Riverside Canal to the east side of the rural residences in Reaches 15–18B would not affect access for landside residences. However, construction of the parallel underground pipeline branch of the Riverside Canal near the toe of the new adjacent levee, which is needed to maintain the canal water supply for the landside rural residences, would temporarily interrupt access to landside residences. Because the Garden Highway provides the only access to residences on the waterside and the landside of the levee in this area, intermittent road closures and detours for levee construction and pipeline construction would disrupt residents' access to the nearby community (see Section 4.10, "Transportation and Circulation"). Temporary disruptions to access for residents would be a **significant** impact.

RSLIP Alternative

As with the Proposed Action, this alternative would have no direct impacts related to the established communities in North and South Natomas.

The RSLIP Alternative would not physically divide an established community; however, raising the levee in Reaches 10–11B and constructing cutoff walls in the existing levee would require full closure and demolition of Garden Highway, which provides primary access to the waterside residences in Reaches 10–15. Closures would affect 1.5- to 2-mile segments of Garden Highway at any one time, and the duration of closure for each segment would be approximately 8–12 weeks to allow for degrading the levee, installing the cutoff wall, reconstructing the levee, and reconstructing Garden Highway. These closures would eliminate access to residences along the waterside of Garden Highway in this area and would require that residents relocate until access is restored. Although some residents with docks may be able to obtain access to their properties from the waterside of the levee, this would not constitute a feasible means of maintaining access for an extended period. As with the Proposed Action, residents on the landside of the levee in Reaches 15–18B would potentially experience temporary access disruptions caused by construction of the irrigation water pipeline near the toe of the new adjacent levee. Temporary pipes would be installed under Garden Highway at the Riverside Pumping Plant and Pumping Plants Nos. 3 and 5 (see **Plate 2-6a**) concurrent with cutoff wall construction. In the following construction year permanent pipes would be installed after the levee has settled. Garden Highway would be closed to through traffic for up to 60 days in three locations for replacement of the temporary pipes; except for these closure points, Garden Highway would remain open and traffic detours would be located between Powerline Road and San Juan Road for the Riverside Pumping Plant, between Bayou Road and Powerline Road for Pumping Plant No. 5, and between Powerline Road and San Juan Road for Pumping Plant No. 3. The temporary access disruption and the full closure of Garden Highway in Reaches 10–15 would be a **significant** impact. ***(Greater)***

Mitigation Measure 4.3-c: Notify Residents and Businesses of Project Construction and Road Closure Schedules; Comply with the Garden Highway Settlement Agreement; and Implement Mitigation Measure 4.10-a, "Prepare and Implement a Traffic Safety and Control Plan for Construction-Related Truck Trips," and Mitigation Measure 4.10-c, "Notify Emergency Service Providers about Project Construction and Maintain Emergency Access or Coordinate Detours with Providers"

Proposed Action

SAFCA and its primary contractors for engineering design and construction shall implement Mitigation Measures 4.10-a, "Prepare and Implement a Traffic Safety and Control Plan for Construction-Related Truck Trips," and 4.10-c, "Notify Emergency Service Providers about

Project Construction and Maintain Emergency Access or Coordinate Detours with Providers," set forth in full in Section 4.10, "Transportation and Circulation." Additionally, the following measures shall be implemented:

a) SAFCA shall provide residents and business owners located adjacent to the construction areas with information regarding construction activities including contact information and complaint procedures, and with a construction timeline and shall post its construction schedule on the SAFCA Web site. Information shall include road closures and detour information. The schedule shall be updated on a regular basis.

b) SAFCA shall apply the following measures to power line relocations: To the extent that the main electrical power transmission lines and poles serving the Garden Highway must be relocated or replaced to accommodate the project, the relocation or replacement shall occur east of the new adjacent levee and in a manner that appropriately accommodates private landside improvements and properties. Existing main electrical power transmission lines and poles on the waterside of the existing Garden Highway levee that do not need to be relocated or replaced to accommodate the project may be left in place. No new main electrical power transmission lines and poles shall be installed on the waterside of the Garden Highway levee. Consistent with south engineering practices that prioritize the following, individual services shall: (1) use existing configurations and facilities, and (2) any new poles shall be placed on the landside of Garden Highway, subject to the approval of USACE, the Central Valley Flood Protection Board (CVFPB), and any other regulatory public agencies and utility companies. If the affected property owner and SAFCA cannot agree on a location of an individual service line pole from among locations that are otherwise acceptable to USACE, CVFPB, other regulatory agencies, and the utility provider, SAFCA shall pay the cost of a referee, who is a qualified registered civil engineer and agreeable to both the affected property owner and SAFCA, to decide the dispute over the location of the individual service line pole. SAFCA shall provide working drawings within 60 days to the Garden Highway Community Association's (GHCA's) officially designated contact in advance of commencing construction of power poles and lines for which locations would be changed as part of the project.

c) SAFCA shall apply the following measure to encroachments: Once SAFCA determines that the Sacramento River east levee is certifiable for the Federal Emergency Management Agency's (FEMA's) flood protection purposes, SAFCA shall make its best efforts to get written agreement from USACE, CVFPB, and RD 1000 that no additional encroachments on the waterside of the Garden Highway levee need to be removed.

d) SAFCA shall implement the following measures before and during construction:

    (i) SAFCA shall give property owners within the project area an informational package advising the property owners that preproject inspections of their properties are important and that SAFCA will conduct a free preconstruction inspection of the property, but only if requested by the affected property owner. The scope of the inspection and documentation shall be determined by SAFCA in consultation with the property owner. For property owners who request prior inspections/ documentation, the inspection/documentation must be scheduled prior to the start of construction within the specified reach of the Sacramento River east levee where project construction will commence.

(ii) If requested by a property owner within the project area, SAFCA shall test the owner's domestic well water before and after project construction for the presence of bentonite, concrete, and cement.

(iii) SAFCA shall cooperate with a construction monitoring committee established by GHCA to resolve reasonable complaints regarding SAFCA or its contractors' construction activities for the projects improvements in accordance with this provision. A complaint procedure and hierarchy shall be developed by GHCA's officially designated contact and SAFCA's Ombudsperson in time to be included in the informational packet referenced in subsection (i), above. In addition, the information packet shall include SAFCA's instructions to its contractors regarding appropriate use of the Garden Highway. SAFCA agrees to resolve all complaints pertaining to dangerous activities immediately and to resolve all other reasonable complaints in an expeditious manner.

(iv) SAFCA shall prohibit the use of earth-moving equipment or haul trucks on the Garden Highway in conjunction with project construction.

(v) SAFCA shall provide GHCA with a timeline for the phased completion of the project that indicates the role of the various agencies involved in implementing or permitting the project. SAFCA shall post its construction schedule for the project on the SAFCA Web site. The schedule shall be updated on a monthly basis. A hard copy of the schedule and monthly updates shall be mailed to GHCA's officially designated contact. In addition, SAFCA shall post a "60-day notice" of Planned Construction on the SAFCA Web site. A hard copy of the "60-day notice" shall be mailed to GHCA's officially designated contact. "Planned Construction" shall not include construction in the event of an emergency or construction necessary to remedy a condition discovered after completion of the project. However, SAFCA shall provide whatever notice is possible under the circumstances to affected, adjacent landowners prior to any emergency or remedial work.

e) SAFCA shall apply the following measures to drainage line location and relocation: No roadside swales shall be included in the design of the new adjacent levee downstream of Powerline Road. Consistent with sound engineering practices, and subject to the approval of USACE, CVFPB, and the Regional Water Quality Control Board (RWQCB), any new drainage outfall lines required by the project shall be buried pipes, located along property lines, and drain to the river. If a property owner does not want a new drain line located along the property line, he or she may request that the drain line be placed elsewhere on his or her property. If the property owner and SAFCA cannot agree on a location for a new drain line from among locations that are otherwise acceptable to USACE, CVFPB, and Central Valley RWQCB, SAFCA shall pay the cost of a referee, who is a qualified registered civil engineer and agreeable to both parties, to decide the dispute over the location of the drain line.

f) Where a property owner occupies a residence on property to be acquired for the project, SAFCA shall allow up to 12 months, rather that the statutory allowance of 3 months, for the owner to relocate off the property. The 12-month period shall be counted from the first written offer.

g) SAFCA shall provide notice as feasible for emergency construction or remedial construction.

Implementation of these mitigation measures would reduce the impact, but not to a less-than-significant level. Because no other feasible mitigation measures are available to fully reduce this impact to a less-than-significant level, therefore, this impact would remain **significant and unavoidable** under the Proposed Action.

RSLIP Alternative

SAFCA and its primary contractors for engineering design and construction shall implement Mitigation Measures 4.10-a, "Prepare and Implement a Traffic Safety and Control Plan for Construction-Related Truck Trips," and 4.10-c, "Notify Emergency Service Providers about Project Construction and Maintain Emergency Access or Coordinate Detours with Providers," set forth in full in Section 4.10, "Transportation and Circulation."

In addition to the measures listed under the Proposed Action, above, the following additional measures shall be implemented:

h) SAFCA shall provide assistance for residents who are required to relocate during the construction period. SAFCA shall compensate residents for reasonable rent and living expenses incurred due to relocation. Residents will have the right to decent, safe, and sanitary housing in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act.

i) SAFCA shall provide 24-hour security patrols for residences that must be vacated during the construction period.

Implementation of these mitigation measures would reduce the impact, but not to a less-than-significant level due to the potential for temporary dislocation of residents as a result of road closures of approximately 8 to 12 weeks. Therefore, this impact would remain **significant and unavoidable** under the RSLIP Alternative because no other feasible mitigation measures are available to fully reduce this impact. ***(Greater)***

4.3.3 RESIDUAL SIGNIFICANT IMPACTS

Under the No-Action Alternative, there would be no direct conflict with implementation of adopted Airport plans. In the event of a levee failure, continued implementation of Airport plans would depend on the location of any future levee failure and the extent of subsequent flooding. Consistency with Airport plans is considered too speculative for meaningful consideration. Additionally, under the No-Action Alternative, significance determinations for potential impacts due to community disruption are considered too speculative for meaningful consideration, given the uncertainties involved as a result of a levee failure.

Under the RSLIP Alternative, because of the likely loss of a substantial amount of nesting habitat for Swainson's hawk, this alternative would remain potentially inconsistent with implementation of the NBHCP, following mitigation.

With respect to disruption of communities and residences located along the Sacramento River east levee, following mitigation, significant and unavoidable impacts related to short-term and temporary access restrictions and construction disturbance under the Proposed Action and the RSLIP Alternative would remain. These impacts would be greater for the RSLIP Alternative because it would require full closures of Garden Highway for extended periods of time.

4.4 GEOLOGY, SOILS, AND MINERAL RESOURCES

4.4.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.4.1.1 METHODOLOGY

This section addresses issues related to geologic hazards, specifically seismicity and soil erosion, soils, and mineral resources. Impacts associated with geology, soils, and mineral resources that could result from project-related activities were evaluated based on expected construction practices, materials used to construct the proposed improvements, general locations of improvements, and the nature of proposed operations.

This analysis relies on review of the *Soil Survey of Sutter County, California* (NRCS 1988), the *Soil Survey of Sacramento County* (NRCS 1993), *Mineral Land Classification: Portland Cement Concrete-Grade Aggregate and Kaolin Clay Resources in Sacramento County, California* (Dupras 1999), as well as published geologic maps and literature.

4.4.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to geology, soils, and mineral resources if they would do any of the following:

- expose people or structures to potential substantial adverse impacts, including risk of loss, injury, or death through the rupture of a known earthquake fault, strong seismic shaking, seismic-related ground failure, soil liquefaction, or landslides;
- result in substantial soil erosion or the loss of topsoil;
- locate project facilities on a geologic unit or soil that is unstable, or that would become unstable as a result of the proposed action, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;
- locate project facilities on expansive soil, creating substantial risks to property;
- have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
- create a substantial flooding risk as a result of a seismic seiche;
- destroy a unique geologic feature;
- 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; or
- 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.

Because the project area is not located within an Alquist-Priolo Earthquake Fault Zone, fault ground rupture is highly unlikely, and therefore this issue is not addressed further in this EIS/EIR.

All levee and canal improvements and borrow site excavation and reclamation would be designed based on the results of detailed geotechnical engineering studies performed previously (summarized in Kleinfelder 2008) and would be required to comply with standard engineering practices for levee design. The Central Valley Flood Protection Board's (CVFPB's) standards are the primary state standards applicable to the proposed levee improvements; these are stated in Title 23, Division 1, Article 8, Sections 111–137 of the California Code of Regulations. CVFPB's standards direct that levee design and construction be in accordance with USACE's *Engineering Design and Construction of Levees* (USACE 2000), the primary Federal standards applicable to levee improvements. Because the design, construction, and maintenance of levee improvements must comply with the regulatory standards of USACE and CVFPB, it is assumed that the design and construction of all levee modifications under the Proposed Action or RSLIP Alternative would meet or exceed applicable design standards for static and dynamic stability, seismic ground shaking, liquefaction, subsidence, and seepage.

Because the project area is relatively flat, there would be no adverse impacts related to landslides. Therefore, this issue is not addressed further in this EIS/EIR.

Because the project would not involve the use of wastewater disposal systems of any kind, there would be no impact related to the ability of project area soils to support the use of septic systems. Therefore, this issue is not addressed further in this EIS/EIR.

While a seiche in the project area could be damaging, the risk of seiches is low, given the distance from active faults and the anticipated short duration of any seismic ground shaking in the area. Therefore, this issue is not addressed further in this EIS/EIR.

There are no unique geologic features in the project area. Therefore, the project would not destroy such features, and this issue is not discussed further in this EIS/EIR.

4.4.2 IMPACTS AND MITIGATION MEASURES

Impact 4.4-a: Potential Temporary and Permanent Localized Soil Erosion during Construction and Operation

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for construction-related soil erosion. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Any levee failures would likely result in soil scouring and permanent loss of topsoil in localized areas within several hundred feet of a levee breach; simultaneous levee failures in more than one location in the perimeter levee system would have an even more widespread impact. The magnitude of the impacts would depend upon the location of the levee breach, severity of the storm, and river flows at the time of flooding. Therefore, a precise determination of significance is not possible and cannot be made. This impact could be offset by soil deposition resulting from inundation of the Natomas Basin by sediment-laden flood waters. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Implementation of the Proposed Action and the RSLIP Alternative would include a substantial amount of construction activity along the Sacramento River east levee, at proposed borrow sites, and at two locations along

the NCC south levee. Construction activities would be conducted continuously, to the extent feasible, between April and November.

Borrow activity is subject to regulation under the California Surface Mining and Reclamation Act (SMARA), which is administered by the county in which the borrow site is located (i.e., Sacramento and Sutter Counties) (see "California Surface Mining and Reclamation Act" under Section 3.4.1, "Regulatory Setting"). The excavation of soil from borrow sites would entail the preservation and replacement of the topsoil on these parcels. Upon completion of soil excavation, the area would be reclaimed as agricultural land, grassland, or managed marsh (See Section 2.3.3, "Borrow Sites").

Table 2-10 lists the borrow sites that would potentially be used for the Phase 4a Project and shows the depth of excavation, depth upon reclamation, and final postreclamation use. As part of the borrow operations, the upper 6–12 inches of topsoil from the borrow sites would be set aside and replaced on-site after project construction in each construction season. After the project is complete, the borrow sites would be recontoured and reclaimed. These borrow operations would support levee construction involving soil stripping and site grading in the footprint of the adjacent levee and seepage berms along the Sacramento River east levee and in the two locations where cutoff wall construction and levee raising would take place on the NCC south levee.

Structures and trees would need to be removed from a portion of the footprint of the adjacent levee and berms along the Sacramento River east levee, and power poles would need to be removed and relocated.

Borrow activities and levee improvement activities would result in the temporary disturbance of soil and could expose disturbed areas to erosion due to wind or early-season rainfall events. Wind or rainfall of sufficient intensity could dislodge soil particles from the soil surface. Once particles are dislodged, substantial localized erosion could occur. The potential for substantial erosion or loss of topsoil during construction of the Proposed Action and RSLIP Alternative is considered a **potentially significant** impact. ***(Similar)***

Mitigation Measure 4.4-a(1): Implement Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions"

Proposed Action and RSLIP Alternative

SAFCA shall implement Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions," set forth in full in Section 4.6, "Water Quality." SAFCA's final design and construction specifications for all project components, including borrow sites, shall include implementation of standard erosion, siltation, and soil stabilization Best Management Practices (BMPs). In summary, this mitigation measure requires filing a Notice of Intent (NOI) with the Central Valley Regional Water Quality Control Board (RWQCB); implementing standard erosion, siltation, and BMP measures; preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP); and complying with the conditions of the National Pollutant Discharge Elimination System (NPDES) general stormwater permit for construction activity. Implementing this mitigation measure would reduce the impacts related to erosion from construction activities to a **less-than-significant** level because a SWPPP and BMPs to prevent erosion and siltation would be implemented. ***(Similar)***

Mitigation Measure 4.4-a(2): Secure and Implement the Conditions of the California Surface Mining and Reclamation Act Permit or Exemption

Proposed Action and RSLIP Alternative

In the event that any borrow site activity is determined to be subject to SMARA, SAFCA shall secure and implement the conditions contained in the SMARA permit or exemption as administered and issued by the local agency (applicable county). Implementing this mitigation measure would reduce the impacts related to erosion from construction activities on borrow sites to a **less-than-significant** level because SAFCA would secure a SMARA permit (if required) and implement its conditions, or would seek an exemption, if applicable.

Impact 4.4-b: Potential Loss of Mineral Resources

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for loss of mineral resources. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Within those areas of the Natomas Basin that are zoned MRZ-1, where no mineral resources are present, there would be no impact as a result of a flood event. For those areas that are zoned MRZ-3, where it is unknown whether or not mineral resources exist, a precise determination of significance is not possible. Because of this uncertainty, this potential impact to areas of the Natomas Basin that are zoned MRZ-3 is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Implementation of the Proposed Action and the RSLIP Alternative would include excavation of soil from the eastern edge of the Fisherman's Lake Borrow Area, which is zoned MRZ-3 by DOC's Division of Mines and Geology. As discussed in Section 3.4, "Geology and Soils," the MRZ-3 designation indicates that the significance of mineral deposits in that area cannot be evaluated from existing data.

The easternmost parcels of the Fisherman's Lake Borrow Area, where the MRZ-3 designation is located, are currently used for agricultural purposes. As with other parcels that would be used for borrow material, the upper 6–12 inches of topsoil from these borrow sites would be set aside and graded back onto these sites after project construction in each construction season to allow them to be returned to agricultural production. Aggregates are not desired to be used as borrow material for any phase of the NLIP; however, they could become disturbed and accidently removed during borrow material activities, if they are present. Excavation in these parcels would not exceed 3 feet, including topsoil removal, which could contain an economically viable source of aggregate.

Because economically valuable minerals, if present, could be removed from a portion of the Fisherman's Lake Borrow Area, this impact is considered to be **potentially significant**.

Mitigation Measure 4.4-b: Conduct Soil Core Sampling in Areas of the Phase 4a Project Footprint Designated as MRZ-3

Proposed Action and RSLIP Alternative

SAFCA shall retain a qualified geologist to analyze soil core samples extracted from proposed borrow sites, to depth of at least 3 feet, in areas that are designated as MRZ-3. In the event that a clean layer of economically viable aggregate is discovered, Sacramento County, DOC, and other appropriate agencies shall be notified. In addition, the horizontal extent of available aggregate shall be delineated by a qualified geologist.

While implementing this mitigation measure would provide data that would allow SAFCA to determine whether or not economically valuable mineral resources are present in the designated MRZ-3 area of the Fisherman's Lake Borrow Area, if economically valuable mineral resources were found to be present, they would be removed as part of project activities. Therefore, this potential impact is considered **significant and unavoidable**. ***(Similar)***

4.4.3 RESIDUAL SIGNIFICANT IMPACTS

In the event of levee failure under the No-Action Alternative, the magnitude of impacts due to temporary and permanent soil erosion is uncertain. Because of this uncertainty, these potential impacts are considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore, impacts that result from the No-Action Alternative would not be mitigated.

Implementation of Mitigation Measures 4.4-a(1) and 4.4-a(2) would reduce the temporary potentially significant impacts associated with soil erosion due to construction activities under the Proposed Action and the RSLIP Alternative to a less-than-significant level. Because implementation of Mitigation Measure 4.4-b would not prevent the possible removal or disturbance of economically valuable mineral resources (if found), the potential loss of mineral resources would remain significant and unavoidable.

4.5 HYDROLOGY AND HYDRAULICS

4.5.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.5.1.1 METHODOLOGY

This analysis relies on information provided by various public agencies, as well as the following site-specific technical planning studies generated to support the Proposed Action and alternatives under consideration in this EIS/EIR:

- *Sacramento Area Flood Control Agency, Natomas Levee Improvement Program, Summary Report on Hydraulic Impact Analyses,* MBK Engineers 2009 (**Appendix C1**);
- *Draft Evaluation of Potential Groundwater Impacts Due to Proposed Construction for Natomas Levee Improvement Program,* Luhdorff & Scalmanini Consulting Engineers 2008 (**Appendix C2**);
- *Evaluation of Cutoff Walls Impacts on Groundwater Recharge, Sacramento East Levee, Natomas Levee Improvement Program,* Kleinfelder 2007 (**Appendix C3**);
- *Potential Impacts of Proposed Slurry Cutoff Walls Along Reach 4B of the Sacramento River East Levee,* Luhdorff & Scalmanini Consulting Engineers 2009 (**Appendix C4**); and
- *Potential Impacts of Proposed Phase 4A Habitat Mitigation Wells,* Luhdorff & Scalmanini Consulting Engineers 2009 (**Appendix C5**).

These reports have been updated. The updates primarily consist of a datum conversion from National Geodetic Vertical Datum of 1929 (NGVD29) to North American Vertical Datum of 1988 (NAVD88) in accordance with USACE's requirement that all vertical datum for USACE inland levee projects and Federal levees within USACE's Inspection of Completed Works be in NAVD88.

This section addresses seasonal flooding and flood management as defining elements of the physical environment in the project area and evaluates the potential hydraulic impacts of the Proposed Action and alternatives under consideration on the operations of the Sacramento River Flood Control Project (SRFCP) and interior drainage within the Natomas Basin. It also evaluates the potential impact of seepage cutoff walls on groundwater recharge.

Impacts associated with hydrology and hydraulics that could result from construction and operation activities related to the project site were evaluated based on expected construction practice, on the materials to be used, and on the locations and duration of the activities. A review of published literature included maps, books, and the primary-source documents cited above.

The surface hydrology analysis evaluated the potential flood-related impacts of the action alternatives on water surface elevations in the stream and river channels in the project area and in the larger watershed within which the project is situated. Specifically, a UNET hydraulic computer model was used to compare existing conditions in the waterways surrounding the Natomas Basin and in the larger SRFCP with and without the Proposed Action (With Project and Without Project [i.e., No-Action Alternative], respectively) and other reasonably foreseeable improvements to Folsom Dam and the urban levees outside the Natomas Basin.

Table 4.5-1 summarizes the conditions and assumptions associated with each of the model runs. The modeling outputs generated by these conditions under the targeted flood scenarios are displayed in **Tables 4.5-2** through **4.5-8**. A description of these conditions is provided below in **Table 4.5-1**.

Table 4.5-1
Definition of Model Assumptions for Various Conditions

Condition	Top of Levee Assumption	Levee Failure Assumption	Reservoir Operations Assumption
Existing	Existing top of levee grade April 2008	Levees fail when water reaches the top of the levee	Existing reservoirs and current (2008) operation criteria
Without Project	Same as Existing with the following changes: Federally authorized improvements to Folsom Dam are implemented and urban area levees outside the Natomas Basin are assumed to have levees at 200-year water surface + 3 feet of levee height; NLIP levees same as Existing	Levees fail when water reaches the top of levee	Same as Existing except Folsom Dam would be operated in accordance with the Joint Federal Project currently under construction
With Project[1]	Same as Without Project except NLIP levees raised to design level	Same as Without Project	Same as Without Project
Without Project Sensitivity Analysis	Same as Without Project except that SRFCP levees with top elevations below SRFCP design standard are assumed to be raised to meet this standard	No levee failures	Same as Without Project
With Project Sensitivity Analysis	Same as With Project except that SRFCP levees with top elevations below SRFCP design standard are assumed to be raised to meet this standard	No levee failures	Same as Without Project

Notes: NLIP = Natomas Levee Improvement Program; SRFCP = Sacramento River Flood Control Project

[1] With-Project condition adds the improvements proposed as part of the NLIP regardless of levee construction alternative (i.e., the Proposed Action or the RSLIP Alternative) to the Without-Project condition, including levee raises on the Sacramento River, NCC, PGCC, and NEMDC in the locations shown in Figure 3 of **Appendix C1**.

Source: **Appendix C1**

Table 4.5-2
Levee Failure Summary in the Sacramento River Flood Control Project
(Predicted Number of Levee Failures)

Condition	Design Flood			
	SRFCP (1957)	100-Year (1% AEP)	200-Year (0.5% AEP)	500-Year (0.2% AEP)
Existing	0	3	26	62
Without Project	0	3	18	80
With Project	0	3	18	77

Notes: SRFCP = Sacramento River Flood Control Project; AEP = Annual Exceedance Probability

Source: **Appendix C1**

Table 4.5-3
100-Year (1% AEP) Maximum Water Surface Elevation Summary
(Levees Fail When Water Reaches Top of Levee)

Location (Comprehensive Study River Mile)	Maximum Water Surface Elevation (Feet NAVD88[1])			Change (Feet)	
	Existing	Without-Project	With-Project[2]	Existing to Without-Project	Without-Project to With-Project
Sacramento River					
at Knight's Landing (90.22)	43.77	43.75	43.75	-0.02	0
at Fremont Weir, west end (84.75)	42.46	42.45	42.45	-0.01	0
at Natomas Cross Canal (79.21)	42.52	42.48	42.49	-0.04	+0.01
at I-5 (71.00)	38.10	38.01	38.01	-0.09	0
at Sacramento Bypass (63.82)	33.46	33.09	33.09	-0.37	0
at NEMDC (61.0)	33.96	33.58	33.58	-0.38	0
at I Street (59.695)	33.68	33.31	33.31	-0.37	0
at Freeport Bridge (46.432)	27.31	27.19	27.19	-0.12	0
Natomas Cross Canal					
at SR 99/70 (4.82)	42.64	42.66	42.67	+0.02	+0.01
Pleasant Grove Creek Canal					
at Sankey Road (3.65)	42.64	42.66	42.67	+0.02	+0.01
at Fifield Road (1.49)	42.72	42.74	42.75	+0.02	+0.01
at Howsley Road (0.40)	42.71	42.73	42.74	+0.02	+0.01
Natomas East Main Drainage Canal					
at Elverta Road (10.35)	30.52	30.52	30.52	0	0
at Elkhorn Boulevard (8.35)	30.30	30.30	30.30	0	0
at Main Avenue (6.09)	38.75	38.21	38.21	-0.54	0
at West El Camino Avenue (2.96)	36.93	36.08	36.08	-0.85	0
Feather River					
at Nicolaus Gage (8.00)	50.82	50.81	50.81	-0.01	0
Yolo Bypass					
at Woodland Gage (51.10)	34.90	34.88	34.88	-0.02	0
American River					
at H Street (6.471)	45.27	42.99	42.99	-2.28	0

Notes: I-5 = Interstate 5; NEMDC = Natomas East Main Drainage Canal; NAVD88 = North American Vertical Datum of 1988; SR = State Route

[1] Water surface elevations originally calculated in National Geodetic Vertical Datum of 1929 (NGVD29).Converted to NAVD88 by adding 2.28 feet (0 NGVD29 = 2.28 NAVD88).

[2] With-Project condition adds the improvements proposed as part of the NLIP regardless of levee construction alternative (i.e., the Proposed Action or the RSLIP Alternative) to the Without-Project condition.

Source: **Appendix C1**

Table 4.5-4
200-Year (0.5% AEP) Maximum Water Surface Elevation Summary
(Levees Fail When Water Reaches Top of Levee)

Location (Comprehensive Study River Mile)	Maximum Water Surface Elevation (Feet NAVD88[1])			Change (Feet)	
	Existing	Without-Project	With-Project[2]	Existing to Without-Project	Without-Project to With-Project
Sacramento River					
at Knight's Landing (90.22)	43.97	43.97	43.97	0	0
at Fremont Weir, west end (84.75)	43.22	43.23	43.24	+0.01	+0.01
at Natomas Cross Canal (79.21)	43.28	43.28	43.28	0	0
at I-5 (71.00)	39.00	38.47	38.47	-0.53	0
at Sacramento Bypass (63.82)	36.70	34.58	34.58	-2.12	0
at NEMDC (61.0)	37.68	35.13	35.13	-2.55	0
at I Street (59.695)	37.41	34.85	34.85	-2.56	0
at Freeport Bridge (46.432)	30.29	28.31	28.31	-1.98	0
Natomas Cross Canal					
at SR 99/70 (4.82)	43.32	43.32	43.32	0	0
Pleasant Grove Creek Canal					
at Sankey Road (3.65)	43.31	43.32	43.33	+0.01	+0.01
at Fifield Road (1.49)	43.38	43.40	43.41	+0.02	+0.01
at Howsley Road (0.40)	43.35	43.35	43.36	0	+0.01
Natomas East Main Drainage Canal					
at Elverta Road (10.35)	32.49	32.53	32.57	+0.04	+0.04
at Elkhorn Boulevard (8.35)	31.78	31.84	31.90	+0.06	+0.06
at Main Avenue (6.09)	42.28	40.00	40.00	-2.28	0
at West El Camino Avenue (2.96)	41.31	38.33	38.33	-2.98	0
Feather River					
at Nicolaus Gage (8.00)	52.44	52.44	52.44	0	0
Yolo Bypass					
at Woodland Gage (51.10)	35.76	35.75	35.75	-0.01	0
American River					
at H Street (6.471)	48.79	46.53	46.53	-2.26	0

Notes: AEP = Annual Exceedance Probability; I-5 = Interstate 5; NEMDC = Natomas East Main Drainage Canal; NAVD88 = North American Vertical Datum of 1988; SR = State Route

[1] Water surface elevations originally calculated in National Geodetic Vertical Datum of 1929 (NGVD29). Converted to NAVD88 by adding 2.28 feet (0 NGVD29 = 2.28 NAVD88).

[2] With-Project condition adds the improvements proposed as part of the NLIP regardless of levee construction alternative (i.e., the Proposed Action or the RSLIP Alternative) to the Without-Project condition.

Source: **Appendix C1**

Table 4.5-5
500-Year (0.2% AEP) Maximum Water Surface Elevation Summary
(Levees Fail When Water Reaches Top of Levee)

Location (Comprehensive Study River Mile)	Maximum Water Surface Elevation (Feet NAVD88[1])			Change (Feet)	
	Existing	Without-Project	With-Project[2]	Existing to Without-Project	Without-Project to With-Project
Sacramento River					
at Knight's Landing (90.22)	43.88	43.92	43.92	+0.04	0
at Fremont Weir, west end (84.75)	43.07	43.13	43.13	+0.06	0
at Natomas Cross Canal (79.21)	43.14	43.14	43.14	0	0
at I-5 (71.00)	39.58	39.40	39.40	-0.18	0
at Sacramento Bypass (63.82)	37.58	37.34	37.34	-0.24	0
at NEMDC (61.0)	38.73	38.50	38.50	-0.23	0
at I Street (59.695)	38.44	38.21	38.21	-0.23	0
at Freeport Bridge (46.432)	30.83	30.68	30.68	-0.15	0
Natomas Cross Canal					
at SR 99/70 (4.82)	43.53	43.65	43.66	+0.12	+0.01
Pleasant Grove Creek Canal					
at Sankey Road (3.65)	44.03	44.08	44.10	+0.05	+0.02
at Fifield Road (1.49)	44.05	44.13	44.14	+0.08	+0.01
at Howsley Road (0.40)	43.77	43.93	43.94	+0.16	+0.01
Natomas East Main Drainage Canal					
at Elverta Road (10.35)	34.58	34.51	35.33	-0.07	+0.82 [3]
at Elkhorn Boulevard (8.35)	34.06	34.04	34.68	-0.02	+0.64 [3]
at Main Avenue (6.09)	43.32	43.40	43.40	+0.08	0
at West El Camino Avenue (2.96)	42.65	42.57	42.57	-0.08	0
Feather River					
at Nicolaus Gage (8.00)	52.40	52.40	52.40	0	0
Yolo Bypass					
at Woodland Gage (51.10)	35.53	35.81	35.81	+0.28	0
American River					
at H Street (6.471)	48.84	49.94	49.94	+1.10	0

Notes: AEP = Annual Exceedance Probability; I-5 = Interstate 5; NEMDC = Natomas East Main Drainage Canal; NAVD88 = North American Vertical Datum of 1988; SR = State Route

[1] Water surface elevations originally calculated in National Geodetic Vertical Datum of 1929 (NGVD29). Converted to NAVD88 by adding 2.28 feet (0 NGVD29 = 2.28 NAVD88).

[2] With-Project condition adds the improvements proposed as part of the NLIP regardless of levee construction alternative (i.e., the Proposed Action or the RSLIP Alternative) to the Without-Project condition.

[3] The computed 500-year "With Project" water surface elevations of 35.33 feet at Elverta Road and 34.68 feet at Elkhorn Boulevard are significantly lower than the SRFCP Design Flood Plane elevations of 39.2 feet at Elverta Road and 39.1 feet Elkhorn Boulevard. The project water surface elevation is also significantly less than the elevation of 39.1 feet that was experienced in the February 1986 flood at both of these locations. The water surface is lower as a result of construction of the NEMDC Stormwater Pump Station north of Dry Creek. The NEMDC upstream of Elkhorn Boulevard is in the Phase 4b Project Area and will be evaluated in more detail as part of a future separate EIS/EIR.

Source: **Appendix C1**

Table 4.5-6
100-Year (1% AEP) Maximum Water Surface Elevation Summary
(No Levee Failures—Sensitivity Analysis)

Location (Comprehensive Study River Mile)	Maximum Water Surface Elevation (Feet NAVD88[1])		Change (Feet) Without-Project to With-Project
	Without-Project	With-Project[2]	
Sacramento River			
at Knight's Landing (90.22)	44.38	44.38	0
at Fremont Weir, west end (84.75)	43.18	43.18	0
at Natomas Cross Canal (79.21)	43.73	43.73	0
at I-5 (71.00)	39.18	39.18	0
at Sacramento Bypass (63.82)	33.73	33.73	0
at NEMDC (61.0)	34.30	34.30	0
at I Street (59.695)	34.02	34.02	0
at Freeport Bridge (46.432)	27.82	27.82	0
Natomas Cross Canal			
at SR 99/70 (4.82)	43.78	43.78	0
Pleasant Grove Creek Canal			
at Sankey Road (3.65)	43.65	43.65	0
at Fifield Road (1.49)	43.78	43.78	0
at Howsley Road (0.40)	43.79	43.79	0
Natomas East Main Drainage Canal			
at Elverta Road (10.35)	33.48	33.49	+0.01
at Elkhorn Boulevard (8.35)	32.57	32.58	+0.01
at Main Avenue (6.09)	38.13	38.13	0
at West El Camino Avenue (2.96)	35.98	35.98	0
Feather River			
at Nicolaus Gage (8.00)	51.18	51.18	0
Yolo Bypass			
at Woodland Gage (51.10)	35.49	35.49	0
American River			
at H Street (6.471)	43.09	43.09	0

Notes: AEP = Annual Exceedance Probability; I-5 = Interstate 5; NEMDC = Natomas East Main Drainage Canal; NAVD88 = North American Vertical Datum of 1988; SR = State Route

[1] Water surface elevations originally calculated in National Geodetic Vertical Datum of 1929 (NGVD29). Converted to NAVD88 by adding 2.28 feet (0 NGVD29 = 2.28 NAVD88).

[2] With-Project condition adds the improvements proposed as part of the NLIP regardless of levee construction alternative (i.e., the Proposed Action or the RSLIP Alternative) to the Without-Project condition.

Source: **Appendix C1**

Table 4.5-7
200-Year (0.5% AEP) Maximum Water Surface Elevation Summary
(No Levee Failures—Sensitivity Analysis)

Location (Comprehensive Study River Mile)	Maximum Water Surface Elevation (Feet NAVD88[1])		Change (Feet) Without-Project to With-Project
	Without-Project	With-Project[2]	
Sacramento River			
at Knight's Landing (90.22)	45.67	45.67	0
at Fremont Weir, west end (84.75)	44.75	44.76	+0.01
at Natomas Cross Canal (79.21)	45.18	45.20	+0.02
at I-5 (71.00)	40.52	40.52	0
at Sacramento Bypass (63.82)	35.76	35.76	0
at NEMDC (61.0)	36.34	36.35	+0.01
at I Street (59.695)	36.06	36.06	0
at Freeport Bridge (46.432)	29.68	29.69	+0.01
Natomas Cross Canal			
at SR 99/70 (4.82)	45.20	45.22	+0.02
Pleasant Grove Creek Canal			
at Sankey Road (3.65)	44.94	44.95	+0.01
at Fifield Road (1.49)	45.18	45.19	+0.01
at Howsley Road (0.40)	45.20	45.22	+0.02
Natomas East Main Drainage Canal			
at Elverta Road (10.35)	37.38	37.77	+0.39
at Elkhorn Boulevard (8.35)	37.17	37.58	+0.41
at Main Avenue (6.09)	38.87	38.87	0
at West El Camino Avenue (2.96)	38.13	38.13	0
Feather River			
at Nicolaus Gauge (8.00)	53.47	53.48	+0.01
Yolo Bypass			
at Woodland Gauge (51.10)	36.84	36.85	+0.01
American River			
at H Street (6.471)	46.68	46.68	0

Notes: AEP = Annual Exceedance Probability; I-5 = Interstate 5; NEMDC = Natomas East Main Drainage Canal; NAVD88 = North American Vertical Datum of 1988; SR = State Route

[1] Water surface elevations originally calculated in National Geodetic Vertical Datum of 1929 (NGVD29). Converted to NAVD88 by adding 2.28 feet (0 NGVD29 = 2.28 NAVD88).

[2] With-Project condition adds the improvements proposed as part of the NLIP regardless of levee construction alternative (i.e., the Proposed Action or the RSLIP Alternative) to the Without-Project condition.

Source: **Appendix C1**

Table 4.5-8
500-Year (0.2% AEP) Maximum Water Surface Elevation Summary
(No Levee Failures—Sensitivity Analysis)

Location (Comprehensive Study River Mile)	Maximum Water Surface Elevation (Feet NAVD88[1])		Change (Feet) Without-Project to With-Project
	Without-Project	With-Project[2]	
Sacramento River			
at Knight's Landing (90.22)	46.55	46.59	+0.04
at Fremont Weir, west end (84.75)	46.07	46.13	+0.06
at Natomas Cross Canal (79.21)	45.96	46.13	+0.17
at I-5 (71.00)	42.04	42.13	+0.09
at Sacramento Bypass (63.82)	40.25	40.28	+0.03
at NEMDC (61.0)	40.25	40.28	+0.03
at I Street (59.695)	39.95	39.97	+0.02
at Freeport Bridge (46.432)	32.56	32.58	+0.02
Natomas Cross Canal			
at SR 99/70 (4.82)	45.73	45.99	+0.26
Pleasant Grove Creek Canal			
at Sankey Road (3.65)	45.53	45.70	+0.17
at Fifield Road (1.49)	45.78	45.99	+0.21
at Howsley Road (0.40)	45.76	46.01	+0.25
Natomas East Main Drainage Canal			
at Elverta Road (10.35)	42.64	44.00	+1.36
at Elkhorn Boulevard (8.35)	42.63	43.99	+1.36
at Main Avenue (6.09)	46.04	46.05	+0.01
at West El Camino Avenue (2.96)	44.99	45.00	+0.01
Feather River			
at Nicolaus Gage (8.00)	55.73	55.75	+0.02
Yolo Bypass			
at Woodland Gage (51.10)	38.24	38.29	+0.05
American River			
at H Street (6.471)	51.44	51.45	+0.01

Notes: AEP = Annual Exceedance Probability; I-5 = Interstate 5; NEMDC = Natomas East Main Drainage Canal; NAVD88 = North American Vertical Datum of 1988; SR = State Route

[1] Water surface elevations originally calculated in National Geodetic Vertical Datum of 1929 (NGVD29). Converted to NAVD88 by adding 2.28 feet (0 NGVD29 = 2.28 NAVD88).

[2] With-Project condition adds the improvements proposed as part of the NLIP regardless of levee construction alternative (i.e., the Proposed Action or the RSLIP Alternative) to the Without-Project condition.

Source: **Appendix C1**

The existing conditions analysis provided an evaluation of the levee and reservoir system as it existed in April 2008. The No-Action condition assumed implementation of Federally authorized improvements to Folsom Dam and anticipated "early implementation" improvements to the levees protecting existing urban areas outside the Natomas Basin (i.e., American River Basin, West Sacramento, Yuba Basin, and Sutter Basin) so as to provide these areas with 200-year flood protection. The With-Project condition added the improvements proposed as part of the entire NLIP to the No-Action condition to display the individual and cumulative impacts of the Proposed Action when added to the other reasonably foreseeable urban levee improvement projects in the Sacramento Valley. The NLIP includes additional levee raising already evaluated in the Phase 2 EIR, Phase 2 EIS, and Phase 3 DEIS/DEIR, as well as levee raising that is evaluated in this EIS/EIR.

The analysis consisted of calibrating the hydraulic model to historic flood events using high-water marks and stream gauge data gathered in connection with the 1997 flood, and modeling the existing Proposed Action and No-Action conditions under the following flood scenarios: (1) the 1957 water surface profiles that serve as the minimum design standard for the SRFCP; (2) the 100-year (1% AEP) flood that affects management of SRFCP-protected floodplains under the National Flood Insurance Program (33 CFR 65.10); (3) the 200-year (0.5% AEP) flood that is likely to affect implementation of the floodplain management standards recently adopted by the California Legislature (Chapter 364, Statutes of 2008 [adding Water Code Section 9602(i)]); and (4) the 500-year (0.2% AEP) flood that represents a worst-case scenario for analyzing project impacts. Each of these scenarios was modeled assuming that levees outside the project area would fail when overtopped. However, to test how sensitive the water surface elevations predicted by the model are to different levee failure scenarios, each scenario was also modeled assuming that nonurban levees that currently do not meet the SRFCP's minimum levee height requirements would be repaired and that no levees would fail even under the most extreme overtopping condition. The 500-year (0.2% AEP) flood scenario represents the worst case because it is the largest hydrologic event modeled for the SRFCP and would produce the highest water surface elevations among the model results. See **Appendix C1** of this EIS/EIR for additional information about the background, approach, and results of the NLIP hydrologic and hydraulic modeling analyses, including a summary description of the legislative support for the NLIP impact methodology.

4.5.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to hydrology and hydraulics if they would do any of the following:

- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
- 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;
- place housing within a 100-year flood hazard area or place within a 100-year flood hazard area structures that would impede or redirect flood flows;
- expose people or structures to a significant risk of loss, injury, or death involving flooding; or
- substantially alter the existing drainage pattern of a site or an area, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site.

The project would not cause substantial increases in amounts of runoff or place housing or other inhabitated structures in a 100-year flood hazard area. Therefore, this issue is not discussed further in this EIS/EIR.

In determining whether a project would expose people or structures to a significant risk as a result of flooding, SAFCA uses the following thresholds:

- whether the project would cause encroachment on SRFCP design levee height for the SRFCP design flow for a project levee outside the project area, or
- whether the project would cause a significant increase in flooding in an area that is outside the protection of the SRFCP.

For purposes of these thresholds, "flood hazard area" means an area that does not meet the minimum level of flood protection required by Federal or state law, whichever is more stringent. The 100-year (1% AEP) level of flood protection will be the standard applicable until 2015, or perhaps earlier, depending on when the Central Valley Flood Protection Plan takes effect. At that point, the applicable standard would be governed by Senate Bill 5, namely, either 200-year (0.5% AEP) protection or "adequate progress" towards meeting the 200-year (0.2% AEP) protection standard by 2025.

4.5.2 IMPACTS AND MITIGATION MEASURES

Impact 4.5-a: Hydraulic Impacts on Other Areas and Exposure to Flood Risk

Table 4.5-2 and **Appendix C1** of this EIS/EIR indicate the levee failures that would occur throughout the SRFCP area under each of the targeted flood conditions assuming levees fail when overtopped. These failures would generally affect nonurban levees. However, the urban levees along the Lower American River would fail under the existing condition 200-year (0.5% AEP) flood (flooding that has a 1-in-200 chance of occurring in any given year), and urban levees along the Feather and Lower American Rivers would fail in the existing condition 500-year (0.2% AEP) flood (flooding that has a 1-in-500 chance of occurring in any given year).

Tables 4.5-3, 4.5-4, and **4.5-5** display the comparative water surface elevations that would occur under each of the targeted flood scenarios with levee failures caused by overtopping. These data indicate no significant increase in water surface elevations when the Proposed Action conditions are compared to the existing and No-Action conditions. The sensitivity analysis does show an increase in water surface elevations on the NEMDC at Elverta Road for 500-year (0.2% AEP) analyses. It should be noted that this potential increase in flood stage is a result of raising the NEMDC levee between Sankey Road and Elkhorn Boulevard. This reach of the NEMDC (Sankey Road to Elkhorn Boulevard) is part of the Phase 4b Project area and will be evaluated at a project-level in a future, separate NEPA/CEQA compliance document.

In addition, as shown in **Table 4.5-2**, the same number of levee failures would occur in the 100-year (1% AEP) flood event under both the Proposed Action and No-Action Alternative.

Tables 4.5-6, **4.5-7**, and **4.5-8** display the comparative water surface elevations that would occur under the sensitivity analysis, which assumes no levee failures. The sensitivity analysis does show an increase in water surface elevations on the NEMDC at Elverta Road for the 200-year (0.5% AEP) and 500-year (0.2% AEP) analyses. It should be noted that this potential increase in flood stage is a result of raising the NEMDC levee between Sankey Road and Elkhorn Boulevard. This reach of the NEMDC (Sankey Road to Elkhorn Boulevard) is part of the Phase 4b Project area and will be evaluated at a project-level in a future, separate NEPA/CEQA compliance document.

These modeling results are more fully discussed in **Appendix C1** of this EIS/EIR.

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore hydrology or hydraulics would not be altered. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Wind and wave run-up or seepage conditions could cause portions of this system to fail, triggering widespread flooding and extensive damage to property within the Basin. Residences on the waterside of the Sacramento River levee in the vicinity of a levee breach could be engulfed, access to residences on the waterside of the levee and within the Basin could be cut off, and interior roadways and other infrastructure damaged. The magnitude of the impacts would depend upon the location of the levee breach, severity of the storm, and river flows at the time of flooding. While a precise determination of significance is uncertain, due to the uncontrolled consequences of levee failure, this impact is still assumed to be **significant**. As discussed in Section 4.1, "Approach to the Environmental Analysis," no mitigation is required. This impact would remain **significant and unavoidable**. ***(Greater)***

Proposed Action and RSLIP Alternative

The hydraulic impacts of either levee construction alternative (i.e., the Proposed Action or the RSLIP Alternative) would be the same, as described in further detail below, because the water surface elevations would not be altered.

Under both action alternatives, levee raises would occur on the Sacramento River east levee (Reaches 10–15) and portions of the NCC south levee to provide the required 3 feet of levee height above the 200-year (0.5% AEP) design water surface profile. This levee height requirement originates in National Flood Insurance Program regulations and the engineering practice of the California Department of Water Resources, which has been established by FEMA to develop design standards for providing a 200-year (0.5% AEP) level of flood protection for urban areas protected by levees in the Central Valley.

As indicated in **Tables 4.5-1** through **4.5-8** above, this analysis shows that the levees around the Natomas Basin are currently high enough to contain the 1957 profile and the 100-year (1% AEP) flood profile under both the levee failure scenario and the sensitivity (no levee failure) analysis. Accordingly, the improvements that would be constructed as part of the Proposed Action would not measurably alter these water surface elevations. However, it should be noted that some of these levees do not meet FEMA's requirement of 3 feet of levee height above the 100-year design water surface profile (see Chapter 2.0, "Alternatives," Section 2.3.1.1, "Levee Raises, Widening, and Slope Flattening"); meeting this requirement is one of the project objectives.

With respect to the 200-year (0.5% AEP) design flood, the hydraulic models show that nonurban levees outside of the Natomas Basin would overtop in multiple locations by 6 inches to 1 foot. At these locations, the UNET model assumes that the overtopping would produce a 500-foot breach over a 2-hour period. The model allows water to leave the system by flowing through the breach. The water remaining in the adjacent channel is routed downstream and thus contributes to the resulting water surface elevations in the channels surrounding the Natomas Basin. The Phase 4a Project would increase flood stages for the 200-year (0.5% AEP) flood profile by a maximum of 0.06 foot; therefore, this impact is **less than significant**.

With respect to the 500-year (0.2% AEP) flood, the hydraulic modeling results show that approximately 100 miles of the SRFCP levee system would be subject to overtopping by up to 2 feet in some locations. The affected levees would perform as described above for the 200-year (0.5% AEP) levee failure.

As part of the sensitivity analysis, the 200-year (0.5% AEP) and 500-year (0.2% AEP) flood analyses were performed without any levee failures being allowed. Under these conditions, the UNET model assumes that the affected levees would function as weirs, allowing water to leave the system by flowing over the top of the affected levee, but without triggering a breach. As in the levee failure scenarios, the water remaining in the adjacent channel is routed downstream and thus contributes to the resulting water surface elevations in the channels surrounding the Natomas Basin. These no levee failure routings indicate that the 200-year (0.5% AEP) flood would slightly overtop portions of the existing Sacramento River east levee, the existing NCC south levee, and the existing NEMDC west levee, but would otherwise be contained. Raising these levees under either action alternative would prevent this overtopping and increase the 200-year (0.5% AEP) design water surface elevation in the project area by 0.02 foot in the Sacramento River channel, 0.02 foot in the NCC, 0.02 foot in the PGCC, and 0.41 foot in the NEMDC. The 500-year (0.2% AEP) flood with no upstream levee failures would cause more substantial overtopping in these reaches of the Natomas Basin levee system. The proposed improvements would contain these overflows and cause the 500-year (0.2% AEP) design water surface elevation to potentially increase by up to 0.17 foot in the Sacramento River channel, up to 0.26 foot in the NCC, up to 0.25 foot in the PGCC, and up to 1.36 feet in the NEMDC. It should be noted that raising the NEMDC levee would be conducted as part of the Phase 4b Project that will be evaluated at a project-level in a future, separate NEPA/CEQA compliance document.

In summary, implementation of the Proposed Action or the RSLIP Alternative would not measurably alter water surface elevations in the project area except in the most extreme circumstances (i.e., a 200-year (0.5% AEP) or a 500-year (0.2% AEP) flood with no levee failures despite 100 miles of levee overtopping in areas upstream of the Natomas Basin). The action alternatives would not change the existing geometry of the channels surrounding the Natomas Basin and therefore would not cause significant changes to water flow in these channels, or cause adverse hydraulic effects upstream or downstream of the project area during peak flows. The details of this analysis are included in **Appendix C1** of this EIS/EIR.

A number of residents of homes on the waterside of the Sacramento River east levee have expressed concerns to SAFCA and USACE that the proposed levee height would increase the risk of flooding of their residences. As described above, implementation of either action alternative would not cause the SRFCP operations to be altered; therefore, the principal risks of flood damage to these existing waterside Garden Highway residences would continue to be either inundation by the water surface elevations that would remain unchanged by the Proposed Action or damage by the wind and wave run-up generated from these water surface elevations. In either event, neither action alternative would alter the existing risk of damage associated with living along the edge of the Sacramento River channel. Moreover, this risk would be alleviated by the project because the levee height added to the Sacramento River east levee would significantly reduce a potential wind- and wave-induced levee failure, and the improvements to address seepage potential would greatly reduce the potential for a seepage-induced failure.

For these reasons, the Proposed Action and the RSLIP Alternative would not have a significant adverse hydraulic impact on the SRFCP. In addition, these alternatives would not expose people or structures to a significant risk of flooding. Rather, this risk would be alleviated because the levee height added to the Sacramento River east levee would reduce the risk of wind- and wave-induced levee failure, and the seepage remediation measures would reduce the potential for seepage-induced failure. Because the action alternatives would replace or upgrade existing levees using up-to-date design and construction standards, implementation of either of these action alternatives would substantially reduce the risk of flooding of the Natomas Basin, which would be a **less-than-significant (beneficial)** impact. ***(Similar)***

Mitigation Measure: No mitigation is required.

Impact 4.5-b: Alteration of Local Drainage

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, construction activities related to the project would not alter the local drainage systems described in Chapter 2.0, "Alternatives." There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could alter local drainage systems. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related effects on local drainage systems cannot be predicted. Therefore, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

In coordination with SAFCA, the SCAS, and RD 1000, Mead & Hunt has conducted preliminary evaluations of local drainage patterns and needs in relation to proposed features of the alternatives.

The primary source of material that would be used for the Phase 4a Project work along the Sacramento River east levee would be the Fisherman's Lake Borrow Area. Sites within this borrow area would be graded to allow positive draining by gravity, with no ponded, open water. The managed marshes would be primarily supplied by surface water from irrigation canals, but would also have wells and pumps to provide groundwater as a back-up source to maintain water quality objectives. The marshes would be managed to maintain a relatively consistent water level within the confines of the marsh and would not interrupt irrigation or drainage services to adjacent properties or change the routine water levels in surrounding irrigation and drainage canals.

Other Phase 4a Project elements include construction of the adjacent levee in Reaches 10–15 of the Sacramento River east levee and levee raises in Reaches 10–11B under the Proposed Action, and raising the Sacramento River east levee in place in Reaches 10–11B with backslope flattening throughout Reaches 10–15 under the RSLIP Alternative. Under both action alternatives, the existing Riverside Canal would be relocated and extended, and in two locations on the NCC south levee, the cutoff walls would be installed and the levee would be raised. Portions of privately maintained local canals, some of which may provide a drainage function, would be overlapped by the footprint of the adjacent levee along the Sacramento River east levee and/or berms associated with both levees. Drainage would need to be rerouted to new replacement canals before the existing canals are decommissioned to ensure that local drainage and ponding areas would not be adversely affected as a result of project construction. Detailed engineering and design plans for these replacements are still under development.

Because the action alternatives under the Phase 4a Project would temporarily or even potentially permanently alter the existing drainage pattern of the project area, localized flooding could occur, resulting in a **potentially significant** impact. ***(Similar)***

Mitigation Measure 4.5-b: Coordinate with Landowners and Drainage Infrastructure Operators, Prepare Final Drainage Studies as Needed, and Implement Proper Project Design

Proposed Action and RSLIP Alternative

During project design, SAFCA's project engineers shall coordinate with owners and operators of local drainage systems and landowners served by the systems. This coordination shall enable the project engineers to evaluate the preproject and postproject drainage needs and the design features to consider in project design any project-related substantial drainage disruption or alteration in runoff that would increase the potential for local flooding. If substantial alteration of runoff patterns or disruption of a local drainage system could result from a project feature, a final drainage study shall be prepared and implemented as part of project design. The study shall consider the design flows of any existing facilities that would be crossed by project features and shall develop appropriate plans for relocation or other modification of these facilities and construction of new facilities, as needed, to ensure that the altered systems provide drainage services during and after construction that are equivalent to the drainage services that were provided prior to construction. If no drainage facilities (e.g., ditches, canals) would be affected, but project features would have a substantial adverse impact on runoff amounts and/or patterns, then new drainage systems shall be included in the design of project improvements to ensure that the project would not result in new or increased local flooding. Any necessary features to remediate project-induced drainage problems shall be constructed before the project is completed or as part of the project, depending on site-specific conditions. Any additional coordination with landowners and drainage infrastructure operators related to future selection of borrow sites in the Fisherman's Lake Area shall be completed by SAFCA before commencement of any earth-moving activities. Implementing this mitigation would reduce adverse impacts to local drainage to a **less-than-significant** level. ***(Similar)***

Impact 4.5-c: Effects on Groundwater

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to directly disturb groundwater recharge or flow. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Flooding of the Basin, should it occur in the absence of improvements to the perimeter levee system, would not inhibit groundwater recharge. Therefore, there would be **no impact**. ***(Lesser)***

Proposed Action and RSLIP Alternative

Groundwater impacts from proposed levee improvements are primarily limited to land use changes and the installation of slurry cutoff walls. No direct groundwater impacts are expected from increasing the height or width of levees, modifying levee slopes, or building seepage berms because this construction would all be above the water table.

Construction of the adjacent levee under the Phase 4a Project would include installation of either soil-bentonite or soil-cement-bentonite cutoff walls throughout Reaches 10–15 of the proposed adjacent levee. The Phase 4a Project would also include installation of cutoff walls in the south levee of the NCC from Station 56+00 to Station 61+00 (Bennett Pump Station) and Station 108+50 to Station 122+10 (Northern Main Pump Station). The depth

of these cutoff walls from the levee crown would range up to 110 feet. In Reach 4B of the Sacramento River east levee, a cutoff wall, ranging in depth from 20 to 75 feet deep, would be installed from approximately Station 190+00 to Station 214+00.

The presence of cutoff walls could restrict the movement of groundwater in either direction (away from or toward the Sacramento River or the NCC), potentially increasing or decreasing localized near-surface groundwater levels in areas immediately adjacent to the cutoff wall. A significant drop in groundwater levels could decrease the yields of nearby wells or increase the pumping costs of those wells. The combined effect of all of SAFCA's proposed construction activities under the NLIP (including the contribution of the Phase 4a Project) on the overall groundwater budget for the Natomas Basin under both existing and future conditions is discussed in Chapter 5.0, "Cumulative and Growth-Inducing Impacts, and Other Statutory Requirements."

The evaluation of potential groundwater impacts prepared by LSCE (**Appendix C2**) estimated the water-level changes caused by the cutoff walls along the Sacramento River east levee. These estimates were based on simulations using the SEEP/W groundwater model analysis developed by Kleinfelder in its report, *Evaluation of Cutoff Walls Impact on Groundwater Recharge Sacramento River East Levee* (**Appendix C3**). To evaluate impacts to groundwater levels from the addition of a cutoff wall in Reach 4B, which was not evaluated in the May 2009 report (**Appendix C2**), LSCE prepared a supplemental technical memorandum, (**Appendix C4**). The technical memo concluded that the groundwater impacts that would result from the addition of a cutoff wall in Reach 4B would not have a measurable effect on groundwater conditions in the area and would not change the conclusion reached in the original groundwater evaluation. On the waterside of the levee, the predicted effect of the cutoff wall is negligible (less than an inch) at low stage, and there would be a slight increase in groundwater levels (less than 1 foot) at high stage (see Figure 8-2 in **Appendix C2**). On the landside of the levee, the simulated groundwater levels are slightly lower because of the cutoff wall (typically 0.25 to 0.5 foot lower). In both cases, any impacts would be small enough to be considered negligible even for the shallowest domestic wells (less than 100 feet deep). As a result, no substantial decrease in groundwater levels or well yields or increase in pumping costs are expected to be caused by the cutoff walls; therefore, this impact is considered **less than significant**.

The evaluation of potential groundwater impacts prepared by LSCE (**Appendix C2**) also estimated the water-level changes to private wells caused by the cutoff walls along the Sacramento River east levee. These estimates were also based on the Kleinfelder report (**Appendix C3**). Groundwater level changes due to slurry cutoff walls along the NCC south levee would likely be similar to those along the Sacramento River east levee. On the waterside of the levee, the predicted effect of the cutoff wall is negligible (less than an inch) at low stage, and there would be a slight increase in water level (less than 1 foot) at high stage (see Figure 8-2 in **Appendix C2**). On the landside of the levee, the simulated water levels are slightly lower because of the cutoff wall (typically 0.25 to 0.5 foot). In both cases, impacts, if any, would be small enough to be considered negligible even for the shallowest domestic wells (less than 100 feet deep). As a result, no substantial decrease in well yields or increase in pumping costs is expected to be caused by the cutoff walls along the Sacramento River east levee; therefore, this impact is considered **less than significant**.

LSCE prepared a supplemental technical memorandum (**Appendix C5**) that evaluates the potential for reduction in yields from existing wells that would be near the five wells that SAFCA has proposed to provide a water supply to habitat mitigation sites. The proposed habitat mitigation water supply wells include a back-up well in Reach 6A of the Sacramento River east levee for the GGS/Drainage Canal, two wells in Reaches 7 and 14 to provide up to five years of irrigation to woodland planting sites until the trees are self-supporting, and two wells in the Fisherman's Lake Habitat Complex (Reach 13) that would provide a back-up water supply to the two proposed managed marsh sites (**Plate 2-12**). LSCE used a single-layer analytical groundwater flow model to estimate drawdowns from operation of these wells. Modeling results indicate that pumping from the proposed wells would not significantly reduce the yield of existing wells. Therefore, this impact is considered **less than significant**.

The evaluation of potential groundwater impacts prepared by LSCE investigated the effects on groundwater from excavation of the proposed borrow sites (see **Appendix C2**). Excavation and reclamation of the Fisherman's Lake Borrow Area would have an indirect effect on groundwater conditions due to land use and water supply changes. At this site, approximately 400 acres of land would be used for borrow material (see Table 5-1in **Appendix C2**). After reclamation, there would be up to 150 acres of created, managed marsh, with the remaining acreage returned to and preserved as upland agriculture, or converted to non-irrigated grassland, or woodland. The creation of managed marsh would result in an increase in deep percolation of 30 acre-feet per year (afy). Overall, however, there would be a net loss in deep percolation of 37 afy due to the conversion of field crops to non-irrigated grassland (see **Appendix C2**). The managed marshes would be primarily supplied by surface water from irrigation canals, but would also have wells and pumps to provide groundwater as a back-up source to maintain water quality objectives. Current groundwater levels in the Fisherman's Lake Area vary widely, depending upon soil type and subsurface stratigraphy; groundwater levels also vary by season, with higher levels in winter than in summer. The postreclamation land uses are not expected to significantly change this variability. Relocation and extension of the Riverside Canal would also affect deep percolation from applied water and seepage from the canals, with an estimated net loss of groundwater storage of about 9 afy. Because the overall effects of land use changes are minor, this impact is considered **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

4.5.3 RESIDUAL SIGNIFICANT IMPACTS

Because mitigation would not be required for the No-Action Alternative, impacts related to the continued exposure of the Natomas Basin to a significant residual risk of flooding are assumed to be significant and unavoidable. Under the No-Action Alternative, impacts to local drainage systems are uncertain. Because of this uncertainty, this potential impact is considered too speculative for meaningful consideration.

Implementation of the mitigation measures described in this section for the Proposed Action and the RSLIP Alternative would reduce residual hydraulic impacts to a less-than-significant level.

As noted in Chapter 2.0, "Alternatives," Section 2.5.1, "Residual Risk of Flooding," implementation of the Phase 4a Project would substantially lessen the probability of a flood in the Natomas Basin due to levee failure. However, the Basin would remain subject to a residual risk of flooding, which would be the same under both the Proposed Action and the RSLIP Alternative. SAFCA would be required to maintain an ongoing residual risk management program, as detailed in Section 2.5.1.

4.6 WATER QUALITY

4.6.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.6.1.1 METHODOLOGY

Water quality impacts that could result from project construction activities were evaluated based on the construction practices and materials used, the location and duration of the activities, and the potential for degradation of water quality or beneficial uses of project area waterways.

4.6.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to water quality if they would violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality.

4.6.2 IMPACTS AND MITIGATION MEASURES

Impact 4.6-a: Temporary Impacts on Water Quality from Stormwater Runoff, Erosion, or Spills

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to directly disturb water quality from stormwater runoff. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Potential flooding and inundation of the Natomas Basin could introduce large quantities of agricultural pesticides, oil, gasoline, and other hazardous materials into waters and subsequently into stream channels and groundwater. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related impacts on water quality cannot be predicted. A precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Project implementation would include extensive ground-disturbing activities during construction, many of them near local drainages and waterways that could become contaminated by soil or construction substances. These waterways include the Sacramento River, the NCC, the West Drainage Canal in the Fisherman's Lake Area, and the Riverside Canal. Construction for the Proposed Action would include landside widening of the Sacramento River east levee along Reaches 10–15 (with levee raising in Reaches 10–11B); and the RSLIP Alternative would raise the Sacramento River east levee in place along reaches 10–11B and strengthen it in place in Reaches 12–15. Both action alternatives would include installation of cutoff walls, seepage berms, and relief wells where necessary. In addition, both of these alternatives would include raising the NCC south levee with the installation of cutoff walls at the Bennett and Northern Main Pump Stations, and relocation and extension of the Riverside Canal away from the existing Sacramento River east levee to accommodate levee construction. Activities

associated with Sacramento River east levee construction include reconstructing sections of Garden Highway and some intersections, and removing vegetation along the landside of the existing levee.

Fill material for levee and berm construction would be excavated primarily from sites in the Fisherman's Lake Borrow Area shown on **Plate 2-7**. Following excavation, these sites would either be returned to their preproject use or converted to marsh or upland habitat (see **Table 2-10**). Some of this land is bordered by agricultural canals or ditches.

Planned construction activities would coincide with part of the rainy season. These activities have the potential to temporarily impair water quality if disturbed and eroded soil, petroleum products, or construction-related wastes (e.g., cement and solvents) are discharged into receiving waters or onto the ground where they can be carried into receiving waters. Soil and associated contaminants that enter receiving waters through stormwater runoff and erosion can increase turbidity, stimulate algae growth, increase sedimentation of aquatic habitat, and introduce compounds that are toxic to aquatic organisms. Accidental spills of construction-related substances such as oils and fuels can contaminate both surface water and groundwater. The extent of potential impacts on water quality would depend on the following factors: tendency for erosion of soil types encountered, types of construction practices, extent of the disturbed area, duration of construction activities, timing of particular construction activities relative to the rainy season, proximity to receiving water bodies, and sensitivity of those water bodies to construction-related contaminants.

Slurry that would be used for construction of the new cutoff walls has a fluid consistency when being placed. Improper handling or storage could result in releases to nearby surface water, thereby degrading water quality.

Excavated areas that fill with surface or groundwater during project construction would require dewatering. Surface or groundwater extracted from dewatering operations typically contains high levels of suspended sediment and often high levels of petroleum products and other construction-related contaminants. This extracted water could be directly released to local receiving waters, thereby degrading water quality.

The potential for release of soil or construction-related materials into the NCC, West Drainage Canal, local drainages, and ultimately the Sacramento River could adversely affect river water quality. This temporary construction-related impact is considered **potentially significant**. ***(Similar)***

Mitigation Measure 4.6-a: Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions

Proposed Action and RSLIP Alternative

SAFCA shall file a Notice of Intent (NOI) to discharge stormwater associated with construction activity with the Central Valley RWQCB. Final design and construction specifications shall require the implementation of standard erosion, siltation, and good housekeeping BMPs. Construction contractors shall be required to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) and comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) general stormwater permit for construction activity. The SWPPP shall describe the construction activities to be conducted, BMPs that will be implemented to prevent discharges of contaminated stormwater into waterways, and inspection and monitoring activities that shall be conducted.

The SWPPP shall include the following:

- pollution prevention measures (erosion and sediment control measures and measures to control nonstormwater discharges and hazardous spills),
- demonstration of compliance with all applicable Central Valley RWQCB standards and other applicable water quality standards,

- demonstration of compliance with regional and local standards for erosion and sediment control,
- identification of responsible parties,
- detailed construction timelines, and
- a BMP monitoring and maintenance schedule.

BMPs shall include the following:

- conduct all work according to site-specific construction plans that identify areas for clearing, grading, and revegetation so that ground disturbance is minimized;
- install silt fences near riparian areas or streams to control erosion and trap sediment, and reseed cleared areas with native vegetation;
- stabilize disturbed soils of the new or raised levees, existing levee removal areas, and borrow sites before the onset of the winter rainfall season; and
- stabilize and protect stockpiles from exposure to rain and potential erosion.

The SWPPP also shall specify appropriate hazardous materials handling, storage, and spill response practices to reduce the possibility of adverse impacts from use or accidental spills or releases of contaminants. Specific measures applicable to the project include, but are not limited to, the following:

- develop and implement strict on-site handling rules to keep potentially contaminating construction and maintenance materials out of drainages and other waterways;
- conduct all refueling and servicing of equipment with absorbent material or drip pans underneath to contain spilled fuel, and collect any fluid drained from machinery during servicing in leak-proof containers and deliver to an appropriate disposal or recycling facility;
- maintain controlled construction staging and fueling areas at least 100 feet away from channels or wetlands to minimize accidental spills and runoff of contaminants in stormwater;
- prevent substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses;
- maintain spill cleanup equipment in proper working condition. Clean up all spills immediately according to the spill prevention and response plan;
- develop a slurry spill contingency plan to respond to a potential for bentonite slurry spill and prevent slurry from entering the Sacramento River or NCC; and
- immediately notify the California Department of Fish and Game (DFG) and the Central Valley RWQCB of any spills and cleanup procedures.

BMPs shall be applied to meet the “maximum extent practicable” and “best conventional technology/best available technology” requirements and to address compliance with water

quality standards. A monitoring program shall be implemented during and after construction to ensure that the project is in compliance with all applicable standards and that the BMPs are effective.

Several technical studies have been conducted regarding water-quality control feature impacts on groundwater (e.g., *California Stormwater Best Management Practices Handbooks* prepared by the California Stormwater Quality Association [DWR 2007]) and surface water (e.g., *Truckee River Basin Stormwater Management Program-Program Years 2007–2012* [Lahontan Regional Water Quality Control Board 2007]). These studies have determined that water-quality control features such as revegetation, erosion control measures, and detention and infiltration basins have been successful in avoiding water quality impacts (e.g., metals and organic compounds associated with stormwater are typically lost within the first few feet of the soil of the retention basins associated with groundwater). Technical studies associated with the Lahontan Development (residential and golf course development) demonstrated that the use of a variety of BMPs (e.g., source control, detention basins, revegetation, and erosion control) have been able to maintain surface water quality conditions in adjacent receiving waters (Martis Creek).

Implementation of Mitigation Measure 4.6-a would reduce water quality impacts from temporary construction activities under the Proposed Action and RSLIP Alternative because SAFCA would conform with applicable local and state regulations regulating construction discharges, which would reduce temporary potentially significant impacts to a **less-than-significant** level. ***(Similar)***

Impact 4.6-b: Impacts to Sacramento River Water Quality from Stormwater Runoff from Garden Highway Drainage Outlets

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to directly disturb water quality from stormwater runoff. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Impacts to water quality as a result of levee failure would be the same as described in Impact 4.6-a under the No-Action Alternative (Potential Levee Failure). The potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

Implementation of the Proposed Action would involve construction of a new drainage system along Garden Highway in Reaches 10–11B of the Sacramento River to collect surface water from the drainage area between the existing highway and the new adjacent levee and convey it beneath Garden Highway to the Sacramento River. The surface water would collect in drainage swales between Garden Highway and the adjacent levee and drain through pipe laterals under Garden Highway to outfalls in the berm along the east bank of the Sacramento River. Without treatment, stormwater runoff from Garden Highway could degrade the water quality of the Sacramento River by discharging water containing metals (e.g., brake-lining dust), oil and grease, solvents, phosphates, hydrocarbons, and suspended solids through the proposed drainage outlets. This impact would be **significant**.

RSLIP Alternative

Under the RSLIP Alternative, the existing drainage patterns on Garden Highway would remain in place. Because the existing drainage would not be altered, there would be no increased impact to water quality in the Sacramento River. This impact would be **less than significant**. ***(Lesser)***

Mitigation Measure 4.6-b: Implement Standard Best Management Practices and Comply with NPDES Permit Conditions

Proposed Action

SAFCA and its engineering consultants shall implement a suite of stormwater quality BMPs designed to remove contaminants from water discharging through the Garden Highway outlets. These BMPs shall be based on the strategies for effectively integrating stormwater quality management into project design described in *Stormwater Quality Design Manual for Sacramento and South Placer Regions* (May 2007). Treatment control measures such as vegetated swales and vegetated filter strips shall be used, depending upon the design requirements of the levee. BMPs shall meet "maximum extent practicable" and "best conventional technology/best available technology" requirements, and comply with NPDES permit conditions.

Implementing this mitigation measure would reduce the potential impact on water quality from stormwater runoff associated with drainage from Garden Highway to a **less-than-significant** level.

RSLIP Alternative

No mitigation is required.

Impact 4.6-c: Effects on Water Quality from Groundwater Discharged by Relief Wells

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no relief wells would be installed; therefore, no potential exists for the project to directly disturb water quality from agricultural tailwater runoff. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system the risk of levee failure would remain high. Impacts to water quality as a result of levee failure would be the same as described in Impact 4.6-a under the No-Action Alternative (Potential Levee Failure). The potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Relief wells used for seepage remediation in the Phase 4a Project would release groundwater into drainage canals. Relief well surface discharge near the seepage berm toe would flow into new collection ditches or existing roadside ditches that would convey the water to Pumping Plant No. 5 or other parts of the interior drainage system. The water from the drainage canals, including the groundwater released from the relief wells, would ultimately be pumped into the Sacramento River. Groundwater may exceed contaminant levels under the Basin Plan's water quality objectives. Information about the quality of the groundwater in the areas where the wells are proposed is limited, although DWR has reported that an area between the Airport and the Bear River to the north has high levels of TDS, chloride, sodium, bicarbonate, manganese, and arsenic. It should be noted that relief wells

are typically drilled to a shallower depth (approximately 50 feet) than the groundwater wells used by DWR for water sampling (200 feet deep or greater); therefore, the data from the sample wells in or near the Phase 4a Project area may not reflect the quality of water at the shallow depths that would be in contact with the proposed relief wells. In addition, during the high surface-water events in which the relief wells discharge, the groundwater would be highly diluted with water that has seeped under the levee from the Sacramento River. The actual quality of groundwater released by the relief wells would not be known until tests at or in the vicinity of potential well sites are conducted. Because the release of untreated groundwater into these waters could adversely affect river water quality, this impact would be **potentially significant**. ***(Similar)***

Mitigation Measure 4.6-c: Conduct Groundwater Quality Tests, Notify the Central Valley RWQCB, and Comply with the RWQCB's Waste Discharge Authorization and NPDES Permit.

Proposed Action and RSLIP Alternative

SAFCA, in coordination with RD 1000, shall ensure that groundwater in the vicinity of potential relief well locations is tested during project design and before well construction, to ensure that discharge of extracted groundwater does not exceed maximum contaminant levels specified in Title 22. SAFCA shall provide the Central Valley RWQCB with the results of these water quality tests and a conceptual plan for how the relief wells will be used (e.g., extracting and discharging groundwater), and shall comply with any waste discharge requirements and the NPDES permit issued by the Central Valley RWQCB.

Implementing this mitigation measure would reduce the potential impact on water quality in the Sacramento River from relief well discharges to a **less-than-significant** level. ***(Similar)***

4.6.3 RESIDUAL SIGNIFICANT IMPACTS

Because mitigation cannot be required for the No-Action Alternative, water quality impacts related to the continued exposure of the Natomas Basin to a significant risk of flooding are uncertain. Because of this uncertainty, the potential impacts remain too speculative for meaningful consideration.

With implementation of Mitigation Measures 4.6-a, 4.6-b, and 4.6-c, there would be no residual significant impacts associated with the Proposed Action or the RSLIP Alternative related to long-term urban runoff, short-term alteration of drainages, sedimentation, groundwater recharge, or groundwater quality.

4.7 BIOLOGICAL RESOURCES

4.7.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.7.1.1 METHODOLOGY

This section presents the methodology used to assess the potential impacts of the Proposed Action and alternatives under consideration on biological resources, including sensitive habitats, terrestrial special-status species, and fisheries and aquatic resources.

Impacts to biological resources resulting from implementation of the Proposed Action and RSLIP Alternative were analyzed based on data collected during field surveys and review of existing documentation that addresses biological resources on or near the Phase 4a Project area. Biologists conducted multiple reconnaissance-level surveys of the project area during 2004–2009 as part of project-related studies and planning efforts. Specific documents reviewed to support the analysis in this section include the NBHCP (City of Sacramento, Sutter County, and TNBC 2003); TNBC's annual monitoring reports; and multiple draft and USACE-verified wetland delineation reports that cover portions of the Phase 4a Project area (see Section 3.7.2.2, "Sensitive Biological Resources," under "Sensitive Aquatic Habitat").

Methodology used to preliminarily identify irrigation, drainage, and field canals and ditches within the Phase 4a Project area is consistent with the USACE-approved delineation methodology. Consistent with the overall approach to this document and for purposes of NEPA and CEQA compliance, the analysis of jurisdictional wetlands presented below encompasses all potential borrow sites for the Phase 4a Project, including some which may not be used for the project. In addition to the potential impacts at the identified borrow sites, if additional borrow sites are needed, they would need to be analyzed under separate supplemental environmental compliance documentation and SAFCA would be required to submit a permit modification.

The (California Natural Diversity Database [CNDDB] 2008), the NBHCP, and TNBC monitoring reports were used as the primary sources to identify previously reported occurrences of special-status species in the project area and vicinity.

Impacts resulting from levee improvement activities were based on the assumption that disturbance could occur within a 660-foot-wide corridor adjacent to the current levee toe on the landside for the Proposed Action and within a 630-foot-wide corridor for the RSLIP Alternative. However, this is a worst-case estimate of disturbance limits based on the potential use of 500-foot-wide berms, and it is probable that a reduced footprint with narrower berms or cutoff walls would meet project objectives along most levee reaches. Therefore, impacts in this section likely overestimate the magnitude of impacts associated with the levee footprint.

It is assumed for purposes of this analysis that USACE and SAFCA will work cooperatively and collaboratively to develop all plans, design, and mitigation associated with the project's habitat improvements.

Natomas Levee Improvement Program Programmatic Conservation Strategy

The impact analysis methodology also considers the NLIP's programmatic conservation strategy developed by SAFCA to offset impacts to sensitive habitats and special-status species that may be temporarily or permanently affected by the overall NLIP (Phase 1–4 Projects).

As discussed in Section 2.3.4, "Habitat Improvements," the programmatic conservation strategy developed by SAFCA to provide compensatory mitigation for the NLIP would, in its entirety, substantially contribute toward the establishment of a valuable habitat reserve in the increasingly urbanized landscape of the Natomas Basin. The conservation strategy takes advantage of a unique opportunity provided by the NLIP to reconfigure and protect large nodes of habitat and connective corridors in the Basin at a landscape scale that would help to

advance the goals and objectives of the NBHCP and assist the Federal Aviation Administration (FAA) and the local reclamation districts (RD 1000 and RD 1001) in achieving their management goals. To date, other projects in the Basin have only provided piecemeal approaches to habitat protection.

The NLIP's conservation strategy would create, restore, and preserve sensitive habitats in the Basin. The strategy would expand the amount of habitat protected in the Basin, establish the components that tie the preserves and disparate mitigation sites together in perpetuity under public ownership, and increase the quality and viability of this emerging habitat reserve. (See Section 2.3.4.3, "Phase 4a Project Habitat Elements," for a detailed description of conservation measures, monitoring components, and performance standards associated with the conservation strategy.)

The conservation strategy has four primary goals:

1. Increase the amount of protected habitat and habitat corridors available for NBHCP-covered species.

2. Consolidate large areas of habitat, to assist in the expansion of TNBC reserve blocks in the northwestern and southwestern regions of the Basin.

3. Improve the connectivity between core habitat reserves and other existing natural habitats distributed throughout the Basin, improve linkages between isolated wildlife populations, and substantially increase acreage and patch size of these critical habitats.

4. Meet regulatory compensatory mitigation requirements.

To meet these goals, the conservation strategy includes the preservation and/or creation of managed marsh, managed grasslands, canals, and associated uplands, valley oak woodlands and savannah, rice fields, and agricultural field crops. These elements provide important habitat for NBHCP-covered species, including aquatic and upland habitat for giant garter snake and other aquatic species, nesting and foraging habitat for Swainson's hawk and other raptors, and potential habitat for valley elderberry longhorn beetle.

Key programmatic conservation strategy elements relating to giant garter snake include:

- creating the GGS/Drainage Canal and improvements to the West Drainage Canal to enhance habitat functionality by linking known concentration of giant garter snakes in the basin and TNBC properties in the northern and southern reserve areas that are managed for giant garter snake habitat;

- reclaiming and preserving existing rice fields within the Basin, to compensate for any temporary losses of habitat; and

- creating managed marsh in the vicinity of Fisherman's Lake to expand and consolidate marsh habitat on TNBC preserves in the area and to compensate for permanent effects to rice fields and aquatic and upland features considered giant garter snake habitat.

Key programmatic conservation strategy elements relating to Swainson's hawk include:

- retaining the mature riparian tree corridor along the Sacramento River and the NCC, which provide important nesting habitat for Swainson's hawk;

- increasing woodland acres, patch size, and connectivity (including creation of potential nesting habitat near Swainson's hawk foraging habitat); and

- preserving and creating foraging habitat (including grassland and agricultural upland).

Implementation of the conservation strategy would result in a net gain in aquatic habitat for giant garter snake (including canals, rice, and managed marsh); a net gain in foraging habitat (overall acreage of grassland and upland agriculture) for Swainson's hawk; and a net gain in woodlands that would provide more potential nesting and perching habitat for Swainson's hawk in the Basin than currently exists, and bring potential nesting and perching sites in closer proximity to areas that are managed as foraging habitat for this species in the Basin.

Although land acquisition and habitat preservation is a key component of the NLIP, the primary benefit of the programmatic conservation strategy is the increased functionality and connectivity of habitat in the Natomas Basin. The NLIP would contribute to the large-scale conservation planning and substantial Basinwide benefits to NBHCP-covered species through providing substantially better quality habitat. Examples include:

- designing new and replacement canals that require less maintenance, and thus less disturbance, through increased canal flow capacity and reduced erosion resulting from higher stability 3H:1V slopes;
- secured water supply for managed marshes and canals through long-term contracts with NCMWC;
- installation of rock pile refugia and expansion of upland banks along the new GGS/Drainage Canal providing giant garter snake habitat;
- precise and dependable water level control for managed marshes and canals provided by check structures and operational criteria;
- enhancements to the West Drainage Canal, which currently provides low-quality habitat;
- preserving rice and agricultural field crops to the benefit of NBHCP-covered species in the Basin;
- creating landside woodland corridors; and, most of all,
- creating permanent linkages between giant garter snake populations in the southern and northwestern portions of the Basin.

These benefits would substantially reduce the collective impacts of the NLIP and would result in the creation of a larger contiguous area protected and managed for giant garter snake, valley elderberry longhorn beetle, Swainson's hawk, and other NBHCP-covered species than currently exists.

Table 4.7-1 provides, by project phase, the acreages of habitats that would be temporarily and permanently affected by implementation of the NLIP and also shows the acreages of habitats, by project phase, that would be preserved and/or created to compensate for construction-related and project footprint impacts. This information provides context to the overall impact assessment below under Section 4.7.2, "Impacts and Mitigation Measures."

As discussed in Section 2.3.4, "Habitat Improvements," the NLIP includes overall habitat conservation goals and strategies and improvements specific to each project phase. The following analysis considers the Phase 4a Project at a project level, as well as implementation of the programmatic conservation strategy covering all phases of the NLIP. The programmatic biological opinion (BO) and amended BO issued by the USFWS (**Appendix D1**) and the Phase 2 Section 2081 incidental take permit issued by DFG considered the entire NLIP habitat conservation strategy. Specific elements of the Phase 2 Project were included in the programmatic permitting documents, subsequent project level permits will be issued for the Phase 3 Project, and the Phase 4a Project will require issuance of a project-level BO and California Fish and Game Code Section 2081 incidental take permit. This approach was used because elements of the conservation strategy implemented in earlier phases of the NLIP included compensation for impacts from future project phases (including the Phase 4a and 4b Projects), and habitat creation and preservation that is part of the Phase 4a Project would provide compensation for impacts to habitat disclosed in environmental documents for the previous project phases.

Table 4.7-1
Habitat Impacts, Creation, and Preservation for the NLIP Programmatic Conservation Strategy by NLIP Project Phase

Species/ Habitat Type	Temporary Habitat Loss			Permanent Habitat Loss			Habitat Creation/ Preservation			Net Gain/Loss			
	Phase 2	Phase 3	Phase 4a	Phase 2	Phase 3	Phase 4a	Phase 2	Phase 3	Phase 4a	Phase 2	Phase 3	Phase 4a	Total
Giant Garter Snake Habitat													
Canals - Aquatic	0.5	5.5	4	9	9	6	12.5	12.5	15.5	3.5	3.5	9.5	**16.5**
Canal - Associated Upland	21	36	1	3	6	-	29	27	48	26	21	48	**95**
Non-canal GGS aquatic/upland habitat (i.e., temporary impacts to Rice)	180	-	-48[1]	-	-	-	Up to 90	-	-	Up to 90			**Up to 90**
Non-canal GGS aquatic/upland habitat (i.e., permanent impacts to Rice or creation of Managed Marsh)	-	-		23	45	1	-	-	Up to 120	-	-	-	**Up to 51**
Swainson's Hawk Habitat													
Field/Row Crop	-	-	-	163	111	473	90	Up to 60[2]	Up to 60[2]	-73	Up to 51	Up to 417	**-597**
Grassland/Ruderal	-	-	27	162	65	66	330	260	527	168	195	461	**824**
Landside Woodlands	-	-	-	15	35[3]	18	61	21	58	46	-14	40	**72**
Waterside Riparian Woodland	-	-	-	0.5	1.4	3.6[4]	-	-	-	-0.5	-1.4	-3.6[4]	**-5.5**[4]

Note: Net gain = acres permanent habitat loss – acres habitat creation/preservation

[1] No net loss of habitat function because of concurrent conversion to Managed Marsh and subsequent long-term management.

[2] The combined total for field/row crop created/preserved as part of the Phase 3 and 4a Projects (which could occur as part of one or both of these project phases) would be 60 acres, which would combine with the 90 acres created/preserved as part of the Phase 2 Project to reach a total of 150 acres for the Phase 2, 3, and 4a Projects.

[3] This estimate includes vegetation removal in the maximum potential flood control footprint (i.e., 660-foot width) in Reaches 10–12A of the Sacramento River east levee as analyzed in the Phase 3 DEIS/DEIR.

[4] Includes approximately 2 acres of waterside riparian woodland that could potentially be affected by implementation of the USACE encroachment policy for the approximate 1,200-foot-wide portion of the levee proposed to be raised in place at the location of Pumping Plant No. 5. This portion of the impact would not be a result of construction-related impacts. This number does not include the unknown amount of waterside woodland that may be affected by the replacement of the South Lauppe private irrigation pumping plant.

Source: Estimates calculated by EDAW in 2009

4.7.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its

impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact if they would do any of the following:

- 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;
- 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 DFG or USFWS;
- substantially reduce the habitat of a fish species or cause a fish species to drop below self-sustaining levels;
- have a substantial adverse effect on native woodland habitats;
- have a substantial adverse effect on waters of the United States, including wetlands; or
- conflict with the provisions of the NBHCP.

4.7.2 IMPACTS AND MITIGATION MEASURES

Impact 4.7-a: Loss of Woodland Habitats

No-Action Alternative

No Project Construction

Under the No-Action Alternative, there would be no improvements to the Natomas perimeter levee system. Conformance with USACE guidance regarding levee encroachments, however, could require removal of riparian vegetation and woodlands (see **Table 4.7-2** for acreage) on the waterside of the Sacramento River east levee. These woodland habitats provide important wildlife habitat and movement corridors and contribute to Shaded Riverine Aquatic (SRA) habitat functions important for fish. Removal of waterside riparian woodland habitat would adversely affect important SRA habitat, including moderation of water temperatures, recruitment of woody debris, and introduction of insects that provide food for aquatic species. Removal of this habitat would also adversely affect terrestrial wildlife that use riparian woodlands, including Swainson's hawks who frequently nest in waterside woodlands. This impact would be **potentially significant**. ***(Greater)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could adversely or beneficially affect woodland habitats and SRA habitat, depending on timing, location, and duration of flooding. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of the impact is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

Landside woodlands and waterside (riparian) woodlands in and adjacent to the Natomas Basin are considered sensitive habitats. They provide important nesting and roosting habitat for a wide variety of wildlife species (including special-status species such as Swainson's hawk) and serve as movement corridors for these species within the Basin. Waterside woodlands in particular are rich in biological fauna and flora and provide the primary source of nesting habitat for Swainson's hawk in the Natomas Basin. Waterside woodlands on the Sacramento

River also provide SRA habitat function, which is important for fish and other Sacramento River aquatic resources.

Table 4.7-2
Estimated Impacts of the Proposed Action and Alternatives on Woodlands

Location	No-Action Alternative (acres)	Proposed Action (acres)	RSLIP Alternative (acres)
Landside Woodland Removal			
Sacramento River East Levee Reaches 12B–15	No impact	16	15.83
Alignment of Relocated/Extended Riverside Canal	No impact	1.6	1.6
Pumping Plant Nos. 3 and 5	No impact	0.2	0.2
Riverside Pumping Plant	No impact	0.03	0.03
Subtotal	**No impact**	**17.83**	**17.6**
Waterside (SRA) Woodland Removal			
Sacramento River East Levee Reaches 10–15	21	No impact	21
Pumping Plant Nos. 3 and 5	No impact	2.83[1]	N/A[2]
Riverside Pumping Plant	No impact	0.27	N/A[2]
Surface Drainage Outfalls	No impact	0.50	No impact
Subtotal	**21**	**3.60**	**21**
Total Losses (approximate)	**21 acres**	**21 acres**	**39 acres**

Notes: N/A = Not Applicable; RSLIP Alternative = Raise and Strengthen Levee in Place Alternative; SRA = Shaded Riverine Aquatic Habitat

[1] Includes 2 acres of waterside riparian woodland that could potentially be affected by implementation of the USACE encroachment policy for the approximate 1,200-foot-wide portion of the levee proposed to be raised in place at the location of Pumping Plant No. 5. This portion of the impact would not be a result of construction-related impacts. This number does not include the unknown amount of waterside woodland that may be affected by the replacement of the South Lauppe private irrigation pumping plant.

[2] Waterside woodland removal for Pumping Plant Nos. 3 and 5, and the Riverside Pumping Plant are included as part of the 21 acres of removal along the Sacramento River east levee Reaches 10–15.

Source: Estimates calculated by EDAW in 2009 based on construction data provided by Wood Rodgers, Mead & Hunt, and HDR, Inc. in 2008 and 2009

SRA habitat includes the nearshore aquatic habitat occurring at the interface between a river and adjacent woody riparian habitat. The principal attributes of this cover type are: (1) an adjacent bank composed of natural, eroding substrates supporting riparian vegetation that either overhangs or protrudes into the water; and (2) water that contains variable amounts of woody debris, such as leaves, logs, branches, and roots and has variable depths, velocities, and currents. SRA habitat provides structure and food for various fish species. Shade decreases water temperatures, while low overhanging branches can provide sources of food by attracting terrestrial insects. As riparian areas mature, the vegetation sloughs off into the rivers, creating structurally complex habitat consisting of large woody debris that furnishes refugia from predators, creates higher water velocities, and provides habitat for aquatic invertebrates. For the Phase 4a Project, SRA loss is estimated as the acreage of canopy coverage from any trees or shrubs (woodlands) on the waterside of the existing Sacramento River east levee that would be impacted by construction activities.

The Proposed Action would include removal of woodlands on the landside of the Sacramento River east levee as follows: (1) in the proposed adjacent levee footprint in Reaches 12B–15; (2) in the alignment for the relocation and extension of the Riverside Canal with underground pipe section in Reaches 11B–18B; (3) in the footprint of RD 1000's Pumping Plant Nos. 3 and 5 sites; and (4) in the footprint of NCMWC's Riverside Pumping Plant

pipeline modifications (**Table 4.7-2**). Removal of vegetation in Reaches 10–12A was evaluated in the Phase 3 DEIS/DEIR.

The Proposed Action would include removal of a small amount of woodlands on the waterside of the Sacramento River east levee (considered SRA habitat) as follows: (1) in the footprint of Pumping Plant Nos. 3 and 5 where the new pipes tie in with the existing outfalls; (2) in the footprint of the Riverside Pumping Plant modifications; and (3) in the footprint of the Garden Highway waterside drainage outfalls in Reaches 10–11B (**Table 4.7-2**). Included in the impact area calculation in **Table 4.7-2** are approximately 2 acres of waterside riparian woodland that could potentially be affected by implementation of the USACE encroachment policy for the 1,200-foot-wide portion of the levee proposed to be raised in place at the location of Pumping Plant No. 5. This portion of the impact would not be a result of construction-related impacts from the Proposed Action. The estimate in **Table 4.7-2** does not include the currently unknown amount of waterside riparian that could be affected by the replacement of the South Lauppe private irrigation pumping plant (two potential alternatives).

The small area of levee work to be completed along the NCC as part of the Phase 4a Project (levee raising in "gaps" remaining along the cutoff wall following construction of the Phase 1 and 2 Projects) falls within the footprint of woodland and vegetation removal previously analyzed in the Phase 2 EIR and Phase 2 EIS. That analysis is hereby incorporated by reference and summarized in Chapter 5.0, "Cumulative and Growth Inducing Impacts," as allowable under CEQA (see Section 1.1.1, "Scope of Environmental Analysis"). The removal of approximately 20 acres of woodland on the landside of the Sacramento River east levee Reaches 10–12A (including along the new alignment for Riverside Canal within these reaches) was disclosed and previously analyzed as an element of the Phase 3 DEIS/DEIR. Impacts associated with woodland removal along these levee reaches were analyzed in the Phase 3 DEIS/DEIR. That analysis is hereby incorporated by reference and summarized in Chapter 5.0, "Cumulative and Growth Inducing Impacts."

Impacts from loss of woodlands include short-term effects that would occur during the period it takes replacement plantings to mature. Although woodland habitat would be created to compensate for the loss of woodlands, replacement plantings do not provide habitat functions equivalent to the mature woodlands that would be removed for approximately 10–15 years. Long-term impacts take into consideration compensation provided by replacement plantings, once created woodlands provide functional replacement habitat.

Temporal Loss (10–15 Years) of Woodland Habitat

The Proposed Action would reduce the potential need to remove waterside woodlands (including those that provide SRA habitat function) along the Sacramento River in order to meet USACE levee guidelines on vegetation clearance because it would shift the Sacramento River east levee prism landward. However, the Proposed Action would result in the need for removal of several landside woodland groves and individual trees. Assuming landside vegetation would be cleared within a 660-foot-wide corridor along the Sacramento River east levee (a worst-case scenario), the proposed improvements would remove a moderate amount of landside woodland vegetation in Reaches 12B–15 of the east levee and along the alignment of the relocated Riverside Canal, and a minimal amount from the reconstruction of Riverside Pumping Plant and RD 1000's Pumping Plant Nos. 3 and No. 5 (see **Table 4.7-2** for acreages). It is anticipated that the small areas of woodlands that occur in the Fisherman's Lake Borrow Area outside of the levee and seepage remediation footprint can be avoided and not impacted by borrow activities. In addition, as described in Section 2.3.1, "Flood Risk Reduction Components," SAFCA would take measures to reduce impacts to heritage oaks where feasible under levee design and seepage remediation performance requirements.

The removal of small amounts of riparian vegetation or woody material along the waterside of the existing Sacramento River east levee would result from installation of drainage outfalls on the waterside of the levee and from modifications to pumping plants (see **Table 4.7-2** for acreages). Additionally, as discussed above, approximately 2 acres of riparian vegetation and woody material along a 1,200-foot-wide portion of Reach 10 could potentially be removed to satisfy vegetation removal requirements of USACE encroachment policy for the

portion of the Sacramento River east levee that would be raised and widened on the waterside of the existing levee. If implemented, this would result in the loss of individual trees that may provide SRA habitat function. The potential loss of trees (and associated potential SRA habitat) would result in reduced quality and quantity of important habitat for fish species and/or their prey species and potential nest trees for Swainson's hawks.

The Phase 4a Project would offset the loss of woodlands by preserving and creating woodlands (see **Table 4.7-3** for acreages); however, there would be a temporal loss of woodland habitat as the replacement plantings mature within approximately 10–15 years. This impact due to loss of existing woodland habitat while the replacement plantings are maturing would be **significant**.

Table 4.7-3
Estimated Impacts of the Proposed Action and Alternatives on Woodlands Following Compensation

Project Activity	Phase 4a Project Alternatives (acres)			Programmatic NLIP (Proposed Action–All Phases) (acres)
	No-Action Alternative	Proposed Action	RSLIP Alternative	
Woodlands Removed	21	21[1]	39	60
Woodlands Preserved	-	0	0	21
Woodlands Created	-	58	133[2]	119
Total Compensation	**0**	**58**	**133**	**140**
Net Gain or (Loss)	**(21)**	**37**[1]	**94**	**80**

Note: RSLIP Alternative = Raise and Strengthen Levee in Place Alternative; Net Gain = Woodland Loss - (Woodlands Preserved + Woodlands Created)

[1] Includes approximately 2 acres of waterside riparian woodland that could potentially be affected by implementation of the USACE encroachment policy for the approximate 1,200-foot-wide portion of the levee proposed to be raised in place at the location of Pumping Plant No. 5. This portion of the impact would not be a result of construction-related impacts. This number does not include the unknown amount of waterside woodland that may be affected by the replacement of the South Lauppe private irrigation pumping plant.

[2] Woodland creation for the RSLIP Alternative would be 75 acres more than for the Proposed Action to compensate for greater loss of mature woodlands on the waterside of the Sacramento River east levee to conform with USACE guidance regarding levee encroachments.

Source: Data compiled by EDAW in 2009

Long-Term Impact Due to Loss of Woodland Habitat

The plan for woodland mitigation would include transplanting suitable trees from the Phase 4a Project footprint, where feasible, as well as planting a variety of native tree species to create woodland habitat. Potential sites for woodland plantings would include locations within a 100- to 200-foot-wide corridor adjacent to the relocated Riverside Canal in Reaches 12A–14 (**Plate 2-12**) and in Reach 4A on the properties north and south of the Lausevic woodland planting area, which was part of the Phase 2 Project (**Plate 2-14**).

To provide adequate compensation for lost habitat, the woodlands must be created and/or managed in a manner that provides the essential woodland habitat functions. A plan for waterside woodland (e.g., SRA) habitat creation has been developed and is currently under review by USACE and NMFS. A detailed design of the landside woodland habitats to be created is being developed and provided for USFWS and DFG review and approval; protective mechanisms and specific management protocols for the woodlands are currently being prepared by SAFCA in coordination with these agencies (as described in Section 2.3.4, "Habitat Improvements").

These proposed compensatory measures would complement woodland preservation and creation activities carried out as part of the programmatic compensation strategy for the NLIP as shown in **Table 4.7-3**. When completed,

the programmatic conservation strategy would result in a substantial net gain in the amount of woodland habitat in the Natomas Basin. In addition, the conservation strategy would result in increased woodland grove size and connectivity, which would provide higher quality habitat for fish and wildlife species that depend on woodlands and oak savannah. However, the long-term loss of woodlands (if habitat creation/preservation is not effectively implemented) would result in a **potentially significant** impact.

RSLIP Alternative

The RSLIP Alternative would be similar to the Proposed Action except that no adjacent levee would be constructed along the Sacramento River east levee in Reaches 10–15, and the levee would instead be either raised or widened in place. However, mature riparian woodland vegetation (i.e., trees and shrubs) along Reaches 10–15 on the waterside of the levee that provide SRA function would likely be removed to construct cutoff walls and conform with USACE guidance regarding levee encroachments (see **Table 4.7-2** for acreages). The RSLIP Alternative would also include removal of landside woodland on the Sacramento River east levee (See **Table 4.7-2**).

The adverse effects of vegetation removal for the RSLIP Alternative would be greater than under the Proposed Action, particularly in terms of the quality of the habitat lost, but also in the amount of habitat lost. The loss of waterside riparian woodlands including those that provide SRA habitat functions on the Sacramento River would be much greater compared to that under the Proposed Action.

Habitat creation and preservation components of this alternative would require planting of substantial woodland habitat along the landside of the adjacent levee along the Sacramento River east levee as part of the Phase 4a Project (see **Table 4.7-3** for acreage). However, these woodland creation efforts would not fully compensate for the extensive loss of mature waterside vegetation, and credits would be purchased from a local mitigation bank to offset the removal of trees from the waterside of the existing levee (because replanting on the waterside of the levee would conflict with USACE guidance regarding levee encroachments).

In summary, woodland conservation efforts would not fully compensate for the extensive loss of mature waterside vegetation even if the habitat creation and management are properly implemented. In addition, the extensive riparian vegetation removal associated with this alternative could substantially and adversely affect the wildlife that depend on waterside riparian woodlands for foraging and nesting habitat and could substantially adversely affect SRA habitat functions important for fish. This impact would be **significant**. ***(Greater)***

Mitigation Measure 4.7-a: Minimize Effects on Woodland Habitat; Implement all Woodland Habitat Improvements and Management Agreements; Compensate for Loss of Habitat; and Comply with Section 7 of the Federal Endangered Species Act, Section 1602 of the California Fish and Game Code, and Section 2081 of the California Endangered Species Act Permit Conditions

Proposed Action and RSLIP Alternative

To reduce impacts on woodland habitat, SAFCA shall implement the measures described below:

- Native woodland areas shall be identified and the primary engineering and construction contractors shall ensure, through coordination with a qualified biologist retained by SAFCA, that construction is implemented in a manner that minimizes disturbance of such areas to the extent feasible. Temporary fencing shall be used during construction to prevent disturbance of native trees that are located adjacent to construction areas but can be avoided.

- SAFCA shall coordinate with USFWS, National Marine Fisheries Service (NMFS), DFG, and the Sacramento County Airport System (SCAS) (if on Airport property) to ensure that all woodland habitat improvements of the NLIP are created and managed. SAFCA shall prepare a project-specific Mitigation and Monitoring Plan (MMP) and append the

programmatic Long-Term Management Plan (LTMP) to ensure the creation and long-term management of these components before construction commences. SAFCA shall enter into agreements with the appropriate local entity responsible for long-term management of these created woodland habitats and shall coordinate with USFWS, NMFS, and DFG to ensure that performance standards and long-term management goals that are required by the regulatory agencies with jurisdiction over these resources will be specifically detailed and outlined in the MMP and LTMP. All performance standards and long-term management goals will be in full compliance with the Endangered Species Act (ESA) and California Endangered Species Act (CESA). SAFCA shall implement all terms and conditions of the agreements.

- Sacramento River waterside riparian woodland areas that provide SRA habitat functions shall be identified and the primary engineering and construction contractors shall ensure, through coordination with a qualified biologist retained by SAFCA, that construction is implemented in a manner that minimizes disturbance of such areas to the extent feasible. Temporary fencing shall be used during construction to prevent disturbance of trees and shrubs that are located adjacent to construction areas but can be avoided.

- Sacramento River waterside riparian forest and scrub (canopy acreage) shall be restored using ratios established by NMFS. Mitigation shall be 1:1 for in-kind mitigation and 3:1 for mitigation above the levee bench hinge (a surrogate for the ordinary high water mark (OHWM) for impacts below the levee bench hinge (OHWM). Mitigation shall be conducted using native plant species, including an assemblage of grasses, sedges, shrubs, and trees. At maturity, the riparian vegetation community would provide SRA functions. SAFCA shall develop a detailed woodland planting design and management protocols in coordination with USFWS, NMFS, and DFG. A monitoring plan with performance criteria shall be developed to determine the progress of the woodland habitats towards providing adequate mitigation.

- The criteria for measuring performance shall be used to determine if the habitat improvement is trending toward sustainability (reduced human intervention) and to assess the need for adaptive management (e.g., changes in design or maintenance revisions). These criteria must be met for the habitat improvement to be declared successful, both during a particular monitoring year and at the end of the establishment period. These performance criteria, shall be developed in consultation with USFWS, NMFS, and DFG, and shall include, but not be limited to:

  - percent survival of planted trees (from 65–85%),
  - percent survival of transplanted trees (from 60–85%), and
  - percent relative canopy cover (from 5–35%).

- SAFCA shall also enter into agreements with entities responsible for long-term management of created SRA habitats to ensure that performance standards and long-term management goals are met. SAFCA shall provide assurances for habitat creation and management goals that are required by regulatory agencies with jurisdiction over these resources will be specifically detailed and outlined in the LTMP and MMP. Such agreements shall be coordinated with USFWS, NMFS, and DFG. SAFCA shall implement all terms and conditions of the agreements.

- A Section 1602 Streambed Alteration Agreement from DFG shall be obtained before any trees within a stream zone under DFG jurisdiction are removed. SAFCA shall comply with all terms and conditions of the streambed alteration agreement including measures

to protect fish habitat or to restore, replace, or rehabilitate any SRA habitat on a no-net-loss basis.

- USACE shall initiate Section 7 consultation with NMFS under Section 7 of the Federal ESA and SAFCA shall consult or coordinate with DFG under CESA regarding potential impacts of the loss of SRA habitat on Federally listed fish species and state-listed fish species, respectively. SAFCA shall implement any additional measures developed through the ESA Section 7 and CESA consultation processes, including Section 2081 permit conditions, to ensure no net loss of SRA habitat functions.

Implementing this mitigation measure, along with the habitat improvements of the Phase 2 and 3 Projects, would minimize adverse effects of the Phase 4a Project on landside woodland habitat because the amount of landside woodlands that would be created and preserved as part of the Phase 2 and 3 Projects along with the Phase 4a Project would result in an increase of 95 acres of landside woodlands in the Basin. The adverse effects of loss to waterside woodlands providing SRA function under the Proposed Action and RSLIP Alternative would be mitigated for on a no net-loss-basis according to the ratios above. The habitat improvements from mitigation implementation would reduce long-term impacts to woodland habitats to a **less-than-significant** level. Although no permanent impacts would occur, this impact would remain **significant and unavoidable** for many years before reaching a less-than-significant level because replacement plantings would require a minimum of 10–15 years before providing important habitat components such as shade and structure.

While the woodland restoration and preservation proposed for the RSLIP Alternative may be adequate to offset the removal of landside woodlands, these replacement woodlands would not be adequate to compensate for the extensive loss of mature waterside vegetation and would not compensate for loss of SRA habitat along the Sacramento River in the vicinity of the Phase 4a Project. Thus, the loss of woodland and SRA habitat for the RSLIP Alternative would remain **significant and unavoidable**. ***(Greater)***

Impact 4.7-b: Impacts on Wildlife Corridors

No-Action Alternative

No Project Construction

Under the No-Action Alternative, there would be no improvements to the Natomas perimeter levee system. However, extensive removal of woodland located on the waterside of the Sacramento River east levee would be required to conform with USACE guidance regarding levee encroachments (see **Table 4.7-2**). Removing a large portion of this riparian vegetation would adversely affect the movement and dispersal of the native birds and wildlife species that depend on woodland cover. This impact would be **potentially significant**. ***(Greater)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could adversely or beneficially affect wildlife corridors, depending on timing, location, and duration of flooding. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact, whether adverse or beneficial, is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Impacts on Movement Corridors for Aquatic Species

Irrigation/drainage ditches and canals within the project area and larger Natomas Basin serve as critical corridors for movement of aquatic species, particularly the giant garter snake. Adverse impacts on these corridors under the Proposed Action would consist of temporary disturbance and permanent loss of canals, ditches, and their associated habitat values due to filling, redesigning, and reconfiguring these facilities to accommodate project improvements.

Under the Proposed Action, a small amount of canal habitat would be temporarily affected or permanently lost due to filling and relocating the Riverside Canal and portions of associated lateral supply pipes (see **Table 4.7-1**). SAFCA proposes to offset temporary impacts to the existing Riverside Canal through creation of the relocated and extended Riverside Canal, which is expected to provide a higher habitat value relative to the canal that would be filled. The relocated Riverside Canal would be designed to reduce maintenance requirements and resulting habitat degradation and snake injury and mortality that could occur.

New canal habitat created as part of SAFCA's programmatic conservation strategy (including creation of the GGS/Drainage Canal under the Phase 2 Project, the Phase 3 Project, and proposed improvements to the West Drainage Canal as part of the future Phase 4b Project) would provide new movement corridors for giant garter snake, partially offsetting the permanent loss of canal habitat. The configuration and preliminary design of these new corridors were specifically formulated to enhance giant garter snake movement opportunities between populations in the northern and southern portions of the Natomas Basin (see Section 2.3.4 for additional details). This is anticipated to provide an overall, long-term enhancement in the quality of aquatic movement corridors in the western portion of the Basin. The creation of managed marsh in the vicinity of Fisherman's Lake would also contribute towards offsetting the permanent loss of canal habitat.

A detailed design of the new canal and managed marsh habitats is being developed and will be provided for USFWS and DFG agency review. Protective mechanisms and specific management protocols are currently being prepared by SAFCA in coordination with USFWS and DFG. To provide adequate compensation for the canal habitat that would be lost, new canal and managed marsh habitat must be created and managed in a manner that provides the essential functions of habitat that would be lost. If this objective is not achieved, project impacts on aquatic movement corridors would be considered **significant**.

Impacts on Movement Corridors for Bird Species

The existing woodland corridor along the waterside and landside of the Sacramento River east levee provides valuable nesting and rearing habitat for a variety of bird species. Under the Proposed Action, substantial landside woodland and a small number of trees on the waterside would be removed (see **Table 4.7-2** for acreage).

To offset this impact, woodland would be planted on the landside of the adjacent levee as described above under Impact 4.7-a and would complement the woodlands created as part of SAFCA's programmatic conservation strategy, as shown in **Table 4.7-3**. This compensatory vegetation would not mature for 10–15 years, however, and its habitat value would therefore be limited in the near term when compared with the value of the existing landside woodlands that would be removed. The Proposed Action would leave the higher quality waterside riparian woodland largely undisturbed, thus substantially preserving the integrity of the existing woodland corridors during the interim period while the new woodland plantings mature. The net result of the Proposed Action (both at the project level and when considered in combination with the programmatic conservation strategy) would be a net increase in landside woodland habitat (see **Table 4.7-3**). Nevertheless, because of the time required for the woodland plantings to mature, this impact would be **potentially significant**.

Impacts on Movement Corridors for Aquatic Species

Impacts on the amount and quality of canal habitat under the RSLIP Alternative would be the same as described for the Proposed Action.

Impacts on Movement Corridors for Bird Species

Under the RSLIP Alternative, extensive removal of large woody vegetation from the riparian corridor on the waterside of the Sacramento River east levee would be required to conform with USACE guidance regarding levee encroachments. A slightly reduced amount of landside woodland (compared to the Proposed Action) would also be removed along Reaches 12B–15 of the Sacramento River east levee. As under the Proposed Action, landside woodlands would also be removed in the alignment of the relocated Riverside Canal and in the areas surrounding pumping plants to be replaced or upgraded (See **Table 4.7-2**).

Removal of a large portion of riparian vegetation would adversely affect the movement and dispersal of the native birds and wildlife species that depend on woodland cover. Without the creation of a levee setback area in the Natomas Basin to prevent extensive loss of riparian vegetation (as under the Proposed Action), there is no known feasible mitigation that would adequately and fully compensate for the likely loss of waterside vegetation along the Sacramento River east levee under the RSLIP Alternative. For these reasons, the RSLIP Alternative could adversely affect wildlife movement corridors, and this impact would be **significant**. ***(Greater)***

Mitigation Measure 4.7-b: Implement Mitigation Measure 4.7-a, "Minimize Effects on Woodland Habitat; Implement all Woodland Habitat Improvements and Management Agreements; Compensate for Loss of Habitat; and Comply with Section 7 of the Federal Endangered Species Act, Section 1602 of the California Fish and Game Code, and Section 2081 of the California Endangered Species Act Permit Conditions," and Mitigation Measure 4.7-e, "Minimize the Potential for Direct Loss of Giant Garter Snake Individuals, Implement All Upland and Aquatic Habitat Improvements and Management Agreements to Ensure Adequate Compensation for Loss of Habitat, and Obtain Incidental Take Authorization"

Proposed Action

Implementing Mitigation Measure 4.7-a would ensure that significant adverse impacts on woodlands that provide wildlife movement corridors are minimized through the creation and preservation of landside woodlands, which would facilitate wildlife movement. These replacement woodlands would reduce effects on wildlife movement and dispersal to a **less-than-significant** level.

Implementing Mitigation Measure 4.7-e would ensure that significant adverse impacts on irrigation/drainage ditches and canals that provide wildlife movement corridors are minimized through the creation of replacement aquatic corridors, which would facilitate wildlife movement. Created canals that would serve as aquatic corridors would reduce effects on wildlife movement and dispersal to a **less-than-significant** level.

RSLIP Alternative

Implementing Mitigation Measures 4.7-a and 4.7-e would ensure that adverse effects on landside woodlands and irrigation/drainage ditches and canals that provide wildlife movement corridors are minimized through the creation of replacement woodland and aquatic corridors, which would facilitate wildlife movement. Created woodlands and canals would partially reduce the effects of wildlife movement and dispersal, but not to a less-than-significant level because there is no known feasible mitigation that would adequately and fully compensate for the likely loss of waterside vegetation along the Sacramento River east levee under the RSLIP Alternative. Thus, this impact would remain **significant and unavoidable**. ***(Greater)***

Impact 4.7-c: Impacts on Jurisdictional Waters of the United States

Potential temporary and permanent impacts on waters of the United States resulting from the Phase 4a Project are identified in **Table 4.7-4**.

Table 4.7-4
Estimated Potential Impacts on Jurisdictional Waters of the United States for the Phase 4a Project

Feature	Functional Value[1]	Proposed Action		RSLIP Alternative	
		Temporary Impact (acres)	Permanent Impact (acres)	Temporary Impact (acres)	Permanent Impact (acres)
Construction of Sacramento River East Levee Improvements					
Irrigation Ditches (Fill)	Low	-	<3.25	-	<3.25
Field Drain (Fill)[3]	Low	-	<3.0	-	<3.0
Drainage Ditch (Fill)	Low	-	1.25	-	1.25
Construction of Relocated Riverside Canal					
Irrigation, Agricultural, Field, and Drainage Ditches (Fill)[3]	Low	-	0.75	-	0.75
Irrigation Ditches (Dewater of Existing Riverside Canal downstream of levee improvements)	Low	-	1.5	-	1.5
Replacement of RD 1000's Pumping Plant Nos. 3 and 5 and NCMWC Riverside Pumping Plant[2]					
Replacement of Outfalls and Intakes in the Sacramento River (Fill)	Low	-	<0.5	-	<0.5
Sacramento River Waterside Erosion Control Rip Rap (Fill)[4]	High	-	n/a[6]	-	8.6
Drainage Outfalls in Sacramento River (Fill)	High	-	<0.01	-	n/a
Borrow Site and Haul Road Construction					
Fisherman's Lake and I-5 Borrow Area Drainage and Field Ditches and Canals (Fill/Dewater)[3]	Low	1.0	<3.0	1.0	<3.0
Elkhorn Borrow Area Drainage, Irrigation, and Field Ditches (Fill)[3,5]	Low	-	<3.0	-	<3.0
Irrigated Wetlands in Fisherman's Lake (Fill)[7]	Low	-	<3.5[7]	-	<3.5[7]
Total		**1.0**	**<19.76**	**1.0**	**<28.35**

Notes: RSLIP Alternative = Raise and Strengthen-Levee-in-Place Alternative; PGCC = Pleasant Grove Creek Canal; GGS = Giant Garter Snake; RD = Reclamation District

[1] Functional value definitions: High = Natural structure and function of biotic community maintained, with minimal changes evident. Moderate = Moderate changes in structure and function of biotic community—i.e., moderate level of disturbance. Low = Severe changes in structure and/or function of biotic community evident—i.e., high level of disturbance. See Section 3.3.7 in Chapter 3.0, "Affected Environment," for additional information.

[2] Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act authorizations are required for work on the waterside of the levee.

[3] In previous delineations conducted by EDAW and verified by the USACE, field drains were determined to be non-jurisdictional features; however, for this estimate, they are included here because USACE has not yet verified those listed above to be non-jurisdictional features.

[4] Estimates based on the draft Jones & Stokes data regarding Waterside Erosion Control Project (2007).

[5] Includes all Elkhorn Borrow Area Drainage, Irrigation, and Field Ditches.

[6] Waterside erosion control riprap would not be necessary under the Proposed Action.

[7] Because the temporal extent of impacts is unknown at this time, these impacts have been conservatively assessed as permanent.

Sources: Data provided by Wood Rodgers in 2008, Mead & Hunt in 2008, and HDR, Inc. in 2008, and compiled by EDAW in 2008 and 2009

No Project Construction

Under the No-Action Alternative, the Natomas perimeter levee system would not be improved and the proposed landscape and irrigation/drainage system modifications would not be implemented. There would be **no impact** on waters of the United States under USACE jurisdiction. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could adversely or beneficially affect waters of the United States that occupy approximately 930 acres, or 1.7%, of the Basin (TNBC 2007). Because the exact level of impact would be dependent on the flooding duration, depth, rate, timing, and location, this impact is considered uncertain and a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

The Proposed Action would, if all the borrow sites were affected, result in 14.51 acres of permanent impacts to waters of the United States, including wetlands (**Table 4.7-4**). These impacts would result from construction along the Sacramento River east levee, relocation and extension of the Riverside Canal, replacement of RD 1000's Pumping Plants Nos. 3 and 5, the NCMWC's Riverside Pump Station, and construction activities at the borrow sites and along haul roads.

Potential impacts to waters of the United States resulting from the Proposed Action would include fill of irrigation, field, and drainage ditches along or near the landside toe of the levee in Reaches 10–15 of the Sacramento River east levee. Relocation and extension of the Riverside Canal would result in permanent fill of irrigation ditches, field drains, and drainage ditches.

Under the Proposed Action, in reaches where the adjacent levee would be constructed and would be higher than the existing levee (Reaches 10–15), filtered runoff (via the grassed swale) would be conveyed in pipes from the swale between the existing levee and the new adjacent levee to new drainage outfalls in the berm along the east bank of the Sacramento River. Most of the outfalls would be placed above the OHWM and are not expected to qualify as fill of waters of the United States under Section 404 of the CWA. However, because this work would be occurring over a navigable water of the United States, authorization under Section 10 of the River and Harbors Act of 1899 would be required. Up to 15 outfalls are anticipated under the Proposed Action. The installation of these outfalls would result in no more than 0.01 acre of fill of waters of the United States and the removal of some minor amounts of riparian vegetation.

Replacement of RD 1000's Pumping Plants Nos. 3 and 5 and would consist of raising the pumping plants' discharge pipes above the 200-year design water surface, extension of the pipes to tie into existing discharge pipes within the waterside bench, replacement or modification of pumps and motors, and other seepage remediation, including relocating the landside stations away from the levee to accommodate the raised discharge pipes. Modifications to NCMWC Riverside Pumping Plant includes raising the pumping plant's discharge pipes above the 200-year design water surface and modification or replacement of the plant's existing pumps and motors to accommodate the raised discharge pipes. Grading and placement of these structures would result in the fill of approximately 0.5 acre of the Sacramento River below the ordinary high water mark.

Use of material from the Elkhorn, Fisherman's Lake, and I-5 Borrow Areas would require the permanent fill of up to approximately 6 acres of drainage, irrigation, and field ditches. Up to approximately 1 acre of irrigation ditches

could be temporarily impacted by fill. The exact amount is not known at this time. Impacts associated with haul road construction across various drainage canals would be temporary, and these resources would be restored to preproject conditions after project completion. Although the temporal extent of the impacts are not known at this time, because only preliminary borrow plans are available, it is anticipated that up to 3.5 acres of irrigated wetlands could be temporarily affected or filled in the Fisherman's Lake Area during borrow operations. For the purposes of this analysis, the impacts are conservatively shown above as being permanent. The total acreage for temporary impacts noted in **Table 4.7-4** is the potential acreage of temporary impacts if all borrow sites are completely disturbed within their excavation footprints. It is not expected that all the borrow sites, however, would be used.

A detailed design of aquatic habitats will be developed and protective mechanisms and specific management protocols are currently being prepared by SAFCA in coordination with USACE, USFWS, and DFG. These aquatic habitats must be created and managed in a manner that provides the essential functions of the habitats that would be lost, for the created habitat to provide adequate compensation. Therefore, an overall adverse impact on waters of the United States could occur if habitat creation and management are not properly implemented. This impact is considered **potentially significant**.

RSLIP Alternative

As shown in **Table 4.7-4**, impacts on waters of the United States under the RSLIP Alternative would be similar to the Proposed Action except that (1) there would be no drainage outfalls constructed along the east bank of the Sacramento River levee and, therefore, no potential for impacts to navigable waters of the United States from those features; and (2) erosion control improvements would be implemented along approximately 5,410 linear feet of river bank at the waterside toe of the Sacramento River east levee at River Miles 70.0, 69.8, 69.4, 69.1, and 68.8 (Sites I, J, K, L, and M in Reaches 10–11B) (see **Plate 1-5**).

The proposed erosion control improvements would involve the permanent placement of cobble, riprap, and soil at Sites I, J, K, L, and M to provide protection of the levee foundation from catastrophic scour and erosion protection of the soil surface. The majority of riprap would be placed on the submerged toe of the eroding bank (where it meets the channel bottom) to arrest retreat of the emergent upper bank and stop the reduction in berm width, destabilization of the levee foundation, and shortening of seepage pathways. As shown in **Table 4.7-4**, approximately 8.6 acres of waters of the United States would be permanently filled at Sites I, J, K, L, and M under the RSLIP Alternative, which would be in addition to the same acreages that would also be affected under the Proposed Action. While the placement of fill in the Sacramento River would alter the cross section and the type of substrate present at the bank protection sites, it would not alter the ability of the Sacramento River to function as a navigable water of the United States. The design of the bank protection is expected to fully compensate for impacts on habitat values through the use of suitable types of substrate, vegetation, and instream woody material.

The RSLIP Alternative would include creation of the same acreages of relocated Riverside Canal and marsh habitat as described for the Proposed Action, more than offsetting the landside filling and dewatering of waters of the United States included under this alternative. However, an overall adverse effect on waters of the United States could occur if habitat creation and management are not properly implemented. This impact is considered **potentially significant**. ***(Greater)***

Mitigation Measure 4.7-c: Minimize Effects on Jurisdictional Waters of the United States; Complete Detailed Design of Habitat Creation Components and Secure Management Agreements to Ensure Compensation of Waters Filled; and Comply with Section 404, Section 401, Section 10, and Section 1602 Permit Processes

Proposed Action and RSLIP Alternative

SAFCA shall implement the measures described below to reduce impacts related to loss or fill of jurisdictional waters of the United States.

- Waters of the United States, including wetlands, shall be identified and the primary engineering and construction contractors shall ensure, through coordination with a qualified biologist(s), that construction is implemented in a manner that minimizes disturbance of canals, ditches, and seasonal wetlands. Temporary fencing shall be used during construction to prevent disturbance of waters of the United States that are located adjacent to construction areas but can be avoided.

- To mitigate for permanent impacts to sensitive aquatic resources, at least 1 acre of aquatic habitat (irrigation/drainage canal) or 1 acre of seasonal wetland shall be created for every acre that is lost to ensure no net loss of sensitive aquatic habitat. The mitigation ratio that is ultimately required will be determined by USACE through the Section 404 permitting process. Features planned in the Phase 4a Project (under both action alternatives), would provide aquatic habitat that has been designed to offset the effects described above. These features include the creation of aquatic habitat resulting from construction of the relocated Riverside Canal and creation of managed marsh in the vicinity of Fisherman's Lake, much of which would meet the criteria for Waters of the United States, including wetlands.

- Develop and implement a Mitigation and Monitoring Plan and Long-Term Management Plan in coordination with and subject to approval of USACE, USFWS, and DFG. The MMP and LTMP shall provide complete detailed designs of habitat creation components, performance standards and management protocols. SAFCA shall also enter into agreements with entities responsible for long-term management of created canals and marsh habitats to ensure that performance standards and long-term management goals that are required by the regulatory agencies with jurisdiction over these resources will be met and specifically detailed and outlined in the LTMP and MMP. All performance standards and long-term management goals will be in full compliance with ESA and CESA.

  SAFCA shall secure all such agreements and implement all conditions of the agreements.

- Obtain the following applicable permits prior to the start of construction activities that would affect the resources covered by these permits: an individual permit pursuant to Section 404 of the CWA and Section 10 of the Rivers and Harbors Act from USACE, Section 401 certification from the Central Valley RWQCB, and a Section 1602 Streambed Alteration Agreement from DFG. All requirements of these permitting processes shall be implemented by SAFCA.

Overall, the action alternatives would include creating waters of the United States that are expected to be more extensive than those filled by the project, and implementing this mitigation measure, including coordination with and issuance of the permits by the aforementioned resource/regulatory agencies, would ensure no net loss of sensitive aquatic habitats occurs and that new jurisdictional waters would be managed in a manner that minimizes maintenance disturbance and provides the essential functions of the habitats that would be lost. Therefore, both the Proposed Action and the RSLIP Alternative, with implementation of this mitigation measure, would have a **less-than-significant (beneficial)** impact on the overall acreage and function of waters of the United States in the Natomas Basin. ***(Similar)***

Impact 4.7-d: Impacts on Special-Status Plant Species

No-Action Alternative

No Project Construction

Under the No-Action Alternative, there would be no improvements to the Natomas perimeter levee system and associated modifications of irrigation and drainage facilities. Therefore, there would be **no impact** on special-status plant species and their habitats. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could adversely or beneficially affect special-status plants and their habitats, depending on timing, location, and duration of flooding. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact, whether beneficial or adverse is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Of the three special-status plant species that were determined to have the potential to occur in the project area (rose mallow, Delta tule pea, and Sanford's arrowhead), all would occur in aquatic habitats (see Section 3.7.2.2, "Special-Status Plant Species," for further discussion). Focused surveys were conducted by EDAW botanists in July 2009 to assess whether the species in question are present in suitable habitat in the Phase 4a Project area. The survey was conducted within the flowering period of these three species. As noted in Section 3.7.2.2, "Sensitive Biological Resources," no special-status plant species were found. This impact is considered **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

Impact 4.7-e: Impacts on Giant Garter Snake Related to Project Construction Activities and Operational Activities of Relocated or Modified Pumping Plants

Table 4.7-5 summarizes the permanent impacts on giant garter snake habitat that would occur from project implementation.

No-Action Alternative

No Project Construction

Under the No-Action Alternative, there would be no improvements to the Natomas perimeter levee system, no associated modifications of irrigation and drainage facilities, and no reconstruction of pumping plants. Because no habitat would be affected, there would be **no impact** on giant garter snake. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure could result in an adverse impact on the Natomas Basin giant garter snake population. Giant garter snakes require upland refugia and may not be able to escape flood waters during their inactive season (October–April), depending on the velocity and depth of the floodwaters and the speed with which the floodwaters inundate the Basin. A catastrophic flood of the Natomas Basin could result in direct mortality of a substantial portion of the Basin's giant garter snake population, as well as extensive damage to habitat for the species, including TNBC

preserves and the infrastructure that supports operation of the preserves. The magnitude of the impacts would depend upon the flooding duration, depth, rate, timing, and location; therefore, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Table 4.7-5
Permanent Impacts of the Proposed Action and Alternatives on Giant Garter Snake Habitat

Location	No-Action Alternative	Proposed Action and RSLIP Alternative (acres)
Habitat Impacts		
Canal/ditch (Sacramento River east levee, Riverside Canal, Woodland Corridor)	Unknown, but losses of The Natomas Basin Conservancy preserve habitat and other agricultural habitats in the event of flooding could be substantial	4
Rice (Sacramento River East Levee, Riverside Canal, Woodland Corridor)	Unknown, but losses of rice in the event of flooding could be substantial	1
Total Permanent Impacts	**Unknown, but potentially substantial**	**4 canal/ditch; 1 rice**
Habitat Creation (Phase 4a Project)		
Created marsh habitat[1] (Fisherman's Lake)	-	Up to 120
Total Habitat Creation	**-**	**Up to 120**
Net Habitat Gain	**Unknown**	**-5 canal/ditch and rice; 119 marsh**

Notes: RSLIP Alternative = Raise and Strengthen-Levee-in-Place Alternative

[1] Created marsh habitat is considered to provide higher quality habitat than rice or canals for giant garter snake.

Source: EDAW surveys in 2008; construction data provided by Wood Rodgers, Mead & Hunt, and HDR, Inc. in 2008; and compiled by EDAW in 2008 and 2009

Proposed Action and RSLIP Alternative

Construction-related Impacts to Giant Garter Snake

Project construction and implementation would result in permanent and temporary loss and disturbance of potential giant garter snake habitat. Temporary loss of habitat is defined as habitat being unavailable or unusable for one giant garter snake active season. Fill, temporary and permanent dewatering, land conversion, and staging and other construction disturbances could disturb, injure, or kill snakes using affected habitats, including irrigation ditches, drainage canals, rice fields, and associated uplands. Project construction activities in areas of potentially suitable habitat, as well as geotechnical and cultural resource investigations conducted near suitable habitat, could also result in direct disturbance and loss of individual giant garter snakes. Following project construction, the operation of intake structures at modified or relocated pumping plants could potentially disturb or injure aquatic fauna including giant garter snakes.

Construction-related adverse impacts on giant garter snake habitat within the Phase 4a Project footprint would occur along Reaches 10–15 of the Sacramento River east levee, along the existing and relocated alignment of the Riverside Canal, along the NCC, and within the Fisherman's Lake Borrow Area.

Permanent loss of aquatic giant garter snake habitat in the Phase 4a Project area would include the loss of lateral canals that would be abandoned due to the relocation of the Riverside Canal as well as a small area of cultivated rice within the relocated Riverside Canal alignment (see **Table 4.7-5** for acreage).

Temporary loss/disturbance of giant garter snake habitat would result from relocating and extending the Riverside Canal. This impact would be temporary because the new (relocated) Riverside Canal would be constructed and would be functional at least one giant garter snake season prior to impacts occurring to the existing Riverside

Canal. The relocated Riverside Canal is expected to provide a higher habitat value relative to that of the canal that would be filled and, because the replacement canal would be extended to north of Powerline Road, it would provide more habitat than is being lost as a result of filling the existing canal. In addition, the relocated Riverside Canal would be designed to minimize maintenance requirements and resulting habitat degradation and snake injury and mortality that could occur. A small amount of aquatic habitat could also be temporarily disturbed in areas where the replacement of irrigation/drainage canals connect to existing lateral canals and in areas where pumping plants are relocated or modified. This impact would be **potentially significant**.

A portion of the Fisherman's Lake Borrow Area (the primary source of soil borrow for the Phase 4a Project) supports rice fields that provide giant garter snake habitat. Following excavation for borrow, these former rice fields would be planted with native riparian and marsh vegetation in order to create managed seasonal and perennial marsh habitat prior to the beginning of the following giant garter snake active season. Therefore, the impacts of borrow activities on these rice fields are considered temporary as the habitat would be unsuitable as giant garter snake habitat for one active season and restored to a higher quality habitat upon the completion of borrow activities. Managed marsh is considered higher quality habitat than rice fields because rice provides suitable habitat only for one-third of the year (when it is flooded) and does not generally provide suitable habitat year-round (e.g., winter upland refugia are absent). A more detailed discussion of managed marsh habitat to be created in the Fisherman's Lake Area is provided below. Should additional borrow be required, excess material from the Airport north bufferlands and the Elkhorn Borrow Area could be supplied for levee and berm construction for the Phase 4a Project. These two borrow area are planned to be used for levee improvements in Sacramento River east levee Reaches 4B to 9B, and previous environmental analysis of these borrow areas is incorporated by reference as discussed in Section 4.1. The potential exists for these borrow areas to be used for the Phase 3 and 4a Projects during the same construction season. Mitigation would be required to ensure that impacts to giant garter snake from overlapping uses of borrow areas are temporary and do not affect current habitat in borrow areas for more than one construction season. This impact would be **potentially significant**.

Beneficial impacts to giant garter snake would also result from implementation of the NLIP and its associated programmatic conservation strategy (see Section 4.7.1.1, "Methodology"). The conservation strategy is expected to result in an overall net gain in garter snake habitat in the Basin (**Table 4.7-1**) and an overall improvement in habitat conditions for giant garter snake. Benefits to giant garter snake in the programmatic conservation strategy for the NLIP that were included in earlier project phases are the creation of giant garter snake habitat resulting from construction of the new GGS/Drainage Canal and the relocation of Elkhorn Canal, which would be implemented as part of the Phase 3 Project. These canals have been designed to minimize the intensity and frequency of maintenance activities, thus reducing habitat degradation and snake injury and mortality. The habitat quality of the new GGS/Drainage Canal is anticipated to eventually be substantially higher than that of the canal habitat that would be lost. In addition to providing habitat, this canal would provide connectivity between known giant garter snake population centers in the northern and southern portions of the Natomas Basin. Loss and deterioration in the quality of existing travel corridors has been identified as a primary concern in maintaining a genetic connection among the snake populations in the Natomas Basin.

Managed marsh would be created in the Fisherman's Lake Borrow Area as part of the Phase 4a Project to compensate for Phase 4a Project impacts to giant garter snake habitat as well as for impacts to giant garter snake habitat from the Phase 2 and 3 Projects. This proposed managed marsh creation would also aid in the overall goal of sustaining giant garter snake populations in the Natomas Basin. Parcels in the Fisherman's Lake Borrow Area to be converted into managed marsh habitat lie adjacent to and between TNBC parcels (**Plate 2-12**) in the southern reserve area, which is one of three reserve areas in the Basin where habitats are managed for giant garter snakes. Creating marsh habitat would not only increase the amount of giant garter snake habitat over what currently exists, but would also help to consolidate and provide connectivity between marsh habitat on TNBC preserve lands managed for giant garter snake in the Fisherman's Lake Area. This approach would be consistent with the NBHCP's goal of sustaining giant garter snake populations in the southern reserve area. Giant garter snakes have been recorded on TNBC lands that were converted from rice to managed marsh, thus demonstrating

that giant garter snake would use restored managed marsh habitats. Overall, impacts to giant garter snake-related to Phase 4a Project construction activities would be **potentially significant**. ***(Similar)***

Operational Impacts to Giant Garter Snake

RD 1000's Pumping Plant Nos. 3 and 5 (including intake structures situated in the interior of the Basin, landside pumping plant structures, and outfall structures in the Sacramento River) need to be relocated or modified in order to raise the irrigation pipes to the proposed new adjacent levee. The intake structure for Pumping Plant No. 3 would be located below the water line in the Pumping Plant No. 3 drainage canal, and the intake structure for Pumping Plant No. 5 would be located below the water line in an excavated channel that connects to the West Drainage Canal at its eastern end. Both intakes would be operated seasonally to pump out agricultural drainage and storm water from the interior of the basin to the Sacramento River and both intakes would be located in canals that are considered giant garter snake habitat.

In addition, should the Phase 4a Project occur before implementation of the American Basin Fish Screen and Habitat Improvement (ABFS) Project, modification of NCMWC's Bennett and North Pump Stations along the NCC would also be necessary. The intakes for these two pumping plant would be located within the NCC, which is considered low-quality habitat for giant garter snake. Giant garter snakes swimming near intake structures could potentially be trapped by the intake velocities. However, because modifications to the pumps and intakes would not produce a change in the rate and volume of water pumped, an increase in entrapment of aquatic fauna above the existing condition is not expected. In addition, giant garter snakes, which typically swim near the water surface, are likely to avoid entrapment through their strong swimming skills and behavioral avoidance of areas that are routinely disturbed (Hansen pers. comm. 2008; Hansen and Brode 1993). Therefore, because giant garter snakes are likely to avoid the area, operational activities at modified pump stations are not likely to cause disturbance or injury to the snake. Impacts to giant garter snake related to operation of relocated or modified pump stations following project construction are considered **less than significant**. ***(Similar)***

Mitigation Measure 4.7-e: Minimize the Potential for Direct Loss of Giant Garter Snake Individuals, Implement All Upland and Aquatic Habitat Improvements and Management Agreements to Ensure Adequate Compensation for Loss of Habitat, and Obtain Incidental Take Authorization

Proposed Action and RSLIP Alternative

To reduce impacts on the giant garter snake, SAFCA shall implement the measures described below.

- The primary engineering and construction contractors shall ensure, through coordination with a qualified biologist retained by SAFCA, that construction is implemented in a manner that minimizes disturbance of giant garter snake habitat (e.g., temporary fencing shall be used during construction to protect all aquatic and adjacent upland habitat that is located adjacent to construction areas that can be avoided).

- Additional measures consistent with the goals and objectives of the NBHCP shall be implemented to minimize the potential for direct injury or mortality of individual giant garter snakes during project construction. Such measures shall be finalized in consultation with USFWS and DFG, and are likely to include conducting worker awareness training, timing initial ground disturbance to correspond with the snake's active season (as feasible in combination with project needs and minimizing disturbance of nesting Swainson's hawks), dewatering aquatic habitat before fill, conducting preconstruction surveys, erecting fencing around habitat features that can be avoided to ensure that these remain undisturbed by construction vehicles and personnel, conducting biological monitoring during construction, and removing any temporary fill or construction debris and restoring temporarily disturbed areas to their pre-project conditions according to the USFWS's *Guidelines for the Restoration and/or Replacement of Giant Garter Snake Habitat* (USFWS 1997).

- SAFCA shall coordinate with USFWS, DFG, and SCAS (if on Airport property) to ensure that the NLIP's aquatic and upland habitat improvements are created and managed. SAFCA shall prepare a project-specific MMP and programmatic LTMP to ensure the creation and long-term management of these components before construction commences. SAFCA shall enter into agreements with the appropriate local entity responsible for long-term management of these created giant garter snake habitats and shall coordinate with USFWS and DFG to ensure that performance standards and long-term management goals required by the regulatory agencies with jurisdiction over these resources will be specifically detailed and outlined in the LTMP and MMP. All performance standards and long-term management goals will be in full compliance with ESA and CESA. SAFCA shall implement all terms and conditions of the management agreements.

- Where borrow sites would result in impacts to giant garter snake habitat over more than one construction season, the work shall progress in cells that will be incrementally developed as habitat or returned to agricultural use as the borrow activities are completed such that no area would be used in consecutive years or such that replacement habitat is available prior to loss of existing habitat.

- Authorization for take of giant garter snake under the ESA and CESA shall be obtained. All measures subsequently adopted through the permitting process shall be implemented.

Implementing this mitigation measure would reduce this impact related to giant garter snake to a **less-than-significant** level because construction would be implemented in a manner that reduces loss of habitat and direct mortality, measures that are part of the NBHCP related to giant garter snake would be implemented, the NLIP's habitat improvements would be implemented in consultation with USFWS and DFG, and take permits would be obtained. ***(Similar)***

Impact 4.7-f: Impacts on Swainson's Hawk and Other Special-Status Birds

Tables 4.7-6 and **4.7-7** summarize impacts to Swainson's hawk foraging and nesting habitat that would occur with project implementation.

Table 4.7-6
Permanent Impacts of the Proposed Action and Alternatives on Swainson's Hawk Habitat

Location of Impact	No-Action Alternative (acres)	Proposed Action (acres)	RSLIP Alternative (acres)
Grasslands (Sacramento River east levee, Riverside Canal, woodland corridor)	Unknown, but losses of TNBC preserve habitats and other agricultural habitats in the event of flooding could be substantial	66	61
Croplands (Sacramento River east levee, Riverside Canal, woodland corridors)	Unknown, but losses of TNBC preserve habitats and other agricultural habitats in the event of flooding could be substantial	473	546
Woodlands (Sacramento River east levee, Riverside Canal, pump stations)	21 waterside	10.63 landside 1.23 waterside	10.46 landside 21 waterside
Total Permanent Impacts	**Unknown, but potentially substantial**	**539 foraging 12 nesting**	**607 foraging 32 nesting**

Notes: RSLIP Alternative = Raise and Strengthen Levee in Place Alternative; TNBC = The Natomas Basin Conservancy
Source: EDAW surveys in 2008; construction data provided by Wood Rodgers, Mead & Hunt, and HDR, Inc. in 2008; and data compiled by EDAW in 2009

Table 4.7-7
Summary of Permanent Impacts of the Proposed Action and Alternatives on Swainson's Hawk Foraging Habitat (in Acres)

	Affected Cropland[1]	Created Cropland	Net Cropland	Affected Grassland	Created Grassland	Net Grassland	Total Loss	Total Increase	Total Net
Phase 4a Project	-473	Up to 60	**-Up to 417**	-66	527	**461**	543	Up to 587	**Up to 44**
NLIP Program[2]	-747	150	**-597**	-293	1,069	**776**	1,040	1,219	**179**

[1] Total affected cropland includes 53 acres of alfalfa for the Phase 4a Project and 27 acres for the Phase 2 and 3 Projects (total 80 acres).

[2] Includes wider Phase 4a Project levee footprint of 660 feet.

Source: Data compiled by EDAW in 2008 and 2009

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no adverse or beneficial impacts on suitable habitat for Swainson's hawk and other special-status birds due to project construction. However, even under the No-Action Alternative, there could be extensive removal of riparian vegetation on the waterside of the Sacramento River east levee to conform with USACE guidance regarding levee encroachments (see **Table 4.7-2**). The habitat along the waterside of the Sacramento River east levee supports the majority of Swainson's hawk nest sites in the Natomas Basin. Removal of this vegetation would have a substantial impact on Swainson's hawks; therefore, this impact would be **potentially significant**. ***(Greater)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Flooding could cause destruction of Swainson's hawk or other special-status bird habitat. The magnitude of the impacts would depend upon the flooding duration, depth, rate, timing, and location. Therefore, a definite determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

Potential adverse effects on the Swainson's hawk would include loss of suitable foraging and nesting habitat and disturbance of nesting pairs during project construction. Other special-status birds, including white-tailed kite, northern harrier, and Cooper's hawk, could also be similarly affected. The effects on foraging and nesting habitat would result from construction of levee improvements (including seepage berms and O&M/utility corridors along the Sacramento River); construction of the relocated Riverside Canal; reconstruction of RD 1000's Pumping Plant Nos. 3 and No. 5, NCMWC's Riverside Pumping Plant, and potentially NCMWC's North and Bennett Pump Stations; borrow activities; and the creation of woodland corridors and marsh habitat. The indirect impacts to Swainson's hawk nesting and foraging habitat that could result from an agreement with the Airport to exchange approximately 45 acres within the Airport's Critical Zone currently owned by SAFCA with lands (approximately 68 acres) in Sutter County outside the Airport Critical Zone currently owned by the Airport/Sacramento County (see **Plate 2-14**) are addressed in Section 5.1.8, "Cumulative Impact Analysis: Project Impacts that Could be Cumulatively Considerable."

Impacts to Foraging Habitat

As summarized in **Table 4.7-6**, above, foraging habitat affected by the Proposed Action would be primarily croplands and grasslands. A portion of levee improvements along Reach 11B in the Phase 4a Project falls within a SCAS Swainson's Hawk mitigation site which was established to compensate for loss of foraging habitat as a result of the Airports' Terminal A expansion and implementation of the Airport Master Plan. Because SAFCA would establish native perennial grassland on levee slopes following completion of the Phase 4a Project and would maintain grasslands in these areas at 6–12 inches in height, it has been determined that these measures would be consistent with the SCAS's foraging habitat requirements for the site (Sacramento County and SAFCA 2009).

The permanent loss of Swainson's hawk foraging habitat within the Phase 4a Project area would be offset by the creation of foraging habitat, including both croplands and grasslands. The creation of grasslands would take place primarily on levee slopes of the adjacent levee and seepage berms and within maintenance setbacks in Reaches 10–15. The levee slopes would be less steep than the existing levee slopes, and several reaches of the levee would have adjoining 100- to 500-foot-wide earthen seepage berms with a nearly flat slope. These areas, with the exception of the crown of the levee and woodland corridors, would be managed as native perennial grassland that would be mowed or grazed with an emphasis on maintaining stubble height to optimize these areas for Swainson's hawk foraging habitat.

As shown in **Table 4.7-7**, the Phase 4a Project would result in a net increase in foraging habitat for Swainson's hawk. However, due to conversion of land cover types in the Phase 4a Project footprint, the composition of this habitat would permanently shift from primarily croplands to grasslands, leading to a decrease in the quality of foraging habitat for Swainson's hawk. Some foraging habitat would be temporarily affected by the Phase 4a Project borrow activities; however, much of this would be returned to equivalent or higher quality Swainson's hawk foraging habitat following borrow activities with the exception of areas that would be converted to marsh or woodland habitat.

The greatest impact to overall foraging habitat value would be the permanent loss of alfalfa and grass hay, which are considered the highest value foraging habitat types for Swainson's hawks in the Central Valley. The loss of alfalfa, grass hay, and other foraging habitats could result in Swainson's hawks having to forage farther from the nest or increase competition for prey with other hawks in the area. Several studies have documented the importance of hay crops, especially alfalfa for Swainson's hawks (Estep 1989, Estep 2008, and Woodbridge 1998). The characteristics that contribute to high value habitat include:

- low vegetation structure, which increases prey accessibility;
- relatively large prey populations due to abundant cover and food;
- farming operations, such as weekly irrigation, which increases cover and food for prey; and
- regular mowing, which lowers vegetation structure, disturbs prey and increases accessibility.

To offset impacts to this high-quality foraging habitat, SAFCA would acquire and preserve an equivalent amount of land that would be managed specifically to optimize its value as foraging habitat for Swainson's hawk. This would be accomplished by creating habitat types (e.g., agricultural or other vegetation types) that can be managed to provide high-quality foraging habitat for Swainson's hawk throughout the nesting season. Preservation of agricultural uplands in the Phase 4a Project area would take place at borrow sites following completion of borrow activities (**Plate 2-12**). Other factors that would contribute to the value of the Swainson's hawk foraging habitat being preserved includes its proximity to other preserved habitat (i.e., larger contiguous parcels of suitable foraging habitat generally provide greater foraging value than smaller parcels) and managing foraging habitat for Swainson's hawk over the long term or in perpetuity. If successful, SAFCA's commitment to preserve high quality foraging habitat in combination with the creation of perennial grasslands would fully mitigate the loss of alfalfa, grass hay, and other foraging habitat types that would result from implementation of the NLIP.

A detailed design of the foraging habitats to be created is being developed and provided for USFWS and DFG review. Protective mechanisms and specific management protocols for Swainson's hawk foraging habitat that would be created in the Fisherman's Lake Borrow Area are currently being prepared by SAFCA in coordination with these agencies. However, if habitat creation/preservation and management are not effectively implemented to provide foraging habitat for the Swainson's hawk or other special-status bird species, an overall adverse effect could occur. This impact would be **potentially significant**.

Impacts to Nesting Habitat

An estimated 600 acres of riparian and nonriparian woodland habitat is present on the landside of the Natomas Basin and approximately 420 acres of riparian woodland habitat is present along the waterside of the Sacramento River east levee and American River north levee, totaling approximately 1,020 acres. The vast majority of Swainson's hawk nests in the Basin are within the mature riparian forest/ woodlands along the waterside of the Sacramento River east levee. The design of the adjacent levee along the Sacramento River east levee avoids almost entirely the need to remove waterside riparian forest/woodlands, which would otherwise be removed if the levee were being rebuilt and upgraded in place or no action was taken. The woodlands that would be affected are along the landside of the Sacramento River east levee in areas where few nests have been documented since 2001. Most nests that have been documented on the landside of the Sacramento River east levee are within woodlands in substantial riparian corridors along ditches, sloughs, and canals towards the interior of the Basin.

The Proposed Action would affect a moderate amount of primarily landside woodlands; this acreage includes an understory of scrub and grassland components (**Table 4.7-2**). Project impacts include removing landside woodland habitat along Reaches 12B–15 of the Sacramento River east levee, landside woodland habitat where the replacement Riverside Canal is to be constructed, landside and waterside woodland in the footprint of RD 1000's Pumping Plant Nos. 3 and No. 5 and NCMWC's Riverside Pumping Plant reconstruction sites, and riparian woodlands on the waterside of Sacramento River east levee Reaches 10–12A where drainage outlets would be constructed (see **Table 4.7-2** for acreages).

Compensation for adverse impacts on nesting habitat and potential unavoidable loss of active nests resulting from the Proposed Action would include creating and preserving woodlands along the landside of the Sacramento River east levee so that no net loss of woodlands would occur over the long-term (see **Table 4.7-3**). As shown in **Table 4.7-3**, SAFCA's programmatic conservation strategy for creation and preservation of landside woodlands would result in an overall net increase in the acreage of woodlands in the Natomas Basin.

The woodland mitigation plan includes transplanting suitable trees from the project footprint, where feasible, as well as planting a variety of native tree species that could become potential nesting habitat for Swainson's hawk. To provide adequate compensation for lost habitat, the woodlands must be created and/or managed in a manner that provides the essential habitat functions for special-status bird species. A detailed design of the woodland habitats to be created is being developed and provided for USFWS and DFG review; protective mechanisms and specific management protocols for the woodlands are currently being prepared by SAFCA in coordination with these agencies (as described in Section 2.3.4, "Habitat Improvements").

However, if habitat creation/preservation is not effectively implemented to provide nesting habitat for Swainson's hawk or other special-status bird species, an overall adverse effect could occur. Should habitat creation/ preservation be implemented effectively, there would be a temporal (10–15 years) loss of woodlands providing potential nesting habitat. These impacts would be **potentially significant**.

Impacts to Nesting Behavior

Project construction would occur during the Swainson's hawk nesting season and could disrupt nesting behavior. If project construction is already under way when pairs return to their nesting territories, project activity could render previously occupied territories unsuitable. If active nests are present near construction areas when construction begins, the nesting pairs could be disturbed, potentially resulting in nest abandonment and loss of

eggs or young. Various conservation measures would be implemented to avoid and minimize take of Swainson's hawks. These measures include conducting surveys for and monitoring of Swainson's hawk nests before and during construction to identify active nests in the vicinity of project activities, and establishing and maintaining buffers around the nests, in coordination with DFG, so that project activity does not result in detectable adverse effects on active nests. This impact would be **potentially significant**.

Impacts Related to Power Pole Relocations

The Phase 4a Project includes relocating or replacing Pacific Gas & Electric Company and Sacramento Municipal Utility District (SMUD) power poles. Power poles may benefit raptors by providing perching and/or nesting structures (or both) in areas where few natural perches or nest sites exist. However, these structures can also pose a threat to raptors and other birds through electrocutions or collisions. Mortality is most common with large wing span birds, such as eagles or cranes. Electrocution can occur when a bird simultaneously touches two energized parts or an energized part and a grounded part of the electrical equipment. Pacific Gas & Electric Company has developed and implemented an Avian Protection Plan (APP) to better protect birds and improve safety and reliability for its customers. The APP, which has been in place since 2002, includes outfitting all new poles and replacement poles in bird-sensitive locations with bird-safe equipment. Pacific Gas & Electric Company is also a founding member of the Avian Power Line Interaction Committee (APLIC), a collaboration between utilities and USFWS that began nearly 20 years ago. The APLIC has guidelines and industry standards to avoid bird collisions and electrocutions.

The Proposed Action would not result in an increase in power pole related hazards for the Swainson's hawk and other birds since the Phase 4a Project requires relocation or replacement of existing power poles. While SAFCA has no direct control over the specific design and retrofitting of the relocated and replaced power poles, it can be expected that Pacific Gas & Electric Company will implement its APP and follow the APLIC guidelines and industry standards to reduce electrocution of birds perching on the power poles and power lines. The Proposed Action would have **no impact** on Swainson's hawks and other birds as a result of power pole relocations.

RSLIP Alternative

Under the RSLIP Alternative, potential effects on Swainson's hawk associated with the Sacramento River east levee improvements would be somewhat different from those under the Proposed Action. Compared to the Proposed Action, loss of nesting habitat on the landside of the levee would be reduced under the RSLIP Alternative (see **Table 4.7-2** for acreage). However, a substantially greater number of acres of riparian woodland acres on the waterside of these levee reaches that provide suitable nesting habitat for Swainson's hawk would likely need to be removed in order to conform with USACE guidance regarding levee encroachments (**Table 4.7-2**). Potential adverse impacts from such vegetation removal are likely to be greater than those under the Proposed Action, in terms of both the amount and quality of that habitat. The foraging habitat affected by this alternative would be cropland replaced by grasslands along levee and berms resulting in a nearly equal amount of foraging habitat, but a conversion of higher-quality croplands to grasslands that provide lesser-quality habitat.

Similar to the Proposed Action, the impacts on nesting habitat and potential unavoidable loss of active nests associated with the removal of landside woodlands would be compensated by the proposed creation of landside woodland habitat at various locations along the Sacramento River east levee. However, it is uncertain whether the new woodlands would be adequate to compensate for the potential extensive loss of Swainson's hawk nest sites on the waterside of the Sacramento River east levee. The RSLIP Alternative would also require relocation and replacement of some power poles. As with the Proposed Action, this alternative would not result in an increase in power pole related hazards for the Swainson's hawk and other birds because the project requires relocation or replacement of existing power poles.

As with the Proposed Action, if habitat creation/preservation is not effectively implemented to provide foraging and nesting habitat for Swainson's hawk or other special-status bird species, an overall adverse effect could occur. This impact would be **potentially significant**. ***(Greater)***

Mitigation Measure 4.7-f: Minimize Potential Impacts on Swainson's Hawk and Other Special-Status Birds Foraging and Nesting Habitat, Monitor Active Nests during Construction, Implement All Upland and Agricultural Habitat Improvements and Management Agreements to Compensate for Loss of Quantity and Quality of Foraging Habitat, Obtain Incidental Take Authorization, and Implement Mitigation Measure 4.7-a, "Minimize Effects on Woodland Habitat, Implement all Woodland Habitat Improvements and Management Agreements, Compensate for Loss of Habitat, and Comply with Section 7 of the Federal Endangered Species Act, Section 1602 of the California Fish and Game Code, and Section 2081 of the California Endangered Species Act Permit Conditions"

Proposed Action and RSLIP Alternative

SAFCA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented to avoid, minimize, and compensate for potential project effects on Swainson's hawks and other special-status birds:

- The primary engineering and construction contractors shall ensure, through coordination with a qualified biologist retained by SAFCA, that construction is implemented in a manner that minimizes disturbance of potential nesting habitat for special-status birds through the following activities:
  - The biologist shall conduct preconstruction surveys to identify active special-status bird nests near construction areas.
  - Surveys for nesting birds shall be conducted before project activities are initiated during the nesting season (March 1–September 15). Surveys shall be conducted in accordance with standardized protocols and NBHCP requirements.
  - Removal of potential nesting habitat shall be conducted during the non-nesting season, to the extent feasible and practicable, to minimize the potential for loss of active nests.
  - If an active nest is found, the biologist shall determine an appropriate buffer that minimizes potential for disturbance of the nest, in coordination with DFG. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active or the birds are not dependent on it. Monitoring shall be conducted during construction and by a qualified biologist to ensure that project activity does not result in detectable adverse effects on the nesting pair or their young. The size of the buffer may vary, depending on the nest location, nest stage, construction activity, and monitoring results. If implementation of the buffer becomes infeasible or construction activities result in an unanticipated nest disturbance, DFG shall be consulted to determine the appropriate course of action.
- The primary engineering and construction contractors shall ensure, through coordination with a qualified biologist retained by SAFCA, that staging areas and access routes are designed to minimize disturbance of known Swainson's hawk nesting territories through the following activities:
  - The biologist shall conduct preconstruction surveys to identify active nests within 0.50 mile of construction areas, in accordance with DFG guidelines. Surveys shall be conducted in accordance with NBHCP requirements and *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000).

- If an active nest is found, an appropriate buffer that minimizes the potential for nest disturbance shall be determined by the biologist, in coordination with DFG. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active or the birds are not dependent on it. Monitoring shall be conducted during construction and by a qualified biologist to determine whether project activity results in detectable adverse effects on the nesting pair or their young. The size of the buffer may vary, depending on the nest location, nest stage, construction activity, and monitoring results. If implementation of the buffer becomes infeasible or construction activities result in an unanticipated nest disturbance, DFG shall be consulted to determine the appropriate course of action.

- SAFCA shall coordinate with USFWS, DFG, and SCAS (if on Airport property) to ensure that the NLIP's woodland, upland, and agricultural habitat improvements are created and managed. SAFCA shall prepare a project-specific MMP and programmatic LTMP to ensure the creation and long-term management of these components before construction commences. SAFCA shall enter into agreements with the appropriate local entity responsible for long-term management of these created Swainson's hawk habitats and shall coordinate with USFWS and DFG to ensure that performance standards and long-term management goals that are required by the regulatory agencies with jurisdiction over these resources will be specifically detailed and outline in the LTMP and MMP. All performance standards and long-term management goals will be in full compliance with ESA and CESA. SAFCA shall implement all terms and conditions of the management agreements.

- The criteria for measuring performance shall be used to determine if the habitat improvement is trending toward sustainability (reduced human intervention) and to assess the need for adaptive management (e.g., changes in design or maintenance revisions). These criteria must be met for the habitat improvement to be declared successful, both during a particular monitoring year and at the end of the establishment period. Performance criteria for managed grasslands shall be developed in consultation with USFWS, NMFS, and DFG, and shall include, but not be limited to:

  - percent cover of invasive species (<1%),
  - percent cover of nonnative herbaceous plants (<10–25%), and
  - percent absolute cover of native species (>50–80%).

- Authorization for take of Swainson's hawk under CESA shall be obtained. All measures subsequently adopted through the permitting process shall be implemented.

Implementation of this mitigation measure as well as Mitigation Measure 4.7-a, would minimize adverse effects of the Proposed Action on Swainson's hawk. This measure coupled with the amount of landside woodlands that would be created and preserved as part of the Phase 2 and 3 Projects would result in a net increase in potential nesting habitat (landside woodlands). In addition, up to 60 acres of high quality foraging habitat would be preserved in the Basin. The creation and preservation of nesting and foraging habitat in the Basin would reduce long-term and overall impacts to Swainson's hawk to a **less-than-significant** level. Although no permanent impacts would occur, this impact would remain **significant and unavoidable** for many years before reaching a less-than-significant level because replacement plantings would likely require a minimum of 10–15 years before providing important habitat components such as structure and shade.

Implementation of this mitigation measure, as well as Mitigation Measure 4.7-a, would minimize long-term, adverse effects of the RSLIP Alternative on Swainson's hawk, but

would not reduce them to a less-than-significant level. While the woodland restoration and preservation proposed for the Levee Raise-in-Place Alternative may be adequate to offset the removal of landside woodlands, these replacement woodlands would not be adequate to compensate for the extensive loss of mature waterside vegetation; therefore,, this impact would remain **significant and unavoidable**. ***(Greater)***

Impact 4.7-g: Impacts on Valley Elderberry Longhorn Beetle

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for direct disturbance on valley elderberry longhorn beetle or elderberry shrubs due to project construction activities. However, there could be extensive removal of elderberry shrubs on the waterside of the Sacramento River east levee to conform with USACE guidance regarding levee encroachments, even without project implementation. This potential impact would be **potentially significant**. ***(Greater)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Flooding of the Basin might result in beneficial or adverse conditions for elderberry shrubs and, consequently, valley elderberry longhorn beetle, in some locations. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact, whether adverse or beneficial is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

Approximately 10 elderberry shrubs are known to be present within or adjacent to the Phase 4a Project footprint along the landside of the Sacramento River east levee Reaches 12B–15. An additional three shrubs are known to occur along the alignment of the relocated Riverside Canal. The removal of approximately 15 elderberry shrubs along Reaches 10–12A of the Sacramento River east levee was analyzed in the Phase 3 DEIS/DEIR. That analysis is hereby incorporated by reference. Because elderberry surveys have not been conducted on the waterside of the east levee along Reaches 10–15, the number of waterside elderberry shrubs is unknown. However, the minimal amount of waterside vegetation removal required under the Proposed Action (**Table 4.7-2**) would likely require the removal of few if any elderberry shrubs. Focused surveys that will document the number of elderberry stems, particular size classes, and presence or absence of beetle exit holes in the Phase 4a Project area are currently being conducted. Some shrubs in the Phase 4a Project area may be able to be avoided in place and incorporated into the proposed woodlands corridor.

Per the USFWS's conservation guidelines for this species (USFWS 1999), all shrubs that require removal would be transplanted during the dormant season into the proposed 150-foot-wide woodland corridor on either side of the new Riverside Canal in the vicinity of Fisherman's Lake. The loss and/or direct impact of elderberry shrubs and potential loss of beetles under the Proposed Action would be offset by SAFCA's plan to incorporate plantings of elderberry shrubs and other appropriate native species into the woodland corridors and other potential woodland restoration areas. Elderberry shrubs would be planted in numbers adequate to compensate for elderberry shrub loss, based on standard USFWS mitigation guidelines. A detailed plan for woodland creation is being developed and provided for USFWS and DFG review; and protective mechanisms and specific management protocols are currently being prepared by SAFCA in coordination with these agencies. Portions of the woodland areas must be created and managed in a manner that provides the essential functions of valley elderberry longhorn beetle habitat that would be lost through project activities in order for them to provide

adequate compensation. However, if habitat creation and management are not effectively implemented to provide replacement habitat for the valley elderberry longhorn beetle, an overall adverse effect could occur. This impact would be **potentially significant**.

RSLIP Alternative

Under the RSLIP Alternative, potential impacts on valley elderberry longhorn beetle would be somewhat different from those under the Proposed Action. Loss of elderberry shrubs on the landside of the Sacramento River east levee may be reduced under this alternative by the lack of an adjacent levee, but a substantial amount of riparian woodland that supports an unknown number of elderberry shrubs on the waterside of the levee may require removal to conform with USACE guidance regarding levee encroachments (**Table 4.7-2**). Per the USFWS's conservation guidelines for this species (USFWS 1999), all of these shrubs would be transplanted during the dormant season into woodland corridors. Potential adverse impacts from such vegetation removal could be greater than those within the adjacent levee footprint on the landside of the levee under the Proposed Action, particularly in terms of the quality of habitat that is affected. Similar to the Proposed Action, the loss of elderberry shrubs and potential loss of beetles under the RSLIP Alternative would be offset by SAFCA's plan to incorporate plantings of elderberry shrubs and other appropriate native species into the woodland corridors and other potential woodland restoration areas. However, as with the Proposed Action, overall adverse effects could occur if the replacement habitat does not provide the essential components and is not managed in a way that maximizes habitat quality and minimizes potential adverse effects on valley elderberry longhorn beetle. This impact would be **potentially significant**. ***(Similar)***

Mitigation Measure 4.7-g: Conduct Focused Surveys for Elderberry Shrubs as Needed, Implement all Woodland Habitat Improvements and all Management Agreements, Ensure Adequate Compensation for Loss of Shrubs, and Obtain Incidental Take Authorization

Proposed Action and RSLIP Alternative

To reduce impacts on valley elderberry longhorn beetle, SAFCA shall implement the measures described below.

- A qualified biologist retained by SAFCA shall conduct focused surveys of elderberry shrubs within 100 feet of the project footprint, in accordance with USFWS guidelines. All elderberry shrubs with potential to be affected by project activities shall be mapped, the number of stems greater than 1 inch in diameter on each shrub that requires removal shall be counted, and these stems shall be searched for beetle exit holes.

- The primary engineering and construction contractors shall ensure, through coordination with the biologist, that construction is implemented in a manner that minimizes disturbance of areas that support elderberry shrubs (e.g., temporary fencing shall be used during construction to protect all elderberry shrubs that are located adjacent to construction areas but can be avoided). Shrubs that require removal shall be transplanted to the woodland creation areas, if feasible, when the plants are dormant (November through the first 2 weeks of February) to increase the success of transplanting. If none of the areas of suitable habitat to be created as part of the project would be available before the impact would occur, alternative transplantation locations (e.g., other SAFCA mitigation areas or TNBC preserves) shall be identified and shall be approved by USFWS.

- The number of replacement elderberry plantings shall be determined based on USFWS guidelines, which require replacement ratios ranging from 1:1 to 8:1 for lost stems at least 1 inch in diameter, depending on the size of the affected stems and presence or absence of beetle exit holes. Associated native species shall be planted at ratios ranging from 1:1 to 2:1 for each elderberry planting.

- SAFCA shall coordinate with USFWS, DFG, and SCAS (if on Airport property) to ensure that the NLIP's woodland habitat improvements are created and managed. SAFCA shall prepare a project-specific MMP and programmatic LTMP to ensure the creation and long-term management of these components before construction commences. SAFCA shall enter into agreements with the appropriate local entity responsible for long-term management of these created woodland habitats and shall coordinate with USFWS and DFG to ensure that performance standards and long-term management goals that are required by regulatory agencies with jurisdiction over these resources will be specifically detailed and outlined in the LTMP and MMP. All performance standards and long-term management goals will be in full compliance with the ESA and CESA. SAFCA shall implement all terms and conditions of the management agreements USACE shall initiate consultation activities with USFWS under Section 7 of the ESA, and authorization for take of valley elderberry longhorn beetle under the ESA shall be obtained if it is determined, in consultation with USFWS, that shrub removal is likely to result in such take. All measures subsequently developed through the Section 7 consultation process shall be implemented by SAFCA.

Implementing this mitigation measure would reduce the impact on valley elderberry longhorn beetle to a **less-than-significant** level because protocol-level surveys would be conducted, construction activities would avoid elderberry shrubs to the maximum extent feasible, elderberry shrub replacement would occur in consultation with USFWS, habitat improvements would be implemented, and USACE would consult with USFWS under Section 7. ***(Similar)***

Impact 4.7-h: Impacts on Other Special-Status Wildlife Species, Including Burrowing Owl and Northwestern Pond Turtle

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for direct disturbance of northwestern pond turtle or burrowing owl habitat or populations. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Floodwaters could inundate habitat areas and result in direct mortality of northwestern pond turtles. Burrowing owls could also be adversely affected by winter flooding as a result of either direct mortality or inundation and destruction of burrows. The magnitude of these impacts would depend upon the flooding duration, depth, rate, timing, and location. Therefore, a precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Project construction and implementation could result in the destruction of burrows occupied by burrowing owls should they occur within the setback levee footprint, along the existing or relocated Riverside Canal, along the NCC, or within active borrow areas. There is potential for direct loss of burrowing owls to occur if they are present within the affected habitats.

Proposed improvements to the Sacramento River east levee would result in the permanent loss of suitable pond turtle habitat due to fill and realignment of portions of irrigation/drainage canals near the landside toe of the levees. Adverse effects on suitable turtle habitat in the Phase 4a Project footprint would include the permanent loss of a small amount of relatively unvegetated irrigation/drainage canals along the Sacramento River east levee (see **Table 4.7-5** for acreage). Development of the Fisherman's Lake Borrow Area would potentially convert potential northwestern pond turtle habitat (e.g., irrigation and drainage ditches) to non-usable habitat temporarily. As described in Section 2.3.3, "Borrow Sites," in selecting borrow sites, consideration would be given to ensure that activities result in minimal adverse impacts to the environment.

Habitat losses for northwestern pond turtle would be offset by the proposed habitat creation components of the Proposed Action, including creation of managed marsh habitat in the Fisherman's Lake Borrow Area. Northwestern pond turtles would also benefit from the creation of canal habitat for giant garter snake implemented as part of the programmatic conservation strategy. There is potential, however, for direct loss of pond turtles to occur if they are present within the affected habitats.

The potential for destruction of burrows occupied by burrowing owls and for the direct loss of northwestern pond turtles would be a **potentially significant** impact. ***(Similar)***

Mitigation Measure 4.7-h: Conduct Focused Surveys for Northwestern Pond Turtles, Relocate Turtles, Minimize Potential Impacts on Burrowing Owls, and Relocate Owls as Needed

Proposed Action and RSLIP Alternative

To reduce impacts on northwestern pond turtle and burrowing owl, SAFCA shall implement the measures described below.

- A qualified biologist retained by SAFCA shall conduct surveys for northwestern pond turtle in aquatic habitats to be dewatered and/or filled during project construction. Surveys shall be conducted immediately after dewatering and before fill of aquatic habitat suitable for pond turtles. If pond turtles are found, the biologist shall capture them and move them to nearby areas of suitable habitat that would not be disturbed by project.

- The primary engineering and construction contractors shall ensure, through coordination with a qualified biologist retained by SAFCA, that construction is implemented in a manner that minimizes disturbance of potential nesting habitat for burrowing owls (e.g., removal of potential nesting habitat shall be conducted during the non-nesting season, to the extent feasible and practicable, to minimize the potential for loss of active nests).

- The biologist shall conduct preconstruction surveys to identify occupied burrowing owl burrows in the vicinity of construction areas. Surveys for burrowing owl shall be conducted before project activities are initiated at any time of year. Surveys shall be conducted in accordance with standardized protocols, including DFG's *Staff Report on Burrowing Owl Mitigation* (DFG 1995), and NBHCP requirements. If an occupied nest burrow is found, an appropriate buffer that minimizes potential for disturbance of the nest shall be determined by the biologist, in coordination with DFG. No project activities shall commence within the buffer area until a qualified biologist confirms that the nest is no longer active or the birds are not dependent on it. Monitoring shall be conducted by a qualified biologist to ensure that project activity does not result in detectable adverse effects on the nesting pair or their young. The size of the buffer may vary, depending on the nest location, nest stage, construction activity, and monitoring results. If implementation of the buffer becomes infeasible or construction activities result in an unanticipated nest disturbance, DFG shall be consulted to determine the appropriate course of action.

- If an occupied burrowing owl burrow that does not support an active nest is found, SAFCA shall develop and implement a relocation plan, in coordination with and subject to approval of DFG and USFWS and consistent with requirements of the NBHCP, DFG's *Staff Report on Burrowing Owl Mitigation* (DFG 1995), and the Airport *Wildlife Hazard Management Plan* (WHMP). Relocation is anticipated to occur through passive exclusion of owls from the project site (using one-way doors at the burrow entrances). The owls would then be able to reoccupy the area after construction is complete. Because the project would generally result in temporary disturbance of burrowing owl habitat and conversion from one suitable habitat type to another, no mitigation for temporary burrow or habitat loss would be required.

Implementing this mitigation measure would reduce the potential impact to a **less-than-significant** level for the Proposed Action and the RSLIP Alternative because turtles would be physically relocated (if present) and construction would be implemented in a manner that reduces loss of nesting habitat and direct mortality of burrowing owls (if present). ***(Similar)***

Impact 4.7-i: Temporary Construction-Related Impacts to Fish and Aquatic Habitats

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no improvements would be made to the Natomas perimeter levee system and there would be no potential for construction-related increases in sedimentation, turbidity, or contaminants, or direct disturbance to fish and aquatic habitats from perimeter levee improvements in project-related activities. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could introduce sediments and contaminants into stream channels, irrigation and drainage canals, and the Sacramento and American Rivers, potentially resulting in the loss of fish or aquatic habitat. Because the extent and location of a levee failure and subsequent flooding is unknown, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Water Quality – Turbidity, Sedimentation, and Contaminants

Fish population levels and survival have been linked to levels of turbidity and siltation in a watershed. Prolonged exposure to high levels of suspended sediment could create a loss of visual capability in fish, leading to a reduction in feeding and growth rates; a thickening of the gill epithelia, potentially causing the decrease of respiratory function; clogging and abrasion of gill filaments; and increases in stress levels, reducing the tolerance of fish to disease and toxicants (Waters 1995). Additionally, high levels of suspended sediments could cause the movement and redistribution of fish populations. Many fish are sight feeders, and turbid waters could reduce the ability of these fish to locate and feed on prey. Some fish, particularly juveniles, could become disoriented and leave areas where their main food sources are located, ultimately reducing their growth rates. Avoidance is the most common result of increases in turbidity and sedimentation. Fish will not occupy areas unsuitable for survival unless they have no other option.

Contaminants such as bentonite slurry, fuels, oils, and other petroleum products used in construction activities may be toxic to fish or may alter oxygen diffusion rates and can cause acute and/or chronic toxicity to aquatic organisms, thereby reducing growth and/or survival. Substances contributing to sedimentation, turbidity, or contamination can enter waterways directly during construction activities or through surface runoff.

Project construction activities that could result in loss of fish and aquatic habitat through temporary increases in sedimentation and turbidity or the release of contaminants into waterways from improvements to the perimeter levees include: extensive soil borrow excavation and placement for all levee improvements; construction of the adjacent levee along a portion of the Sacramento River east levee and raising and widening (on the waterside of the existing levee) of a 1,200-foot-wide portion of the existing levee in Reach 10 of the Sacramento River east levee including finish grading; clearing, and grubbing/stripping, degrading, and construction of slurry cutoff walls under the Proposed Action; finish grading, clearing, and grubbing/stripping, degrading, construction of slurry cutoff walls, and subsequent reconstruction of portions of the upper half of the Sacramento River east levee under the RSLIP Alternative; and raising of two segments of the NCC south levee, including flattening of the side slopes and construction of slurry cutoff walls, construction of the replacement for the South Lauppe Pumping Plant, site restoration, and demobilization/cleanup. These activities could impair water quality for fish if soils or contaminants enter waterways directly or through surface runoff and hydrologic connection. The removal and replacement of the South Lauppe Pumping Plant would be conducted in association with an approved bank protection project, which would include placement of riprap for erosion control and revegetation at River Mile 77.2. As noted in section 2.3.2.4, "South Lauppe Pump Replacement" the bank protection project has already undergone environmental review (USACE 2009).

Modifications to pumping plants and/or their pipelines, including modification/replacement of RD 1000 Pumping Plant Nos. 3 and 5 pipelines (Sacramento River east levee), reconstruction of the outfall for Pumping Plant No. 3 and removal of a deep culvert at the outfall location including cofferdam construction and dewatering, modifications to irrigation Pumping Plant pipelines and pumps (Riverside Pumping Plant and South Lauppe Pumping Plant [Sacramento River], Bennett Pump Station [NCC], and Northern Main Pump Station [NCC]), and potential localized dredging under the irrigation pumping plant intakes could impair water quality for fish if soils or contaminants enter waterways directly or through surface runoff or the disturbing of bottom sediments (e.g., dredging, pile driving).

Other modifications necessary for proposed levee improvements, including the relocation and construction of the Riverside Canal, reconstruction of the Garden Highway intersections (i.e., Powerline Road and San Juan Road), and construction of surface drainage outfalls could impair water quality for fish if soils or contaminants enter waterways directly or through surface runoff. Riverbank erosion control along 5,400 feet of riverbank (Reaches 10–11B) under the RSLIP Alternative and at the South Lauppe Pumping Plant location, including demobilization and cleanup, could also impair water quality for fish if soils or contaminants enter waterways directly or through surface runoff or through disturbance of bottom sediments (i.e., placement of rock riprap).

The waterways potentially affected (Sacramento River and NCC) provide or are hydrologically connected to waterways that provide habitat for special-status adult and juvenile Chinook salmon (all races), Central Valley steelhead, and green sturgeon, as well as striped bass and American shad.

Disturbance to Fish and Aquatic Habitats

In-water work that could cause direct disturbance or injury to fish and aquatic habitats include the following:

- placement of riprap on the riverbank for erosion control using a barge or excavator (which would be greater under the RSLIP Alternative than the Proposed Action) could cause disturbance to fish and aquatic habitats;

- potential dredging to accommodate modifications to the irrigation pumping plants (i.e., Riverside, Bennett, Northern Main, and South Lauppe) could result in habitat disturbance and direct effects to fish and other aquatic organisms;

- pile driving/vibratory hammer use from construction of the replacement South Lauppe Pumping Plant and construction of the cofferdam for the reconstruction of the Pumping Plant No. 3 outfall and removal of the deep culvert could result in sounds pressure effects to fish;

- dewatering of the cofferdam at the Pumping Plant No. 3 outfall reconstruction/deep culvert removal location could cause fish stranding; and

- general disturbance from the dismantling and rebuilding (welding of steel supports) of the existing South Lauppe Pumping Plant infrastructure cause result in habitat disturbance and direct effects on fish and other aquatic organisms.

If the ABFS Project (replacement of the three irrigation pumping plants with two new irrigation pumping plants) does not occur prior to construction of the Phase 4a Project, modification of the Riverside, Bennett, and Northern Main pumping plants potentially requiring dredging would be included in the Phase 4a Project. Depending upon whether or not the ABFS Project occurs before the Phase 4a Project, dredging may be necessary at the South Lauppe Pumping Plant replacement location, although the application of the bank stabilization materials prior to reconstruction may preclude the necessity for dredging for this purpose.

The construction of a sheetpile cofferdam and dewatering at the Pumping Plant No. 3 outfall reconstruction/ culvert removal site could result in underwater sound pressure effects and fish stranding if fish are present in the immediate work area during construction activities. All in-water work would be conducted during periods when sensitive fish species are least likely to be present and a fish rescue plan would be implemented to minimize the potential for stranding of individual fish in the relatively small area within the cofferdam. Available information indicates that exposure of fish species to underwater sound pressure levels exceeding approximately 180 decibels (dB) may result in sublethal (e.g., damage to ear, hearing impairments, behavioral implications including delays in migration) or lethal (e.g., ruptured swim bladder, internal bleeding) effects (Laughlin 2005). These critical sound levels exceed levels that are anticipated to be associated with project-related construction activities, as pile driving activities with repetitive high peaks have been documented to generate up to about 115 dB at a distance of 10 feet. Therefore, this activity is expected to be well below critical sound pressure levels for fish mortality or injury and avoidance of the construction area would be the anticipated behavioral response.

Individual fish, if present in the immediate work area during any of the above construction activities, could be injured by equipment used for these activities or the sound pressure generated by them. Behavioral avoidance of adverse habitat conditions by fish is anticipated to be the most common result of increases in disturbance. Fish and other aquatic organisms displaced from their habitat due to the application of riprap, placement of support piles, localized dredging, cofferdam construction and dewatering, or general in-water construction activities could become vulnerable to predators or other unfavorable habitat conditions. Construction-related habitat disturbance could result in temporarily adverse affects to the aquatic food web and fish populations including listed species within the Phase 4a Project area boundaries.

Impact Summary

Potential sedimentation, increased turbidity, or the release and exposure of contaminants could adversely affect fish and aquatic habitats. Construction activities including rip rap placement, potential dredging, pile driving, cofferdam construction and dewatering, and general in-water construction could cause direct disturbance to fish and their aquatic habitats. Out-of-water construction activities could also occur at times of the year when there is potential for the presence of sensitive fish species/life stages in the Sacramento River during construction activities. For the above reasons, this impact would be **significant *(Similar)*** for the Proposed Action. For the RSLIP Alternative, the extent of application of rip rap (and therefore direct disturbance to fish and aquatic habitats), and removal of waterside vegetation resulting in sedimentation would be greater than for the Proposed Action. The impact would also be **significant**. ***(Similar)***

Mitigation Measure 4.7-i: Implement Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, Prepare and Implement a Spill Containment Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions," Implement a Feasible Construction Work Window that Minimizes Impacts to Special-Status Fish Species for Any In-Water Activities, and Implement Operational Controls and a Fish Rescue Plan that Minimizes Impacts to Fish Associated with Cofferdam Construction and Dewatering

Proposed Action and RSLIP Alternative

SAFCA shall implement the following measures to reduce impacts to fish and aquatic habitats related to temporary, short-term construction-related increases in sediments and turbidity and release of contaminants as well as direct disturbance to a less than significant level. These measures shall be included in construction specifications along with any additional measures identified in necessary permits.

- SAFCA shall implement Mitigation Measure 4.6-a, as described in Section 4.6, "Water Quality." This measure requires filing a Notice of Intent (NOI) with the Central Valley RWQCB; implementing standard erosion and siltation measures and best management practices (BMPs); preparing and implementing a storm water pollution prevention plan (SWPPP); preparing and implementing a spill containment plan; and complying with the conditions of the National Pollutant Discharge Elimination System (NPDES) general stormwater permit for construction activity.

- SAFCA shall identify and implement feasible in-water construction work windows in consultation with NMFS and DFG. In-water work windows shall be timed to occur when sensitive fish species/life stages are not present or least susceptible to disturbance (e.g., July 1–October 1). This measure would reduce potential construction-related direct impacts to fish from dredging and/or construction of the cofferdam and dewatering, general in-water construction, and/or the placement of rock riprap because all in-water work would occur during the period of time that sensitive fish (or life stages) would be least likely to be present in the construction area.

- USACE shall initiate Section 7 consultation with NMFS under Section 7 of the ESA, and SAFCA shall consult with DFG under CESA regarding potential construction-related impacts to Federally listed fish species and state-listed fish species, respectively. SAFCA shall implement any additional measures developed through the ESA Section 7 and CESA consultation processes, including Section 2081 permit conditions, to ensure that impacts are avoided and/or minimized.

- The cofferdam sheetpiles at the outfall structure construction site and the piles at the South Lauppe Pumping Plant site shall be installed using a vibratory hammer when possible to minimize underwater sound pressure levels to the greatest extent feasible and associated effects to sensitive fish species. Vibratory hammers/pile drivers shall only be used during daytime hours and shall commence at low energy levels and slowly build to impact force. If it is determined that a higher-intensity percussion hammer or pile driver would be required for installing the cofferdam or pilings, avoidance of potential adverse effects would be achieved by consulting with NMFS, USFWS, and DFG to determine the appropriate actions, which may include surveying the outfall site to determine fish presence prior to installation, and possibly modifying the work window accordingly.

- To reduce the potential for fish stranding or minimize the potential for harm during cofferdam dewatering activities, SAFCA or its contractor shall implement a fish rescue plan. Prior to the closure of the cofferdam in the Sacramento River, seining by a qualified fisheries biologist (with a current DFG collection permit) will be conducted within the cofferdam using a small-mesh seine to direct and move fish out of the

cofferdam area. Upon completion of seining, the entrance to the cofferdam will be blocked with a net to prevent fish from entering the cofferdam isolation area before the cofferdam is completed. Once the cofferdam is completed and the area within the cofferdam is closed and isolated, additional seining will be conducted within the cofferdam to remove any remaining fish. Once most of the fish have been removed from the isolated area, portable pumps with intakes equipped with 1.75 mm mesh screen shall be used to dewater to a depth of 1.5–2 feet. A qualified biologist shall implement further fish rescue operations using electrofishing and dip nets. All fish that are captured will be placed in clean 5-gallon buckets and/or coolers filled with Sacramento River water, transported downstream of the construction area, and released back into suitable habitat in the Sacramento River with minimal handling. After all fish have been removed using multiple seine passes, electrofishing, and dip nets (as necessary) portable pumps with screens (see above) will be used for final dewatering. NMFS, USFWS, and DFG shall be notified at least 48 hours prior to the fish rescue.

Implementing Mitigation Measure 4.7.i would reduce the potential impacts of increased sedimentation, turbidity, and direct disturbance to fish to a **less-than-significant** level because the use of BMPs (e.g., source control, detention basins, revegetation, spill containment plan, waterside construction outside of the flood season, erosion control), an in-water work window and operational controls and a fish rescue plan would maintain surface water quality conditions in adjacent receiving waters and minimize disturbance to fish and aquatic habitats. ***(Similar)***

Impact 4.7-j: Impacts to Fish Species Associated with Operation of Pump Plants and Surface Drains

No-Action Alternative

No Project Construction

Under the No-Action Alternative, modifications to RD 1000 Pumping Plant Nos. 3 and 5, reconstruction of the Pumping Plant No. 3 outfall, removal of the deep culvert at the Pumping Plant No. 3 outfall location, construction of drainage outfalls, and modifications to/replacement of the existing irrigation pumping plants (i.e., Riverside, Bennett, Northern Main, and South Lauppe) would not occur. As a result, there would be no potential for impacts related to the operation of the pump plants or surface drains because no new facilities would be constructed and existing facilities would not be modified. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Levee failure would cause flows into, and possibly out of the Natomas Basin, potentially stranding fish. Levee failure could also damage irrigation pump plants, and depending on the magnitude and location of the levee failure, could result in the pump plants being shut down for an unknown period of time. This could have an effect on fish entrainment as well as sedimentation, turbidity, and contaminants concentrations at the outfalls. A precise determination of significance of the impacts is not possible and cannot be made because the extent of the magnitude of impact is unknown and whether it would be adverse or beneficial. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Interference with the Migration of Migratory Fish Species through the Creation of Attraction Flows at Drainage Outfalls

The Phase 4a Project includes modification to the pipes and associated pumping facilities at RD 1000 Pumping Plant Nos. 3 and 5, and the reconstruction of the outfall at Pumping Plant No. 3 under both action alternatives and construction of several surface drainage outfalls to accommodate storm runoff from the area between the existing and adjacent levee in Reaches 10–11B of the Sacramento River east levee under the Proposed Action.

Pumping Plant Nos. 3 and 5 are drainage pumping plants with their pumps located on the landside of the Sacramento River east levee. New discharge pipes crossing the levee would be required to raise the pipes above the 200-year flood level elevation to meet USACE requirements for perimeter levee integrity under flood conditions. Modifications to the pumps may also be required to accommodate the additional pressure from the increase in elevation to maintain the existing pumping rate. Relocation of the pumping plants may also be required on the landside of the levee. The new discharge pipes would connect to the existing pipes on the waterside of the levee at Pumping Plant No. 5 and the stormwater would discharge into the river through the existing outfalls. The outfall at Pumping Plant No. 3 would need to be reconstructed as part of the Phase 4a Project and the replaced pipes would connect at the reconstructed outfall and discharge into the Sacramento River. The existing outfall consisting of a single pipe would be replaced by a concrete-reinforced structure with three 36-inch openings covered by flap gates. There would be no change in the volume, timing, or quality of stormwater being discharged at the Pumping Plant Nos. 3 and 5 outfalls compared to the existing condition.

Several drainage outfalls are proposed to be constructed along Reaches 10–11B of the Sacramento River east levee. Each drain is designed to accommodate flows generated from runoff in the localized areas between the existing levee and proposed adjacent levee as a result of the raise in the height of the adjacent levee. Water quality of the runoff is anticipated to be similar to the runoff that currently occurs on the waterside of the existing levee (through drainage of stormwater over the crest of the levee). Drainage pipes are anticipated to vary in size from 12 to 15 inches in diameter. Most of the drainage outfalls would be located above the ordinary high-water mark of the river.

Water quality in the discharge water from the pumping plants and drainage outfalls would be required to meet NPDES permit requirements (see Mitigation Measures 4.6-b and 4.7-i); therefore, operation of these facilities would not substantially degrade water quality in the Sacramento River.

Anadromous salmonids, during their spawning migrations in the Sacramento River, use primarily olfactory cues to home to their natal streams once they reach the freshwater environment. There is the potential that the flows from the drainage pumps and surface drainage outfalls could create velocity gradients that could attract these fish to attempt to swim up the water discharge. During fall and winter, adult chinook salmon and steelhead are in the river migrating upstream to spawning grounds. If these fish become attracted to the flows from the outfall pipes, there is a potential to cause migration delays. With high river levels, the drainage outfalls could directly interface with Sacramento River surface water and create a condition where fish could swim directly into the pipes. However, because salmonids imprint on olfactory cues particular to their stream of origin, the probability of flows from the pump or drainage outfalls interfering with migration is low.

Entrainment of Fish at Existing or Replaced Irrigation Pumping Plants

The Phase 4a Project includes modification of the pumping facilities at the Bennett, Northern Main, and Riverside Pumping Plants to accommodate the raise in the pipes above the 200-year flood elevation. As a result of bank protection activities as well as the raise in the pipes, the South Lauppe Pumping Plant would need to be replaced either in place or at a location north of the rock slope protection area. Operation of these modified/replaced facilities could entrain fish, including special-status species. Under the Proposed Action and the RSLIP

Alternative, there are two possible scenarios with respect to this potential impact (as described in Section 2.3, "Proposed Action," and Chapter 5.0, "Cumulative and Growth-Inducing Impacts, and Other Statutory Requirements"). Under the American Basin Fish Screen and Habitat Improvement Project (ABFS), there is a plan to decommission the Bennett and Northern Main Pump Stations and the Riverside Pumping Plant and replace them with two new irrigation pumping plants on the Sacramento River that would be fitted with fish screens. The construction activities to be included in the Phase 4a Project could vary depending on the timing of the ABFS project in relation to Phase 4a Project activities as follows:

- If construction of the ABFS is completed first, the decommissioning of the plants would be completed and the pipes beneath the levee would be removed by the responsible parties for the ABFS as needed to install a cutoff wall in the levee. As a result, modification or replacement of the pipes and associated pumps would not be required by and, therefore, would not be included in the Phase 4a Project.

- If the ABFS is not completed first, the modifications to the pipes and associated irrigation pumping plants to allow them to maintain their current operation with the rise of the pipes above the 200-year flood elevation would be implemented along the NCC south levee and Sacramento River east levee as part of the Phase 4a Project. After the ABFS project is constructed and operational, the modified pipes and pumps would be removed.

Under the first scenario, the ABFS would decommission the plants and no modification and/or replacement of the existing discharge pipes and associated pump plants would be required. Under the second scenario, modification or replacement of the discharge pipes and associated irrigation pumps would be a necessary component of the Phase 4a Project for Riverside, Bennett, and Northern Main Pumping Plants. Replacement of the South Lauppe irrigation pump and infrastructure would be required to accommodate bank stabilization and would continue independent of the ABFS Project activities. The modifications to/replacement of the pumping plants under the Phase 4a Project, would not result in a change in the operation (e.g., frequency, magnitude, or duration of pumping). Therefore, there would be no change in the potential for fish entrainment associated with the future operation of these facilities compared to that under the existing condition.

Impact Summary

The potential for interference with the migration of fish species resulting from the modifications to Pumping Plant Nos. 3 and 5 or the surface drainage outlets would be low. The volume of water that would be discharged from the Pumping Plant Nos. 3 and 5 outfalls would not change from current levels, and, therefore, no additional attraction flows would be created compared to the existing condition. Further, migratory fish including anadromous salmonids follow olfactory cues on their upstream migrations and the stormwater discharges would not be expected to carry those particular cues. Modification/replacement of the irrigation pump plants including their intakes (Riverside, Bennett, and Northern Main Pumping Plants if the Proposed Action occurs before the ABFS project and South Lauppe under both timing scenarios) could result in the entrainment of fish. However, there would be no change in the rate or volume of water pumped compared to the existing condition. As a result, the potential for entrainment of fish into the pumps would be the same as under the existing condition. Therefore, impacts to fish species associated with modifications to/replacement of or operation of pumping plants and surface drains under the action alternatives would be **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

No-Action Alternative

No Project Construction

Under the No-Action Alternative, without levee improvements, vegetation removal from the waterside of the levee would be required to conform with USACE guidance regarding levee encroachments, eliminating habitat for several species covered by the NBHCP. This habitat supports the majority of Swainson's hawk nest sites in the Natomas Basin. As described under Impact 4.7-f, above, the impact of the loss of this vegetation on Swainson's hawks would be significant and may not be mitigable. Impacts on nesting habitat for Swainson's hawks in the near term (i.e., before compensation woodland plantings have developed sufficiently to provide replacement nesting habitat) could substantially affect the successful implementation of the NBHCP. Under the No-Action Alternative, therefore, this impact is considered **significant**. ***(Greater)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. TNBC's reserve infrastructure would be subject to damage in the event of levee failure; however the extent of such damage is uncertain. Without flood risk reduction provided by the project, restrictions would be placed on new urban development and remaining habitat would not be at risk for conversion due to development. Because there would be no habitat loss due to urban development, implementation of this alternative would not directly conflict with the implementation of the NBHCP. This potential impact would be **less than significant**. ***(Lesser)***

Proposed Action

Implementation of the Proposed Action could jeopardize successful implementation of the NBHCP through the conversion of habitats and land uses.

Impact on TNBC Preserves

The Proposed Action could encroach onto a small area of TNBC reserve land. TNBC lands in the area of potential overlap support grassland and cropland managed to provide Swainson's hawk foraging habitat (TNBC 2008). Within this area, the Proposed Action would result in land use conversions rather than loss of habitat (e.g., conversion of cropland to grassland) and following project implementation, the area would still provide Swainson's hawk foraging habitat. This would be a **significant** impact.

Impacts on NBHCP-Covered Species Viability

The potential for the Proposed Action to threaten the viability of populations of certain covered species, reduce the effectiveness of the NBHCP's conservation strategy, and adversely affect attainment of the goals and objectives of the NBHCP, could jeopardize successful implementation of the NBHCP. This would be a **significant** impact.

Impacts on Habitat Availability

The Proposed Action would not result in the development of land outside the NBHCP permit area, but it would result in land use conversions. Land use conversions, however, would not cause a net loss in the habitat values provided by these lands for NBHCP-covered species in the Natomas Basin.

Impacts to habitat resulting from project implementation are summarized in **Tables 4.7-1** through **4.7-7**. Although temporary and permanent loss of habitat would result from implementation of the Proposed Action, the overall habitat quality for NBHCP species that use these habitats is unlikely to be adversely affected. This is because many components of the proposed project would support attainment of NBHCP goals and objectives through:

(1) the expansion of the amount of protected habitat available for NBHCP-covered species; (2) the consolidation of large areas of habitat, assisting in the expansion of TNBC reserve blocks in the northwestern and southwestern regions of the basin; (3) the connection of core habitat reserves that are distributed throughout the basin through the construction of new canals and the establishment of woodland corridors; and (4) the extension of currently protected habitat blocks by substantially increase acreage and patch size of these habitats.

Given the collective implementation of elements of SAFCA's conservation strategy and proposed mitigation to compensate for temporary and permanent habitat loss, the proposed project would not jeopardize the implementation and efficacy of the NBHCP. However, if habitat creation/preservation are not effectively implemented to provide woodland habitat for NBHCP-covered species, an overall adverse effect could occur. This impact would be **potentially significant**.

RSLIP Alternative

The impacts of the Proposed Action on successful implementation of the NBHCP would also occur under the RSLIP Alternative, with the exception that under this alternative, there would also be extensive removal of riparian vegetation on the waterside of the Sacramento River east levee to conform with USACE guidance regarding levee encroachments. This habitat is used by a variety of species covered by the NBHCP, and supports the majority of Swainson's hawk nest sites in the Natomas Basin. As described under Impact 4.7-f, above, the impact of the loss of this vegetation on Swainson's hawks would be significant and may not be mitigable. Impacts on nesting habitat for Swainson's hawks in the near term (i.e., before compensation woodland plantings have developed sufficiently to provide replacement nesting habitat) could substantially affect the successful implementation of the NBHCP. Under the RSLIP Alternative, therefore, this impact would be **significant**. ***(Greater)***

Mitigation Measure 4.7-k: Ensure that Project Encroachment Does Not Jeopardize Successful Implementation of the NBHCP and Implement Mitigation Measures 4.7-a and 4.7-c through 4.7-h

Proposed Action and RSLIP Alternative

To reduce impacts on the successful implementation of the NBHCP, SAFCA shall implement the measures described below:

- Implement Mitigation Measures 4.7-a and 4.7-c though 4.7-h.
- Based on the current value-per-acre, SAFCA shall contribute funds to TNBC to offset direct impacts to TNBC reserves on an acre-per-acre basis, drawing upon TNBC's existing land surplus.

These measures would ensure that the Proposed Action would be implemented in a manner that is consistent with and does not jeopardize successful implementation of the NBHCP. Creating woodland and aquatic movement corridors and other replacement habitats, conducting protocol-level surveys for special-status plants and wildlife, implementing construction in a manner that reduces loss of habitat and direct mortality of species, implementing measures that are part of the NBHCP related to special-status species, and creating and implementing a management plan in consultation with USFWS and DFG would reduce the impact on consistency with the NBHCP to a **less-than-significant** level.

Implementing this mitigation measure, and Mitigation Measures 4.7-a, and 4.7-c though 4.7-h would partially reduce the impact under the RSLIP Alternative, but not to a less-than-significant level. Because of the likely loss of a substantial amount of nesting habitat for Swainson's hawk, these measures could be insufficient to ensure that the RSLIP Alternative would not jeopardize successful implementation of the NBHCP. Thus, this impact would remain **significant and unavoidable**. ***(Greater)***

4.7.3 RESIDUAL SIGNIFICANT IMPACTS

Under the No-Action Alternative, there would be no impacts to sensitive aquatic habitats or impacts related to fish attraction at the drainage outfalls. However, impacts on waterside woodland, wildlife corridors, Swainson's hawk nesting, and valley elderberry longhorn beetle cannot be fully reduced to a less-than-significant level without the successful creation of waterside planting areas sufficient in size to fully and adequately compensate for the removal of extensive amounts of waterside vegetation along the Sacramento River east levee. Because mitigation cannot be required for the No-Action Alternative, this impact would remain significant and unavoidable.

In the event of levee failure under the No-Action Alternative, impacts to waterside woodlands, wildlife corridors, fish, special-status plant and animal species, and sensitive aquatic habitats are uncertain. Although there would be some unknown level of fish mortality through physical injury and stranding of fish entering Natomas Basin through a levee breach and some impacts associated with degraded water quality on fish habitat, the severity of flood conditions can vary substantially, and the specific effects on fish cannot be reasonably predicted. Because of this uncertainty, these potential impacts are considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore, impacts that result from the No-Action Alternative would not be mitigated.

Under the Proposed Action, implementation of mitigation measures described above would reduce long-term impacts to woodlands, Swainson's hawk, and wildlife corridors for aquatic species, bird species, fish, and special-status species to a less-than-significant level and would not result in residual significant adverse impacts. These measures would also ensure that the Proposed Action would not jeopardize successful implementation of the NBHCP. Although no permanent impacts would occur, impacts to woodland habitats would remain significant and unavoidable for many years before reaching a less-than-significant level because replacement plantings would require 10–15 years to mature. This temporal loss of woodland habitat would also result in significant and unavoidable impacts to Swainson's hawk nesting habitat related to this temporal loss of habitat.

Implementation of mitigation measures described above for the RSLIP Alternative would not be sufficient to fully mitigate impacts to woodland habitats, loss of wildlife corridors, or the likely loss of a substantial amount of nesting habitat for Swainson's hawk along the waterside of the Sacramento River east levee. These measures would also be insufficient to ensure successful implementation of the NBHCP. Residual impacts would occur because of the extensive loss of waterside vegetation, the temporal loss of habitat while replacement vegetation matures, and the limited extent of the new plantings that would reduce the value of this replacement habitat to wildlife and bird movement. Because no other feasible mitigation measures are available, impacts under the RSLIP Alternative would remain significant and unavoidable.

With implementation of the mitigation measures described in this section, the Proposed Action and the RSLIP Alternative would not result in any residual significant impacts related to giant garter snake, valley elderberry longhorn beetle, northwestern pond turtle, burrowing owl, or fish.

With implementation of the mitigation measures described in this section, the Proposed Action and the RSLIP Alternative would not result in any residual significant impacts related to sensitive aquatic habitats. In fact, successful implementation of the mitigation measures would have a beneficial impact on overall acreage and functions of waters of the United States in the Natomas Basin.

4.8 CULTURAL RESOURCES

This section evaluates the Phase 4a Project's potential effects on cultural resources. Cultural resources include prehistoric archaeological sites and artifacts, historic-era buildings and structures, and places used for traditional Native American practices or other properties with special cultural significance to Native Americans (Traditional Cultural Properties [TCPs]).

This project is subject to both CEQA and Section 106 of the National Historic Preservation Act (NHPA), hereinafter referred to as "Section 106"; each has specific cultural resources mitigation requirements. The regulatory setting for management of cultural resources is provided in Section 3.8, "Cultural Resources." The requirements of the NHPA are described in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations." In general, the standards and process required for identifying and managing effects on cultural resources under the NHPA are used for determining the significance of impacts under NEPA.

4.8.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.8.1.1 METHODOLOGY

This section describes the methods used to identify and evaluate cultural resources that may be affected by the Phase 4a Project.

Native American Tribal Consultation

In May 2008, USACE, SAFCA, and the State Historic Preservation Officer (SHPO) became signatories to a Programmatic Agreement (PA), concluding compliance with Section 106 (**Appendix E1**). Native American tribes who were consulted by USACE were the Ione Band of Miwok Indians, the Shingle Springs Band of Miwok Indians, and the United Auburn Community, and all were invited to participate in the PA. Native American monitors worked with SAFCA to assist in the treatment of Native American human remains and items associated with Native American burials discovered during the project inventory process, as required by the PA (Section VI).

EDAW sent a letter of inquiry to the Native American Heritage Commission (NAHC) on June 12, 2007, asking for information or concerns regarding the project area, as well as a list of individuals or organizations that might have information or concerns regarding the project area. On June 19, 2007, Debbie Pilas-Treadway of the NAHC responded and indicated that no known sites were found in the Sacred Lands File that were located within the project area or in the immediate vicinity. Ms. Pilas-Treadway also provided EDAW with a list of individuals who could be contacted concerning cultural resources in the project area. These individuals were sent contact letters on June 21, 2007, with information regarding the project and a request for any information they might provide or concerns that they might have about the project. This program of correspondence did not reveal new resources. The complete results of this program of investigation are described in the Phase 2 EIR (SAFCA 2007: 3.8-11).

The NAHC also designated a Most Likely Descendant for the project, Mr. John Tayaba of the Shingle Springs Band of Miwok Indians. Mr. Tayaba is designated to determine how to reinter identified prehistoric human remains that are uncovered in the NLIP area with appropriate dignity per California Public Resources Code Section 5097.98. Representatives from SAFCA, USACE, and EDAW, and Mr. Tayaba meet weekly to discuss management of cultural resources for the NLIP and milestones in the Section 106 process.

Information Center Records Searches

Records searches were performed in 2006 and 2007 for the entire NLIP footprint, which includes the proposed Phase 4a Project footprint. Most of the searches were conducted at the North Central Information Center (NCIC) of the California Historical Resources Information System, located at California State University, Sacramento. The NCIC records search covered portions of the project area in Sacramento County. Records searches were also

conducted at the Northeast Information Center (NEIC), which maintains cultural resource records for Sutter County. The searches at both facilities included, but were not necessarily restricted to, an examination of the following resources:

- the State Office of Historic Preservation's *Historic Property Directory and Determination of Eligibility* (2006),
- the National Register of Historic Places and California Registers of Historical Resources (2006),
- *California Inventory of Historic Resources* (1976 and updates),
- *Historic Properties Directory* (2006),
- *California Historical Landmarks* (1996 and updates),
- *California Points of Historical Interest* (1992 and updates),
- *Caltrans Local Bridge Survey* (1987), and
- various historic maps.

The record search results are described in detail in Section 3.8.2.3, "Records Search Results."

Inventory and Management of Resources Within the Phase 4a Project Area of Potential Effect

SAFCA is required to perform an inventory, evaluation, and finding of effect for identified resources for the area of potential effect (APE) for each project phase, under the executed PA, as described below (Stipulation IV[A]). Inventory and evaluation typically consists of the following steps:

- pedestrian survey of the project footprint;
- limited shovel testing or probing where ground cover impairs surface visibility;
- monitoring of preconstruction geotechnical borings and backhoe excavations;
- documentation of identified resources; and
- evaluation of identified resources by application of eligibility criteria, and where necessary, limited test excavation to assist in resource evaluation.

SAFCA has completed a pedestrian survey for a portion of the Phase 4a Project footprint along the Sacramento River east levee. However, several proposed borrow locations remain within the Phase 4a Project footprint that require pedestrian inventory or additional subsurface investigation, including the majority of the Fisherman's Lake Borrow Area (see **Plate 2-6a**), and segments along the Sacramento River east levee. SAFCA will complete an inventory of all project features that involve ground-disturbing work in native soils, including borrow locations. SAFCA will also complete evaluations, findings of effect, and treatment of identified resources where required. Within the portion of the Phase 4a Project footprint that has been surveyed, three identified resources require evaluation to determine if they are historic properties or historical resources (CA-Sac-15/H, CA-Sac-268, and CA-Sac-160). If they are eligible for listing on the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR), SAFCA will make a finding of effect and make recommendations for further management in an Historic Property Treatment Plan (HPTP), as required under Stipulation V(A) of the PA. The remaining resources are either determined ineligible for listing on the NRHP or CRHR (CA-Sac-493H, CA-Sac-1115H), or are listed on the NRHP (CA-Sac-16/H). Because CA-Sac-16/H is listed on the NRHP it is automatically listed on the CRHR (California PRC Section 5024.1[d][1]), and thus is an historical resource under CEQA. As described below, CA-Sac-17/H was documented in the project vicinity, but it has not been relocated and may have been destroyed.

4.8.1.2 THRESHOLDS OF SIGNIFICANCE

California Environmental Quality Act

The Phase 4a Project would result in a significant impact on a cultural resource if it would result in a substantial adverse change in an historical resource, as defined under CEQA. 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 the historical resource would be materially impaired.

National Historic Preservation Act

The Phase 4a Project would result in a significant impact on an historic property as defined under Section 106 if it would result in an adverse effect on that resource. An adverse effect would occur if the project would alter, directly or indirectly, any of the characteristics of an historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

4.8.2 IDENTIFIED RESOURCES

Table 4.8-1 contains all identified resources, other than elements of RD 1000 (discussed separately under Impact 4.8-a, below) in the Phase 4a Project footprint. For all resources that are determined ineligible, no further management is required. The Phase 4a Project is an action within a program of undertakings. The Phase 2 EIR and Phase 2 EIS have analyzed the impacts of the program and have identified potential impacts for several other identified resources within the Phase 4a Project footprint (**Table 4.8-1**). These program-level significance conclusions are summarized in **Table 4.8-1**.

As described in Section 1.1.1, "Scope of Environmental Analysis," the State CEQA Guidelines allow for tiering of analysis and documentation when CEQA documentation has been performed for a program of projects. Incorporation of previous analysis by reference is also encouraged for NEPA analysis under the CEQ regulations, as described in Section 1.1.1. Accordingly, for resources for which the potential impact of the program has been previously determined, the significance conclusion is identified in **Table 4.8-1**, and a citation is provided to the relevant document. No further analysis is provided in this document, and the reader is referred to the previous analysis. The list of documents in which this analysis is provided includes the Phase 2 EIR and Phase 2 EIS.

4.8.2.2 PREHISTORIC RESOURCES

The following prehistoric resources, which were not addressed fully in the program-level documents cited above, have been identified within the project footprint, as noted in **Table 4.8-1**. In this table, resources are organized approximately north to south. For all resources that may be determined eligible or are already listed on the NRHP or CRHR, SAFCA will determine the effect of the undertaking, subject to USACE and SHPO concurrence. If adverse effects are found, SAFCA would prepare and implement an HPTP in consultation with USACE and the SHPO.

An analysis of these resources is required in this document to determine if the Phase 4a Project could result in a substantial adverse change on an historical resource under CEQA, or an adverse effect on a historic property under the NHPA:

- **CA-Sac-17/H.** This resource consists of the remains of a mound site recorded as early as 1934 along the Sacramento River east levee. Site records depict the site in varying locations. EDAW conducted pedestrian and subsurface inventory efforts in 2009 to relocate this resource; however, because the above-grade portion of this resource has been truncated, it is difficult to identify and relocate the remaining subterranean portion of the site, if it still exists with any degree of integrity. EDAW's shovel testing efforts may have identified the

Table 4.8-1
Identified Cultural Resources in the Phase 4a Project Footprint

Trinomial or P-Number	Resource Type	Eligibility Status (NRHP and CRHR)	Previous Significance Conclusion after Mitigation
	Reclamation District 1000	Determined eligible	Less than significant (Phase 2 EIR, SAFCA 2007:3.8-29), Less than Adverse (Phase 2 EIS, USACE 2008:4-69)
CA-Sac-485/H	Prehistoric site	Determined eligible	Significant and Unavoidable (Phase 2 EIR, SAFCA 2007:3.8-29), Potentially Significant (Phase 2 EIS, USACE 2008:4-72)
CA-Sac-15/H	Prehistoric site	Requires testing/evaluation to determine eligibility	Significant and Unavoidable (Phase 2 EIR, SAFCA 2007:3.8-31), Potentially Significant[1] (Phase 2 EIS, USACE 2008:4-73)
CA-Sac-493/H	Historic debris	Determined ineligible for listing on the NRHP and CRHR (SHPO concurrence received) (USACE 2008)	Not applicable; no further management required
CA-Sac-16/H	Prehistoric mound site with spatially associated historic component	Listed on the NRHP and CRHR	Significant and Unavoidable (Phase 2 EIR, SAFCA 2007:3.8-31), Potentially Significant (Phase 2 EIS, USACE 2008:4-73)
CA-Sac-1115H	Historic farmstead	Determined ineligible for listing on the NRHP and CRHR (SHPO concurrence received) (USACE 2009)	Not applicable; no further management required
CA-Sac-268	Lithic scatter	Requires testing/evaluation to determine eligibility	Discussed in Impact 4.8-b, below
CA-Sac-17/H	Prehistoric mound site	Not relocated, requires testing/ evaluation to determine eligibility	Potentially Significant (Phase 2 EIS, USACE 2008:4-73) Discussed in Impact 4.8-b, below, pursuant to CEQA
CA-Sac-160/H[2]	Prehistoric mound site and spatially associated historic farmstead	Requires testing/evaluation to determine eligibility	Significant and Unavoidable (Phase 2 EIR, SAFCA 2007:3.8-31), Potentially Significant (Phase 2 EIS, USACE 2008:4-73)

Notes: NRHP = National Register of Historic Places; CRHR = California Register of Historic Resources

[1] The Phase 2 EIS text states "implementation of this mitigation may not fully reduce the impact to a less-than-significant level"; therefore, the significance conclusion after mitigation implementation would be significant and unavoidable.

[2] Resource contains a mortuary component.

Source: Data compiled by EDAW in 2008 and 2009

edge of the site on the edge of the AKT and Huffstutler Trust properties within the proposed Elkhorn Borrow Area (**Plate 2-7**). Absent stronger physical evidence, it is extremely difficult to say where this site is, but mound sites in the Sacramento Valley almost always have mortuary components. Even though the mound has been leveled to the current grade, it is likely that subterranean portions of the deposit contain human remains, if such deposits remain with sufficient integrity to allow identification and evaluation.

- **CA-Sac-268.** This resource consists of a sparse scatter of debris associated with the manufacture of flaked stone tools. While the deposit requires testing and evaluation under the NRHP and CRHR listing criteria it does not evince potential to offer data in prehistoric archaeological research, and thus is not anticipated to be eligible or require treatment to resolve adverse effects.

4.8.3 IMPACTS AND MITIGATION MEASURES

This section describes the impacts of the Proposed Action and alternatives under consideration on cultural resources and outlines treatment measures that may avoid or reduce the predicted impacts. These measures would be implemented by USACE and SAFCA, in consultation with the SHPO. The specific documents that will further define and describe monitoring and mitigation measures include HPTPs that SAFCA will prepare and the Construction Monitoring and Inadvertent Discovery Plan, in compliance with the PA.

Impacts that are significant under CEQA are also considered adverse effects under the NHPA.

Impact 4.8-a: Potential Changes to Elements of Reclamation District 1000 and Rural Landscape District

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to directly disturb elements of RD 1000 and Rural Landscape District. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could alter elements of RD 1000. However, the major elements and overall character of RD 1000 are unlikely to be significantly adversely affected because levee systems by their nature are subject to ongoing repair and upgrades. Repairs would thus be consistent with the character-defining elements of the landscape. This potential impact is considered **less than significant**. ***(Lesser)***

Proposed Action and RSLIP Alternative

As described in Section 3.8.2.2, "Historic Setting," RD 1000 is a rural historic landscape district that contains numerous elements associated with flood damage reduction and drainage infrastructure. An evaluation of RD 1000 was conducted both to determine the NRHP eligibility of the district and to evaluate whether the district would be significantly affected by flood damage reduction projects (levee modifications) planned and subsequently implemented by USACE as part of the American River Watershed Project (USACE 1991). RD 1000 was identified as eligible for inclusion in the NRHP as a Rural Historic Landscape District. Because RD 1000 was determined eligible for listing on the NRHP, it is also listed on the CRHR and is an historical resource under CEQA. The finding of effect statement concluded that USACE projects would adversely affect both contributing and noncontributing elements of RD 1000 by allowing for greater development to occur in the region. As a result, mitigation measures were adopted and incorporated into USACE's project. These consisted of Historic American Engineering Record (HAER) documentation, which was prepared by Peak & Associates (1997), videotapes of historic properties, and a list of repositories where copies of the information would be made available to the public.

Work associated with the Phase 4a Project under both the Proposed Action and the RSLIP Alternative may alter contributing elements of RD 1000. This work includes improving the Sacramento River east levee, remediating seepage, and modifying pumping plants along the Sacramento River east levee, as well as relocating and extending Riverside Canal.

Along the NCC south levee, the Bennett and Northern Main Pump Stations would be modified, and cutoff walls would be installed and the levee raised at the pump stations. These changes include construction of new features along contributing levees, such as adjacent levees and seepage berms (under the Proposed Action), or changes to the existing levee slope and crown (under the RSLIP Alternative). These changes may be consistent with the character-defining elements of RD 1000 because flood damage reduction infrastructure, by its nature, requires ongoing maintenance and alteration. However, such changes could diminish the significance or integrity of contributing elements of the district, under both the Proposed Action and the RSLIP Alternative. This impact is considered **potentially significant** pending identification and evaluation of effects on contributing elements of RD 1000. ***(Similar)***

Mitigation Measure 4.8-a: Incorporate Mitigation Measures to Documents Regarding Any Elements Contributing to RD 1000 and Rural Landscape District and Distribute the Information to the Appropriate Repositories

Proposed Action and RSLIP Alternative

The management of the cultural resources that constitute the contributing elements of RD 1000 is governed by the PA (**Appendix E1)**. Because the elements of the RD 1000 historic landscape district have already been recorded, a new inventory of these resources is not required under Stipulation IV(A) of the PA. After an APE has been determined per Stipulation III(C), a qualified architectural historian shall determine if contributing elements of the district are present in the APE. If contributing elements are present, the architectural historian shall update records for these resources and evaluate those elements to determine if they retain integrity. Because much of the Natomas Basin has been developed, it is possible that changes to the setting have diminished the integrity and thus eligibility of contributing elements in the APE. If the elements in the APE retain eligibility, the architectural historian shall make a finding of effect.

If there is an adverse effect to a contributing element (under Section 106) or a significant impact on the resource's integrity as an historical resource (under CEQA), the architectural historian shall review existing HAER documentation and determine whether any augmentation of this documentation is needed. The original documentation for the American River Watershed Project (completed in 1997) contemplated changes to the setting of the district and thus provided comprehensive documentation to record the district before urbanization (Peak & Associates 1997). This original documentation was intended to adequately recorded and preserve records of the elements that may be affected. However, if this documentation is not sufficient for adversely affected and contributing elements, SAFCA shall prepare an HPTP stipulating additional HAER documentation, or other similar treatment as required under Stipulation V(A). After consultation with USACE and the SHPO, SAFCA shall implement the required documentation or treatment prior to construction. Any additional documentation that is needed shall be prepared and distributed to appropriate public repositories.

Implementing this mitigation and treatment measure would reduce the impacts of potential changes to elements of RD 1000 under both the Proposed Action and the RSLIP Alternative to a **less-than-significant** level. If required, this treatment measure would be incorporated into an HPTP developed through consultation with USACE and the SHPO. ***(Similar)***

Impact 4.8-b: Potential Damage or Disturbance to Known Prehistoric Resources from Ground-Disturbance or Other Construction-Related Activities

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to directly disturb any known historic-era resources. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Substantial flooding could result in inundation, or scour at the location of a levee break, of known subsurface prehistoric resources. Before construction of the levee system, these resources were subject to the effects of periodic flooding over several centuries and are unlikely to be adversely affected by additional episodes of inundation. Should a levee break occur at the location of a prehistoric site, the resource could be obliterated by the scourhole (potentially 1,000 feet wide and 80 feet deep) that would be created by the levee break. The magnitude of the impacts would depend upon the location of the levee breach, severity of the storm, and river flows at the time. Therefore, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Construction of proposed improvements may affect six identified prehistoric sites (see **Table 4.8-1**) under both the Proposed Action and the RSLIP Alternatives. The impact of program and project work on these sites has largely been addressed in previous documents (see **Table 4.8-1**). The following analysis focuses on the potential effect that the two action alternatives would have on CA-Sac-17/H and CA-Sac-268, which were not fully addressed in previous environmental documents, as well as the potential for an increase in the severity of impacts to CA-Sac-485/H. This discussion also incorporates by reference previous discussion of CA-Sac-16/H, an NRHP- and CRHR-listed site that is within the APE for the Phase 4a Project, and updates this analysis by examining the potential effect that the action alternatives would have on this important resource.

CA-Sac-17/H, a prehistoric archaeological deposit, has not been precisely located despite extensive pedestrian and subsurface testing in the vicinity. Although agricultural practices appear to have largely obliterated this resource, it is possible that intact portions of this deposit remain. Because the original site record describes a mound site, any remaining portions of the resource are likely to have mortuary components. Another identified prehistoric resource, CA-Sac-268, consists of a sparse scatter of debris associated with the manufacture of flakes stone tools. It does not appear to be eligible for listing on the NRHP or CRHR; however, neither CA-Sac-17/H nor CA-Sac-268 have been formally evaluated for listing in accordance with the PA. Construction of proposed levee improvements, such as placement of seepage berms and relief wells along the Sacramento River east levee, excavation of inspection trenches and cutoff walls, and improvements and additions to drainage and water conveyance features, could result in ground disturbance that would affect these unevaluated resources.

As noted in **Table 4.8-1**, the effect of program- and project-level work on CA-Sac-16/H was analyzed in the Phase 2 EIR (SAFCA 2007:3.8-31) and the Phase 2 EIS (USACE 2008:4-73). These documents described how proposed work, including levee improvements and borrow excavation, could affect this NRHP- and CRHR-listed resource at a program and project level. Because CA-Sac-16/H is listed on the NRHP, it is also listed on the CRHR and is thus an historical resource under CEQA. Proposed improvements in the Phase 4a Project footprint in the vicinity of this resource would involve construction of up to 500-foot-wide seepage berms, placement of relief wells, and excavation of cutoff walls or inspection trenches. The presence of an existing jet fuel pipeline in the southeastern portion of Reach 11B of the Sacramento River east levee may also require ground-disturbing

work in the vicinity of CA-Sac-16/H. These actions could require excavation into and disturbance of CA-Sac-16/H.

The proposed construction of cutoff walls in Reach 4B overlaps with the location of CA-Sac-485/H. The proposed cutoff wall, which would range in depth from 20 to 75 feet, could intrude into deposits associated with CA-Sac-485/H that extend under the levee because the southern end of the cutoff wall overlaps slightly with the northern edge of CA-Sac-485/H. Because these deposits occur under the existing levee, it would not be feasible to perform any data recovery excavations on these deposits in advance of construction. Therefore, construction may result in significant impacts to CA-Sac-485/H.

The evaluation of eligibility and determination of effects on all eligible and listed sites will be made in consultation with USACE and the SHPO. The sites that require evaluation may be significant both for their data potential and for their importance to local Native American groups, and may have the integrity to convey this significance. Such resources would be eligible for listing on the NRHP and the CRHR. As described above, it is possible that ground-disturbing work associated with the Phase 4a Project may, absent mitigation or treatment, result in significant impacts to CA-Sac-16/H, CA-Sac-17/H, CA-Sac-268, and CA-Sac-485/H, as well as other prehistoric sites listed in **Table 4.8-1**. Significant impacts may occur by conducting ground-disturbing construction that diminishes the data these resources may contain, or disturbing interred human skeletal remains and associated grave goods, under both the Proposed Action and the RSLIP Alternative. This impact is considered **potentially significant**. ***(Similar)***

Mitigation Measure 4.8-b: Avoid Ground Disturbance Near Eligible and Listed Resources to the Extent Feasible, Prepare a Finding of Effect, and Resolve Any Adverse Effects through Preparation of an HPTP

Proposed Action and RSLIP Alternative

Under either the Proposed Action or the RSLIP Alternative, SAFCA shall implement the following measures.

- Complete an evaluation of identified resources, and determine the effect of each phase of work on all eligible or listed resources in accordance with Stipulation IV(A) of the PA.
- Consult with USACE, the SHPO, and other consulting parties such as Native American individuals and organizations, to develop appropriate treatment or mitigation in an HPTP, per Stipulation V(A) of the PA if the project would result in adverse effects on eligible resources.
- Document the site and avoid further effects by protecting the resource through capping per management under an HPTP or other avoidance measures where feasible. Where physical impacts cannot be avoided and such physical impacts could damage the data these sites contain, including mortuary components, further mitigation may required. Such mitigation may consist of data recovery excavations to retrieve those values and mortuary assemblages that contain significance for archaeology after consultation with and the agreement of the Native American most likely descendent (MLD), where possible.
- Monitor potentially destructive construction in the vicinity of documented resources, as required under the Construction Monitoring and Inadvertent Discovery Plan.

Project implementation involves ground-disturbing work that both covers large areas of land, and includes deep excavation within the existing and adjacent levee footprint to provide necessary repairs to the flood damage reduction infrastructure in the Basin. Flood damage reduction measures that only involve capping of sites with minimization of vibratory and compaction impacts may reduce significant impacts to less-than-significant levels. The complex and stratified geomorphology of the Basin as well as the magnitude of the construction are such that implementation of all treatment and mitigation may not fully

reduce all impacts to known prehistoric resources under either the Proposed Action or the RSLIP Alternative to a less-than-significant level. For example, identified sites may have buried components containing mortuary elements that cannot be adequately documented prior to intrusive work. Therefore, these impacts would remain **significant and unavoidable**. ***(Similar)***

Impact 4.8-c: Potential Damage to or Destruction of Previously Undiscovered Cultural Resources from Ground-Disturbance or Other Construction-Related Activities

No-Action Alternative

No Project Construction

Under the No-Action Alterative, no construction activities would occur; therefore, no potential exists for the project to directly damage or destroy previously undiscovered cultural resources. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to this system, the risk of levee failure would remain high. Substantial flooding could occur and result in inundation of unknown subsurface prehistoric resources, or scour at the location of a levee break. However, before construction of the levee system, these resources would have been subject to the effects of periodic flooding over several centuries and are unlikely to be significantly adversely affected by additional episodes of inundation. Should a levee break occur at the location of a previously unidentified and significant prehistoric site, the resource would likely be obliterated by the scourhole (potentially 1,000 feet wide and 80 feet deep) that would be created by the levee break. The magnitude of the impacts would depend upon the location of the levee breach, severity of the storm, and river flows at the time. Therefore, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

The Proposed Phase 4a Project includes construction of levee improvements and seepage remediation (Reach 4B and Reaches 10–15 of the Sacramento River east levee), excavation of borrow sites, and changes and improvements to drainage infrastructure along the Sacramento River east levee, and work at the Northern and Bennett Pump Stations along the NCC south levee. These construction activities would involve ground disturbance and excavation that could damage or destroy previously undiscovered cultural resources.

Sacramento Valley floodplains and riverbanks were extensively occupied and used by prehistoric populations. Prehistoric occupation sites frequently took the form of mounds constructed above the natural ground surface by prehistoric human populations, but the upper portions of many of these sites have been destroyed by modern agricultural cultivation and leveling of fields, and the remains of these sites are thus no longer easily visible above ground. Additionally, intermittent flooding deposited layers of alluvium over prehistoric deposits, leaving these resources intact below grade with no surface manifestations. Areas within the Phase 4a Project footprint are also commonly covered with agricultural crops or residential developments such as lawns and driveways, and other impervious surfaces associated with residential development. These conditions may obscure both prehistoric and historic archaeological deposits.

Because technical work necessary to identify additional resources in the Phase 4a Project footprint and overall NLIP footprint is ongoing, significant resources may be identified after certification and approval of this EIS/EIR that would be adversely affected by construction-related and other ground-disturbing activities. It is possible that

impacts on yet unidentified resources cannot be avoided through changes in project design or configuration of borrow sites identified in Chapter 2.0, "Alternatives." This impact is considered **potentially significant**. ***(Similar)***

Where cultural resources are buried below sterile soils or where mounds have been truncated with no surface manifestation, discovery prior to construction or other ground-disturbing activities is not always possible. Furthermore, proposed improvements such as cutoff walls would occur under the footprint of the existing Sacramento River east levee. The levee would only be degraded immediately prior to construction; thus, there are no feasible methods of conducting a cultural resources inventory within the footprint of these activities. Degrading the levee prior to construction for cultural resource investigations would not be feasible because it would require demolishing the levee for cultural investigations during the summer in advance of construction and rebuilding the levee for the flood season, at substantial expense and project delay.

Excavation, grading, and other ground-disturbing activities required during construction of improvements and excavation of borrow from sites identified in Chapter 2.0, "Alternatives," could encounter and damage previously unknown cultural resources that may be eligible for listing on the NRHP, CRHR, or both, under both the Proposed Action and the RSLIP Alternative. This impact is considered **potentially significant**. ***(Similar)***

Mitigation Measure 4.8-c: Train Construction Workers before Construction, Monitor Construction Activities, Stop Potentially Damaging Activities, Evaluate Any Discoveries, and Resolve Adverse Effects on Eligible Resources, if Encountered.

Proposed Action and RSLIP Alternative

Under either the Proposed Action or the RSLIP Alternative, SAFCA shall implement the following measures.

- SAFCA shall complete surveys to identify cultural resources in the Phase 4a Project footprint, as identified in the Phase 2 EIR (SAFCA 2007:3.8-31) at the program level.
- Mitigation Measure 3.4-d from the SEIR prepared for the Phase 2 Project is copied below and shall be implemented, as appropriate within the footprint of the Proposed Action (SAFCA 2009: 3.4-10).

  Mitigation Measure 3.4-d: Conduct Additional Backhoe and Canine Forensic Investigations As Appropriate

  To increase the data set for identifying buried sites under the existing levee, SAFCA shall recommend that the following additional mitigation measures be adopted by USACE during Section 106 consultation:

  - Additional inventory should be conducted at appropriate intervals along the Sacramento River east levee for the Phase 2 Project, using a backhoe excavator, to increase the sample of information at depths below 6 feet that cannot be reached with conventional shovel test methods.
  - Where this process or additional inventory efforts reveal other resources, SAFCA recommends the use of canine forensic investigations as a way of identifying interred human remains with minimal disturbance, and for further refinement of and understanding of the constituents of identified resources.
- Before construction begins, a qualified professional archaeologist retained by SAFCA shall give a presentation and training session to all construction personnel so that they can assist with identification of undiscovered cultural resource materials and avoid them where possible.

- A qualified archaeologist shall monitor ground-disturbing construction activities along the Sacramento River east levee. In areas of known sacred value, such as archaeological sites containing Native American burials, a Native American monitor will be present to observe potentially destructive construction activities and to ensure proper treatment of human remains in accordance with State law. If a previously unidentified archaeological resource is uncovered during construction, construction activities shall be halted in the vicinity of the find and the construction contractor, SAFCA, USACE, and other appropriate parties shall be notified regarding the discovery. Where construction would consist of cutoff walls excavated in a bentonite and/or cement slurry, SAFCA and USACE anticipate that it will not be possible to identify the precise location of any materials found in spoils or at soil mixing stations, thus construction cannot stop during excavation of cutoff walls if resources are discovered in spoils.

- SAFCA shall then consult with USACE and the SHPO to determine the eligibility of the resource. If SAFCA and USACE, in consultation with the SHPO, concur that the resource is eligible and the project may result in adverse effects on the resource, SAFCA shall prepare and implement an HPTP as required under the PA, Stipulation V(A). The HPTP shall be prepared in consultation with USACE, the SHPO, and other appropriate consulting parties such as Native American individuals or organizations.

- Work may only resume when either all necessary treatment has been performed under the HPTP, or construction in the vicinity will not result in adverse effects, and that work does not encroach within 30 meters of the known boundaries of the resource, or the boundaries designated by the SHPO, per the PA, Stipulation V(B)(2). All treatment stipulated in the HPTP shall be performed by SAFCA, in consultation with USACE.

It may be possible to avoid resources or recover and preserve them through measures stipulated in an HPTP. However, as with all ground-disturbing construction impacts, there is always the possibility of disturbing and adversely affecting resources before they can be discovered and appropriately protected. There is also the possibility that design constraints for proposed improvements and borrow sites will preclude the ability of SAFCA and USACE to avoid impacts on significant resources identified during inventory efforts. Therefore, implementation of these mitigation measures may not fully reduce all impacts under the Proposed Action, or the RSLIP Alternative, or under the NLIP to a less-than-significant level. Thus, this impact would remain **significant and unavoidable**. ***(Similar)***

Impact 4.8-d: Potential Discovery of Human Remains during Construction

No-Action Alternative

No Project Construction

Under the No-Action Alterative, no construction activities would occur; therefore, no potential exists for the project to result in the discovery of human remains. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Substantial flooding could occur and result in inundation of unknown human remains, or scour at the location of a levee break. However, before construction of the levee system, these resources would have been subject to the effects of periodic flooding over several centuries. Should a levee break occur at the location of the prehistoric resource site, any interred and previously unidentified burials would be obliterated by the scourhole (potentially 1,000 feet wide and 80 feet deep) that would be created by the levee break. A precise determination of

significance is not possible and cannot be made because it is unknown where such an event would occur and whether any resources would be affected. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Prehistoric human remains have been found at several prehistoric sites in the NLIP and Phase 4a Project areas. Previously unknown buried human remains may be unearthed, damaged, or destroyed during excavation activities associated with project construction and excavation of borrow from the sites identified in Chapter 2.0, "Alternatives." This work includes construction of levee improvements, seepage remediation, changes and improvements to drainage infrastructure along the Sacramento River east levee, and work at the Northern and Bennett Pump Stations along the NCC. This impact was previously analyzed by SAFCA in the Phase 2 EIR, which is hereby incorporated by reference, as Impact 3.8-e (SAFCA 2007:3.8-32). Mitigation Measure 3.8-e was adopted by the SAFCA Board of Directors and incorporated into the NLIP, and the significance conclusion remains unchanged under CEQA. USACE concludes that the possibility exists of inadvertently disturbing interred human remains under both the Proposed Action and the RSLIP Alternative. In particular, the Proposed Action has a high risk of impacting previously undiscovered human remains because of the nature of the construction methods and procedures involved in the levee improvements. Under the Proposed Action, the existing stability berm along the landside of the levee would be removed and an earthen platform would be constructed to serve as the working area for construction of the cutoff wall, where cutoff walls are planned along the Sacramento River east levee. The existing level of flood protection would be reduced temporarily by removal of the stability berm and the levee would need to be reconstructed to at least the same level of flood protection for the following flood season.

Because there is no feasible way to conduct cultural resource investigations in advance of cutoff wall construction, there is no way to completely investigate the exact footprint of the deep cutoff wall for human remains and other cultural features. In areas where seepage berms are proposed, the excavation of the inspection trench that would be constructed prior to placement of the berm could not be accomplished without prior removal of the existing stability berm. This excavation could not be conducted during the flood season because the open trench would aggravate existing underseepage concerns. This impact is considered **potentially significant**. ***(Similar)***

Mitigation Measure 4.8-d: Stop Work Within An Appropriate Radius Around the Find, Notify the Applicable County Coroner and Most Likely Descendant, and Treat Remains in Accordance with State Law and Measures Stipulated in an HPTP Developed in Consultation between USACE, SAFCA, and the SHPO

Proposed Action and RSLIP Alternative

If human remains are uncovered during ground-disturbing activities, under either the Proposed Action or the RSLIP Alternative, SAFCA shall cease all ground-disturbing activities within the vicinity of the find, if known. If the discovery occurs in spoils removed from construction of cutoff walls, the remains shall be treated in accordance with state law. Because cutoff walls are constructed at great depth within a slurry of soil and bentonite and/or cement, SAFCA and USACE anticipate that it will not be possible to pinpoint the location of human remains that may be disinterred during construction of these features and it will not be feasible or useful to stop construction. Discovered remains removed from cutoff wall spoils will be treated as required by state law, as follows. SAFCA's archaeological monitors and/or the contractor shall notify the relevant county coroner and a SAFCA-retained archaeologist skilled in osteological analysis to determine the nature of the remains. If the coroner determines that the remains are those of a Native American, he or she must contact the NAHC by phone within 24 hours of making that determination (Health and Safety Code Section 7050[c]). The NAHC will designate an MLD who may decide how to reinter the remains with appropriate dignity in an appropriate location.

Prehistoric remains are usually found in the context of an archaeological site. The treatment of any associated site shall be in consultation with the MLD, as required under the PA and Mitigation Measure 4.8-c. It is unlikely, but also possible, that ground-disturbing work may disinter human remains associated with an historic burial, not subject to the jurisdiction of the NAHC. Such a resource shall be treated as an archaeological discovery as required by Mitigation Measure 4.8-c.

Monitoring (Mitigation Measure 4.8-c) and discovery protocols reduce the chance of damage to or destruction of previously undiscovered human remains. However, it is possible that despite monitoring of construction and implementation of this mitigation measure, ground-disturbing work would disinter and damage human remains under either the Proposed Action or the RSLIP Alternative. Therefore, implementation of this mitigation measure may not fully reduce the impact to potential interred human remains under the Proposed Action or the RSLIP Alternative to a less-than-significant level. Thus, this impact would remain **significant and unavoidable**. ***(Similar)***

4.8.4 RESIDUAL SIGNIFICANT IMPACTS

Under the No-Action Alternative, the significance determinations for potential impacts to known and undiscovered cultural resources and to undiscovered human remains due to levee failure are uncertain. Because of this uncertainty, these impacts are considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore, impacts that result from the No-Action Alternative would not be mitigated.

As described under Mitigation Measures 4.8-b, 4.8-c, and 4.8-d, potential construction impacts on known prehistoric resources, previously unidentified cultural resources, and interred human remains are potentially significant and unavoidable under the Proposed Action and the RSLIP Alternative, despite the implementation of all feasible mitigation measures, because there is a potential that resources could still be adversely affected. Therefore, significant and unavoidable impacts would likely remain even with implementation of the recommended mitigation measures.

4.9 PALEONTOLOGICAL RESOURCES

4.9.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

Paleontological resources (fossils) are the remains or traces of prehistoric animals and plants that are 10,000 years old or older. This section assesses the potential for earthmoving activities associated with the Proposed Action and alternatives under consideration to affect scientifically important fossil remains. **Plate 3-4** shows the geologic formations in the project area.

4.9.1.1 METHODOLOGY

The potential paleontological importance of the project area can be assessed by identifying the paleontological importance of exposed rock units within the project site. Because the aerial distribution of a rock unit can be easily delineated on a topographic map, this method is conducive to delineating parts of the project area that are of higher and lower sensitivity for paleontological resources and to delineating parts of the project area that may require monitoring during construction.

A paleontologically important rock unit is one that (1) has a high potential paleontological productivity rating and (2) is known to have produced unique, scientifically important fossils. The potential paleontological productivity rating of a rock unit exposed in the project area refers to the abundance/densities of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near the project area. Exposures of a specific rock unit at the project site are most likely to yield fossil remains representing particular species in quantities or densities similar to those previously recorded from the unit in and near the project area.

The following tasks were completed to establish the paleontological importance of each rock unit exposed at or near the project area:

- the potential paleontological productivity of each rock unit was assessed, based on the density of fossil remains previously documented within the rock unit; and
- the potential for a rock unit exposed in the project area to contain a unique paleontological resource was considered.

In its standard guidelines for assessment and mitigation of adverse impacts on paleontological resources, the Society of Vertebrate Paleontology (SVP) (1995) established three categories of sensitivity for paleontological resources: high, low, and undetermined. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas that have not had any previous paleontological resource surveys or fossil finds are considered to be of undetermined sensitivity until surveys and mapping are performed to determine their sensitivity. After reconnaissance surveys, observation of exposed cuts, and possibly subsurface testing, a qualified paleontologist can determine whether the area should be categorized as having high or low sensitivity. In keeping with the significance criteria of the SVP (1995), all vertebrate fossils are generally categorized as being of potentially significant scientific value.

4.9.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to paleontological resources if they would directly or indirectly destroy a unique paleontological resource or site.

For the purposes of this analysis, an individual vertebrate fossil specimen may be considered unique or significant if it is identifiable and well preserved, and it meets one of the following criteria:

- a type specimen (i.e., the individual from which a species or subspecies has been described);
- a member of a rare species;
- a species that is part of a diverse assemblage (i.e., a site where more than one fossil has been discovered) wherein other species are also identifiable, and important information regarding life history of individuals can be drawn;
- a skeletal element different from, or a specimen more complete than, those now available for its species; or
- a complete specimen (i.e., all or substantially all of the entire skeleton is present).

For example, identifiable vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare. The value or importance of different fossil groups varies, depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions such as part of a research project. Marine invertebrates are generally common, well developed, and well documented. They would generally not be considered a unique paleontological resource.

4.9.2 IMPACTS AND MITIGATION MEASURES

Impact 4.9-a: Disturbance of Unknown Unique Paleontological Resources during Earthmoving Activities

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no excavation activities would occur along the Natomas perimeter levee system or at the proposed borrow sites; therefore, no potential exists for the project to directly disturb any paleontological resources that may be present in those areas. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Because any paleontological resources in the Basin would be relatively deep within the ground and would have existed through numerous past flooding episodes, they would be unlikely to sustain damage in the event of flooding in the absence of improvements to the perimeter levee system. This potential impact is considered **less than significant**. ***(Lesser)***

Proposed Action and RSLIP Alternative

Areas along the Sacramento River east levee are associated with Holocene-age alluvium. By definition, sediments associated with Holocene-age alluvium are too young to contain paleontologically sensitive resources. Therefore, earthmoving activities in any of these sediments would result in no impacts on paleontological resources.

However, because of the number of recorded fossil sites in the Riverbank and Modesto Formations within the Central Valley, they are both considered paleontologically sensitive rock formations under SVP criteria. The discovery of Pleistocene vertebrate fossil remains in sediments referable to the Riverbank and Modesto Formations from Sutter and Sacramento Counties, as well as from Davis, Woodland, and numerous other areas

throughout the Central Valley, suggests the potential exists for uncovering additional similar fossil remains during construction-related deep excavation within portions of the project area.

Certain construction-related activities in the Riverbank or Modesto Formations, such as enhancing levee embankments or forming berms on top of the existing ground surface, would not cause significant adverse impacts on paleontological resources because Pleistocene-age fossils would not be encountered until approximately 10 feet below the surface. However, excavations deeper than 10 feet (e.g., for borrow excavation, installation of cutoff walls, and installation of relief wells) in the Riverbank or Modesto Formations could encounter and possibly damage unique paleontological resources.

Of the areas potentially excavated as part of the project, portions of the Fisherman's Lake Borrow Area and Northern Main Pump Station overlie paleontologically sensitive rock units. Because construction-related activities have the potential to encounter and damage or destroy unique paleontological resources, this impact is considered **potentially significant**. ***(Similar)***

Mitigation Measure 4.9-a: Conduct Construction Personnel Training and, if Paleontological Resources Are Found, Stop Work Near the Find and Implement Mitigation in Coordination with a Professional Paleontologist

Proposed Action and RSLIP Alternative

Before the start of construction and/or borrow activities in the Riverbank Formation or the Modesto Formation, construction personnel involved with earthmoving activities shall be informed by SAFCA of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and the proper notification procedures should fossils be encountered. This worker training may be either (1) prepared and presented by an experienced field archaeologist at the same time as construction worker education on cultural resources, or (2) prepared and presented separately by a qualified paleontologist.

If paleontological resources are discovered during earthmoving activities, the construction crew shall immediately stop work in the vicinity of the find. SAFCA shall retain a qualified paleontologist to evaluate the resource and prepare a mitigation plan in accordance with SVP guidelines (1995). The mitigation plan may include a field survey, construction monitoring, sampling and data recovery procedures, museum storage coordination for any specimen recovered, and a report of findings. Recommendations made by the paleontologist, in consultation with SAFCA, shall be implemented before construction activities can resume at the site where the paleontological resources were discovered.

Implementing this mitigation measure would reduce the impact to unique, scientifically-important paleontological resources discovered during construction or other earthmoving activities to a **less-than-significant** level. ***(Similar)***

4.9.3 RESIDUAL SIGNIFICANT IMPACTS

Under the No-Action Alternative no impacts would occur to paleontological resources. In the event of a levee failure, under the No-Action Alternative impacts would be less than significant.

With implementation of the mitigation measures described in this section, project implementation would not result in any residual significant impacts related to paleontological resources under the Proposed Action and the RSLIP Alternative.

4.10 TRANSPORTATION AND CIRCULATION

4.10.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.10.1.1 METHODOLOGY

This section analyzes the potential impacts of the Proposed Action and alternatives under consideration on traffic circulation and transportation systems and potential impacts related to emergency vehicle access and construction traffic hazards. Impacts on flight safety related to operation of the Airport are addressed in Section 4.15, "Hazards and Hazardous Materials."

Because project operation would not generate an increase in vehicle trips, long-term project operation would have no impacts on transportation and circulation. Therefore, this analysis is focused on temporary and short-term construction-related traffic impacts.

Instead of a traffic analysis focused on level of service, which is appropriate for projects that are focused within a specific, discrete area and when the exact project-related traffic routes are known, this analysis uses the traffic analysis methodology from the Institute of Transportation Engineers (ITE) (1989). This methodology is appropriate for this EIS/EIR because the exact traffic routes are not known and construction activities would be dispersed over a wide area. ITE recommends using the following screening criterion for assessing the impacts of development projects that create permanent traffic increases: "In lieu of other locally preferred thresholds, a traffic access/impact study should be conducted whenever a proposed development will generate 100 or more added (new) peak-direction trips to or from the site during the adjacent roadway's peak hours or the development's peak hours." For construction projects that create temporary traffic increases, this criterion is considered conservative by ITE (1989).

4.10.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action and alternatives under consideration were determined to result in a significant impact related to transportation and circulation if they would do any of the following:

- cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system;
- 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;
- substantially increase hazards due to a design feature or incompatible uses;
- result in inadequate emergency access;
- result in inadequate parking capacity; or
- conflict with adopted policies, plans, or programs supporting alternative transportation.

To account for the large percentage of heavy trucks associated with a large construction project, ITE recommends that the threshold level (see Section 4.10.1.1, "Methodology," above) be reduced to 50 or more new peak-direction trips. Consequently, the Proposed Action and alternatives under consideration were determined to result in a significant impact on traffic (i.e., would be considered to cause an increase in traffic that is substantial in

relation to the existing traffic load and capacity of the street system) if the project would result in 50 or more new truck trips during the a.m. or p.m. peak hour.

The project does not involve changes to air traffic patterns or other Airport operations that would affect air traffic patterns, and therefore this issue is not discussed further in this EIS/EIR.

All construction-related vehicles (i.e., equipment and worker vehicles) would be parked at construction staging areas, which would be located away from any public roadways. No public parking facilities would be affected by the parking of project-related construction-related equipment and worker vehicles, and therefore this issue is not discussed further in this EIS/EIR.

The project would not permanently eliminate alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts). In addition, the project would not include changes in policies or programs that support alternative transportation. Therefore, the project would not conflict with adopted policies, plans, or programs supporting alternative transportation. These issues are not discussed further in this EIS/EIR.

4.10.2 IMPACTS AND MITIGATION MEASURES

Impact 4.10-a: Temporary Increase in Traffic on Local Roadways

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to adversely affect traffic on local roadways. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Flooding of Natomas Basin roadways—Sacramento and Sutter County roadways, SR 99/70, I-5, and I-80—could be minor to extensive depending on the location and severity of the levee failure and the duration of flooding. Traffic rerouting could lead to minor to substantial traffic congestion on alternate roadways. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

Project construction would result in a temporary, but substantial, increase in traffic on local roadways. Construction-related traffic would consist of daily commute trips by construction workers and truck trips to haul materials (especially borrow) and supplies from outside the project area, as well as truck trips to haul waste materials off-site for disposal. Section 3.10, "Transportation and Circulation," identifies the roadways in the project area (see **Table 3.10-1**) and includes the traffic count and level of service (LOS) data for these roadways, where available. **Plate 2-7** shows the anticipated haul routes that would be used during construction.

Haul routes proposed for transporting materials from borrow sites to construction areas are shown in **Plate 2-7**. Construction of the Sacramento River east levee improvements and Riverside Canal relocation and extension would require borrow from the Fisherman's Lake Area, which is located in Reaches 12A–15. Other potential sources of soil borrow include the I-5 Borrow Area, the Elkhorn Borrow Area, South Sutter, LLC, the Airport north bufferlands, the Krumenacher borrow site, and the Twin Rivers Unified School District stockpile site (adjacent to the NEMDC west levee). Hauling from the Fisherman's Lake Borrow Area would primarily take

place on off-road haul routes, with some truck traffic occurring on short sections of Del Paso, Powerline, and Radio Roads. The improvements to the Sacramento River east levee would involve haul trucks carrying borrow material to construction areas along unpaved access roads that would be constructed parallel to the Sacramento River east levee to allow equipment to move up and down the levee during construction. Because the I-5 Borrow Area, the Elkhorn Borrow Area, and the South Sutter, LLC borrow site are located close to construction sites along the Sacramento River east levee, borrow material would primarily be trucked on the off-road haul routes shown on **Plate 2-7** or moved overland via scrapers. Truck hauling from the South Sutter, LLC borrow site and the Elkhorn Borrow Area could also take place on West Elkhorn Boulevard west of Schoolhouse Road. Hauling from the Krumenacher borrow site and the Twin Rivers Unified School District stockpile site, which are both located adjacent to the NEMDC west levee, would use Elkhorn Boulevard and Powerline Road. Personnel, equipment, and other imported construction materials would reach the construction areas and Garden Highway via a combination of roadways that may include SR 99/70, Elverta Road, Powerline Road, Natomas Road, East Levee Road, Elkhorn Boulevard, Del Paso Road, San Juan Road, El Centro Road, and West El Camino Avenue. Borrow material would be hauled from the Brookfield borrow site to the NCC south levee along a short section of Sankey Road and on off-road haul routes paralleling the levee.

The total crew size for the Sacramento River east levee would reach up to 300 workers per shift working two shifts. The total crew size for the NCC south levee would reach up to 35 workers, with 10–15 of those workers divided between two 12-hour shifts. Construction crew members would travel to different project sites from different directions and by way of different sets of roadways and intersections. It is also likely that some ridesharing would take place and that trips would occur before and after peak hours. Therefore, traffic from construction crew commutes is unlikely to substantially affect local roadways, even during the peak a.m. and p.m. hours.

Haul trips for borrow material are anticipated to be up to 2,200 trips per day for the Sacramento River east levee (Reaches 10–15) and Riverside Canal improvements (Reaches 11B–18). Many of these trips would take place using the off-road haul route on the landside of the existing levee toe, and scrapers may be used where borrow sites in the Fisherman's Lake and I-5 Borrow Areas are close to the site of the new adjacent levee. Some trips from the Fisherman's Lake Borrow Area would use Del Paso Road (from Powerline Road east 1 mile), Powerline Road (from Del Paso Road south), and Radio Road. Haul trips from the Elkhorn Borrow Area would use the off-road landside haul route, and haul trips from the Airport north bufferlands would use a 4-mile segment of Powerline Road from Elverta Road south to the Sacramento River east levee in Reach 12A (see **Plate 2-7**). Up to 200 trips per day would be required to haul borrow material from the Krumenacher borrow site and the Twin Rivers Unified School District stockpile site to the improvement areas. This hauling would use the section of Elkhorn Boulevard between the NEMDC and Powerline Road. Construction of the Phase 3 Project (Sacramento River east levee Reaches 5A–9B) and the Phase 4a Project may overlap; however, the two project phases would use different haul routes and therefore would not add to each other's traffic loads on public roads.

Haul trips for borrow material for the NCC south levee improvements would be up to 20 trips per day. Most of these trips would take place on off-roads between the Brookfield borrow site and the two construction sites (see **Plate 2-7**); however, a short section of Howsley Road may also be used. Construction of the Phase 3 Project (Pleasant Grove Creek Canal west levee) and the Phase 4a Project may overlap; however, the two project phases would use different haul routes and therefore would not add to each other's traffic loads on public roads.

Implementation of the Proposed Action would result in a substantial increase in traffic on local roadways associated with truck haul trips during construction activities. In addition, temporary, short-term road closures would be required to accommodate construction activities on the levee. The Proposed Action may require portions of Garden Highway south of Powerline Road to experience single-lane closures for 8–12 weeks for construction of cutoff walls. One-way traffic would be maintained during cutoff-wall construction to provide access to properties along the work area. Lane closures on the landside of Garden Highway may also be necessary in this area for installation of underground utilities. These lane closures would be minimal in duration and extent,

and measures would be taken to provide access outside of construction working hours for residents on the landside of Garden Highway.

Temporary pipes would be installed under Garden Highway at the Riverside Pumping Plant and Pumping Plants Nos. 3 and 5 (see **Plate 2-6a**) concurrent with cutoff wall construction. In the following construction year permanent pipes would be installed after the levee has settled. Garden Highway would be closed to through traffic for up to 60 days in three locations for replacement of the temporary pipes; except for these closure points, Garden Highway would remain open and traffic detours would be located between Powerline Road and San Juan Road for the Riverside Pumping Plant, between Bayou Road and Powerline Road for Pumping Plant No. 5, and between Powerline Road and San Juan Road for Pumping Plant No. 3.

Compared to other local roads in the Natomas Basin, Garden Highway is a primary route for residents traveling to and from their homes on the west side of the Basin. These road closures would cause or contribute to temporary substantial increases in traffic levels as traffic is detoured or slowed on Garden Highway and other local roadways. This temporary impact is considered **significant**.

RSLIP Alternative

Under the RSLIP Alternative, construction-related trips would be the same as for all elements described for the Proposed Action, including haul trips associated with work on the NCC south levee, improvements to the Sacramento River east levee (Reaches 10–15), and the relocation and extension of the Riverside Canal (Reaches 11B–18). The number of trips would be approximately 14% lower than the Proposed Action (1,900 haul trips per day under this alterative compared to 2,200 trips per day under the Proposed Action). However, unlike the Proposed Action, raising the existing Sacramento River east levee in place under the RSLIP Alternative would require lane or road closures along portions of Garden Highway for prolonged periods during construction, causing traffic and access delays on local roadways. Closures would affect 1.5- to 2-mile segments of Garden Highway at any one time with the duration of closure for each segment lasting approximately 8–12 weeks to allow for levee degradation, installation of the cutoff wall, reconstruction of the levee, and reconstruction of Garden Highway and connecting roadway intersections. Access to some residences located on the waterside of the levee would be temporarily prevented by construction of the cutoff walls, requiring some residents to relocate temporarily for approximately 8–12 weeks during construction.

As described above for the Proposed Action, Garden Highway would be closed to through traffic for up to 60 days in three locations for replacement of the temporary pipes under Garden Highway at the Riverside Pumping Plant and Pumping Plants Nos. 3 and 5; except for these closure points, Garden Highway would remain open and traffic detours would be located between Powerline Road and San Juan Road for the Riverside Pumping Plant, between Bayou Road and Powerline Road for Pumping Plant No. 5, and between Powerline Road and San Juan Road for Pumping Plant No. 3.

Compared to other local roads in the Natomas Basin, Garden Highway is a primary route for residents traveling to and from their homes on the west side of the Basin. The prolonged closures that would be required to raise the levee in place and construct cutoff walls would result in substantial traffic and access delays that, although temporary, would be greater than for the Proposed Action. This impact is considered **significant**. ***(Greater)***

Mitigation Measure 4.10-a: Prepare and Implement a Traffic Safety and Control Plan for Construction-Related Truck Trips

Proposed Action and RSLIP Alternative

Before the start of construction in each construction season, SAFCA and its primary contractors for engineering and construction shall develop a coordinated construction traffic safety and control plan to minimize the simultaneous use of roadways by different construction contractors for material hauling and equipment delivery to the extent feasible and to avoid and minimize potential traffic hazards on local roadways during construction. Upon selection of borrow sites within the Elkhorn Borrow Area, the traffic safety and control plan shall reflect affected roadways. Items (a) through (e) of this mitigation measure, as listed below, shall be integrated as terms of the construction contracts.

(a) The plan shall outline phasing of activities and the use of multiple routes to and from off-site locations to minimize the daily amount of traffic on individual roadways. SAFCA shall ensure that the construction contractors enforce the plans throughout the construction periods.

(b) The construction contractors shall develop a traffic safety and control plan for the local roadways that would be affected by construction traffic. Before the initiation of construction-related activity involving high volumes of traffic, the plan shall be submitted for review by Caltrans and the agencies of the local jurisdictions (Sutter County, Sacramento County, and/or City of Sacramento) having responsibility for roadway safety at and between project sites. The plan shall call for the following elements:

- posting warnings about the potential presence of slow-moving vehicles;
- using traffic control personnel when appropriate; and
- placing and maintaining barriers and installing traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Works Zones* and in accordance with city/county requirements (Caltrans 1996).

The contractor shall train construction personnel in appropriate safety measures as described in the plan and shall implement the plan. The plan shall include the prescribed locations for staging equipment and parking trucks and vehicles. Provisions shall be made for overnight parking of haul trucks to avoid causing traffic or circulation congestion.

(c) Consistent with Mitigation Measure 4.11-a "Implement Applicable District-Recommended Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction," the track-out of bulk material onto public paved roadways as a result of operations, or erosion, shall be minimized by the use of track-out and erosion control, minimization, and preventive measures. Tracked-out materials shall be removed within 1 hour from adjacent streets anytime such material track-out extends for a cumulative distance of greater than 50 feet onto any paved public road during active operations. All visible roadway dust tracked out upon public paved roadways as a result of active operations shall be removed at the conclusion of each work day when active operations cease, or every 24 hours for continuous operations. Wet sweeping or a HEPA filter equipped vacuum device shall be used for roadway dust removal.

(d) Construction of project features along the Sacramento River east levee shall be accommodated through the creation of temporary haul roads along the landside of the

adjacent levee and berm footprint. Garden Highway shall not be used for earthen materials hauling activities.

(e) A Transportation Management Plan shall be prepared and submitted to Caltrans District 3 to cover any points of access from the state highway system for haul trucks and other construction equipment.

(f) Before the start of the first construction season, SAFCA shall coordinate with Sacramento and Sutter Counties and the City of Sacramento to address maintenance and repair of affected roadways resulting from increased truck traffic.

(g) Before project construction begins, SAFCA shall provide notification of project construction to all appropriate emergency service providers in Sutter County, Sacramento County, and/or the City of Sacramento and shall coordinate with providers throughout the construction period to ensure that emergency access through construction areas is maintained.

(h) Before the start of construction, SAFCA and its primary contractors shall coordinate with Sacramento County regarding any closures of Garden Highway.

Implementation of this mitigation measure would reduce the impact, but not to a less-than-significant level. However, given the high amount of hauling required for the Proposed Action and the RSLIP Alternative, and the limited number of roadways in the project vicinity that would be suitable for hauling between borrow sites and project construction sites, it is possible that the volume of traffic during some periods may still exceed ITE thresholds despite the implementation of this measure. Because no other feasible mitigation measures are available to fully reduce this impact to a less-than-significant level, this impact would remain **significant and unavoidable**.

In addition to the above, the RSLIP Alternative would require the temporary closure of 1.5- to 2-mile segments of Garden Highway (for approximately 8–12 weeks in each segment) in order to accommodate the construction of cutoff walls. Even with implementation of this mitigation measure, there are no feasible mitigation measures available to fully reduce the impacts from the temporary closure of Garden Highway, therefore, this temporary, short-term impact would remain **significant and unavoidable**. ***(Greater)***

Impact 4.10-b: Temporary Increase in Traffic Hazards on Local Roadways

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to temporarily increase traffic hazards. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. If any part of the levee system were to fail, flooding of Natomas Basin roadways—Sacramento and Sutter County roadways, SR 99/70, I-5, and I-80—could be minor to extensive depending on the location and severity of the failure and the duration of flooding and associated traffic hazards could be minor to severe. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is

unknown. Because of this uncertainty, this potential impact is considered to **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

During project construction along the Sacramento River east levee (Reaches 10–15), two public roadways—Powerline Road and San Juan Road—would be reconstructed across the adjacent levee to Garden Highway. As described under Impact 4.10-a, high volumes of slow-moving truck traffic could be associated with the construction activities on some rural roadways.

Pavement sections on the rural Sacramento and Sutter County roadways in the project area were designed to carry low-volume traffic. The high-volume truck traffic during construction would accelerate wear and tear on a section of Howsley Road north of the Brookfield borrow site and on Powerline, Del Paso, and Radio Roads, and on Elkhorn Boulevard. Besides shortening the life of pavement sections, high-volume truck traffic could cause road damage, such as cracks and potholes, which could create road hazards for other motorists.

The combination of the high volume of slow-moving truck traffic, potentially tracking mud and debris onto roadways; workers entering and exiting construction sites; periodic road and lane closures associated with levee improvements; and potential damage to pavement would increase traffic hazards on local roadways during the construction period. This impact is considered **significant**.

RSLIP Alternative

Under the RSLIP Alternative, construction-related traffic hazards would be similar to but greater in magnitude than those described above for the Proposed Action. Construction of the RSLIP Alternative would include raising the existing Sacramento River east levee in place in Reaches 10–11B, which would require closure of both lanes of Garden Highway for prolonged periods during construction, causing traffic and access delays on local roadways. Additionally, Garden Highway intersections at Powerline Road and San Juan Road would be reconstructed to match the reconfigured profile of the raised existing levee.

Construction workers entering and exiting construction areas at the beginning and end of work shift could also increase traffic hazards. In addition, trucks and other vehicles could track mud and gravel onto the local roadways, potentially posing driving hazards.

Under the RSLIP Alternative, the high-volume truck traffic during construction would accelerate wear and tear on Howsley Road north of the Brookfield borrow site, and on Powerline and Radio Roads, and on Elkhorn Boulevard. Besides shortening the life of pavement sections, high-volume truck traffic could cause road damage such as cracks and potholes, which could create road hazards for other motorists. The potential increase in traffic hazards under the RSLIP Alternative is considered a **significant** impact. ***(Similar)***

Mitigation Measure 4.10-b: Implement Mitigation Measure 4.10-a, "Prepare and Implement a Traffic Safety and Control Plan for Construction-Related Truck Trips"

Proposed Action and RSLIP Alternative

SAFCA and its primary contractors for engineering design and construction shall implement Mitigation Measure 4.10-a, above.

Implementing this mitigation measure would reduce the impact to a **less-than-significant** level because a traffic safety plan would be prepared and implemented, and SAFCA would coordinate with the construction contractors and local and regional agencies regarding the distribution of traffic along haul routes and establishing alternative traffic routes. ***(Similar)***

Impact 4.10-c: Temporary Disruption of Emergency Service Response Times and Access

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to directly disturb emergency service response times and access. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure along the NCC or the Sacramento River east levee could result in minor to substantial flooding of the Natomas Basin, including the Airport, I-5 and I-80, and SR 99/70, as well as local roadways, which would result in a minor to substantial disruption of emergency service and response times. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related effect on traffic and circulation and emergency service response cannot be estimated. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered to **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

Implementation of the Proposed Action could delay emergency service response times because of the difficulty of emergency vehicles needing to pass through or near construction areas as discussed under Impacts 4.10-a and 4.10-b, above.

The Proposed Action would increase traffic on local roadways associated with construction trips. In addition, temporary road closures associated with levee improvements could cause or contribute to temporary increases in traffic levels as traffic is detoured or slowed on some local roadways and SR 99/70. Increased traffic congestion could interfere with the use of main roadways for emergency evacuation routes. Garden Highway is the primary access for homes and businesses located on the water side of the levee. Temporary construction closures, including an approximately 8- to 12-week closure of one lane of Garden Highway downstream of Powerline Road, would interfere with emergency access to these residences and businesses (see also Section 4.16, "Socioeconomics and Population and Housing"). Installation of the permanent pipes for the pumping stations would take place one year following completion of levee construction as described in Impact 4.10-a, "Temporary Increase in Traffic on Local Roadways." Closures of Garden Highway would be required at three different locations with detours provided that would maintain access; however delays in emergency service response times may result. Because the Proposed Action could result in delays in emergency service response times, this impact is considered **potentially significant**.

RSLIP Alternative

As with the Proposed Action, the RSLIP Alternative would increase traffic on local roadways due to construction trips and traffic detours, including detours to accommodate permanent installation of pipes for the pumping stations as described under the Proposed Action. Additionally, this alternative would require long-term closure of Garden Highway to accommodate construction of cutoff walls in the existing levee. Closures would affect 1.5- to 2-mile segments of Garden Highway at any one time with the duration of closure for each segment lasting approximately 8–12 weeks to allow for levee degradation, installation of the cutoff wall, reconstruction of the levee, and reconstruction of Garden Highway and connecting roadway intersections. This would eliminate landside access to residences and businesses along Garden Highway in these sections; therefore, emergency access to residences and businesses would be severely limited during construction in this area (see also Section

4.16, "Socioeconomics and Population and Housing"). Because the RSLIP Alternative could restrict emergency service response in the project area, this impact is considered **potentially significant**. ***(Greater)***

Mitigation Measure 4.10-c: Notify Emergency Service Providers about Project Construction and Maintain Emergency Access or Coordinate Detours with Providers

Proposed Action — SAFCA and its primary contractors for engineering design and construction shall implement Mitigation Measure 4.10-a, above.

Implementing this mitigation measure would reduce the temporary impact on emergency service response times and access to a **less-than-significant** level because before project construction begins, SAFCA would provide notification of project construction to all appropriate emergency service providers in Sutter County, Sacramento County, and/or the City of Sacramento and would coordinate with providers throughout the construction period to ensure that emergency access through construction areas is maintained.

RSLIP Alternative — SAFCA and its primary contractors for engineering design and construction shall implement Mitigation Measure 4.10-a, above. Despite implementing this mitigation measure, the temporary impact on emergency service response time and access would be **significant and unavoidable** under the RSLIP Alternative due to the requirements for road closures of 1.5- to 2-mile segments of Garden Highway (for approximately 8–12 weeks in each segment) needed to accommodate construction of cutoff walls and Garden Highway for 60 days in three locations for replacement of the temporary pipes. ***(Greater)***

Impact 4.10-d: Conflict with Adopted Policies, Plans, or Programs Supporting Alternative Transportation

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to conflict with adopted policies, or programs supporting alternative transportation, or to prevent use of project are roadways by alternative modes of transportation. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. If any part of the levee system were to fail, flooding of Natomas Basin roadways could be minor to extensive depending on the location and severity of the failure and the duration of flooding and associated effects on alternative modes of transportation could be minor to severe. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered to **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and Strengthen and RSLIP Alternative

There are no Sacramento Regional Transit bus routes serving the project area, either along Garden Highway or along the roads that are potential haul routes (see **Plate 2-7**). The Sacramento County Department of Transportation is in the process of updating the Sacramento County Bikeway Master Plan (Klinker, pers. comm., 2009). At the present time there are no designated Class I (off-street), Class II (on-street with lane markings) or Class III (designated on-street) bicycle routes within the Phase 4a Project area. However, future bicycle routes are planned in the area; a Class I off-street trail is planned along Garden Highway and on-street Class II routes are planned for Powerline Road, Del Paso Boulevard, and Elkhorn Boulevard (Sacramento County 2009). The project would not preclude future development of alternative transportation corridors or facilities (e.g., bike paths, lanes,

bus turnouts) in the project area. In addition, the Phase 4a Project would not include changes in policies or programs that support alternative transportation. Therefore, the project would not conflict with adopted policies, plans, or programs supporting alternative transportation.

Bicycle use of roadways in the Phase 4a Project area does occur on roadways without bikeway designations. The Sacramento Area Bicycle Advocates have noted that Garden Highway is used extensively by recreational cyclists and increasingly by commuters (SAFCA 2009). Construction of levee improvements would require partial (Proposed Action) or full closure (RSLIP Alternative) of Garden Highway requiring bicyclists to use alternative routes or alternate modes of transportation. Additionally, the Sacramento County General Plan Circulation Element notes that routes used extensively for truck hauling have increased hazards for bicycles (Sacramento County 1993). Proposed on-road haul routes, as shown in **Plate 2-7**, include Elverta Road, Elkhorn Boulevard, Powerline Road, and Del Paso Road. Bicyclists using these routes would be exposed to increased hazards during construction. The potential increase in hazards for bicyclists using the Phase 4a Project area roadways would be a temporary, short-term construction-related **significant impact**. ***(Similar)***

Mitigation Measure 4.10-d: Prepare and Implement a Bicycle Detour Plan for Project Area Roadways, Including Garden Highway

Proposed Action and RSLIP Alternative

SAFCA shall implement the following measures to reduce temporary, short-term construction impacts on bicycle transportation facilities in the project area:

- Before the start of construction, SAFCA or its primary contractor shall prepare a bicycle detour plan for roadways that would be affected by project construction activities, including Garden Highway, in consultation with the County Alternative Modes Coordinator and/or City of Sacramento Bicycle and Pedestrian Coordinator as applicable. The detour plan shall include posted signs clearly indicating closure points, truck haul routes, detour routes, and informational signs to notify motorists and bicyclists to share the roads. Signs shall be posted outside of the immediate project area in order to notify bicyclists of closure points and detours. The detour plan shall be in place before the start of construction and shall be maintained and implemented throughout the construction period.

Implementing this mitigation measure would reduce the temporary, short-term impact from construction-related disruption to bicycle facilities under the Proposed Action and the RSLIP Alternative to a **less-than-significant** level because construction-related damage would be repaired, access restored, and detour routes, roadway markings to designate temporary bike lanes, and informational signs would be provided. ***(Similar)***

4.10.3 RESIDUAL SIGNIFICANT IMPACTS

Under the No-Action Alternative, impacts due to disruption of traffic circulation, traffic hazards, and emergency service response times and access in the event of levee failure are uncertain. Because of this uncertainty, this potential impact is considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore, impacts that result from the No-Action Alternative would not be mitigated.

Implementation of Mitigation Measure 4.10-a under the Proposed Action and RSLIP Alternative would not fully reduce the impacts created from the temporary increase in traffic levels from haul trucks during construction to a less-than-significant level; therefore, a residual significant impact would occur. While impacts related to the temporary disruption of emergency service response times and access would be reduced to a less-than-significant level under the Proposed Action, this impact would remain significant and unavoidable on a temporary, short-

term basis for the RSLIP Alternative as a result of the closures of 1.5- to 2-mile segments of Garden Highway for approximately 8–12 weeks in each segment.

Implementation of Mitigation Measure 4.10-a under the Proposed Action and the RSLIP would reduce impacts created from temporary traffic increase and impacts related to emergency service response times related to the installation of permanent pipes for the pumping stations to a less than significant level; closure of Garden Highway would be limited to the points where the pipes would be placed under the roadway and detours would maintain access for residents.

4.11 AIR QUALITY

4.11.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.11.1.1 METHODOLOGY

Almost all increased pollutant emissions that would be associated with the proposed Phase 4a Project levee improvements would be generated by construction-related activities. Construction emissions are described as "short-term" or temporary in duration. These temporary and short-term emissions, especially emissions of criteria air pollutants (i.e., respirable particulate matter less than 10 microns in diameter [PM_{10}]) and ozone precursors (e.g., reactive organic gases [ROG] and oxides of nitrogen [NO_X]), have the potential to represent a significant air quality impact.

Fugitive dust emissions are associated primarily with site preparation and excavation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and vehicle miles traveled on- and off-site. Emissions of ROG and NO_X are associated primarily with gas and diesel equipment and asphalt paving.

The method of analysis for temporary, short-term construction-long-term operation-related (regional); local mobile-source; and toxic air contaminant (TAC) emissions is consistent with the recommendations of the Sacramento Metropolitan Air Quality Management District (SMAQMD) and the Feather River Air Quality Management District (FRAQMD).

To ensure that worst case air quality impacts were captured for both the Proposed Action and RSLIP Alternative, emissions were estimated assuming that all of the Phase 4a Project is constructed in 2010 (simultaneous with construction of the Phase 3 Project and 30% of the Phase 2 Project, as discussed in Chapter 2.0, "Alternatives"). Construction elements in the Phase 2 and 3 Projects are summarized in Section 2.2.2, "No-Action Alternative—Implementation of Natomas Levee Improvement Program Phase 1, 2, and 3 Projects Only." It should be noted that emissions are estimated within the air districts that regulate them. For purposes of analyzing the impacts of the Phase 4a Project, it is assumed that of the 30% of the Phase 2 Project construction that may occur in 2010, half would occur in Sutter County and half would occur in Sacramento County.

The Brookfield borrow site in Sutter County is the assumed source of soil borrow material for improvements to the NCC south levee. The Fisherman's Lake Borrow Area would be the primary source of soil borrow material used for the Phase 4a Project, with other potential sources of borrow listed in **Table 2-10** and shown on **Plate 2-7**, in Chapter 2.0, "Alternatives." For modeling purposes and to capture worst-case impacts under both the Proposed Action and RSLIP Alternative, it was assumed that borrow material would be transported an average of approximately 4 miles round trip on 50% paved and 50% unpaved haul routes.

The estimates assume that all construction activity would take place in a 6-month construction season.

4.11.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to air quality if they would do any of the following:

- conflict with or obstruct implementation of the applicable air quality plan,
- violate any air quality standard or contribute substantially to an existing or projected air quality violation,

- result in a cumulatively considerable net increase of a criteria air pollutants for which the project region is nonattainment under any applicable Federal or state ambient air quality standards (including releasing emissions that exceed quantitative thresholds for ozone precursors),

- result in exposure of sensitive receptors to substantial concentrations of toxic air emissions or criteria air pollutants, or

- create objectionable odors affecting a substantial number of people.

As stated in Appendix G of the State CEQA Guidelines, the significance criteria established by the applicable air quality management districts or air pollution control district may be relied upon to make the above determinations. Thus, the appropriate district-recommended emission thresholds as published in their respective CEQA guidance documents also applies to individual projects under their jurisdiction. For portions of the project that would occur in Sacramento County, based on SMAQMD's *Guide to Air Quality Assessment in Sacramento County* (SMAQMD 2004), an air quality impact was considered significant if implementation of the Proposed Action or alternatives under consideration would do any of the following:

- generate construction-related emissions of criteria air pollutants or precursors that exceed the SMAQMD-recommended threshold of 85 pounds per day (lb/day) for NO_X, or result in or substantially contribute (at a level equal to or greater than 5%) to emissions concentrations that exceed the national ambient air quality standards (NAAQS) or California ambient air quality standards (CAAQS) (e.g., 50 micrograms per cubic meter [$\mu g/m^3$] and 2.5 $\mu g/m^3$, respectively, for PM_{10}); or

- generate long-term regional criteria air pollutant or precursor emissions that exceed the SMAQMD-recommended threshold of 65 lb/day for ROG and NO_X, or result in or substantially contribute (at a level equal to or greater than 5%) to emissions concentrations that exceed the NAAQS or CAAQS (e.g., 50 $\mu g/m^3$ and 2.5 $\mu g/m^3$, respectively, for PM_{10}).

For levee improvements conducted in Sutter County, the FRAQMD *Indirect Source Review Guidelines* and CEQA planning guidance (FRAQMD 1998, 2007) provide recommended thresholds of significance for project-generated emissions of ozone precursors and PM_{10}. An air quality impact was considered significant if implementation of the Proposed Action or alternatives under consideration would result in project construction emissions that exceed:

- 25 lb/day of ROG,
- 25 lb/day of NO_X, or
- 80 lb/day of PM_{10}.

Project construction would conflict with applicable air quality planning efforts as specified under the Clean Air Act, and a conformity determination would be needed, if the following emissions thresholds were exceeded:

- For construction-related emissions in Sacramento County:
  - 25 tons per year (TPY) of ROG,
  - 25 TPY of NO_X, or
  - 100 TPY of PM_{10}.

- For construction-related emissions in Sutter County:
  - 25 TPY of ROG, or
  - 25 TPY of NO_X.

Project implementation would not result in any major sources of odor, and the Phase 4a Project would not involve operation of any of the common types of facilities that are known to produce odors (e.g., landfill, coffee roaster, wastewater treatment facility). Diesel exhaust, which is sometimes considered an objectionable odor source,

would be associated with the use of on-site construction equipment, but it would be intermittent and temporary and would dissipate rapidly from the source with an increase in distance. Thus, project implementation would not expose sensitive receptors to odorous emissions, and this issue is not discussed further in this EIS/EIR.

4.11.2 IMPACTS AND MITIGATION MEASURES

Impact 4.11-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for project-related construction emissions. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Cleanup actions in the event of levee failure would likely require the use of construction equipment that would emit air quality pollutants. The amount and types of pollutants cannot be predicted and would depend on the magnitude of cleanup operations. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered to **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

The Proposed Action would result in the temporary generation of ROG, NO_X, and PM_{10} emissions from excavation, material handling, vegetation clearing, grading, cut-fill, concrete placement, asphalt paving, motor vehicle exhaust associated with construction equipment, construction employee commute trips, material transport (especially on unpaved surfaces), and other construction activities associated with construction of the Phase 4a Project, including excavation and reclamation in the borrow areas listed in **Table 2-10** and shown on **Plates 2-6a–6c** and on **Plate 2-7**. Routes used for modeling haul truck trip emissions are shown on **Plate 2-7**.

See Section 4.11.1.1, "Methodology," above, for assumptions used in estimating the emissions that would be generated as a result of the Phase 4a Project and assumptions for borrow and hauling.

With the exception of the two sites on the NCC south levee, the Phase 4a Project improvements described in Section 2.3, "Proposed Action," would be constructed in Sacramento County and would be under the jurisdiction of SMAQMD. Construction on the NCC south levee would take place entirely within Sutter County and would be under FRAQMD's jurisdiction.

Worst-case daily and annual construction emissions were calculated, based on the assumptions described in Section 4.11.1.1, "Methodology," above, for completion of the 2010 construction season using AP-42 emission factors recommended by the U.S. Environmental Protection Agency (EPA) for fugitive dust, and OFFROAD and EMFAC 2007 emission factors for mobile-equipment, as contained in the Road Construction Emissions Model version 6, as recommended by FRAQMD and SMAQMD. The results of the calculations are shown in **Table 4.11-1**.

Table 4.11-1
Summary of Maximum Daily Emissions during the 2010 Construction Season (Combined Phase 2, 3 and 4a Projects) for the Proposed Action[1]

	Pollutant		
	ROG	NO_X	PM_{10}
Worst-Case Emissions within Sutter County—FRAQMD Emissions (lb/day)			
Phase 2 Emissions (30% of actions)	16.6	83.2	524.8
Phase 3 Emissions (100% of actions)	78.5	516.6	3,885.4
Phase 4a Emissions (100% of actions)			
NCC Phase 4a work	12.0	58.9	627.6
Total unmitigated emissions (lb/day)	107.1	658.7	5,037.8
FRAQMD Threshold (lb/day)	**25**	**25**	**80**
Significant?	**Yes**	**Yes**	**Yes**
Total mitigated emissions (lb/day)[2]	101.7	527.0	1,259.5
Significant with Mitigation Incorporated?	**Yes**	**Yes[4]**	**Yes**
Worst-Case Emissions within Sacramento County—SMAQMD Emissions (lb/day)			
Phase 2 Emissions (30% of actions)	5.9	27.0	85.3
Phase 3 Emissions (100% of actions)	98.2	623.4	5,133.1
Phase 4a Emissions (100% of actions)			
Sacramento East Levee Reaches 10–15	153.3	909.6	8,442.2
Riverside Canal	21.7	101.0	1,645.8
RD 1000 Pumping Plants Nos. 3 and 5	20.3	160.7	8.7
Fisherman's Lake Excavation and Restoration	3.3	24.3	72.6
Total unmitigated emissions (lb/day)	302.7	1,846.0	15,387.7
SMAQMD Threshold	**–**	**85**	**-[3]**
Significant?	**–**	**Yes**	**Yes[3]**
Total mitigated emissions (lb/day)[2]	287.6	1,476.8	3,846.9
Significant with Mitigation Incorporated?	–	No[4]	**Yes[3]**

Notes: FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; $\mu g/m^3$ = micrograms per cubic meter; NCC = Natomas Cross Canal; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases; SMAQMD = Sacramento Metropolitan Air Quality Management District

[1] 2010 construction season refers to improvements to the NCC south levee, Sacramento River east levee Reaches 1-15, GGS/Drainage Canal, NEMDC, PGCC, and Riverside Canal.

[2] Implementation of all recommended standard mitigation measures listed under Mitigation Measure 4.11-a would result in reductions of ROG, NO_X, and PM_{10} emissions by approximately 5%, 20%, 75%–85% for fugitive PM_{10} emissions, and 45% for mobile-source PM_{10} emissions, respectively.

[3] SMAQMD does not have an adopted mass emission-based threshold for PM_{10}.

[4] Payment into SMAQMD's Off-site Construction Mitigation Fee Program to offset NO_X emissions in excess of SMAQMD's significance threshold would reduce impacts for this pollutant in SMAQMD's jurisdiction to a less-than-significant level. Coordination of an emissions reduction agreement with the FRAQMD for calculation and fee payment by SAFCA to FRAQMD prior to project approval would be used to offset an equivalent mass of NO_X emissions in excess of EPA's applicable threshold for general conformity purposes. Successful implementation of Mitigation Measure 4.11-a would reduce NO_X emissions in FRAQMD's jurisdiction, but not to a less-than-significant level for this impact.

See **Appendix F** for assumptions and modeling results for each activity and subphase.

Source: Calculations performed by EDAW based on data provided by HDR, Wood Rodgers, and Mead & Hunt in 2009

Conservative assumptions were made for construction activities associated with all improvements that would occur under the Phase 4a Project. Therefore, emissions calculations summarized in **Table 4.11-1** represent worst-case daily emissions that could occur associated with construction of the Phase 2 (30%), 3, and 4a Projects potentially overlapping during 2010. See **Appendix F** for detailed emission sources and assumptions. Based on the project information presented in Chapter 2.0, "Alternatives," construction of the Proposed Action in 2010 would result in maximum unmitigated daily emissions in excess of applicable FRAQMD thresholds for ROG, NO_X, and PM_{10} and SMAQMD thresholds for NO_X and PM_{10}. Because of the large size of the project, large extent, and high intensity of construction activities to be conducted concurrently, as well as the existing nonattainment status of the project area, and based on the modeling conducted, it is foreseeable that unmitigated construction-generated emissions could result in or substantially contribute to a violation of air quality standards.

SMAQMD does not have an adopted mass emission-based threshold for PM_{10}. Instead, SMAQMD relies on a concentration-based threshold equivalent to the ambient air quality standard for PM_{10}. If construction activities would result in or substantially contribute to a violation of the standard at or beyond the project boundary, then construction-generated emissions of PM_{10} would be significant. Because of the intensity of earthmoving activities that would be involved during the construction of the Sacramento River east levee and Riverside Canal improvements, it is likely that a substantial contribution to a violation of the applicable air quality standard would occur. If the proposed construction schedule for the Phase 4a Project were to experience a delay (i.e., construction of part of or the entire Phase 4a Project in 2011 instead of in 2010) as a result of permitting issues or other environmental constraints, worst-case daily emissions would be similar to those presented below in **Table 4.11-1**. This is because the nature and intensity of construction activities and the construction equipment fleet would be similar, but would occur during the subsequent calendar year. If construction of the Phase 4a Project were to begin in 2010 and extend into 2011, worst-case daily emissions would be similar to, or slightly less than, those presented in **Table 4.11-1**, because the same extent of construction activities would be spread out over a longer duration, potentially resulting in less intense construction and earth movement on any single active day.

The Proposed Action would result in temporary and short-term construction-related emissions that could expose nearby existing sensitive receptors to substantial pollutant concentrations and/or substantially contribute to a violation of an air quality standard. As a result, the Proposed Action would have a direct, temporary, short-term adverse effect on air quality. This impact is considered **significant**.

RSLIP Alternative

Worst-case daily and annual construction emissions associated with this alternative would occur during the levee construction phase during which most earthmoving activities would occur. Emissions associated with the RSLIP Alternative were calculated based on the difference in earth movement volumes relative to the Proposed Action. As for the Proposed Action, modeling for this alternative was based on the scenario described above under "Methodology." The difference in ROG, NO_X, and PM_{10} emissions are modeled as a function of change in the number of haul trips and in the total amount of borrow material relative to the Proposed Action.

Total unmitigated worst-case emissions under the RSLIP Alternative would be approximately the same as those under the Proposed Action for the 2010 construction season (see **Table 4.11-2**). Emissions associated with the RSLIP Alternative would be anticipated to expose nearby existing sensitive receptors to substantial pollutant concentrations and/or substantially contribute to an air quality violation. The RSLIP Alternative would have a direct, adverse impact on air quality. This impact is considered **significant**. ***(Similar)***

Table 4.11-2
Summary of Maximum Daily Emissions during the 2010 Construction Season (Combined Phase 2, 3, and 4a Projects) for the RSLIP Alternative[1]

	Pollutant		
	ROG	NO_X	PM_{10}
Worst-Case Emissions within Sutter County—FRAQMD Emissions (lb/day)			
Total unmitigated emissions (lb/day)	71.8	426.2	3,289.4
FRAQMD Threshold (lb/day)	**25**	**25**	**80**
Significant?	**Yes**	**Yes**	**Yes**
Total mitigated emissions (lb/day)[2]	68.2	341.0	822.4
Significant with mitigation incorporated?	**Yes**	**Yes[4]**	**Yes**
Worst-Case Emissions within Sacramento County—SMAQMD Emissions (lb/day)			
Total unmitigated emissions (lb/day)	280.5	1,743.5	13,580.4
SMAQMD Threshold	**–**	**85**	**–[3]**
Significant?	**–**	**Yes**	**Yes[3]**
Total mitigated emissions (lb/day)[2]	266.5	1,394.8	3,395.1
Significant with Mitigation Incorporated?	**–**	No[4]	**Yes[3]**

Notes: FRAQMD = Feather River Air Quality Management District; lb/day = pounds per day; $\mu g/m^3$ = micrograms per cubic meter; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases; RSLIP Alternative = Raise and Strengthen-Levee-in-Place Alternative; SMAQMD = Sacramento Metropolitan Air Quality Management District

[1] 2010 construction season refers to improvements to the NCC south levee, Sacramento River east levee Reaches 1-15, GGS/Drainage Canal, NEMDC, PGCC, and Riverside Canal.

[2] Implementation of all recommended standard mitigation measures listed under Mitigation Measure 4.11-a would result in reductions of ROG, NO_X, and PM_{10} emissions by approximately 5%, 20%, and 75%–85% for fugitive PM_{10} emissions, and 45% for mobile-source PM_{10} emissions, respectively.

[3] SMAQMD does not have an adopted mass emission-based threshold for PM_{10}.

[4] Payment into SMAQMD's Off-site Construction Mitigation Fee Program to offset NO_X emissions in excess of SMAQMD's significance threshold would reduce impacts for this pollutant in SMAQMD's jurisdiction to a less-than-significant level. Coordination of an emissions reduction agreement with the FRAQMD for calculation and fee payment by SAFCA to FRAQMD prior to project approval would be used to offset an equivalent mass of NO_X emissions in excess of EPA's applicable threshold for general conformity purposes. Successful implementation of Mitigation Measure 4.11-a would reduce NO_X emissions in FRAQMD's jurisdiction, but not to a less-than-significant level for this impact.

See **Appendix F** for assumptions and modeling results for each activity and subphase.

Source: Calculations performed by EDAW based on data provided by HDR, Wood Rodgers, and Mead & Hunt in 2009

Mitigation Measure 4.11-a: Implement Applicable District-Recommended Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction

Proposed Action and RSLIP Alternative

SAFCA shall implement mitigation measures as recommended by FRAQMD or SMAQMD, as applicable, and shall comply with all applicable rules and regulations of FRAQMD or SMAQMD, as described below.

Construction in Sutter County (FRAQMD)

For portions of the project occurring in Sutter County, FRAQMD's *Indirect Source Review Guidelines* and online CEQA guidance provide mitigation measures for reducing short-term air quality impacts. As recommended by FRAQMD, SAFCA shall ensure that the following mitigation measures are implemented during all project construction activities to the extent practicable. In addition, construction of the proposed levee improvements are required to comply with all applicable FRAQMD rules and regulations, in particular Rule 3.0 (Visible Emissions), Rule 3.16 (Fugitive Dust Emissions), and Rule 3.15 (Architectural Coatings).

1. SAFCA shall implement a Fugitive Dust Control Plan that includes the following measures:

   - All earthmoving operations should be suspended when winds exceed 20 miles per hour or when winds carry dust beyond the property line despite implementation of all feasible dust control measures.
   - Construction sites shall be watered as directed by the Sutter County Department of Public Works or FRAQMD and as necessary to prevent fugitive dust violations.
   - An operational water truck shall be on-site at all times. Apply water to control dust as needed to prevent visible emissions violations and off-site dust impacts.
   - On-site dirt piles or other stockpiled particulate matter shall be covered, wind breaks installed, and water and/or soil stabilizers employed to reduce wind blown dust emissions. Incorporate the use of approved nontoxic soil stabilizers to all inactive construction areas according to manufacturers' specifications.
   - All transfer processes involving a free fall of soil or other particulate matter shall be operated in such a manner as to minimize the free-fall distance and fugitive dust emissions.
   - Apply approved chemical soil stabilizers to all inactive construction areas (previously graded areas that remain inactive for 96 hours), including unpaved roads and employee/equipment parking areas, according to the manufacturers' specifications.
   - To prevent track-out, wheel washers shall be installed where project vehicles and/or equipment exit onto paved streets from unpaved roads. Vehicles and/or equipment shall be washed before each trip. Alternatively, a gravel bed or rumble strip may be installed as appropriate at vehicle/equipment site exit points to effectively remove soil buildup on tires and tracks to prevent/diminish track-out.
   - Paved streets shall be swept frequently (at least once per day by water sweeper with reclaimed water recommended; wet broom) if soil material has been carried onto adjacent paved, public thoroughfares from the project site.

- Provide temporary traffic control as needed during all phases of construction to improve traffic flow, as deemed appropriate by the Sutter County Department of Public Works and/or Caltrans and to reduce vehicle dust emissions. An effective measure is to enforce vehicle traffic speeds at or below 15 miles per hour on unpaved roads.

- Reduce traffic speeds on all unpaved surfaces to 15 miles per hour, where feasible, and reduce unnecessary vehicle traffic by restricting access. Provide appropriate training, on-site enforcement, and signage. Where restricting vehicle speeds on unpaved surfaces to 15 miles per hour would make timely completion of the project infeasible, SAFCA shall cooperate with FRAQMD to implement alternative dust control measures that would be at least as effective in reducing fugitive dust emissions. Such measures may include increased frequency in applying water to the unpaved roads in the vicinity of sensitive receptors and reducing speeds in the vicinity of sensitive receptors.

- Reestablish ground cover on the construction site as soon as possible, through seeding and watering.

- Open burning is yet another source of fugitive gas and particulate emissions, and it shall be prohibited at the project site. No open burning of vegetative waste (natural plant growth wastes) or other legal or illegal burn materials (trash, demolition debris, etc.) may be conducted at the project site. Vegetative wastes should be chipped or delivered to waste to energy facilities (permitted biomass facilities), mulched, composted, or used for firewood. It is unlawful to haul waste materials off-site for disposal by open burning.

2. Construction equipment exhaust emissions shall not exceed FRAQMD Regulation III, Rule 3.0, Visible Emissions Limitations (40% opacity or Ringelmann 2.0). Operators of vehicles and equipment found to exceed opacity limits shall take action to repair the equipment within 72 hours or remove the equipment from service. Failure to comply may result in a notice of violation.

3. SAFCA shall be responsible for ensuring that all construction equipment is properly tuned and maintained before and during on-site operation.

4. Minimize idling time to 10 minutes, to conserve fuel and minimize emissions.

5. Use existing power sources (e.g., power poles) or clean fuel generators rather than temporary diesel-powered generators.

6. Portable engines and portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, may require California Air Resources Board (ARB) Portable Equipment Registration with the state or a local district permit. The owner/operator shall be responsible for arranging appropriate consultations with ARB or FRAQMD to determine registration and permitting requirements before equipment is operated at the site.

7. SAFCA shall assemble a comprehensive inventory list (i.e., make, model, engine year, horsepower, and emission rates) of all heavy-duty off-road (portable and mobile) equipment (50 horsepower [hp] and greater) that will be used an aggregate of 40 or more hours for the construction project and apply the following mitigation measure:

- Reduce NO_X emissions from off-road diesel-powered equipment: SAFCA shall provide a plan for approval by FRAQMD demonstrating that the heavy-duty (equal to or greater than 50 hp) off-road equipment to be used in the construction project, including owned, leased and subcontractor vehicles, shall achieve a project wide fleet-average 20% NO_X reduction and 45% particulate reduction[1] compared to the most recent ARB fleet average at time of construction.

  Implementing the FRAQMD-recommended measures is expected to achieve at least a 75% reduction in fugitive dust emissions, 5% reduction in ROG emissions from construction equipment, 20% reduction in NO_X emissions from construction equipment, and 45% reduction in PM_{10} emissions from construction equipment (SMAQMD 2004). The resulting maximum average daily construction-generated emissions in Sutter County, with mitigation incorporated, are conservatively calculated to be as high as 102 lb/day of ROG, 527 lb/day of NO_X, and 1,260 lb/day of PM_{10} for the Proposed Action, and 68 lb/day of ROG, 341 lb/day of NO_X, and 822 lb/day of PM_{10} for the RSLIP Alternative.

SAFCA shall implement the following measure to further mitigate NO_X emissions through off-site reductions:

8. SAFCA shall enter into a voluntary emissions reduction agreement with the FRAQMD to mitigate the portion of construction-generated emissions of NO_X that exceeds EPA's applicable threshold for general conformity purposes. The calculation of the fee shall be determined in coordination with the FRAQMD and paid prior to the occurrence of any construction-related activities within areas under the jurisdiction of the FRAQMD.

Implementation of the mitigation measures described above would reduce project-generated construction-related emissions, but emissions would remain in excess of the FRAQMD-recommended thresholds of 25 lb/day for ROG and NO_X and 80 lb/day for PM_{10}. Therefore, although the impact would be reduced, implementing the mitigation measures described above would not reduce project-generated construction-related emissions of ROG and PM_{10} in Sutter County to levels less than FRAQMD's significance thresholds. It should be noted that not meeting FRAQMD-suggested impact criteria, postmitigation, is not a violation of any FRAQMD rules or guidelines, and authorization to construct would be provided by FRAQMD if the listed mitigation measures are implemented. Nevertheless, because this mitigation would not reduce temporary construction-related impacts in Sutter County below the FRAQMD-recommended thresholds, this impact is considered **significant and unavoidable**. ***(Similar)***

Construction in Sacramento County (SMAQMD)

For portions of the project occurring in Sacramento County, SMAQMD's *Guide to Air Quality Assessment in Sacramento County* (SMAQMD 2004) provides mitigation measures for reducing short-term air quality impacts. As recommended by SMAQMD, SAFCA shall ensure that the following mitigation measures are implemented during all project construction activities to the extent practicable and feasible.

- SAFCA shall prepare a construction emissions dust control plan(s) in accordance with SMAQMD recommendations that reduces fugitive dust emissions by at least 85% (or

[1] Acceptable options for reducing emissions may include use of late-model engines, low-emission diesel products, alternative fuels, engine retrofit technology (Carl Moyer Guidelines), and after-treatment products; voluntary off-site mitigation projects; providing funds for air district off-site mitigation projects; and/or other options as they become available. FRAQMD should be contacted to discuss alternative measures.

shall provide calculations based on SMAQMD-approved methodologies showing that emissions would be reduced to less than 100 tons per year assuming a conservative reduction of 75% with typical mitigation). All grading operations shall be suspended when fugitive dust levels exceed levels specified by SMAQMD rules. SAFCA and its primary construction contractors shall ensure that dust is not causing a nuisance beyond the property line of the construction site.

- If overlapping construction phases in Sacramento County create unmitigated PM_{10} emissions in excess of 400 TPY SAFCA shall use advanced dust suppressant materials (such as EnviroTac II) on all unpaved roadways and stockpiled materials to ensure 95% or greater control of fugitive dust and a reduction of PM_{10} emissions below 100 TPY. Overlapping Phases where this would apply includes all work on the Sacramento River east level for the Phase 3 and 4a Projects.

- SAFCA shall develop a plan, in consultation with SMAQMD, demonstrating that the heavy-duty (>50 hp), off-road vehicles to be used in the construction project (including owned, leased, and subcontractor vehicles) shall achieve a project-wide fleet-average 20% NO_X reduction and 45% particulate reduction compared to the most recent ARB fleet average at the time of construction.[2]

- A comprehensive inventory of all off-road construction equipment equal to or greater than 50 hp that will be used for an aggregate of 40 or more hours during any portion of project construction shall be submitted to SMAQMD. The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction operations occur. At least 48 hours before heavy-duty off-road equipment is used, SAFCA shall provide SMAQMD with the anticipated construction timeline, including the start date, and the name and phone number of the contractor's project manager and on-site foreman.

- Emissions from off-road, diesel-powered equipment used on the project site shall not exceed 40% opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40% opacity (or Ringelmann 2.0) shall be repaired immediately, and SMAQMD shall be notified of noncompliant equipment within 48 hours of identification. A visual survey of all in-operation equipment shall be made at least weekly. A monthly summary of visual survey results shall be submitted to SMAQMD throughout the construction period, except that the monthly summary shall not be required for any 30-day period in which no construction operations occur. The monthly summary shall include the quantity and type of vehicles surveyed, as well as the dates of each survey. SMAQMD and/or other officials may conduct periodic site inspections to determine compliance.

- SAFCA shall pay SMAQMD an off-site mitigation fee for implementation of any proposed alternatives for the purpose of reducing impacts to a less-than-significant level. Based on the construction information presented in Chapter 2.0, "Alternatives" and the emissions calculations shown in **Appendix F**, if the Proposed Action is implemented, the specific fee amount to offset NO_X emissions for elements of the 2010 construction phase that would occur in Sacramento County would be $737,248 (see **Appendix F** for fee calculations) plus a 5% administrative fee of $36,862. Thus, the total mitigation fee for project-related work conducted in Sacramento County during the 2010 construction season is currently estimated to be $774,110 for the Proposed Action. Calculation of fees associated with subsequent improvement plans/project phases shall be conducted at the

[2] Acceptable options for reducing emissions include the use of late-model engines, low-emission diesel products, alternative fuels, particulate-matter traps, engine retrofit technology, after-treatment products, and/or such other options as become available.

time of project approval. The applicable fee rate shall be determined and the total fee shall be calculated based on the fee rate in effect at the time that subsequent environmental documents are prepared. The fee for subsequent construction projects shall be remitted to SMAQMD before groundbreaking.

SAFCA shall pay into SMAQMD's off-site construction mitigation fund to further mitigate construction-generated emissions of NO_X that exceed SMAQMD's daily emission threshold of 85 lb/day. The calculation of daily NO_X emissions is based on the cost to reduce 1 ton of NO_X at the time when the document is prepared (currently $16,000 per ton). The determination of the final mitigation fee shall be conducted in coordination with SMAQMD before any demolition or ground disturbance occurs for any project phase.

Calculation of and payment of the fee for all subsequent project phases shall also be included in the CEQA MMRP for the project.

Implementing the SMAQMD-recommended measures is expected to achieve at least a 75–85% reduction in fugitive dust emissions, 5% reduction in ROG emissions from construction equipment, 20% reduction in NO_X emissions from construction equipment, and 45% reduction in PM_{10} emissions from construction equipment (SMAQMD 2004). The resulting maximum average daily construction-generated emissions with mitigation incorporated are shown in **Table 4.11-1**.

Implementation of the mitigation measures described above would reduce project-generated construction-related emissions in Sacramento County to a **less-than-significant** level for NO_X. However, it is anticipated that the project could still result in emissions that substantially contribute to a violation of the ambient air quality standard for PM_{10}. Therefore, although the impact would be reduced, implementing the mitigation measures described above would not fully reduce project-generated construction-related emissions of PM_{10} in Sacramento County to a less-than-significant level. Therefore, construction-related emissions for PM_{10} would remain **significant and unavoidable**. ***(Similar)***

All Project Construction

SAFCA shall implement the following additional measures to reduce construction emissions of PM_{10} comprising fugitive dust and mobile-exhaust and ozone precursors throughout the project area:

- Open burning of removed vegetation shall be prohibited. Vegetation material shall be chipped on-site or delivered to waste-to-energy facilities to the extent feasible.
- An operational water truck shall be on-site at all times. Water shall be applied to control dust as needed to prevent dust impacts off-site. Unpaved areas subject to vehicle traffic, including employee parking areas and equipment staging areas, shall be stabilized by being kept wet, treated with a chemical dust suppressant or soil binders, or covered.
- The track-out of bulk material onto public paved roadways as a result of operations, or erosion, shall be minimized by the use of track-out and erosion control, minimization, and preventive measures, and removed within 1 hour from adjacent streets such material anytime track-out extends for a cumulative distance of greater than 50 feet onto any paved public road during active operations. All visible roadway dust tracked out upon public paved roadways as a result of active operations shall be removed at the conclusion

of each work day when active operations cease, or every 24 hours for continuous operations. Wet sweeping or a HEPA filter equipped vacuum device shall be used for roadway dust removal.

- Low-sulfur fuel shall be used for stationary construction equipment.
- Existing power sources or clean fuel generators shall be used rather than temporary power generators to the extent feasible.
- Low-emission on-site stationary equipment shall be used.
- Vehicle speeds on unpaved roadways shall be limited to 15 miles per hour.
- Idling time for all heavy-duty equipment shall be limited to 5 minutes.
- Install ARB-certified Level 3 diesel particulate filters (DPF) on a minimum of 15% of the total number of off-road (non-street legal) diesel-powered construction equipment pieces with an engine size equal to or greater than 50 hp throughout the duration of the project. For fleets with 6 or fewer total applicable equipment pieces, a DPF shall be installed on a minimum of one engine. All DPFs shall be kept in working order and maintained in operable condition according to manufacturer's specifications. At the time of writing, a list of ARB-certified Level 3 DPF can be found at http://www.arb.ca.gov/diesel/verdev/level3/level3.htm.
- Install Level 3 ARB-certified DPF that are functional and kept in working order to meet manufacturer's specifications throughout the duration of the project on at least 15% of the total pieces of off-road (non-street legal) construction equipment on the project site over 50 hp (a minimum of one diesel particulate filter for fleets with 6 or less total pieces).

Implementing this mitigation measure would reduce the impact under the Proposed Action and the RSLIP Alternative, but not to a less-than-significant level. This impact would remain **significant and unavoidable**. ***(Similar)***

Impact 4.11-b: General Conformity with the Applicable Air Quality Plan

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no construction emissions associated with such construction would result. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding, necessitating emergency procedures. Extensive construction required to repair infrastructure damages would result in ozone precursor emissions and PM_{10}. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered to **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

The General Conformity Rule, which addresses whether a project conforms to the State Implementation Plan (SIP) approved and promulgated under Section 110 of the Federal Clean Air Act (CAA), applies to Federal actions that would generate emissions of criteria air pollutant or precursor emissions in nonattainment or maintenance areas. The Sacramento and Sutter County portions of the Sacramento Valley Air Basin (SVAB) are currently designated as serious nonattainment areas with respect to the national 8-hour ozone standard. In addition, the Sacramento County portion of the SVAB is designated as moderate nonattainment for the national PM_{10} standard, while Sutter County is unclassified for PM_{10}. General conformity requirements would apply to actions where the total project-generated direct or indirect emissions would be equal to or exceed the applicable emissions levels, known as the *de minimis* thresholds, or would be greater than 10% of the area's annual emissions budget, known as regionally significant thresholds. If either of the thresholds is exceeded, a conformity determination would be needed prior to project approval. The *de minimis* thresholds applicable to Sacramento and Sutter Counties are provided in Section 4.11.1.2, "Thresholds of Significance," above.

As discussed above, ozone precursor emissions of ROG and NO_X would occur associated primarily with construction equipment exhaust and asphalt paving. Fugitive PM_{10} emissions are associated primarily with site preparation and earthmoving activities. Because general conformity is determined by calendar year, total emissions were calculated for the 2010 calendar year using a worst-case assumption (i.e., that all of the levee improvements for 30% of the Phase 2 Project, 100% of the Phase 3 Project, and 100% of the Phase 4a Project would occur simultaneously with all activities in the 2010 calendar year at a minimum).

Construction-generated emissions that would occur during calendar year 2010 under worst-case assumptions for air quality analysis are shown in **Table 4.11-3**, and are categorized by the respective jurisdiction in which they would occur. Total worst-case emissions for Sutter and Sacramento Counties combined, with mitigation proposed under Mitigation Measure 4.11-a implemented, were calculated to be 20 TPY of ROG, 138 TPY of NO_X, and 84 TPY of PM_{10}. See **Table 4.11-3** for detailed emissions that would occur in each jurisdiction. See **Appendix F** for detailed emission sources and assumptions.

Based on the project information presented in Chapter 2.0, "Alternatives," construction of the Phase 4a Project would result in maximum unmitigated and mitigated annual emissions in excess of the *de minimis* threshold for NO_X in the Sutter County portion of the SVAB, as summarized in **Table 4.11-3**. Based on the modeling conducted, it is foreseeable that unmitigated construction-generated emissions would result in or substantially conflict with applicable air quality planning efforts. However, with implementation of mitigation identified under Impact 4.11-a, emissions would be reduced below the Federal *de minimis* thresholds.

If the Phases 2, 3, and 4a Projects were not constructed during the same calendar year, then emissions would be less than those presented in **Table 4.11-3**, and would also be below the Federal *de minimis* thresholds.

Finally, project operation (discussed under Impact 4.11-c, below) would result in minimal emissions of pollutants for which the region is in nonattainment. Construction under the Proposed Action is not anticipated to conflict with implementation of the SIP, and a conformity determination would not be required prior to project approval. For this reason, this impact is considered **less than significant**.

RSLIP Alternative

According to current Federal standards, a conformity determination is required only for the Proposed Action. However, for purposes of this analysis, the emissions of criteria air pollutant or precursor emissions under the RSLIP Alternative were calculated and are shown in **Table 4.11-3**. Because the emissions under this alternative would fall below the Federal *de minimis* threshold, implementation of the RSLIP Alternative would not conflict with implementation of the SIP, and therefore if selected in place of the Proposed Action, a conformity determination would not be required. Therefore, this impact is considered **less than significant**. ***(Similar)***

Table 4.11-3
Summary of Maximum Annual Construction Emissions during the 2010 Calendar Year Associated with the Combined Phase 2, 3, and 4a Projects

	Pollutant		
	ROG	NO_X	PM_{10}
Worst-Case Emissions within Sutter County—FRAQMD Emissions (TPY)			
Phase 2 Emissions (15% of actions)	0.8	4.2	28.4
Phase 3 Emissions (100% of actions)	7.8	54.7	377.1
Phase 4a Emissions (100% of actions)			
NCC Phase 4a work	0.3	1.4	4.2
Total unmitigated emissions (tons/year)	8.9	60.3	409.7
General Conformity Thresholds: De minimis/ Regional Significance (TPY)	25/377	25/740	-
Significant?	No	**Yes**	-
Total mitigated emissions (TPY)[1]	8.5	48.2	20.5
Significant with mitigation incorporated?	No	No [2]	-
Worst-Case Emissions within Sacramento County—SMAQMD Emissions (TPY)			
Phase 2 Emissions (15% of actions)	0.3	1.4	3.8
Phase 3 Emissions (100% of actions)	6.3	41.2	356.0
Phase 4a Emissions (100% of actions)			
Sacramento River East Levee Reaches 10–15	9.8	56.9	811.6
Riverside Canal	1.0	5.4	60.5
RD 1000 Pumping Plants Nos. 3 and 5	0.6	4.8	0.3
Fisherman's Lake Excavation and Restoration	0.3	1.9	5.1
Total unmitigated emissions (tons/year)	18.3	111.6	1,237.3
General Conformity Thresholds: De minimis/Regional Significance (TPY)	**25/2,351**	**25/2,985**	**100/1,622**
Significant?	No	No	**Yes**
Total mitigated emissions (TPY)[1]	17.4	89.3	61.9
Significant with Mitigation Incorporated?	No	No[2]	No[1]

Notes: FRAQMD = Feather River Air Quality Management District; TPY = tons per year; $\mu g/m^3$ = micrograms per cubic meter; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less; ROG = reactive organic gases; SMAQMD = Sacramento Metropolitan Air Quality Management District

[1] Implementation of all recommended standard mitigation measures and advanced dust suppressant applications listed under Mitigation Measure 4.11-a would result in reductions of ROG, NO_X, and PM_{10} emissions by approximately 5%, 20%, 75–95% for fugitive PM_{10} emissions, and 45% for mobile-source PM_{10} emissions, respectively.

[2] Payment into SMAQMD's Off-site Construction Mitigation Fee Program to offset NO_X emissions in excess of SMAQMD's significance threshold would reduce impacts for this pollutant in SMAQMD's jurisdiction to a less-than-significant level. Coordination of an emissions reduction agreement with the FRAQMD for calculation and fee payment by SAFCA to FRAQMD prior to project approval would be used to offset an equivalent mass of NO_X emissions in excess of EPA's applicable threshold for general conformity purposes. Successful implementation of Mitigation Measure 4.11-a would reduce NO_X emissions in FRAQMD's jurisdiction, but not to a less-than-significant level for this impact.

See **Appendix F** for assumptions and modeling results for each activity and subphase.

Source: Calculations performed by EDAW based on data provided by HDR, Wood Rodgers, and Mead & Hunt in 2009

Mitigation Measure: No mitigation is required.

Impact 4.11-c: Long-Term Changes in Emissions of ROG, NO_X, and PM_{10} Associated with Project Implementation

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no long-term changes in emissions related to the project would occur. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Efforts to reconstruct the levee would depend on the extent and location of damage. Equipment such as pumping plants would likely be used, generating short-term emissions of air quality pollutants. Upon completion of levee repairs, generation of these emissions would not be substantially greater than in a no-action, no-flood scenario. However, a precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Long-term project operation would not result in increased regional emissions of ROG, NO_X, and PM_{10} from mobile-, stationary-, or area-source emissions. Project implementation would require a negligible increase in operational maintenance activities at the proposed facilities, and associated vehicle trips. In addition, the levee system would not require extensive landscape maintenance or other activities that would result in a substantial net increase in emissions in comparison with existing conditions.

Furthermore, project implementation would not result in the operation of any new major stationary emission sources. Modifications to pump stations at the NCC south levee and along the Sacramento River east levee would require replacement of some motors; however, these motors operate on electricity. Modifications may also include the addition of diesel-powered backup generators, but these additions would be minor stationary sources of emissions. The diesel-powered backup generators would be used in emergency situations and would be tested monthly. Stationary equipment such as diesel-powered generators would be subject to the applicable air district's permitting process and Best Available Control Technology (BACT) and offset requirements. The applicable air district's permitting process would ensure that emissions from equipment are within acceptable limits. Emissions of ozone precursors and PM_{10} associated with pump station operation would be negligible. No other stationary sources of emissions would be associated with the action alternatives. Thus, long-term operational emissions of criteria air pollutants or precursors would not result in or substantially contribute to a violation of the applicable air quality standards. Because project operation would not result in a direct, adverse impact on air quality, this impact is considered **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

Impact 4.11-d: Exposure of Sensitive Receptors to Toxic Air Emissions

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for direct exposure of sensitive receptors to project-related toxic air emissions. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the perimeter levee system, the risk of levee failure would remain high. In the event of a flood, toxic air emissions could be associated with the use of equipment during cleanup operations. However, effects on sensitive receptors would depend on many factors (e.g., magnitude and duration of emissions, proximity to sensitive receptors), and therefore the magnitude of the impact cannot be predicted. For these reasons, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Project construction and operation would generate emissions of diesel PM, which is identified by ARB as a TAC. TAC emission sources are discussed separately below. Neither FRAQMD nor SMAQMD has any current guidance on TAC emissions from mobile equipment, and neither has a threshold of significance for exposure to emissions from this equipment.

Project construction would result in the temporary and short-term generation of diesel exhaust emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities, in addition to diesel-fueled on-road haul trucks used for hauling borrow material. The dose to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). According to the Office of Environmental Health Hazard Assessment, health risk assessments (HRAs) that determine the exposure of sensitive receptors to TAC emissions should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (Salinas, pers. comm., 2004).

The duration of mobilized equipment used near sensitive receptors located along the levee system and borrow sites would be short (less than 2 full years for the Phase 4a Project). Each construction season would last approximately 6 months. In addition, as improvements are completed, mobile equipment would progress along the levees and canal alignments and would not operate near (within approximately 500 feet of) any one sensitive receptor for more than a maximum of a few weeks at a time. Sensitive receptors located near (within 500 feet of) the borrow areas would likely experience longer exposure periods than receptors located along the levee alignments but would be located a greater distance from most of the borrow activities (see **Plates 6a–6d** for a depiction of the project area). The project would represent less than 0.1% of the 70-year exposure period for any nearby sensitive receptor in the area. Because the exposure period for receptors in the vicinity of the project would be minimal, and because the local air districts do not have guidance for preparation of HRAs for construction equipment, an HRA is not recommended for the action alternatives' construction activities.

As discussed under Impact 4.11-c, above, the pump stations at the NCC south and along the Sacramento River east levee to be modified as part of the Proposed Action or the RSLIP Alternative would be minor stationary sources of TAC emissions in Sutter and Sacramento Counties. Diesel-powered backup generators would be used in emergency situations and would be tested monthly. Consequently, diesel PM emissions associated with the modified pump stations would be infrequent. Furthermore, this category of stationary source (i.e., portable equipment), in addition to any other stationary sources that may emit TACs (i.e., dry cleaners), would be subject to FRAQMD and SMAQMD permitting and toxic best available control technology (T-BACT) requirements. If the implementation of T-BACT would not reduce emissions to an acceptable level, then FRAQMD and SMAQMD would deny the required permit for the stationary source (in this case, the diesel-powered backup generators). Therefore, operation of these stationary sources would not result in the exposure of sensitive receptors to substantial concentrations of TACs. No other stationary sources of emissions would be associated with any of the action alternatives. Thus, this impact is considered to be **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

4.11.3 RESIDUAL SIGNIFICANT IMPACTS

In the event of a levee failure under the No-Action Alternative, impacts due to temporary construction emissions, lack of general conformity with the Air Quality Plan, long-term emissions, and exposure of sensitive receptors to toxic air emissions are uncertain. Because of this uncertainty, these potential impacts are considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore, impacts that result from the No-Action Alternative would not be mitigated.

Because of the intensity of construction operations, time constraints to which it is assumed all action alternatives must adhere to avoid other environmental impacts and adverse weather conditions, and the nonattainment status of the project area, Mitigation Measure 4.11-a is not expected to be sufficient to reduce the Phase 4a Project emissions of ROG or PM_{10} associated with the Proposed Action or the RSLIP Alternative below the applicable threshold. As described under Impact 4.11-a and summarized in **Tables 4.11-1** and **4.11-2**, emissions of ROG and PM_{10} that would occur in Sutter County would still exceed the applicable FRAQMD significance criteria of 25 and 80 lb/day, respectively. Similarly, mitigated emissions of PM from earth-moving activities in Sacramento County would still be expected to result in or substantially contribute to a violation of applicable air quality standards. Because the impacts cannot be fully mitigated, this impact would be significant and unavoidable for the Proposed Action and the RSLIP Alternative.

4.12 NOISE

4.12.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.12.1.1 METHODOLOGY

Construction-related and stationary-source noise impacts were calculated based on the Federal Transit Noise and Vibration Impact Assessment methodology (Federal Transit Administration [FTA] 2006). Reference emission noise levels and usage factors were based on the Federal Highway Administration (FHWA) Roadway Construction Noise Model. The FHWA Roadway Noise Prediction Model (FHWA-RD-77-108) was used to calculate traffic noise levels along haul routes, based on estimates described in Chapter 2.0, "Alternatives."

4.12.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to noise if they would do any of the following:

- result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- expose people residing or working in the project area to excessive noise levels;
- expose persons to or generate excessive groundborne vibration or groundborne noise levels;
- for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or
- for a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

The following considerations apply to the first three significance thresholds:

- **Temporary, short-term construction noise impacts:** Temporary, short-term construction noise impacts are considered significant if construction-generated noise levels exceed the applicable standards at nearby noise-sensitive land uses.
- **Noise impacts from haul truck traffic:** For all affected residential land uses, noise that would be generated by haul truck traffic is considered significant if it would cause the overall exterior noise level to exceed the "normally acceptable" exterior land use compatibility noise standard of 60 A-weighted decibels (dBA) L_{dn}/CNEL (day-night average noise level/community noise equivalent level) for residential land uses or would exceed the interior noise standard of 45 dBA L_{dn}/CNEL in any inhabitable residence.
- **Exposure of sensitive receptors to, or generation of, excessive vibration levels:** Short- and long-term vibration impacts would be significant if project construction or operation would result in the exposure of sensitive receptors to, or would generate, vibration levels that exceed Caltrans' recommended standard of 0.2 inches per second (in/sec) peak particle velocity (PPV) with respect to the prevention of structural damage for normal buildings (Caltrans 2002), or FTA's maximum acceptable vibration standard of 80 vibration

decibels (VdB) with respect to human response for residential uses (i.e., annoyance) (FTA 2006) at any nearby existing sensitive land uses.

Portions of the Phase 4a Project activities would be located inside the Airport Land Use Compatibility Plan (ALUCP) area. In some areas, construction would occur as close as 3,000 feet from the Airport.

There are no private airstrips in the vicinity of the Phase 4a Project area. Therefore, this issue is not discussed further in this EIS/EIR.

Local Noise Standards

City of Sacramento

The *City of Sacramento General Plan* Noise Element establishes an exterior noise level of 60 dBA L_{dn} and an interior noise level of 45 dBA L_{dn} as acceptable.

The City's exterior noise standard, as stated in the City's noise ordinance, is 55 dBA during the hours of 7:00 a.m. to 10:00 p.m. for residential and agricultural uses. The standard then adjusts to 50 dBA between 10:00 p.m. and 7:00 a.m. for residential and agricultural uses. The noise ordinance also exempts construction noise during the hours of 7:00 a.m. and 6:00 p.m. Monday through Saturday and from 9:00 a.m. to 6:00 p.m. on Sundays. The ordinance further states that the operation of an internal combustion engine is not exempt if the engine is not equipped with suitable exhaust and intake silencers in good working order (8.68.080 Exemptions, Noise Control Standards, City of Sacramento Municipal Code).

Sacramento County

The *Sacramento County General Plan* Noise Element states that noise created by new non-transportation noise sources may not exceed the standards outlined in **Table 4.12-1** when measured at the property line of the noise-sensitive land use.

Table 4.12-1
Local Government Non-transportation Noise Standards (dBA)

Noise Element Jurisdiction/ Land Use Category	Maximum Allowable Exterior Noise Levels					
	Daytime 7:00 a.m.–7:00 p.m.		Evening 7:00 p.m.–10:00 p.m.		Nighttime 10:00 p.m.–7:00 a.m.	
Sutter County	**Daytime Hourly**		**Evening Hourly**		**Nighttime Hourly**	
	L_{eq}	**L_{max}**	**L_{eq}**	**L_{max}**	**L_{eq}**	**L_{max}**
	50	70	50	70	45	65
	Construction noise is not exempt from Sutter County noise standards during any hours of the day.					
Sacramento County Residential Areas	**Hourly**		**Hourly**		**Hourly**	
	L_{50}	**L_{max}**	**L_{50}**	**L_{max}**	**L_{50}**	**L_{max}**
	50	70	50	70	45	65
	Construction noise is exempt from the Sacramento County noise regulations provided that construction does not take place before 6:00 a.m. or after 8:00 p.m. Monday through Friday, and before 7:00 a.m. or after 8:00 p.m. on Saturday and Sunday.					
City of Sacramento Residential Areas	**Exterior Ldn/CNEL**			**Interior Ldn/CNEL**		
	60			45		
	Construction noise is exempt from the City of Sacramento noise regulations provided that construction does not take place before 7:00 a.m. or after 6:00 p.m. Monday through Saturday, and before 9:00 a.m. or after 6:00 p.m. on Sunday.					

Notes: dBA = A-weighted decibel; L_{50} = noise level exceeded 50% of the time; L_{max} = maximum noise level; L_{dn} = day-night average noise level; CNEL = community noise equivalent level; L_{eq} = energy-equivalent noise level
Source: City of Sacramento 2009, Sacramento County 1993, Sutter County 1996

The Sacramento County noise ordinance states that a standard of 55 dBA is applied during the hours of 7:00 a.m. and 10:00 p.m. and a standard of 50 dBA is applied during the hours of 10:00 p.m. and 7:00 a.m. for residential and agricultural uses. The noise ordinance also states that construction activities are exempt during the hours of 6:00 a.m. and 8:00 p.m. Monday through Friday and from 7:00 a.m. and 8:00 p.m. on Saturdays and Sundays (Chapter 6.68 Noise Control, County of Sacramento Code).

Sutter County

The *Sutter County General Plan* Noise Element has established noise standards for noise-sensitive land uses. The County has established an exterior noise level of 60 dBA L_{dn} and an interior noise level of 45 dBA L_{dn}. For non-transportation noise sources, the standards outlined in **Table 4.12-1** would apply. Sutter County does not contain any provisions that would exempt construction noise within the County; therefore, the standards shown in **Table 4.12-1** would also apply to construction noise.

General

Construction noise may affect sensitive receptors in unincorporated areas of Sutter and Sacramento Counties and in the City of Sacramento. These jurisdictions either have non-transportation noise standards based on time of day and land use sensitivity or provide exemptions for construction as long as those activities occur during the daytime. Residential areas are considered the most noise-sensitive land use, and the most restrictive noise standards apply.

Noise generated by a transportation source is also regulated according to land use. All the jurisdictions with standards for transportation noise impacts have adopted a normally acceptable L_{dn}/CNEL noise standard of 60 dBA for residential land uses and a conditionally acceptable L_{dn}/CNEL noise standard of 65 dBA, provided that the best available noise reduction measures have been applied. Many of the jurisdictions have adopted a maximum L_{dn}/CNEL noise limit of 70 dBA for playgrounds, parks, and riding stables.

For the purposes of this analysis, the local noise level standards presented above and in **Table 4.12-1** are applied to evaluate the impacts of noise generated by construction equipment, and the local noise level standards presented above are applied to evaluate the impacts of noise generated by construction-related truck trips.

4.12.2 IMPACTS AND MITIGATION MEASURES

Impact 4.12-a: Generation of Temporary, Short-Term Construction Noise

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to generate temporary, short-term construction noise. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Noise-sensitive land uses (in this case, primarily residential uses) are scattered throughout the area in which repair-related construction would occur. However, levee failure would likely result in evacuation of people (i.e., sensitive receptors) from damaged levee locations. Without sensitive receptors, potential impacts related to temporary, short-term construction noise would be **less than significant**. ***(Lesser)***

Construction of improvements to levees, drainage and irrigation infrastructure, and pumping plants; excavation of borrow sites; and development of habitat restoration areas under the Proposed Action would generate short-term, temporary and intermittent noise at or near the individual noise-sensitive locations. Much of the construction activity would proceed in a linear manner along the levee and canal alignments and would have the maximum noise impact on individual residences for approximately 2–3 weeks in most locations. Construction of the adjacent levee and associated cutoff walls and seepage berms would take place in Reaches 10–15 of the Sacramento River east levee. A cutoff wall would be installed in the adjacent levee in Reach 4B. The Riverside Canal would be relocated and extended in Reaches 11B–17, with a parallel underground pipe extension that would be located in Reaches 15–18B between landside residences and the new levee toe. A piped section is also being considered in Reaches 12B–13 to avoid residences. Noise levels would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment, and the physical location of construction activities. On-site equipment required for construction activities is anticipated to include excavators, backhoes, bulldozers, scrapers, rollers, graders, loaders, compactors, and various trucks. Drilling augers and associated support equipment would also be needed for well replacement activities and new well drilling needed to supply water for habitat mitigation. Individual equipment maximum noise levels produced by these operations could range from 79 to 90 dBA without the implementation of feasible noise control at a distance of 50 feet from the nearest noise source, as indicated in **Table 4.12-2**.

Table 4.12-2
Construction Equipment Noise Emission Levels[1]

Equipment Type	Typical Noise Level (dB) at 50 feet	Equipment Type	Typical Noise Level (dB) at 50 feet
Air Compressor	78	Generator	81
Asphalt Paver	77	Grader	85
Backhoe	78	Hoe Ram Extension	90
Compactor	83	Jack Hammer	89
Concrete Breaker	82	Pneumatic Tools	85
Concrete Pump	81	Pile Driver	101
Concrete Saw	90	Rock Drill	81
Crane, Mobile	81	Scraper	84
Dozer	82	Trucks	74–81
Front-end Loader	79	Water Pump	81
Groundwater Well Drilling Operations[2]	77		

Notes: dB = A-weighted decibels (dBA)

[1] All equipment fitted with properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are the actual measured noise levels for each piece of heavy construction equipment.

[2] Groundwater well drilling noise was measured by EDAW for the Phase 2 EIR Addendum on May 27, 2009.

Sources: Bolt, Beranek, and Newman 1981; FTA 2006; EDAW 2009

Noise-sensitive land uses (in this case, primarily residential uses) are scattered throughout the areas in which construction would occur. Waterside residences and a few landside residences are located along the Sacramento River east levee Reaches 10–15 (see **Plate 2-6a**); some of the landside residences would be removed before construction of levee improvements would take place in this area. Other scattered residences are present near the NCC pumping plants (**Plate 2-6d**), Fisherman's Lake Borrow Area, and Riverside Canal, but are typically more

than one-half mile from work areas; however, several residences are as close as 50–100 feet from the canal, levee, and borrow areas where construction activity would occur. Several residences in Reaches 8, 12B, and 13 of the Sacramento River east levee would be subject to noise disturbance from a variety of construction activities, including borrow excavation and hauling, canal construction, habitat well drilling, cutoff wall installation and/or seepage berm, or levee construction. Three properties with residences located in Reaches 12B and 13 are situated between the levee (and off-road haul route) and the Riverside Canal alignment, and are located approximately 500 feet from the Fisherman's Lake Borrow Area. Two landside residences in Reach 8 are located within 500 feet of the South Sutter, LLC borrow site and adjacent to the levee and off-road haul route. The proximity of these residences to more than one construction activity would likely prolong their exposure to daytime construction noise in comparison with other sensitive receptors. The duration of this exposure would range from several weeks to several months, depending on the extent to which schedules for the various construction activities listed above are staggered over the construction season.

Construction noise attributable to the Phase 4a Project was estimated using the FTA noise methodology for the prediction of stationary noise sources (FTA 2006). **Table 4.12-3** shows the results for the various stages of construction activities associated with the proposed levee and canal improvements, based on the equipment requirements for construction shown in Chapter 2.0, "Alternatives," and the distances to the 45-dBA and 50-dBA noise contours assuming no intervening barriers. **Appendix G** shows the complete listing of inputs and the methodology for predicting noise levels from construction.

Table 4.12-3
Predicted Noise Levels Attributable to Major Construction Activities

Action	Project Improvement Type	Resulting Noise Level in dBA L_{eq} at 100 Feet	Distance to Noise Contour (Feet)	
			50 dBA[1]	45 dBA[1]
Clearing and Grubbing/Stripping	Levee, Canal	77.6	2,386.3	4,243.5
Landside Structures Removal	Levee	76.6	2,073.9	3,687.9
Stability Berm Excavation	Levee	77.9	2,472.5	4,396.9
Adjacent Levee Construction	Levee	77.9	2,472.5	4,396.9
Cutoff wall Construction	Levee	77.3	2,313.5	4,114.1
Groundwater Well Drilling Operations[2]	Levee	70.8	1,035.0	1,815.0
Garden Highway Reconstruction	Levee	76.1	2,019.1	3,590.6
Levee Degrading	Canal	76.7	2,172.6	3,863.4
Pipeline Removal	Canal	75.6	1,912.2	3,400.4
Cutoff Wall Construction	Canal	76.0	1,989.7	3,538.2
Levee Crown Reconstruction	Canal	75.1	1,805.7	3,211.0
Borrow Site Excavation	Canal	75.9	1,964.8	3493.9
Site Restoration, Demobilization	Levee, Canal	75.9	1,970.2	3,503.6

Notes: dBA = A-weighted decibel; L_{eq} = energy-equivalent noise level

[1] Distances to noise contours do not take into account intervening topography or existing structure facades.

[2] Groundwater well drilling noise was measured by EDAW for the Phase 2 EIR Addendum on May 27, 2009.The equation: L_{eq}(equipment) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Source: FTA 2006; Data modeled for SAFCA by EDAW in 2009

As shown in **Table 4.12-3**, the predicted highest noise level associated with construction activities would be 77.9 dBA L_{eq} at 100 feet from construction activities without noise control device outfitting for heavy construction equipment, for the levee improvement, canal improvement, and pumping station construction activities. In some work locations, construction noise would be temporary and short term, and impacts would generally not result in sleep disruption or annoyance. In other instances, the levee itself may serve as a sound barrier that provides some protection to sensitive land uses. For instance, this may occur when construction activity takes place at the landside toe of the Sacramento River east levee in reaches where there are waterside residences.

Assuming a standard exterior-to-interior attenuation rate of 25 dBA for typical residential buildings with doors and windows closed, noise generated by construction equipment could result in interior noise levels that exceed the interior noise standard of 45 dBA L_{dn}/CNEL for residential land uses established by the City of Sacramento, Sacramento County, and Sutter County. Although construction activity is expected to take place during daytime hours in Sacramento County, Sutter County, and the City of Sacramento, because of the need to complete levee improvements outside of the flood season and because of other environmental and engineering constraints on project schedule, as described in Chapter 2.0, "Alternatives," it is possible that construction may need to be conducted 24 hours per day, 7 days per week (24/7). For example, 24/7 construction would be needed for installation of cutoff walls in Reach 4B and in portions of Reaches 10–15 of the Sacramento River east levee. In addition, up to three days of 24-hour construction would be required for drilling of groundwater wells to replace existing wells located within the proposed levee footprint and for new wells to supply water for habitat mitigation. Therefore, noise may be generated by construction equipment operating near homes during the more noise-sensitive early morning and nighttime hours (i.e., during hours that are not exempted by the applicable local ordinances in the City and County of Sacramento) and could result in sleep disturbance at nearby residences.

The standard for exterior night time noise levels established by Sacramento County and the City of Sacramento is 60 dBA L_{dn}. Noise models indicate that noise levels from cutoff wall construction equipment (deep soil mixing equipment or long-stick excavators) would be at or below 60 dBA L_{dn} at a distance of 500 feet from the construction equipment. Based on this distance of 500 feet from construction equipment, in the worst case, residents in the vicinity of cutoff wall construction could be affected by round-the-clock construction for approximately one week as the cutoff wall is installed along the levee.

The 500-foot distance is modeled based on the assumption that sensitive receptors are located in the line-of-sight from the noise source. Additional reductions in noise levels would come from natural sound barriers, such as existing levees or other structures, including dwellings. For example, cutoff walls along the Sacramento River east levee would be constructed on the landside of the levee (near the toe of the existing levee) at an elevation below the crown of the levee. Therefore, the existing levee would provide some shielding to residents on the water side of Garden Highway, reducing exterior noise levels at 500 feet by an additional 10–12 dB below the predicted level of 60 dBA L_{dn}. This estimate is based on the assumption that cutoff wall construction equipment would generate noise at the level of 10 feet above ground surface, and the height of the existing levee is 25 feet above ground surface. Waterside residences would be out of the line-of-sight of this equipment.

Because of their proximity to residences, construction activities associated with the proposed levee and canal improvements as well as borrow site excavation could result in temporary, short-term noise levels that exceed the applicable daytime and nighttime standards for non-transportation sources (Table 4.12-3), resulting in increased annoyance and/or sleep disruption to occupants of residential dwellings and other sensitive receptors. Residences in Reaches 8 and 12B–13, which would be in proximity to multiple construction activities, including borrow site excavation and off-road materials hauling, could experience prolonged exposure (several weeks to several months) to noise levels exceeding applicable daytime standards because of the potential for those activities to be staggered over the construction season. This temporary, short-term impact is considered significant.

RSLIP Alternative

Under the RSLIP Alternative, residences along the Sacramento River east levee would be exposed to the highest noise levels shown in **Table 4.12-3** without the benefit of the shielding that would be provided by the levee itself. As a result, this alternative would likely cause greater noise disturbance to residents along the Sacramento River east levee than under the Proposed Action. This temporary, short-term impact is considered **significant**. ***(Greater)***

Mitigation Measure 4.12-a: Implement Noise-Reducing Construction Practices, Prepare and Implement a Noise Control Plan, and Monitor and Record Construction Noise Near Sensitive Receptors

Proposed Action and RSLIP Alternative

SAFCA and its primary contractors for engineering design and construction shall ensure that the following measures are implemented at each work site in any year of project construction to avoid and minimize construction noise effects on sensitive receptors. These measures are consistent with SAFCA's standard contract specifications for noise control.

The primary construction contractors shall employ noise-reducing construction practices. Measures that shall be used to limit noise shall include the measures listed below:

- Equipment shall be used as far away as practical from noise-sensitive uses.
- All construction equipment shall be equipped with noise-reduction devices such as mufflers to minimize construction noise and all internal combustion engines shall be equipped with exhaust and intake silencers in accordance with manufacturers' specifications.
- Equipment that is quieter than standard equipment shall be used, including electrically powered equipment instead of internal combustion equipment where use of such equipment is a readily available substitute that accomplishes project tasks in the same manner as internal combustion equipment.
- Construction site and haul road speed limits shall be established and enforced.
- The use of bells, whistles, alarms, and horns shall be restricted to safety warning purposes only.
- Noise-reducing enclosures shall be used around stationary noise-generating equipment (e.g., compressors and generators).
- Fixed construction equipment (e.g., compressors and generators), construction staging and stockpiling areas, and construction vehicle routes shall be located at the most distant point feasible from noise-sensitive receptors.
- When noise sensitive uses are within close proximity and subject to prolonged construction noise, noise-attenuating buffers such as structures, truck trailers, or soil piles shall be located between noise generation sources and sensitive receptors.
- Before construction activity begins within 500 feet of one or more residences or businesses, written notification shall be provided to the potentially affected residents or business owners, identifying the type, duration, and frequency of construction activities. Notification materials shall also identify a mechanism for residents or business owners to register complaints with the appropriate jurisdiction if construction noise levels are overly intrusive. The distance of 500 feet is based on the 60-dBA contour of the loudest anticipated construction activity.

- When construction of cutoff walls takes place during nighttime hours (between 10:00 p.m. and 6:00 a.m.), SAFCA shall honor requests from affected residents to provide reasonable reimbursement of local hotel or short-term rental stays for the period of time that cutoff wall construction takes place within 500 feet of the residents requesting reimbursement.

- If noise-generating activities are conducted within 100 feet of noise-sensitive receptors (the 70-dBA noise contour of construction noise), the primary contractor shall continuously measure and record noise levels generated as a result of the proposed work activities. Sound monitoring equipment shall be calibrated before taking measurements and shall have a resolution within 2 dBA. Monitoring shall take place at each activity operation adjacent to sensitive receptors. The recorded noise monitoring results shall be furnished weekly to SAFCA.

- The primary contractor shall prepare and implement a detailed noise control plan based on the proposed construction methods. This plan shall identify specific measures to ensure compliance with the noise control measures specified above. The noise control plan shall be submitted to and approved by SAFCA before any noise-generating construction activity begins.

Implementing this mitigation measure would reduce the impact, but may not reduce noise levels at all times to a **less-than-significant** level because of the close proximity of noise-sensitive receptors to construction activities and the limited feasibility of mitigating construction noise to acceptable levels. Therefore, this temporary, short-term impact would remain **significant and unavoidable.** ***(Similar)***

Impact 4.12-b: Temporary, Short-term Exposure of Sensitive Receptors to or Temporary, Short-term Generation of Excessive Groundborne Vibration

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to directly expose sensitive receptors to or generation of excessive groundborne vibration. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Noise-sensitive land uses (in this case, primarily residential uses) are scattered throughout the areas in which repair-related construction would occur. However, levee failure would likely result in evacuation of people (i.e., sensitive receptors) from damaged levee locations. Without sensitive receptors, potential impacts related to the generation of excessive groundborne vibration would be **less than significant**. ***(Lesser)***

Proposed Action and RSLIP Alternative

Construction activities for the Proposed Action and the RSLIP Alternative have the potential to result in varying degrees of temporary ground vibration, depending upon the specific construction equipment used and operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. **Table 4.12-4** displays vibration levels for typical construction equipment.

Table 4.12-4 Typical Construction Equipment Vibration Levels		
Equipment	PPV at 25 feet (in/sec)[1]	Approximate Lv at 25 feet[2]
Large bulldozer	0.089	87
Trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Notes:
[1] Where PPV is the peak particle velocity.
[2] Where Lv is the velocity level in decibels and based on the root mean square velocity amplitude.
Source: FTA 2006

On-site construction equipment would include excavators, backhoes, bulldozers, scrapers, rollers, graders, loaders, compactors, and various trucks. With the exception of pile driving, the most intense generation of ground vibration would be associated with large bulldozers that generate levels of 0.089 in/sec PPV and 87 vibration decibels (VdB). These levels would attenuate to 0.031 in/sec PPV or 78 VdB at a distance of 50 feet. Because there are no residential buildings closer than 50 feet to the construction areas, vibration generated by other off-road construction equipment would not exceed the Caltrans (0.2 in/sec PPV) or FTA (80 VdB) standards. Ground vibration would also be generated by haul trucks operating on area haul routes. As shown in **Table 4.12-4**, vibration levels generated by trucks could reach as high as 0.076 in/sec PPV or 86 VdB at a distance of 25 feet. At a distance of 50 feet, these levels would attenuate to 0.027 in/sec PPV and 77 VdB. Because levels would be less than Caltrans' and FTA's standards, this temporary, short-term impact related to vibration from other construction equipment is considered **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

Impact 4.12-c: Temporary, Short-term Exposure of Residents to Increased Traffic Noise Levels from Truck Hauling Associated With Borrow Activity

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for borrow hauling activity caused by the project to directly increase traffic noise levels. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Repairs would result in a substantial increase in vehicle trips. It is unknown how a flood would affect roadways within the Natomas Basin, or if borrow material sites would be the same or in close proximity to those examined for the Phase 4a Project. Traffic noise levels, as a result of flooding in Natomas during a catastrophic flood, are unpredictable; therefore, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Construction during all construction years under the Proposed Action and the RSLIP Alternative would generate high volumes of haul truck trips for borrow activities on area roads, as shown on **Plate 2-7** and described in Section 4.10, "Transportation and Circulation." Associated traffic noise levels were estimated using the FHWA Federal Highway Traffic Noise Prediction Model (FHWA 1978) and are displayed in **Table 4.12-5**. These estimates are based on the amount of borrow material to be hauled, number of days of construction, and the hours per day in which hauling would occur.

Table 4.12-5
Summary of Modeled Haul Truck Noise Levels[1]

Phase 4a Project Area	Number of One-Way Trips Required per Hour	Resulting Noise Level (dBA L_{eq} 50 Feet from Haul Route Centerline)
Fisherman's Lake Borrow Area	573	71.5
Krumenacher Borrow Site and Twin Rivers Unified School District Stockpile Site	36	59.4

Notes: dBA = A-weighted decibels; L_{eq} = energy-equivalent noise level

[1] Traffic noise levels were modeled using the Federal Highway Traffic Noise Prediction Model (FHWA 1978). Calculated noise levels do not consider any shielding or reflection of noise by existing structures or terrain features or noise contribution from other sources. Estimates are based on the amount of borrow material to be hauled, number of days of construction, and the number of hauling hours per day as provided in Chapter 2.0, "Alternatives," and assuming a speed of 25 mph. See modeling results in **Appendix G** for further detail.

Source: Data compiled by EDAW in 2009

As shown in **Table 4.12-5**, noise levels attributable to Phase 4a Project haul truck traffic would be approximately 71.5 dBA L_{eq} at a distance of 50 feet from the roadway centerline for material brought from the Fisherman's Lake Borrow Area and 59.4 dBA L_{eq} at a distance of 50 feet from the roadway centerline for material brought from the Krumenacher borrow site and the Twin Rivers Unified School District stockpile site. Borrow material transported from the I-5 Borrow Area would be moved within the footprint of levee construction, and noise levels from this activity are shown in **Table 4.12-3**.

Because most of the project area roadways currently serve a limited volume of residential and agricultural traffic, it is assumed that the modeled noise levels represent substantial increases compared to existing traffic noise levels. Not only would the Proposed Action result in substantially more vehicle trips on some roads along the toe of the Sacramento River east levee near residences, but the vehicles would be predominantly haul trucks, which generate considerably more noise than passenger vehicles. Predicted traffic noise levels along haul routes related to construction in Reaches 10–15 would exceed local exterior noise standards at residential land uses located along designated haul routes (**Plate 2-7**). Specifically, residences located along Del Paso Road, San Juan Road, El Centro Road, and Powerline Road would experience an increase in traffic noise levels due to hauling activities. The nearest residential land uses situated along San Juan Road are located 50 feet from the centerline and could experience haul truck traffic noise levels of 71.5 dB from borrow activities associated with the Fisherman's Lake Borrow Area.

Hauling from the Krumenacher borrow site and the Twin Rivers Unified School District stockpile site would be approximately 36 one-way trips per hour and would travel west along Elkhorn Boulevard to Powerline Road and then south down Powerline Road. The nearest residential land uses situated along Elkhorn Boulevard are located 100 feet from the centerline of the road and could experience haul truck traffic noise levels of 53.4 dB. Hauling from the Krumenacher borrow site and Twin Rivers Unified School District stockpile site for construction in Reaches 10–15 of the Sacramento River east levee would not result in a substantial increase in roadway noise levels or a violation of applicable noise standards.

Assuming a standard exterior-to-interior attenuation rate of 25 dBA for residential buildings, noise generated by haul trucks supplying material for the Sacramento River east levee improvements could result in maximum interior noise levels of 46.5 dBA L_{eq}. The 24-hour average exterior noise levels (L_{dn}) associated with daily haul truck trips, assuming haul trucks would be operational for 10 daytime hours, would be 43.1 dB L_{dn}. Based on these results, haul truck noise levels are not expected to result in an exceedance of the interior noise standard of 45 dBA L_{dn}/CNEL for residential land uses established by Sutter County, Sacramento County, and the City of Sacramento for transportation noise sources, although they would exceed local exterior noise standards at residential land uses, as noted above. In addition, although hauling activity is expected to take place during daytime hours, because of the need to complete levee improvements outside of the flood season and because of other environmental constraints on project schedule, it may be necessary to conduct some hauling activity during some noise-sensitive early morning and nighttime hours, potentially resulting in sleep disturbance at nearby residences. Although truck hauling for the Phase 2, 3, and 4a Projects may overlap in time, the haul routes used for these phases are not the same; therefore, noise generated by truck hauling from the Phase 2 and 3 Projects would not increase the contribution to the noise generated by the Phase 4a Project, and vice versa. For both the Proposed Action and RSLIP Alternative, this impact is considered **potentially significant**. ***(Similar)***

Mitigation Measure 4.12-c: Implement Noise-Reduction Measures to Reduce the Impacts of Haul Truck Traffic Noise

Proposed Action and RSLIP Alternative

SAFCA and its primary contractors for engineering design and construction shall ensure that the measures listed below are implemented at each work site in any year of project construction to minimize construction traffic noise effects on sensitive receptors:

- All heavy trucks shall be equipped with noise-control (e.g., muffler) devices in accordance with manufacturers' specifications.
- All haul trucks shall be inspected before use and a minimum of once per year to ensure proper maintenance and presence of noise-control devices (e.g., lubrication, nonleaking mufflers, and shrouding).
- Before haul truck trips are initiated during a construction season on roads within 160 feet of residences (the 60-dBA noise contour of haul truck traffic), written notification shall be provided to the potentially affected residents identifying the hours and frequency of haul truck trips. Notification materials shall also identify a mechanism for residents to register complaints with the appropriate jurisdiction if haul truck noise levels are overly intrusive or occur outside the exempt daytime hours for the applicable jurisdiction.

These measures would reduce interior and exterior noise levels generated by haul truck traffic that passes noise-sensitive receptors. However, the mitigated noise levels may not meet the applicable standards for local exterior noises for residential land uses. Therefore, implementing this mitigation measure would partially reduce the temporary traffic noise impact from hauling activities, but not to a less-than-significant level because there are no other feasible mitigation measures available to fully reduce this impact. Thus, this impact would remain **significant and unavoidable**. ***(Similar)***

Impact 4.12-d: Long-Term Increases in Project-Generated Noise

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for long-term increases in project-generated noise. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without the Natomas perimeter levee system, the risk of levee failure would remain high. Efforts to reconstruct the levee would depend on the extent and location of damage. Equipment such as pumping plants would likely be used, generating short-term noise. Upon completion of levee repairs, noise generation would not be substantially greater than in a no-action, no-flood scenario. However, a precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

The proposed modifications to the NCC Bennett Pump Station and Northern Main Pump Station would be located on the south side of the NCC in Reaches 2 and 3, respectively. The proposed modifications to the RD 1000 Pumping Plants No. 3 and 5, and the Riverside Pumping Plant, would be located on the east bank of the Sacramento River in Reaches 10, 13, and 14, respectively. These new pumping stations would involve the long-term operation of noise-generating stationary equipment. RD 1000 Pumping Plant No. 3 would contain three new pumps and associated infrastructure. RD 1000 Pumping Plant No. 5 would contain four new pumps and associated infrastructure. Engineering details required for the Bennett, Northern, and Riverside Plants are not available at this time. Such equipment could result in noise levels in the range of 78–88 dBA at 3–5 feet from the source depending on the exact type and size (EPA 1971).

Any pumps that would be replaced as part of the proposed modifications would be similar in size to the pumps that are currently operating at these stations. The only increase in stationary and area source noise associated with the proposed pump station modifications would be from additional mechanical equipment, such as an emergency standby generator. The generator would be used only during emergency situations and during monthly testing. Operational noise levels associated with proposed pumping station improvements would be in compliance with applicable performance standards at nearby receptors. Therefore, this impact related to long-term operational noise is considered **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

Impact 4.12-e: Temporary Exposure of People Working in the Project Area to Excessive Airport Noise Levels

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, people would not be working in the project area and workers would not be exposed to excessive Airport noise levels. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. If a flood were to occur, the location of workers reconstructing the levee would depend on the location of damage. Provided that repair locations are in close proximity to the Airport, it is considered highly unlikely for aircraft operations to be occurring post-flood event. This potential impact would be **less than significant**. ***(Similar)***

Proposed Action and RSLIP Alternative

Construction activities for the Proposed Action and the RSLIP Alternative would result in exposing people working in the Phase 4a Project area to excessive Airport noise levels. Portions of the Phase 4a Project construction area would be located within the 65 dB, 70 dB, and 75 dB L_{dn}/CNEL Airport noise level contours,

specifically Reaches 10–11B and the I-5 Borrow Area. The *Sacramento County General Plan* Land Use Compatibility for Airport Noise chart (pages 21–23 of the *Sacramento County General Plan*) lists a variety of land uses and the acceptable Airport noise levels applicable for each land use. Construction areas are not specifically stated in this list; however, it is assumed to fall in the category of industrial and manufacturing, which allows an acceptable airport noise level of up to 85 dB L_{dn}/CNEL. As stated above, construction areas would only be exposed to noise levels of up to 75 dB L_{dn}/CNEL. Therefore, construction areas would not exceed the recommended land use compatibility for Airport noise for the Phase 4a Project under the Proposed Action and RSLIP Alternative. This temporary, short-term impact is considered **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

4.12.3 RESIDUAL SIGNIFICANT IMPACTS

No residual significant noise impacts would occur under the No-Action Alternative because there would be no noise impacts associated with No Project Construction and impacts associated with Potential Levee Failure are too speculative for meaningful consideration; therefore, it is currently unknown what the residual impact would be. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore, impacts that result from the No-Action Alternative would not be mitigated.

Under the Proposed Action and the RSLIP Alternative, the adverse effects of both temporary, short-term exposure of sensitive receptors to construction noise and exposure of residents to increased traffic noise levels from hauling activity would be significant. Implementing Mitigation Measures 4.12-a and 4.12-c would reduce this impact, but not to a less-than-significant level, because the mitigation would not fully reduce exterior noise to levels that are below established standards. Therefore, the Proposed Action and the RSLIP Alternative would result in a temporary, short-term significant and unavoidable impact on noise-sensitive receptors (e.g., nearby residents).

4.13 VISUAL RESOURCES

4.13.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.13.1.1 METHODOLOGY

Evaluation of the project's potential impacts on visual resources was based on a review of scenic vistas and landscapes that could be affected by project-related activities. Visual contrasts were examined, which included evaluations of changes in form, size, colors, project dominance, view blockage, and duration of impacts. Other elements such as natural screening by vegetation or landforms, placement of the Phase 4a Project in relation to existing structures, and sensitivity of viewer groups were also considered.

4.13.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to visual resources if they would do any of the following:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including but not limited to trees, rock outcrops, and historic buildings, within a state scenic highway;
- substantially degrade the existing visual character or quality of the site and its surroundings; or
- create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

There are no designated state scenic highways in the project area (Caltrans 2007); therefore, this issue is not discussed further in this EIS/EIR.

4.13.2 IMPACTS AND MITIGATION MEASURES

Impact 4.13-a: Alteration of Scenic Vistas, Scenic Resources, and Existing Visual Character of the Project Area

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for impacts on adjacent trees on the landside of the Sacramento River east levee. On the waterside of the levee, trees and vegetation would continue to be removed in compliance with USACE guidance regarding levee encroachments. The quality of the views of the waterside of the levee would be degraded for recreational users of the river and for residents living along the waterside of the Sacramento River east levee as a result of these actions. Therefore, this is considered a **potentially significant** impact. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Damage caused by flooding could result in damage to structures, vegetation, and woodlands. Sensitive viewers, such as residents and recreational users, could lose aspects of visual coherence, vividness, and unity. However, if

a levee failure were to occur, damage to visual resources would depend on extent and duration of a flood event and subsequent repair. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action

The Sacramento River east levee improvements would entail constructing an adjacent levee which would widen the levee embankment and flatten its landside slope. Pump stations located in the Phase 4a Project area would also be modified. These alterations to the existing levee and pump stations would result in views similar to existing conditions at the conclusion of construction activities. The temporary construction activities and presence of construction equipment would substantially degrade the visual character or quality along the landside of the Sacramento River east levee. Upon completion of project construction, visual resource qualities and character would return to preexisting conditions.

The construction of an adjacent levee and installation of seepage cutoff walls would enable SAFCA to retain the mature riparian tree corridor along the waterside of the Natomas Basin levees. However, the Proposed Action would require the removal of several woodland groves and individual trees on the landside toe of the Sacramento River east levee and along the alignment of the relocated and extended Riverside Canal. Many of these trees tower above the surrounding features and are striking, distinctive elements in local settings along the levee system, visible to residents on both sides of the levee and travelers along Garden Highway and other local roadways, including I-5. As reminders of the oak woodlands that formerly occupied much of the region and sometimes the only remnants of farmsteads that once stood in locations along the levee toe, these trees have a high aesthetic value. Additionally, a small amount of waterside vegetation would be removed at Garden Highway waterside drainage outlets (Reaches 10–11B of the Sacramento River east levee), Pumping Plants Nos. 3 and 5, and the Riverside Pumping Plant. Under the Proposed Action, vegetation would be cleared up to 660 feet from the landside toe of the existing Sacramento River east levee.

The total extent of tree removal for the Proposed Action is described in **Table 4.7-2**, under Impact 4.7-a "Loss of Woodland Habitat." As described in Section 2.3.4, "Habitat Improvements," the Landside Improvements Project would preserve and create woodland groves throughout the western Natomas Basin near the Sacramento River east levee. **Table 4.7-3** shows the estimated long-term impacts of the Phase 4a Project on woodlands and total compensation included in all phases of the NLIP. Sites for woodland plantings would primarily be located within a 100- to 200-foot-side corridor on the landside of the new Riverside Canal in Reaches 12–14A, and possibly in some locations between the Riverside Canal and the Operations and Maintenance/Utility Corridor. Compared to existing woodland groves in the Natomas Basin, the groves created by the Landside Improvements Project would have larger patch sizes, a wider range of age classes, and a greater diversity of woodland species.

In time, these new woodlands would enhance the visual qualities of the landscape; however, it would take many years for the new plantings to reach the size of the existing trees that are proposed to be removed, which in some cases are likely 100 years old or older. The removal of the existing trees would substantially degrade the quality of scenic resources and the existing visual character and quality of local sites and their surroundings.

The raised and widened Sacramento River east levee would be noticeable to travelers on Garden Highway, but variations in the height and width of flood damage reduction features are common throughout the flood damage reduction system, and the levees themselves are not distinctive scenic resources. For this reason and the reasons stated with regard to changes in views from the landside of the levees, these changes in the appearance of the flood damage reduction system would not represent a substantial change in scenic vistas or the character or quality of views.

The potential borrow sites for the Phase 4a Project are listed in **Table 2-10** and shown on **Plate 2-7**. The proposed borrow operations would lower the elevation of borrow sites by about 5 feet over very large areas. The majority

of the sites would be returned to preproject conditions (field crops, fallow fields, rice, or grazing) (see **Table 2-10** for details regarding borrow pit depth, area of excavation, and postreclamation uses). The proposed elevation changes would not be discernible at the scale at which they would be implemented (hundreds of acres), and the proposed postconstruction land cover types would be consistent with adjacent land uses and overall land cover types in the surrounding portions of the Natomas Basin. Therefore, the long-term impacts at the borrow sites are considered **less than significant**. However, in the short term, the presence of construction equipment and the loss of vegetative cover would temporarily degrade the visual character of the borrow sites, resulting in a short-term, temporary **significant** impact.

The NCC south levee improvements involving levee raises and cutoff walls in two locations would result in minor temporary changes in views of the south levee. Upon completion of the construction, visual resource qualities and character would return to preexisting conditions. Other infrastructure changes including realignment and relocation of power poles, irrigation systems, and pumps would not substantially alter the visual character of the project area.

Overall, alteration of scenic vistas, scenic resources, and existing visual character of the project area as a result of temporary construction and excavation activities, and as a result of tree removal, would be a **significant** impact.

RSLIP Alternative

The RSLIP Alternative is similar to the Proposed Action except that the Sacramento River east levee would be raised and widened in place, requiring removal of riparian woodlands on the waterside of these levee reaches to conform with USACE guidance regarding levee encroachments.

Tree removal for the relocation and extension of Riverside Canal would be the same as under the Proposed Action. The total amount of tree loss that would result from the RSLIP Alternative is described in **Table 4.7-2**, under Impact 4.7-a "Loss of Woodland Habitat." Viewer sensitivity would be high for Sacramento River recreational users and for residents living on the waterside of the levee. This alternative would include offsetting the removal of trees with woodland planting; however, purchase of credits from a local mitigation bank would be necessary to fully offset the removal of trees from the waterside of the existing levee. As noted above, replacement plantings would require many years to achieve the same size and aesthetic value as the existing mature vegetation that would be removed. Woodland compensation efforts would not fully compensate for the extensive loss of mature waterside vegetation. The loss of high aesthetic qualities due to removal of mature waterside vegetation combined with high viewer sensitivity of recreational users of the Sacramento River and residents on the waterside of the levee would be a **significant** impact. ***(Greater)***

Mitigation Measure: No feasible mitigation is available.

Impact 4.13-b: New Sources of Light and Glare that Adversely Affect Views

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to change light and glare along the perimeter levee system. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Damage to the infrastructure in the Natomas Basin could result in a short-term decrease in nighttime lighting due to power outages. However, depending on the extent and location of levee failure and subsequent flood damage, emergency lighting could be required for nighttime security and construction. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of

this uncertainty, this potential impact is considered to be **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

No new permanent sources of light or glare would be associated with the Proposed Action or the RSLIP Alternative. However, equipment staging areas would be lit as necessary for security reasons during construction. With the exception of construction of the cutoff walls (e.g., 24/7 construction), construction is not generally anticipated to be conducted after 8:00 p.m.; however, it is possible that occasional construction activities may be required during nighttime hours (except for borrow areas in the Airport Critical Zone, namely, the I-5 Borrow Area), in which case additional construction areas may require temporary nighttime lighting. Construction of the cutoff walls may require construction 24 hours per day/7 days per week (24/7), in which case security and construction night lighting would be used.

Residences are located on the landside of the Sacramento River east levee close to the proposed levee improvement sites in the Phase 4a Project area; however, the landside construction areas could often be screened from direct views of the construction area by trees, depending on tree height and proximity to the construction areas, and proximity of residences to the construction area. Where many residences are present on the waterside of the levee, the existing levee itself, trees, and other vegetation could partially shield residences from lighting used on the landside of the levee, where the work would be performed. Security night lighting also would be provided at the modified pumping plants, although they would be situated such that no residences would be affected by this source of night light.

Construction work would typically move in a linear fashion along the levees, and construction activities generally would not take place in any one location for more than a few weeks. Therefore, where nighttime construction lighting (if needed) would be clearly visible from nearby residences, the activity would be short-term and temporary and therefore would not constitute a substantial source of light or glare. However, nighttime lighting related to 24/7 project construction, as described in Chapter 2.0, "Alternatives," in particular could create a new source of substantial light or glare that would adversely affect nighttime views in the area.

An additional source of construction-related light and glare would occur as a result of well abandonment and new or replacement construction, as described in Section 2.3.2.5, "Development of New and Replacement Groundwater Wells." Approximately 13 existing groundwater wells on the landside of the Sacramento River east levee would require abandonment and replacement outside of the levee footprint. In addition to replacement wells, five new wells would be constructed to provide a water supply for habitat mitigation features. The well construction would extend approximately three weeks. Nighttime construction lighting would be required for up to three days for each well to allow drilling activities to continue 24 hours per day, which is required to avoid collapse or seizing of drill equipment within the hole. Development and test pumping would also continue 24 hours per day for several days per new well because continuous pumping is required to obtain accurate results.

The introduction of new light and glare, primarily with nighttime construction on the Sacramento River east levee and for well construction activities, would be a temporary but **significant** impact. ***(Similar)***

Mitigation Measure 4.13-b: Implement Mitigation Measure 4.15-f, "Coordinate Work in the Critical Zone with Airport Operations and Restrict Night Lighting within and near the Runway Approaches," and Direct Lighting Away from Adjacent Properties

Proposed Action and RSLIP Alternative

SAFCA shall implement Mitigation Measure 4.15-f, "Coordinate Work in the Critical Zone with Airport Operations and Restrict Night Lighting within and near the Runway Approaches," set forth in Section 4.15, "Hazards and Hazardous Materials." In summary, this mitigation requires that no borrow activities shall be conducted within the Airport Critical Zone during nighttime hours; and, that all project-related nighttime lighting that is in,

or is aligned with, the Airport runway approach zone shall be directed downward to avoid potential interference within nighttime aircraft operations. As discussed in Section 4.15, "Hazards and Hazardous Materials," implementation of Mitigation Measure 4.15-f would reduce lighting impacts associated with the Airport to a less-than-significant level. ***(Similar)***

Additionally, SAFCA shall implement the following measures to reduce the impacts of light and glare associated with project construction activities:

(a) SAFCA shall require that nearby residents be notified in advance of nighttime construction activities.

(b) SAFCA shall require that construction and security lighting be shielded and directed downward to minimize the spill of light onto adjacent properties.

Implementing these measures would reduce the impacts of light and glare for nearby residents, but not to a less-than-significant level; therefore, this impact would remain **significant and unavoidable**. ***(Similar)***

4.13.3 RESIDUAL SIGNIFICANT IMPACTS

Impacts related to degradation of visual resources in the project area in the event of levee failure are uncertain. Because of this uncertainty, these potential impacts are considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore, impacts that result from the No-Action Alternative would not be mitigated.

Under the Proposed Action and the RSLIP Alternative, adverse impacts on visual resources due to construction activities and equipment on the levees would be significant. Measures to screen residences from construction sites and equipment staging and storage areas would reduce these impacts, but screening may not be feasible at all construction locations; therefore, the impact would remain significant and unavoidable. Similarly for visual degradation due to light and glare, screening and directing lighting away from adjacent properties would reduce the impacts of light and glare for nearby residents, but not to a less-than-significant level; therefore, this impact would remain significant and unavoidable.

Under the Proposed Action and the RSLIP Alternative, adverse effects on scenic resources and visual character of the Sacramento River east levee area from the removal of a substantial number of trees along the landside and waterside of this levee would be significant. The Proposed Action and the RSLIP Alternative include measures to limit the extent of impacts on visual resources caused by the short-term loss of woodland areas (e.g., transplanting existing trees outside the project footprint where feasible) and to offset them over the longer term (through substantial woodland planting). However, no feasible mitigation is available to reduce the short-term impacts from Impact 4.13-a to a less-than-significant level; thus, this impact would be significant and unavoidable in the short term. For the Proposed Action, with the new acres of woodland plantings that would be installed as described in Section 4.7, "Biological Resources," the impact would be reduced to a less-than-significant level over the long term. With the RSLIP Alternative, mitigation measures would not be sufficient to fully mitigate impacts on woodland habitats as a result of the loss of waterside vegetation. The impact would remain significant and unavoidable under the RSLIP Alternative.

4.14 UTILITIES AND SERVICE SYSTEMS

4.14.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.14.1.1 METHODOLOGY

Impacts on utilities and service systems that would result from project implementation were identified by comparing existing service capacity and facilities against project implementation. Evaluation of potential utility and service systems impacts was based on a review of documents pertaining to the Natomas Basin. Additional information was obtained through consultation with appropriate agencies, such as Sacramento Regional County Sanitation District, Sacramento Municipal Utility District, Pacific Gas and Electric Company, and NCMWC.

4.14.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to utilities and service systems if they would do any of the following:

- exceed wastewater treatment requirements of the applicable regional water quality control board;
- 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;
- exceed water supplies available to service the project from existing entitlements and resources, such that new or expanded entitlements would be needed;
- result in a determination by the wastewater treatment provider that serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- generate waste materials that would exceed the permitted capacity of local landfills or fail to comply with Federal, state, and local statutes and regulations related to solid waste; or
- result in substantial adverse physical impact associated with the provision of new or altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for public services such as fire protection, police protection, schools, or parks.

The Phase 4a Project would not involve any changes in land use that would increase short-term or long-term demand for public services, including fire and police protection, schools, parks, and other public facilities, thus necessitating the construction of new or altered government service facilities. Similarly, the Phase 4a Project would not result in demand for increased natural gas facilities, electrical transmission lines, communication systems, water infrastructure, sewer lines, or solid-waste services beyond their current capacity. Therefore, thresholds related to increasing demands on existing public services and utilities do not apply to this analysis and are not addressed further in this EIS/EIR.

4.14.2 IMPACTS AND MITIGATION MEASURES

Impact 4.14-a: Potential Temporary Disruption of Irrigation Water Supply

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to cause construction-related disruption to irrigation water supply. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could cause flooding that would damage canals, potentially disrupting irrigation of cropland. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related effect on these services cannot be predicted. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

RSLIP Alternative

Irrigation and drainage pipeline penetrations of the Sacramento River east levee Reaches 10–15 would be raised as part of the project to meet current USACE regulations. Wells and pumps in the footprint of the proposed flood damage reduction facilities would be removed and replaced in locations farther from the project footprint. The Riverside Canal, which is constructed above the surrounding terrain, would be relocated away from the toe of the Sacramento River east levee (Reaches 13–17 with an extension through Reach 11B–12B and an underground pipe section in Reaches 15–18B), and the replacement canal would need to be operable and lateral irrigation canals connected to it before the existing canals are demolished. Additional buried irrigation lines may exist that would need to be removed or reconnected.

Substantial temporary interruptions of irrigation supply could occur if irrigation infrastructure is damaged or otherwise rendered inoperable at a time when it is needed (e.g., reconnections to water supply sources are not completed by the time crop irrigation must begin). Given the extent and intensity of project construction activities, it is possible that these activities could impede the repair of damaged infrastructure or cause a delay in the provision of irrigation supply. This temporary impact is considered **potentially significant**. ***(Similar)***

Mitigation Measure 4.14-a: Coordinate with Irrigation Water Supply Users Before and During All Irrigation Infrastructure Modifications and Minimize Interruptions of Supply

Proposed Action and RSLIP Alternative

SAFCA and its primary contractors for engineering design and construction shall ensure that the measures listed below are implemented to minimize the potential for irrigation water supply interruptions during construction activities.

- Coordinate the timing of all modifications to irrigation supply infrastructure with the affected infrastructure owners and water supply users, either directly or through NCMWC.
- Include detailed scheduling of the phases of modifications/replacement of existing irrigation infrastructure components in project design and in construction plans and specifications.

- Plan and complete modifications of irrigation infrastructure for the nonirrigation season to the extent feasible.
- Provide for alternative water supply, if necessary, when modification/replacement of irrigation infrastructure must be conducted during a period when it would otherwise be in normal use by an irrigator.
- Ensure either that (1) users of irrigation water supply do not, as a result of physical interference associated with the project, experience a substantial interruption in irrigation supply when such supply is needed for normal, planned farming operations (i.e., a decrease in level of service in comparison with the existing level of service), or (2) users of irrigation water supply that experience a substantial decrease in an existing level of service that meets the established standards for the project area are compensated in kind for losses associated with the reduction in level of service.

Implementing this mitigation measure would reduce the potential temporary impact of disruptions to irrigation supply to a **less-than-significant** level because SAFCA would coordinate with water supply providers and consumers to minimize interruptions, would conduct work during the nonirrigation season whenever feasible, and would ensure that essential water supply necessary during the irrigation season is provided by an alternative supply if an interruption is unavoidable. ***(Similar)***

Impact 4.14-b: Potential Disruption of Utility Service

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to disrupt utility service. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in minor to substantial flooding that could substantially interrupt utilities and public services. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related impact on these services cannot be predicted. Therefore, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Project implementation would encroach upon multiple types of utility equipment and facilities. Along the Sacramento River east levee Reaches 10–15, project implementation would infringe upon electric conduits, telephone conduits, conductors, irrigation pipes, and at least one gas line, as well as other pipelines and underground utilities. Project construction activities, including grading and excavation, could damage identified and unidentified utility equipment and facilities. In addition, required relocation of existing electrical and telephone lines and gas pipelines could result in interruptions in service.

As described in Section 3.14, “Utilities and Service Systems,” a jet fuel pipeline runs from the Port of Sacramento north to the Airport, crossing underneath the Sacramento River and continuing north from the landside toe of the Sacramento River east levee at a depth of 5–10 feet below ground surface through Reach 11B. To protect cultural resources, a 500-foot-wide seepage berm may be required to be installed over this pipeline, which would block

access to a shut-off valve that is located approximately 300 feet from the toe of the existing levee. To allow access to this valve from the top of the berm, SAFCA would install either a concrete access vault or a new riser stem and other necessary devices. This work is not expected to affect transportation of jet fuel to the Airport.

However, earthmoving activities and the use of heavy equipment on the ground surface level near the pipeline could damage the jet fuel pipeline and potentially interfere with jet fuel delivery to the Airport. Construction activities related to relocation of power poles, use of heavy construction equipment (i.e., backhoes), ground clearance prior to construction of the levee improvements, placement of fill material and grading of levee and berm structures, and shallow (1 foot deep) excavation for the relocated Riverside (highline) Canal could inadvertently damage the jet fuel pipeline and disrupt delivery of jet fuel to the Airport, or cause an accidental upset, as described in Section 4.15, "Hazards and Hazardous Materials."

Detailed project design would include consultation with all known service providers to identify infrastructure locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of facilities as construction proceeds to minimize service disruptions. The extent and intensity of project construction activities, however, may affect service providers' abilities to quickly repair damage and/or restore interrupted service. This impact is considered **potentially significant**. ***(Similar)***

Mitigation Measure 4.14-b: Verify Utility Locations, Coordinate with Utility Providers, Prepare and Implement a Response Plan, and Conduct Worker Training with Respect to Accidental Utility Damage and Implement Mitigation Measure 4.15-c, "Review Design Specifications and Prepare and Implement an Impact Avoidance and Contingency Plan in Consultation with Wickland Pipelines, LLC"

Proposed Action and RSLIP Alternative

Before construction begins, SAFCA and its primary contractors shall coordinate with USACE, the CVFPB, and applicable utility providers to implement orderly relocation of utilities that need to be removed or relocated. Power pole relocations shall be coordinated with SMUD and SACDOT to avoid conflicts with the SACDOT-proposed bike/pedestrian path. Existing main electrical power transmission lines and poles on the waterside of the existing Garden Highway levee that do not need to be relocated or replaced to accommodate the project may be left in place. No new main electrical power transmission lines and poles shall be installed on the waterside of Garden Highway. Consistent with sound engineering practices that prioritize the following, individual service lines shall: (1) use existing configurations and facilities, and (2) any new poles shall be placed on the landside of Garden Highway, subject to the approval of USACE, the CVFPB, and any other regulatory public agencies and utility companies. SAFCA shall implement Mitigation Measure 4.15-c, "Review Design Specifications and Prepare and Implement an Impact Avoidance and Contingency Plan in Consultation with Wickland Pipelines, LLC."

- SAFCA and its primary contractors shall provide the following: Notification of any potential interruptions in service shall be provided to the appropriate agencies and affected landowners.
- Before the start of construction, utility locations shall be verified through field surveys and the use of the Underground Service Alert services. Any buried utility lines shall be clearly marked in the area of construction on the construction specifications in advance of any earthmoving activities.
- Before the start of construction, a response plan shall be prepared to address potential accidental damage to a utility line. The plan shall identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the safety of the public and workers. Worker education training in response to such situations shall be conducted by the contractor. The response plan shall be implemented by SAFCA and its contractors during construction activities.

- Utility relocations shall be staged to minimize interruptions in service.

Implementing this mitigation measure would reduce the impact from disruption of utility services to a **less-than-significant** level because SAFCA and its primary contractors would coordinate with utility service providers and consumers to minimize interruptions to the maximum extent feasible, and a response plan to address service interruptions would be prepared and implemented. ***(Similar)***

Impact 4.14-c: Increases in Solid Waste Generation

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, there would be no increase in solid waste generation related to project implementation. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Cleanup operations following flooding are likely to generate very high levels of solid waste; the amount of waste would depend on the extent, depth, and duration of flooding and the types of property damaged. Waste materials could exceed the permitted capacity of local landfills or fail to comply with Federal, state, and local statutes and regulations related to solid waste. A precise determination of significance is not possible and cannot be made because the extent of the magnitude of impact is unknown. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

There would be no long-term generation of solid waste associated with project operation. Temporary, short-term project construction activities would generate over 100,000 cubic yards of solid waste during construction of the Phase 4a Project. Some residences, agricultural structures, and appurtenances in or near the footprint of the proposed flood damage reduction facilities on the landside of the Sacramento River east levee Reaches 10–15 would be relocated if feasible and in accordance with landowner preferences, but others would be demolished. Other materials, such as asphalt, concrete, pipes, and gravel, would need to be removed from the footprint of the proposed flood damage reduction facilities.

Waste materials (including cleared vegetation) would be hauled off-site to a suitable disposal location. Excess earth materials (organic soils, roots, and grass from borrow sites and the adjacent levee foundation; and excavated materials that do not meet levee embankment criteria) would be used in the reclamation of borrow sites or hauled off-site to a suitable disposal location. Hazardous materials (e.g., building materials containing lead paint or asbestos) encountered during the removal of residences and other structures would be disposed of in accordance with regulatory standards (see Mitigation Measures 4.15-b[1] and 4.15-b[2] in Section 4.15, "Hazards and Hazardous Materials"). The location of the landfill used for disposal of spoil material and other construction-related waste would be determined by the construction contractor at the time of construction activity based on capacity, type of waste, and other factors. Only those landfills determined to have the ability to accommodate the construction disposal needs of the alternatives would be used. It is likely that Kiefer Landfill, owned and operated by Sacramento County, would be used for all or a part of the construction waste. Kiefer Landfill, which accepts 10,815 tons per day (TPD) of solid waste, is located about 15 miles southeast of the city of Sacramento (approximately 40 miles southeast of the NCC south levee). With a permitted capacity of more than 117 million cubic yards through 2035 and a remaining capacity of nearly 113 million cubic yards as of 2005 (California Integrated Waste Management Board 2009), Kiefer Landfill would be able to accommodate the project's

construction disposal needs. Similarly, the Western Regional Landfill in Placer County, approximately 15 miles from the NCC, would be able to accommodate the project disposal requirements, accepting 1,900 TPD with a maximum permitted capacity of more than 36 million cy and a remaining capacity of more than 29 million cy (California Integrated Waste Management Board 2009). Project construction and operation would not cause existing regional landfill capacity to be exceeded; therefore, this temporary, short-term impact is considered **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

4.14.3 RESIDUAL SIGNIFICANT IMPACTS

Impacts associated with disruption to irrigation supply and utility services, and increases in solid waste generation as a result of the No-Action Alternative are uncertain. Because of this uncertainty, these potential impacts are considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore impacts that result from the No-Action Alternative would not be mitigated.

Implementation of the mitigation measures described in this section for the Proposed Action and the RSLIP Alternative would reduce the impacts of a potential temporary, short-term disruption of the irrigation supply and the provision of other utility services to less-than-significant levels; therefore, there would be no residual significant impacts.

4.15 HAZARDS AND HAZARDOUS MATERIALS

4.15.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.15.1.1 METHODOLOGY

This section addresses potential sources of hazards and risks associated with hazardous materials that may be associated with implementation of the Proposed Action and alternatives under consideration. This analysis is based on a review of:

- *Natomas Levee Improvement Program Initial Site Survey and Phase I Environmental Site Assessment, Volumes 6, 9, 10, 11, and 12* (Kleinfelder 2009a); and
- *Borrow Site Environmental Conditions: South Sutter Property (APNs 201-0250-015, 201-0270-002 and -037), Novak Property (APN 225-0090-040), Huffstutler/Johnson Trust Property (APNs 225-0110-019, -020, -037) Sacramento County, CA* (Kleinfelder 2009b; **Appendix I**).

Evaluation of the project's potential impacts on Airport safety was based on a review of the regulations pertaining to the Phase 4a Project area, including the Airport's WHMP (SCAS 2007) and the FAA's Advisory Circular (AC) 150/5200-33B on hazardous wildlife attractants on or near airports (FAA 2007).

Potential sources of wildfire hazards and risks associated with implementation of the Proposed Action and alternatives under consideration were also evaluated. This evaluation was based on a review of historic local weather conditions, historic ignition sources, topography, vegetation, and fire history. Fire hazard severity zones, which are established by the California Department of Forestry and Fire Protection, were identified and compared to the Phase 4a Project area.

4.15.1.2 THRESHOLDS OF SIGNIFICANCE

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in Appendix G of the State CEQA Guidelines. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. The Proposed Action or alternatives under consideration were determined to result in a significant impact related to hazards and hazardous materials if they would do any of the following:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- emit hazardous emissions or involve the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- 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, create a significant hazard to the public or the environment;
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- result in a safety hazard for people residing or working in a project area that is located within 2 miles of a public airport or public-use airport; or

- result in a significant impact related to wildfire hazards if they would expose people or structures to a significant risk of loss, injury, or death from wildland fires.

There are no established thresholds for wildlife strikes. For this analysis, airport safety was analyzed within the Airport Critical Zone and the Airport Operations Area. The FAA recommends a separation distance of 10,000 feet between the Airport Operations Area and hazardous wildlife attractants (FAA 2007); this area is identified as the Critical Zone. Additionally, the FAA recommends a distance of 5 statute miles between the farthest edge of the Airport Operations Area and hazardous wildlife attractants (FAA 2007).

4.15.2 IMPACTS AND MITIGATION MEASURES

Impact 4.15-a: Accidental Spills of Hazardous Materials

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities and thus no accidental spills of hazardous materials related to this project would occur. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could upset stored hazardous materials and spread agricultural pesticides, oil, gasoline, and other hazardous materials in flood waters, creating hazardous conditions for the public and the environment. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related risks cannot be predicted. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Project-related construction and maintenance activities would involve the use of potentially hazardous materials, such as fuels (gasoline and diesel), oils and lubricants, and cleaners (which could include solvents and corrosives in addition to soaps and detergents), that are commonly used in construction projects. Bentonite (a nonhazardous material) and/or cement would be used where cutoff walls are being constructed to remediate levee seepage conditions. Construction contractors would be required to use, store, and transport hazardous materials in compliance with Federal, state, and local regulations during project construction and operation. Risks to water quality associated with incidental releases of these materials on project sites are addressed in Section 4.6, "Water Quality."

Compliance with the applicable regulations would reduce the potential for accidental release of hazardous materials during their transport and during project construction activities. Consequently, the risk of significant hazards associated with the transport, use, and disposal of these materials is low. This impact is considered **less than significant**. ***(Similar)***

Mitigation Measure: No mitigation is required.

Impact 4.15-b: Exposure to Hazardous Materials Encountered at Project Sites

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to expose people to hazardous materials encountered at project sites. The Natomas Basin is largely agricultural and this type of land use can often involve the application of pesticides, residues of which may remain in soils for years. Soil testing performed by Kleinfelder in 2009 for the Phase 4a Project indicates the presence of pesticide residues, including arsenic, dieldrin, and toxaphene, within the Phase 4a Project footprint (Kleinfelder 2009b). Elevated concentrations of arsenic in soil can be a result of historic arsenic-containing pesticide application; however, arsenic can also occur naturally in certain soils, including those found in the Phase 4a Project footprint and throughout California (see Section 3.4.3, "Soils"; USGS 1984, DTSC undated as cited in Kleinfelder 2009b). The concentrations of this naturally occurring arsenic in the Phase 4a Project footprint soils exceed some screening levels (e.g., EPA Region 5 Ecological Screening Levels) (Kleinfelder 2009b). Humans may be exposed to these potentially hazardous materials through direct contact with soil, groundwater leaching, or exposure to airborne dust created by typical agricultural crop management practices, such as disking. Plants and animals may be exposed to these potentially hazardous materials through contact with surface soils or through contact with storm water or irrigation runoff that could carry the materials into ponds, drainages, and other waterways. Because of this risk, the continued presence of pesticide residues and the existing levels of arsenic in soil on land used for agricultural purposes is considered to be a **potentially significant** impact. ***(Similar)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding known sites of hazardous materials, potentially exposing the public and the environment to both known hazardous conditions (discussed in Section 3.15, "Hazards and Hazardous Materials") and potentially unknown hazardous conditions in areas that have not been evaluated under a Phase I and/or II Environmental Site Assessment (ESA). Underseepage and boils, resulting from high river stages, may force groundwater to the surface within or adjacent to areas containing pesticide residues or contaminated soils. This could transport sediments containing hazardous materials from agricultural fields into waterways. However, the potential for such an occurrence is uncertain, and the magnitude and duration of any related risks cannot be predicted. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Potential Exposure to Existing, On-Site Hazardous Materials

As described in Section 3.15, "Hazards and Hazardous Materials," Phase I ESAs have been completed for portions of the Phase 4a Project footprint. The Phase I ESAs disclose the potential presence of the following hazardous materials that may be encountered during project construction: arsenic, dieldrin, and toxaphene in the soil; asbestos in underground pipelines and building materials; lead-based paint in building materials; underground storage tanks (USTs) and aboveground storage tanks (ASTs); oil and gas wells; and PCBs in pole-mounted transformers (Kleinfelder 2009a). See Section 3.15, "Hazards and Hazardous Materials," for the site-specific conditions at each Assessor's Parcel Number (APN) included in the Phase I ESAs. Many parcels within the Phase 4a Project footprint have not yet been evaluated for the potential presence of hazardous materials. Areas that have not been evaluated include several parcels within the Fisherman's Lake Borrow Area and the I-5 Borrow Area.

Soil testing analysis performed by Kleinfelder in 2009 for the Phase 4a Project indicates that pesticide residues, including arsenic, dieldrin, and toxaphene are present on several of the Phase 4a Project borrow sites (namely, the South Sutter, LLC borrow site in the Elkhorn Borrow Area and the Novak and Huffstutler Trust/Johnson properties in the Fisherman's Lake Borrow Area) in concentrations exceeding the San Francisco Regional Water Quality Control Board's (RWQCB's) environmental screening levels (ESLs).[1] Residual pesticide concentrations are generally at higher concentrations within the upper 6 to 18 inches of topsoil (see Section 3.15, "Hazards and Hazardous Materials," for detailed information). As described above under the No-Action Alternative, soils in the Phase 4a Project footprint, and soils throughout California in general, are known to contain naturally occurring concentrations of arsenic (USGS 1984 and DTSC undated, as cited in Kleinfelder 2009b:Table 1). Construction workers could be exposed to pesticide residues in the soil by accidental ingestion of soil, absorption through the skin, or from inhalation of soil particles. The general public, however, could only be exposed to these pesticide residues through inhalation (dust) because they would not have direct contact with on-site, pesticide-laden soils (Kleinfelder 2009b).

Table 4.15-1 presents soil testing results for the South Sutter, LLC borrow site and the Novak and Huffstutler Trust/Johnson properties and compares these results to human health and ecological risk levels (see Section 3.15, "Hazard and Hazardous Materials," for quantitative data). It is important to note that concentrations of pesticide residues found on these sites do not constitute a reportable condition because the pesticides appear to have been properly applied for agricultural purposes and were not detected at levels exceeding the California hazardous waste threshold limits, nor are they an imminent threat to public health, welfare, or the environment based on risk evaluations, as discussed below (Kleinfelder 2009b:5).

Table 4.15-1
Soil Testing Results

Human Health Risk (Construction Worker Contact)			
Property	**Arsenic**	**Dieldrin**	**Toxaphene**
South Sutter, LLC	Less than Screening Levels	Less than Screening Levels	Less than Screening Levels
Novak property	Less than Screening Levels	Less than Screening Levels	Less than Screening Levels
Huffstutler Trust/ Johnson property	***Exceeds Screening Levels***	Less than Screening Levels	Less than Screening Levels
Ecological Risk			
Property	**Arsenic**	**Dieldrin**	**Toxaphene**
South Sutter, LLC	Less than Screening Levels	Less than Screening Levels[1]	Less than Screening Levels[1]
Novak property	Less than Screening Levels	Less than Screening Levels	***Exceeds Screening Levels***
Huffstutler Trust/ Johnson property	***Exceeds Screening Levels***	***Exceeds Screening Levels***	Less than Screening Levels

[1] Ecological risk considered the average concentration compared to the project-specific screening levels of 11.3 mg/kg for arsenic; 0.0024 mg/kg for dieldrin; and 0.119 mg/kg for toxaphene.

Source: Compiled by EDAW in 2009 based on data provided in Kleinfelder 2009b:9, 11, and 13 and Tables 1 and 2

[1] Levels were compared to San Francisco RWQCB's ESLs because the Central Valley RWQCB does not provide limits specific to the Central Valley.

Exposure of Construction Workers to Hazardous Materials through Direct Contact

Only one site evaluated at the time of release of this EIS/EIR (August 2009)—the Huffstutler Trust/Johnson property—contains elevated levels of pesticide residues (i.e., arsenic) that could affect human health through direct contact, including accidental ingestion. Similar conditions with respect to pesticide residue may be found on other agricultural parcels in the Phase 4a Project footprint because much of the Natomas Basin has been and/or continues to be in agricultural use. Earthmoving activities on the Huffstutler Trust/Johnson property would expose construction workers to elevated levels of hazardous materials and would be considered a **significant** impact.

Exposure of Construction Workers and the General Public to Hazardous Airborne Particulates through Inhalation

Earthmoving activities may potentially expose construction workers to soils containing arsenic at concentrations that exceed preliminary human health risk screening levels. According to calculations performed by Kleinfelder, however, earthmoving activities are not expected to disperse concentrations of hazardous materials into the air that would exceed relevant ambient air quality limits for construction workers (see **Table 4.15-2**) (Kleinfelder 2009b:19–20). In addition, implementation of Mitigation Measure 4.11-a, "Implement Applicable District-Recommended Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction," would reduce fugitive dust emissions associated with earthmoving activities (Kleinfelder 2009:21). Thus, earthmoving activities, with implementation of appropriate dust control measures, would not affect human health or the general public, both because of the multiple conservative assumptions used to estimate the risk and because the general public would be further away than construction workers from construction activities (and dispersal into the air would further reduce ambient air concentrations). Without implementation of Mitigation Measure 4.11-a, however, exposure of construction workers and the general public to hazardous materials found on these sites would be **significant** impact.

Table 4.15-2
Anticipated Pesticide Residue Concentration in Ambient Air During Earthmoving Activities

	Maximum Detected Soil Concentration (mg/kg)	Construction Worker		Neighboring Resident	
		Calculated Ambient Air Concentration (µg/m³) [1]	Ambient Air Thresholds (µg/m³) [2]	Calculated Ambient Air Concentration (µg/m³) [3]	Ambient Air Thresholds (µg/m³) [4]
Arsenic	43	0.043	10	0.013	0.015
Dieldrin	0.10	0.0001	500	0.00003	0.00053
Toxaphene	0.22	0.00022	250	0.000066	0.0076

Notes: mg/kg = milligram per kilogram µg/mg = microgram per milligram; EPA = U.S. Environmental Protection Agency

[1] Construction worker calculated ambient air concentrations based on the following equation: (soil concentration mg/kg x 1,000 µg/mg) / (Particulate Emission Factor of 1,000,000 m^3/kg).

[2] Construction worker ambient air thresholds are from the U.S. Occupational Health and Safety Administration permissible exposure limits (as cited in Kleinfelder 2009b:Table 1).

[3] Neighboring resident calculated air concentrations are based on an 8-hour Fenceline Particulate Not Otherwise Specified Level of 0.3 mg/m^3 and calculations cited in Kleinfelder 2009b: Table 3.

[4] Neighboring resident ambient air thresholds are from the Office of Environmental Health Hazard Assessment reference exposure levels and EPA regional screening levels for air concentrations (as cited in Kleinfelder 2009b).

Source: Kleinfelder 2009b:19–20

Exposure of Construction Workers to Hazardous Materials in Building Materials and Utilities, Oil and Gas Wells, USTs, and PCBs in Transformers

Construction workers could encounter hazardous materials in building materials and utilities, oil and gas wells, USTs, and PCBs in transformers during levee construction, demolition activities, and borrow activities; therefore, construction workers could be exposed to unacceptable levels of hazardous materials associated with existing and former land uses during Phase 4a Project demolition and relocation activities. In addition, project demolition and relocation activities also may create a potential for construction workers to be exposed to hazardous materials associated with existing and former agricultural and rural residential structures. These materials may include asbestos in underground pipelines, asbestos and lead-based paint in building materials, and/or PCBs in pole-mounted transformers. Finally, not all areas of the Phase 4a Project footprint have been evaluated with respect to the potential presence of hazardous materials. Therefore, this impact is considered to be significant.

Exposure of Ecological Receptors to Hazardous Materials

A review of preliminary risk screening levels indicates that concentrations of on-site pesticide residues could pose a risk to ecological receptors (i.e., wildlife in land and aquatic habitats). This exposure could occur through leaching of pesticide residues into groundwater or through runoff of soils containing pesticide residue into surface water bodies. Borrow activities would reduce the distance from the ground surface to the groundwater table by removing approximately 6–12 inches of soil. Respreading topsoil onto borrow sites could potentially increase the risk of pesticide residues and other contaminants leaching into the groundwater because the migration distance to the water table would be reduced (Kleinfelder 2009b:24-25). However, according to calculations performed by Kleinfelder, borrow material activities on the South Sutter, LLC borrow site and the Novak property would not be expected to affect groundwater or pose an unacceptable ecological risk, because the levels of potentially hazardous materials are less than project-specific screening levels and within DTSC's normal concentrations for agricultural sites (Kleinfelder 2009b: 31). Because the Huffstutler Trust/Johnson property would be used for habitat following completion of borrow activities, there could be an ecological risk posed by arsenic and dieldrin (Kleinfelder 2009: 31). Even with implementation of Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions," which would reduce the potential for runoff of soils containing hazardous materials during construction, impacts after construction from respreading of topsoil containing pesticides residue would pose a risk to ecological receptors (Kleinfelder 2009b:32). Therefore, this impacts is considered to be **significant**.

Impact Summary

Because sampling results at the Huffstutler Trust/Johnson property exceed construction worker contact levels of health risk for arsenic, construction workers could be exposed to unacceptable levels of hazardous materials associated with existing and former land uses during Phase 4a Project demolition and relocation activities. Upon completion of construction activities, respreading topsoil onto the Huffstutler Trust/Johnson property would pose a risk to ecological receptors. In addition, project demolition and relocation activities may also create a potential for construction workers to be exposed to hazardous materials associated with existing and former agricultural and rural residential structures. These materials may include asbestos in underground pipelines, asbestos and lead-based paint in building materials, and/or PCBs in pole-mounted transformers. Finally, not all areas of the Phase 4a Project footprint have been evaluated with respect to the potential presence of hazardous materials. Therefore, this impact is considered to be **significant**. ***(Similar)***

Mitigation Measure 4.15-b(1): Implement Mitigation Measure 4.11-a, "Implement Applicable District-Recommended Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction," and Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions"; and Complete Phase I and/or II ESAs and Implement Recommended Measures

Proposed Action and RSLIP Alternative

SAFCA shall implement Mitigation Measure 4.11-a, "Implement Applicable District-Recommended Control Measures to Minimize Temporary Emissions of ROG, NO_X, and PM_{10} during Construction," set forth in Section 4.11, "Air Quality." In summary, this mitigation measure requires preparation of a construction emissions dust control plan in accordance with SMAQMD's recommendations to reduce fugitive dust emissions. SAFCA and its primary construction contractors shall ensure that dust is not causing a nuisance beyond the property line of the construction site. This measure, in combination with the measures, below, that constitute the remainder of Mitigation Measure 4.15(b)(1), would reduce the health risk impact to construction workers from inhalation of hazardous materials to a **less-than-significant** level by reducing the amount of potentially contaminated construction site dust to which construction workers would be exposed.[2] ***(Similar)***

SAFCA shall implement Mitigation Measure 4.6-a, "Implement Standard Best Management Practices, Prepare and Implement a Stormwater Pollution Prevention Plan, and Comply with National Pollutant Discharge Elimination System Permit Conditions," set forth in Section 4.6, "Water Quality." In summary, this mitigation measure requires implementation of standard erosions, siltation, and good housekeeping best management practices; preparation and implementation of a Stormwater Pollution Prevention Plan; and compliance with the conditions of the NPDES general stormwater permit for construction activity. As discussed in Section 4.6, "Water Quality," implementation of Mitigation Measure 4.6-a would reduce water quality impacts from temporary construction activities to a **less-than-significant** level because SAFCA would conform with applicable local and state regulations regulating construction discharges. ***(Similar)***

Before the start of any construction activities, SAFCA shall ensure that Phase I ESAs are completed for all sites subject to ground disturbance, and that any additional site evaluations that be recommended in the Phase I ESAs are conducted. For the following sites where Phase I ESAs have been completed, the following additional evaluations (as recommended in the applicable Phase I ESAs) shall be completed prior to start of construction or earthmoving activities:

APN 201-0330-019

- Conduct a limited Phase II ESA to evaluate for pesticide residues, and the possible presence of petroleum and/or other hazardous materials associated with on-site ASTs and drums.

APNs 225-0010-038, 225-0010-041, and 225-0010-043

- Conduct a limited Phase II ESA to evaluate for pesticide residues, and the possible presence of petroleum and/or other hazardous materials associated AST tanks and an on-site vehicle.
- Conduct a geophysical survey to assess the presence of a possible UST and if present, collect soil and/or groundwater samples to evaluate if contamination exists.

[2] As discussed in Section 4.11, "Air Quality," implementation of Mitigation Measure 4.11-a would reduce project-generated construction-related emissions in Sacramento County, but it is anticipated that the Phase 4a Project could nonetheless result in emissions that substantially contribute to a violation of the ambient air quality standard for PM_{10}. Although the impact would be reduced with implementation of this mitigation measure, construction-related emissions for PM_{10} would remain **significant and unavoidable** because there is no feasible mitigation that would fully reduce project-generated construction-related emissions of PM_{10} in Sacramento County to a less-than-significant level.

APNs 225-0090-014, 225-0110-050, 225-0101-007, 225-0101-057, 225-0101-058, 225-0101-061, 225-0110-018, and 225-0110-051

- Conduct a limited Phase II ESA to evaluate for pesticide residues.

APN 225-0090-040 (Novak Property)

- As recommended in the Phase I ESA (Kleinfelder 2009a), a limited Phase II ESA was completed to evaluate for pesticide residues. The possible presence of petroleum and/or other hazardous materials associated with on-site ASTs, car batteries, burn areas, and drums shall be evaluated before the start of earth-moving activities.

APN 225-0090-069

- Conduct a limited Phase II ESA to evaluate for pesticide residues.
- Conduct a geophysical survey to assess the presence of a possible UST and if present, collect soil and/or groundwater samples to evaluate if contamination exists.

APNs 225-0101-003, 225-0101-004, 225-0101-005, 225-0101-006

- Conduct a limited Phase II ESA to evaluate for pesticide residues.
- Conduct a geophysical survey to assess the presence of a possible UST and if present, collect soil and/or groundwater samples to evaluate if contamination exists.

APN 225-0210-026

- Conduct a limited Phase II ESA to evaluate for pesticide residues and residual chemical concentrations related to petroleum product surface staining.

APNs 225-0110-019, 225-0110-020, and 225-0110-037 (Huffstutler Trust/Johnson Property)

- Conduct additional Phase II ESA work to further evaluate for potentially hazardous materials discussed in the Phase I ESA, including potential hydrocarbon contamination, miscellaneous refuse, unlabeled containers, and compounds found in aboveground and underground structures.
- Retain an Industrial Hygienist to prepare a Construction Worker Health and Safety Plan. The Construction Worker Health and Safety Plan Shall include, but shall not be limited to: personal protective equipment for workers, a delineation of the horizontal and vertical extent of elevated arsenic levels, a list of required monitoring equipment to be onsite during contaminated soil excavation (e.g., air quality meter), and proper procedures in the event that stained soil is encountered.
- Retain a qualified professional to conduct an Ecological Risk Assessment. The Ecological Risk Assessment shall include, but shall not be limited to: potential chemicals of concern, biological characterization of the site, identification of potential exposure pathways, ecological receptors, and recommendations for and implementation of remediation, if necessary.

APNs 201-0250-015, 201-0270-002, and 201-0270-037 (South Sutter, LLC Borrow Site)

- Conduct a Phase II ESA to evaluate for potentially hazardous materials discussed in the Phase I ESA, including potential miscellaneous refuse, unlabeled containers, and ASTs may have impacted the soil.

- Remove, as appropriate, items on site, such as the AST, car batteries, unlabeled storage tanks, debris, and water wells in accordance with regional, local, state, and Federal regulations.

Implementing this mitigation measure would reduce the potentially significant impact from exposure of construction workers and the general public to known hazardous materials at project sites under the Proposed Action and the RSLIP Alternative to a **less-than-significant** level because steps would be taken to reduce the opportunity of hazardous materials to become airborne or enter waterways; consultation with appropriate Federal, state, regional, and local agencies would occur; on-site contamination would be removed and properly disposed of by a licensed contractor in accordance with Federal, state, regional, and local regulations; and any additional site evaluations would be conducted and recommendations implemented. ***(Similar)***

Mitigation Measure 4.15-b(2): Complete Investigations Related to the Extent to Which Soil and/or Groundwater May Have Been Contaminated in Areas Not Covered by the Phase I and/or II ESAs and Implement Required Measures (e.g., Site Management and/or Other Contingency Plans)

Proposed Action and RSLIP Alternative

For parcels that will be used for Phase 4a Project borrow activities or where earthmoving activities would occur, SAFCA shall ensure that the contractor complete the following prior to start of construction and earthmoving activities:

- Prepare a site management plan, subject to SAFCA review and approval that contains protocols and procedures for excavation, use, disposal, and handling of soil containing pesticide residues or contaminants, and for identifying possible contamination during construction. The plan shall include measures for the safe transport, use, and disposal of pesticide residue impacted soil and building debris removed from the site. Soil reuse may include: containing portions of the affected topsoil within the core of seepage berms, with an overlay of clean soil to prevent surface runoff caused by rainfall erosion on the topsoil materials; rip, mix, and/or amend affected topsoil that is re-spread onto borrow sites, levee, and/or berm surfaces, to provide a plant growth medium and reduce the concentration of pesticide residues in the soil; establish native perennial grasses and other perennial vegetation cover (e.g., hay, alfalfa) on these planted surfaces to reduce sediment runoff that may be caused by rainfall erosion or surface irrigation; and improve the drainage of agricultural lands used as borrow/mitigation sites to reduce ponded water and minimize the discharge of sediments into nearby drainages. In the event that impacted groundwater is encountered during site excavation activities, the contractor shall report the chemical concentrations to the appropriate regulatory agencies, dewater the excavated area, and treat the groundwater to remove the chemicals before discharge. The contractor shall be required to comply with applicable Federal, state, regional, and local laws. The plan shall outline measures for specific handling and reporting procedures for hazardous materials and disposal of hazardous materials removed from the site at an appropriate off-site disposal facility. The plan shall include, but shall not be limited to: delineations of the horizontal and vertical extent and concentration of soil contamination; a list of required monitoring equipment to be onsite during soil excavation (e.g., an air quality meter shall be used at the fenceline during dust-producing

activities); sampling and analysis protocol for additional soil investigations; a list of necessary agencies to be contacted if chemical concentrations in water, air, and/or soil exceed set threshold limits; and a list of necessary permits, reports, or other compliance mechanisms.

- Retain an industrial hygienist to prepare a construction worker health and safety plan. The construction worker health and safety plan shall include, but not be limited to: personal protective equipment for workers, a delineation of the horizontal and vertical extent of elevated arsenic levels, a list of required monitoring equipment to be on-site during contaminated soil excavation (e.g., air quality meter), and proper procedures in the event that stained soil is encountered.

- Retain a qualified professional to conduct an ecological risk assessment on sites found to contain levels of contaminant exceeding pertinent ecological risk levels. The ecological risk assessment shall include, but not be limited to: potential chemicals of concern, biological characterization of the site, identification of potential exposure pathways, ecological receptors, and recommendations for and implementation of remediation, where feasible and practicable.

- Retain an air quality specialist to monitor the concentration of particulates of concern in the air at the project fenceline, adjacent to residential property to ensure compliance with Federal, state, regional, and local regulations, to the extent feasible and practicable. Airborne particulate monitoring should be performed in the on-site worker's breathing zone using the Particulate Not Otherwise Specified (NOS) concentrations standard of 5 mg/m^3 as well as at the project boundaries using the Fenceline Particulate NOS goal of 0.3 mg/m^3.

- Retain a licensed contractor to remove USTs, ASTs, and stained soils in accordance with applicable Federal, state, regional, and local regulations.

- Retain a licensed contractor to remove and dispose of asbestos cement pipe found within the project area in accordance with applicable Federal, state, regional, and local regulations.

- Retain a licensed contractor to remove septic systems, water wells, and other underground structures, as needed, in accordance with applicable Federal, state, regional, and local regulations.

- Retain an asbestos specialist who is certified by the Cal/OSHA The asbestos specialist shall investigate whether asbestos-containing materials or lead-based paints are present before demolition of on-site buildings and utilities. If materials containing asbestos or lead are found, they shall be removed by an accredited contractor in accordance with EPA and Cal/OSHA standards. In addition, activities (construction or demolition) in the vicinity of these materials shall comply with Cal/OSHA asbestos and lead worker construction standards. The materials containing asbestos and lead shall be disposed of properly at an appropriate off-site disposal facility.

- Obtain an assessment conducted by the Sacramento Municipal Utility District and/or Pacific Gas & Electric Company pertaining to the contents of the existing pole-mounted transformers that would be relocated as part of the Phase 4a Project. The assessment shall determine whether existing on-site electrical transformers contain PCBs and whether there are records of spills from such equipment. If equipment containing PCBs is identified, the maintenance and/or disposal of the transformer shall be subject to the

regulations of the Toxic Substances Control Act under the authority of the Sutter County Environmental Health Division and Sacramento County Environmental Management Department.

- Identify oil and gas well locations. Prepare and implement a California Department of Oil, Gas, and Geothermal Resources well review program, if necessary.

- Notify the appropriate Federal, state, regional, and local agencies, as required, if evidence of previously undiscovered soil or groundwater contamination (e.g., stained soil, odorous groundwater) is encountered during construction activities. Areas with chemical concentrations exceeding regulatory levels shall be cleaned up in accordance with recommendations made by the Sutter County Environmental Health Division, Sacramento Environmental Management Department, Central Valley RWQCB, DTSC or other appropriate Federal, state, regional, or local regulatory agencies as generally described above.

- Implement Mitigation Measure 4.14-b, "Verify Utility Locations, Coordinate with Utility Providers, Prepare and Implement a Response Plan, and Conduct Worker Training with Respect to Accidental Utility Damage," as set forth in Section 4.7, "Utilities and Service Systems."

Implementing this mitigation measure would reduce the significant impact from exposure of unknown hazardous materials at the project site under the Proposed Action and the RSLIP Alternative to a **less-than-significant** level because potentially hazardous materials would be identified; a Site Management Plan that specifies remediation activities and procedures to appropriately identify, stockpile, handle, reuse and/or remove and dispose of hazardous materials would be prepared and implemented; monitoring activities would ensure that construction workers and the general public are not exposed to unsafe levels of hazardous substances; and hazardous substances that are encountered would be removed and properly disposed of by licensed contractors in accordance with Federal, state, regional, and local laws and regulations. ***(Similar)***

Impact 4.15-c: Risk of Accidental Release of Jet Fuel from Construction Near an Existing Pipeline in Reach 11B of the Sacramento River East Levee

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for accidental upset of the jet fuel pipeline. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could damage the jet fuel pipeline. Because the effects of a levee failure are unpredictable and because the magnitude, extent, and severity of an accidental upset if it were to occur is too speculative, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

A 12-inch diameter pipeline that supplies jet fuel, primarily consisting of kerosene, from the Port of Sacramento to the Airport traverses the Phase 4a Project footprint through Reach 11B of the Sacramento River east levee. The pipeline, which is owned and operated by Wickland Pipelines, LLC, descends below the Sacramento River from West Sacramento and, near entry into the Natomas Basin, ascends for approximately 500 feet, where it remains approximately parallel to the ground surface at a depth of 5–10 feet below ground surface until reaching the Airport. A shut-off valve is located at the point where the pipeline becomes parallel to the ground surface, approximately 300 feet from the existing landside toe of the levee. Because a 500-foot-wide seepage berm may be required in Reach 11B, a new riser stem may be installed on the shut-off valve to maintain access to it (see Section 2.3.1.1, "Sacramento River East Levee," for more detail). It is expected that installation of the riser stem could be completed without interfering with the distribution of jet fuel. Construction specifications for the riser extension would be reviewed by Wickland Pipelines, LLC, which would also supervise the construction activities affecting the pipeline.

Other construction activities that would take place in the vicinity of the pipeline would include relocation of power poles, ground clearance prior to construction of the levee improvements, placement of fill material and grading of levee and berm structures, and shallow (1 foot deep) excavation for the relocated Riverside (highline) canal. Construction of the seepage berm would involve grading and vegetation removal, followed by spreading and compacting of borrow material. Clearing and grading activities generally would not penetrate more than a few inches below the ground surface. However, the removal of several trees along Powerline Road by using backhoes could damage the pipeline through direct disturbance several feet below ground or by exerting uneven pressure to the pipeline.

Damage to the pipeline could result in a substantial release in jet fuel. According to Wickland Pipelines, LLC's Oil Spill Contingency Plan, the worst case discharge scenario could result in the release of up to 32,172 gallons of jet fuel. A release of jet fuel could contaminate groundwater, surface water, soil, and air, and potentially affect aquatic and terrestrial wildlife and vegetation in the vicinity of the rupture. Additionally, release of jet fuel into the environment could cause a variety of adverse health effects to people within the vicinity, which could range from skin irritation to coma and death. Jet fuel also contains naphthalene, a chemical that may be carcinogenic to humans with repeated or prolonged exposure.

An accidental release could provide fuel for a potential fire. Construction equipment or construction practices could provide an ignition source for the jet fuel, particularly on days in which temperatures are higher, allowing for the fuel to vaporize. Depending upon the size, location, and extent of the release, a jet-fuel-fire could result in substantial loss, injury, or death, and produce chemicals that could adversely affect air quality (e.g., carbon monoxide, airborne solids) (Chevron Energy Research & Technology Company 2003).

Because there is a potential for accidental damage during construction to the jet fuel pipeline that could result in a spill of a hazardous substance into the environment that could adversely affect human health and the natural environment, this impact is considered to be **potentially significant**. ***(Similar)***

Mitigation Measure 4.15-c: Review Design Specifications and Prepare and Implement an Impact Avoidance and Contingency Plan in Consultation with Wickland Pipelines, LLC

Proposed Action and RSLIP Alternative

Prior to issuance of construction contract bid requests for the Phase 4a Project, SAFCA and its engineers shall ensure that Wickland Pipelines, LLC has approved design specifications and impact avoidance and safety measures for construction activities within 10 feet of the jet fuel pipeline (CCR Title 8, Section 1541). Construction specifications to be approved with Wickland Pipelines, LLC include, but are not limited to, the type of construction and equipment (e.g., bulldozers, graders, excavators) and the location and depth of earth-moving activities near the pipeline (i.e., 10 feet).

Prior to the start of earthmoving activities, an impact avoidance and contingency plan shall be prepared and implemented by SAFCA in consultation with Wickland Pipelines, LLC. The plan shall include, but shall not be limited to:

- a contingency plan for actions to take in the event of damage to the pipeline or release of jet fuel, which shall include chain of command and notification procedures, worker safety, pipeline security, wildlife care, response procedures, necessary permits for response actions, and waste handling and disposal;
- a worker health and safety plan and worker training that shall consider personal protective equipment, operations safety within 10 feet of the pipeline, and a contact list for reporting and obtaining medical service; and
- a method to provide the Airport with jet fuel in the event that the pipeline incurs substantial damage.

Agreements made between SAFCA, SAFCA's contractor, and Wickland Pipelines, LLC shall be in compliance with applicable Federal and state regulations (e.g., Hazardous Liquid Pipeline Safety Act, Pipeline Safety Improvement Act of 2002, Cal OSHA regulations).

Implementing this mitigation measure would reduce the potential impact of accidental release of jet fuel due to damage of the jet fuel pipeline under the Proposed Action and the RSLIP Alternative to a **less-than-significant** level because an impact avoidance plan and design specifications would be agreed upon by SAFCA and Wickland Pipelines, LLC prior to issuance of construction bid requests, ensuring contractor compliance with avoidance and safety measures related to the jet fuel pipeline. ***(Similar)***

Impact 4.15-d: Interference with an Adopted Emergency Evacuation Plan

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to interfere with adopted emergency evacuation plans. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could damage roadways. Road closures could create increases in traffic levels that could interfere with the use of main roadways for emergency evacuation routes. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

The Proposed Action and the RSLIP Alternative would increase traffic on local roadways associated with construction trips. In addition, temporary road closures associated with levee improvements could cause or contribute to temporary increases in traffic levels as traffic is detoured or slowed on some local roadways and SR 99/70. Increased traffic congestion could interfere with the use of main roadways for emergency evacuation routes. This impact is considered **significant**. ***(Similar)***

Mitigation Measure 4.15-d: Notify State and Local Emergency Management Agencies about Project Construction and Coordinate Any SR 99/70 Detours with these Agencies to Ensure That Any Need for Emergency Use Is Not Significantly Impaired

Proposed Action and RSLIP Alternative

SAFCA shall implement Mitigation Measures 4.10-a and 4.10-c, set forth in Section 4.10, "Traffic and Circulation," to avoid impairment of the use of SR 99/70 as an emergency evacuation route.

Implementing this mitigation measure would reduce the impact from the potential interference with an adopted emergency evacuation plan under the Proposed Action and the RSLIP Alternative to a **less-than-significant** level because the appropriate state and local agencies would be involved in implementing detours to ensure acceptable traffic flow and reduce the risk of impairment to emergency evacuation routes. ***(Similar)***

Impact 4.15-e: Hazardous Emissions or Handling of Hazardous or Acutely Hazardous Materials, Substances, or Waste within One-Quarter Mile of an Existing or Proposed School

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to release hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A levee failure in the Natomas Basin could result in flooding that could damage the Natomas Basin in such a way that hazardous substances could be emitted or handled within one-quarter mile of an existing or proposed school. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Natomas Middle School, located at 3700 Del Paso Road, is located within one-quarter mile of a portion of the Fisherman's Lake Area. In addition, the Natomas Unified School District is planning to construct a high school and elementary school (West Lakeside) to be located on parcels within one-quarter mile of the Fisherman's Lake Area. The Twin Rivers Unified School District is planning to open a high school to be located on the parcel containing the Twin Rivers Unified School District soil stockpile and adjacent to the Krumenacher Borrow Site. Construction and maintenance activities and borrow excavation would involve the use of potentially hazardous materials, such as fuels (gasoline and diesel), oils and lubricants, and cleaners (which could include solvents and corrosives in addition to soaps and detergents), that are commonly used in construction projects. Additionally, undocumented contaminated soil or water may be found during construction. Because the potential exists for exposure to both known and previously unknown hazardous materials within one-quarter mile of a school during construction activities, this impact is considered **significant**. ***(Similar)***

Mitigation Measure 4.15-e: Notify the Natomas Unified School District and Applicable Schools with Jurisdiction within One-Quarter Mile of Project Construction Activities

Proposed Action and RSLIP Alternative

SAFCA shall provide written notification of the project to each of the affected schools and the Natomas and Twin Rivers Unified School Districts within 30 days prior to certification of t this EIS/EIR and shall consult with the Natomas and Twin Rivers Unified School Districts regarding the potential impacts on schoolchildren from hazards associated with project implementation.

Implementation of this mitigation measure would reduce impacts associated with hazardous materials emissions related to schools within one-quarter mile of the project area to a **less-than-significant** level because under CEQA, the notification process is considered to satisfy the requirements of CEQA (PRC Section 21151.4). ***(Similar)***

Impact 4.15-f: Temporary Aircraft Safety Hazards Resulting from Project Construction Activities Within or Near the Airport Critical Zone

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to introduce a safety hazard within or near the Airport Critical Zone. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Extensive night lighting may be necessary near or within the Airport Critical Zone for emergency operations, which could pose a potential safety hazard. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

The I-5 Borrow Area, a potential source of soil borrow for the Phase 4a Project, overlaps with the Airport Critical Zone (**Plate 2-6a**). Extensive night lighting of construction work and security lighting of construction staging areas at night within these areas could interfere with nighttime aircraft landing operations and create a safety hazard related to aircraft landings. This impact is considered **significant**. ***(Similar)***

Mitigation Measure 4.15-f: Coordinate Work in the Critical Zone with Airport Operations and Restrict Night Lighting Within and Near the Runway Approaches

Proposed Action and RSLIP Alternative

SAFCA and its primary construction contractors shall ensure that the following mitigation is implemented to avoid interference of construction activities with Airport operations.

- No borrow activities shall be conducted within the Airport Critical Zone during nighttime hours.
- All project-related nighttime lighting that is in, or is aligned with, the Airport runway approach zones (Sacramento River east levee Reaches 10–11A) shall be directed downward to avoid potential interference with nighttime aircraft operations.

- SAFCA shall ensure that the SCAS is informed in advance of the timing and nature of all construction activities within the Airport Critical Zone, and shall coordinate with SCAS during final project design to ensure that all appropriate safety precautions within the Airport Critical Zone are incorporated into the construction plans. Additionally, requirements provided by the FAA, not incorporated into this document, shall be followed.

- SAFCA shall submit the FAA form 7460-1, Notice of Proposed Construction or Alteration, which notifies the FAA of construction or alteration that might affect navigable airspace. This form must be submitted to the FAA at least 30 days before the earlier of the following dates: (1) the date the proposed construction or alteration is proposed to begin, or (2) the date an application for a construction permit is to be filed.

Implementing this mitigation measure would reduce the temporary aircraft safety hazard impact from project construction activities within or near the Airport Critical Zone under the Proposed Action and the RSLIP Alternative to a **less-than-significant** level, because all nighttime lighting would be directed downward and SAFCA would coordinate with SCAS to ensure that all appropriate safety precautions are taken within the Critical Zone. ***(Similar)***

Impact 4.15-g: Potential for Higher Frequency of Collisions between Aircraft and Wildlife at Sacramento International Airport

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to increase the number of wildlife at the Airport. None of the proposed borrow site activities, dewatering, filling, canal replacement, removal and replacement of trees, or creation of habitat described for the Proposed Action and the RSLIP Alternative would occur. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. Flooding is likely to result in changes in land surface in some areas, and areas retaining water for long periods even after floodwaters have receded. These conditions could result in high numbers of birds being attracted to the lands around the Airport (which is in a low-elevation area in the Basin) in the months following flooding and the resumption of Airport operations, increasing the potential for collisions between aircraft and wildlife. Because the effects of a levee failure are unpredictable, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

The Airport has one of the highest numbers of reported wildlife strikes with aircraft of all California airports (SCAS 2007). Collisions between aircraft and wildlife compromise the safety of aircraft passengers and flight crews. In an attempt to reduce wildlife collisions with aircraft, SCAS has maintained and implemented the WHMP for more than 10 years at the Airport. The plan identifies routine maintenance, hazardous wildlife habitat manipulation, and other land management activities as the most effective long-term preemptive measures for reducing wildlife hazards.

As described in FAA's AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*, the FAA recommends a separation distance of 10,000 feet between the Airport Operations Area and hazardous wildlife

attractants (FAA 2007); this area is identified as the Airport Critical Zone. Additionally, the FAA recommends a distance of 5 statute miles between the farthest edge of the Airport Operations Area and hazardous wildlife attractants (FAA 2007). Open water and agricultural crops are recognized as being the greatest wildlife attractants in the Airport vicinity, and rice cultivation is considered the most incompatible agricultural crop because of its flooding regime. Wildlife attractants near the runways are of greatest concern because, nationally, 74% of bird-aircraft strikes occurred at or below 500 feet above ground level (Cleary, Dolbeer, and Wright 2004). The area within a 10,000-foot radius of the Airport Operations Area is where arriving and departing aircraft are typically operating at or below 2,000 feet, an altitude that also corresponds with most bird activity (SCAS 2007).

Generally, the Airport Critical Zone is currently used for agricultural purposes, a land use practice that is considered to attract hazardous wildlife. Implementation of the Phase 4a Project would not increase the amount of hazardous wildlife habitat. The I-5 Borrow Area, a potential source of soil borrow for the Phase 4a Project, overlaps with the Airport Critical Zone (**Plate 2-6a**). Any borrow sites used in this area would be returned to their previous agricultural land uses following borrow activities and would not be developed into new land uses that would attract hazardous wildlife, such as wetlands, water management facilities, or golf courses, as described in FAA's AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*. Following construction, the slopes of the proposed levee improvements and associated seepage berms, which overlap with the Airport Critical Zone in Reaches 10–11A of the Sacramento River east levee, would be seeded to create managed grassland.

Because the Phase 4a Project would not increase the amount of habitat considered to attract hazardous wildlife within the Airport Critical Zone, the Proposed Action and the RSLIP Alternative would result in a **less-than-significant** impact related to Airport and wildlife collisions. ***(Similar)***

Mitigation Measure: No mitigation is required.

Impact 4.15-h: Potential Exposure to Wildland Fires

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no construction activities would occur; therefore, no potential exists for the project to expose people or structures to wildland fires. There would be **no impact**. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. A recently flooded area is not likely to be dry enough to sustain a fire that would pose significant risk of loss, injury, or death. However, if accumulated debris from uprooted vegetation or structures remained in place long enough to dry out, there would be a potential for increased fire hazard. However, the potential for such an occurrence is uncertain, and the magnitude of the effect cannot be predicted; therefore, a precise determination of significance is not possible and cannot be made. Because of this uncertainty, this potential impact is considered **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

Although no "Very High Fire Hazard Severity Zones" are located in the project area, and the majority of Sutter and Sacramento Counties is located in either a "nonflammable" or "moderate" zone for wildland fires, the project components would be constructed in locations where physical and weather conditions may combine to lead to a high risk of fire hazard. Construction equipment or construction practices could ignite fires that may result in wildland fires and expose people or structures to a significant risk of loss, injury, or death under some circumstances. This potential impact is considered **significant**. ***(Similar)***

Mitigation Measure 4.15-h: Prepare and Implement a Fire Management Plan to Minimize Potential for Wildland Fires

Proposed Action and RSLIP Alternative

SAFCA and its primary contractors for engineering design and construction shall prepare and implement a fire management plan in coordination with the appropriate emergency service and/or fire-suppression agencies of the applicable local jurisdictions before beginning project construction. The plan shall describe fire prevention and response methods, including fire precaution, presuppression, and suppression measures that are consistent with the policies and standards of the affected jurisdictions. All materials and equipment required for implementation of the plan shall be maintained on-site. All construction personnel shall be made familiar with the contents of the plan before construction activities begin.

Implementing this mitigation measure would reduce the potential impact from exposure to wildland fires under the Proposed Action and the RSLIP Alternative to a **less-than-significant** level, because a plan to provide project-specific fire prevention and response would be implemented. ***(Similar)***

4.15.3 RESIDUAL SIGNIFICANT IMPACTS

Impacts associated with spills of hazardous materials, exposure to hazardous materials or interference with emergency evacuation, increased hazards in the vicinity of the Airport or increased frequency of wildlife airstrikes, and increased wildfire hazards due to the No-Action Alternative are uncertain. Because of this uncertainty, these potential impacts are considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore, impacts that result from the No-Action Alternative would not be mitigated.

Implementation of the mitigation measures described in this section for the Proposed Action and the RSLIP Alternative would reduce all potential impacts associated with spills of hazardous materials, accidental risk of upset from potential damage to the jet fuel pipeline during construction, exposure to hazardous materials or interference with emergency evacuation, increased hazards in the vicinity of the Airport or increased frequency of wildlife airstrikes, and increased wildfire hazards to less-than-significant levels.

4.16 ENVIRONMENTAL JUSTICE

Environmental justice is defined by the U.S. Environmental Protection Agency (EPA) Office of Environmental Justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Fair treatment means that "no group of people, including racial, ethnic, or socioeconomic group, shall bear a disproportionate share of negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies." Analysis of project effects on environmental justice is required by NEPA.

4.16.1 METHODOLOGY AND THRESHOLDS OF SIGNIFICANCE

4.16.1.1 METHODOLOGY

The following analysis is based on *Environmental Justice, Guidance Under the National Environmental Policy Act*, prepared by the Council of Environmental Quality (CEQ) and the Executive Office of the President (CEQ 1997). Although none of the published guidelines define the term "disproportionately high and adverse," CEQ includes a non-quantitative definition stating that an effect is disproportionate if it appreciably exceeds the risk or benefit rate to the general population.

Under the CEQ guidelines, the first step in conducting an environmental justice analysis is to determine the presence of minority and low-income populations (CEQ 1997:25). The second step of an environmental justice analysis requires that the Federal agency determine if the Federal action would result in disproportionately high or adverse health or environmental effects (CEQ 1997:26). The CEQ guidance indicates that when determining whether the effects are high and adverse, agencies are to consider whether the risks or rates of impact "are significant (as employed by NEPA) or above generally accepted norms" (CEQ 1997:26). The CEQ offers a non-quantitative definition stating that an effect is disproportionate if it appreciably exceeds the risk or rate to the general population (CEQ 1997:26). The environmental justice analysis is based on a review of relevant demographic data to define the relative proportion of minority and low-income populations in the Natomas Basin in order to determine whether the Proposed Action or alternatives under consideration would result in environmental justice impacts on the relevant populations. (See Section 3.16, "Environmental Justice," and Appendix H for the demographic data used to conduct this analysis.)

This section compiles demographic data on income and minority status for census block groups that occur in the Natomas Basin, and then compares these data with the demographic profiles of Sutter and Sacramento County to determine if the Natomas Basin contains significant minority or low-income populations. **Table 3.16-1** presents the relative proportion of the population that responded as members of minorities or as low-income households during the 2000 Census. These data are based upon **Appendix H**, which compiles and explains the source of these data (U.S. Census Bureau 2006).

The Natomas Basin does not contain a significant low-income population, as indicated in **Table 3.16-1** (e.g., greater than 50% of the total population or substantially greater than in Sacramento or Sutter Counties. The Sutter County portion of the Natomas Basin has a minority population that is less than 50% of the total (23.34%), and is also lower than the proportion of minorities in Sacramento and Sutter Counties. The Sacramento County portion of the Natomas Basin, however, does contain a significant minority population (60.35% of the total population for those census block groups).

4.16.1.2 THRESHOLDS OF SIGNIFICANCE

To prove a violation of Federal environmental justice principles, low-income populations, individuals belonging to minority populations, and/or minority populations (i.e., Native American or Alaskan Native, Asian or Pacific Islander, black, not of Hispanic origin, or Hispanic) must be affected by the project. According to CEQ, two types

of environmental justice impacts may exist: disproportionately high and adverse human health effects and disproportionately high and adverse environmental effects. Determination of disproportionately high and adverse human health effects considers whether any of the following, described below, would exist.

- The health effects, which may be measured in risks and rates, are significant (as employed by NEPA), or above the generally accepted norm. Adverse health effects may include bodily impairment, infirmity, illness, or death.

- The risk or rate of hazard exposure by a minority population, low-income population, or Native American tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceed the risk or rate to the general population or other appropriate comparison group.

- The health effects occur in a minority population, low-income population, or Native American tribe affected by cumulative or multiple adverse exposures from environmental hazards.

Determination of a disproportionately high and adverse environmental effect considers whether any of the following, described below, would exist.

- There is or would be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Native American tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Native American tribes when those impacts are interrelated to impacts on the natural or physical environment.

- The environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Native American tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group.

- The environmental effects occur or would occur in a minority population, low-income population, or Native American tribe affected by cumulative or multiple adverse exposures from environmental hazards.

4.16.2 IMPACTS AND MITIGATION MEASURES

Impact 4.16-a: Potential to Have a Disproportionate High and Adverse Environmental Impact On Any Minority Or Low-Income Populations

No-Action Alternative

No Project Construction

Under the No-Action Alternative, no improvements would be made to the Natomas perimeter levee system and there would be no potential to have disproportionately high and adverse environmental impacts on any minority or low-income populations. There would be no impact. ***(Lesser)***

Potential Levee Failure

Without improvements to the Natomas perimeter levee system, the risk of levee failure would remain high. If the primary location of flooding occurred in the Sacramento portion of the Basin, flooding could cause disproportionately impact to minority or low-income populations by causing displacement of people from their homes, disruption of business, damage to property, and injury or death. However, it is equally probable that a levee breach would occur in the northern half of the Basin (in Sutter County), which has relatively low population density and a low minority population in relation to the total population (23.34%). Determination of the location, and thus the impact of a levee breach is speculative. Therefore, a precise determination of significance is not

possible and cannot be made because the location and extent of the magnitude of the potential impact is unknown. Because of this uncertainty, this potential impact is considered to be **too speculative for meaningful consideration**. ***(Currently Unknown)***

Proposed Action and RSLIP Alternative

The Phase 4a Project would reduce the risk of flooding to existing residential, commercial, and industrial land uses in the Natomas Basin. Although there are low-income and minority populations present in the Sacramento County portion of project area, as described above, the flood protection benefits of the project would accrue to all segments of the population in the Natomas Basin. Environmental impacts would be confined primarily to the work along the Sacramento River east levee, the NCC, and associated borrow sites. The large, concentrated population centers containing most of the residents of the Natomas Basin (and thus minority populations) occur east of I-5, in the southeastern portion of the Basin, in Sacramento County. While people residing in these population centers would benefit from the Proposed Action or RSLIP Alternative, most environmental impacts would not directly affect them because such effects would be confined to the project footprint and the immediate surrounding areas. Temporary exposure to construction noise, dust, and light and glare during project construction would be experienced within the project area. Air quality impacts, and the contribution to the health effects associated with poor air quality, would accrue to the entire air basin and thus would not disproportionately affect minority populations in the Sacramento County portion of the Natomas Basin. No permanent residential relocations would occur in low-income areas or areas with high minority populations. Therefore, the project would have no disproportionately high and adverse environmental impact on any minority or low-income populations in the Natomas Basin.

Executive Order 12898, which is described more fully in Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations," requires that the lead Federal agency consider the effects of an action on Native American tribes and determine if the adverse effects are disproportionate relative to the beneficial aspects of the action. As described in Section 4.8, "Cultural Resources," many elements of the project have the potential to adversely affect cultural resources that possess particular cultural significance and value to Native American individuals and organizations that are culturally affiliated with the prehistoric inhabitants of the Natomas Basin. Construction of improvements such as seepage berms and cutoff walls, as well as the excavation of large quantities of borrow from a range of possible sites, has the potential to damage prehistoric archaeological assemblages, including interred skeletal remains. The ancestors of the Native American tribes that dwelled on the project site in the past may not necessarily experience the direct beneficial aspect of flood damage reduction in the Natomas region. This raises an environmental justice concern because the project could result in disturbance to and/or damage of cultural resources of importance to the Native American community, while the Native American community would not receive a proportionate benefit from flood damage reduction because they live in dispersed locations, largely outside of the Natomas Basin. This is a **significant** impact with respect to environmental justice. ***(Similar)***

Mitigation Measure 4.16-a: Increase the Direct Benefits of the Project for the Ancestors of the Native American Tribes

Proposed Action and Strengthen-Levee-in-Place Alternative

As part of the Phase 4a Project, SAFCA proposes to acquire various properties in the Natomas Basin as compensation for the project's potential impacts, as required under Federal and state laws. As part of the process for restoring these lands, SAFCA shall implement the following measures to address environmental justice and increase the direct benefits to the ancestors of the Native American tribes that would bear disproportionate adverse effects:

- consult with appropriate Native American representatives to identify plant species of value for traditional cultural uses;
- consult with Native American representatives to identify traditional cultural activities that could occur on these lands, consistent with habitat conservation and safety objectives;

- to the extent feasible, include identified plant species in the planting palettes developed for habitat conservation;
- to the extent feasible, establish easements or other protective measures on these properties that include access for appropriate Native American representatives for plant gathering and other traditional cultural activities; and
- where feasible, also provide access to appropriate Native American representatives to the river front on acquired parcels that have access to the Sacramento River, provided that access does not permit the construction of physical structures on the levee, beaches, or in the river without prior approval from the appropriate regulatory agency.

Implementation of these measures would reduce the impact to a **less-than-significant** level because it would provide the ancestors of the Native American tribes with a benefit that would offset the disproportionate burden created by impacts to cultural resources of concern, and of great value to the Native American community, caused by the Proposed Action and the RSLIP Alternative. ***(Similar)***

4.16.3 RESIDUAL SIGNIFICANT IMPACTS

In the event of a levee failure under the No-Action Alternative, impacts to minority or low-income populations or Native American tribes are uncertain. Because of this uncertainty, these potential impacts are considered too speculative for meaningful consideration. Additionally, mitigation measures cannot be required for the No-Action Alternative; therefore impacts that result from the No-Action Alternative would not be mitigated.

With implementation of the mitigation measures described in this section, project implementation would not result in any residual significant impacts related to environmental justice.

5 CUMULATIVE AND GROWTH-INDUCING IMPACTS, AND OTHER STATUTORY REQUIREMENTS

5.1 CUMULATIVE IMPACTS

The following analysis includes the overall cumulative impacts of the Natomas Levee Improvement Program (NLIP) Phase 4a Project taken together with other past, present, and probable (i.e., reasonably foreseeable) future projects producing related impacts, as required by NEPA implementing regulations (40 Code of Federal Regulations [CFR] 1508.7) and the State CEQA Guidelines (14 California Code of Regulations [CCR] Section 15130). The goal of such an exercise is twofold: first, to determine whether the effects of all such projects would be cumulatively significant; and second, to determine whether the Phase 4a Project individually would cause a "cumulatively considerable" (and thus significant) *incremental* contribution to any such cumulatively significant impacts. (See the State CEQA Guidelines [CCR Sections 15064(h), 15065(a)(3), 15130(a), 15130(b), and 15355(b)] and *Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 120.)

The Council on Environmental Quality (CEQ) regulations implementing provisions of NEPA define cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively significant, actions over time and differ from indirect impacts (40 CFR 1508.8). They are caused by the incremental increase in total environmental effects when the evaluated project is added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can thus arise from causes that are totally unrelated to the project being evaluated, and the analysis of cumulative impacts looks at the life cycle of the effects, not the project at issue.

Cumulative impacts are defined in the State CEQA Guidelines (CCR Section 15355) as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact occurs from "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects (see also CCR Section 15130[a][1]). Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (CCR Section 15355[b]).

Consistent with the State CEQA Guidelines (CCR Section 15130[a]), the following discussion of cumulative impacts focuses on significant and potentially significant cumulative impacts. The State CEQA Guidelines (CCR Section 15130[b]) state that:

> The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

This section identifies the resources that would be significantly adversely affected by the project in combination with other actions, and assesses the extent of potential cumulative impacts. To frame the discussion of cumulative impacts, a description of relevant NLIP environmental documents that are incorporated by reference in this EIS/EIR is provided below.

5.1.1 GEOGRAPHIC SCOPE AND TIMEFRAME

The geographic area that could be affected by the proposed project varies depending on the type of environmental issue being considered. When the effects of the proposed project are considered in combination with those other past, present, and future projects to identify cumulative impacts, the other projects considered may also vary depending on the type of environmental effects being assessed. The general geographic area associated with different environmental effects of the proposed project defines the boundaries of the area used for compiling the list of projects considered in the cumulative impact analysis. **Table 5-1** presents the general geographic areas associated with the different resources addressed in this EIS/EIR.

The timeframe for consideration of cumulative impacts is approximately 30 years, generally consistent with the timeframe for buildout of approved and proposed specific plan development projects in the Natomas Basin.

5.1.2 APPROACH TO PHASE 4A PROJECT CUMULATIVE IMPACT ANALYSES

The Phase 4a Project cumulative impact analysis incorporates by reference the cumulative impact analyses from previous NLIP environmental documents. Information that was not known at the time of preparation of the earlier documents is also presented in this chapter, as well as any cumulative impacts not previously covered in the earlier documents. The analysis specifically addresses the potential cumulative effects from the overlap of construction of the Phase 2, 3, and 4a Projects, if it occurs (i.e., a reasonable worst-case scenario). As discussed in Section 5.1.8, below, any overlapping construction of these three project phases may increase the severity of an environmental effect in the event that these phases are constructed simultaneously.

5.1.3 SUMMARY OF CUMULATIVE IMPACT ANALYSES FROM PREVIOUS NATOMAS LEVEE IMPROVEMENT PROGRAM ENVIRONMENTAL DOCUMENTS

This document analyzes the Phase 4a Project, in accordance with the requirements of NEPA and CEQA. Because this document provides project-level analysis that is tiered from previous program-level analysis, relevant material from the previous documents (listed below) is incorporated by reference in accordance with State CEQA Guidelines Section 15150(c). Incorporation by reference is encouraged by both NEPA (40 CFR 1500.4, 1502.21) and CEQA (State CEQA Guidelines CCR Section 15150). Both NEPA and CEQA require brief citation and summary of the referenced material and the public availability of this material. CEQA also requires citation of the state identification number (i.e., State Clearinghouse Number) of the previous EIRs cited.

This section summarizes the analysis of cumulative impacts conducted for (1) the funding mechanisms that provide funding for the project, (2) the NLIP as a whole, (3) the Phase 2 Project, and (4) the Phase 3 Project. The program-level and cumulative impact analyses contained in the following documents are incorporated by reference herein:

- *Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area*, State Clearinghouse No. 2006072098 (SAFCA 2007a) (Local Funding EIR);

- *Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project*, State Clearinghouse No. 2007062016 (SAFCA 2007b) (Phase 2 EIR);

- *Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project* (USACE 2008) (Phase 2 EIS);

Table 5-1
Geographic Areas that Would Be Affected by the Phase 4a Project

Resource Area	Geographic Area
Agriculture	Natomas Basin, with regional implications
Land use	Not applicable, because the only potential impacts on land use from the project relate to possible inconsistency with adopted land use plans and policies, and inconsistency with policies is not cumulative. Land use is not addressed further in this cumulative impact analysis
Socioeconomics, population and housing	Local (population and housing near the project site)
Geology, soils, and mineral resources	Individual construction sites and other ground disturbance sites within the Natomas Basin
Hydrology	Drainage system on the west and east sides of the Natomas Basin and individual grading sites
Hydraulics	Sacramento River system in the vicinity of Natomas Basin
Groundwater	Natomas Basin
Water quality	Ditches and canals on the west and east sides of the Natomas Basin, with implications for the Sacramento River system in the vicinity of Natomas Basin
Biological resources	
Woodland habitat	Natomas Basin, with regional implications
Wildlife corridors	Natomas Basin, with regional implications
Sensitive aquatic habitat	Natomas Basin
Special status plant species	Natomas Basin, with regional implications
Special status wildlife species	Natomas Basin, with regional implications
Fish and aquatic habitats	Habitat at individual waterside improvement sites, with regional implications for species
Cultural resources	Individual ground disturbance sites, with regional implications
Paleontological resources	Individual ground disturbance sites within the Natomas Basin
Transportation and circulation	Roadway network in the Natomas Basin, with regional implications
Air quality	Regional (FRAQMD and SMAQMD); global for greenhouse gas emissions
Noise	Immediate vicinity of the individual sites of construction activity
Recreation	Local (facilities near construction sites)
Visual resources	Individual levee improvement sites and landscape level
Utilities and service systems	Local service areas
Hazards and hazardous materials	Individual construction and other ground disturbance sites
Airport safety	Airport
Wildlife hazards	Individual construction sites within the Natomas Basin
Environmental justice	Natomas Basin and affected Tribe

Notes: Airport = Sacramento International Airport; FRAQMD = Feather River Air Quality Management District; SMAQMD = Sacramento Metropolitan Air Quality Management District; NA = not applicable; SMAQMD = Sacramento Metropolitan Air Quality Management District
Source: Data compiled by EDAW in 2009

- *Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project—Phase 2 Project,* State Clearinghouse No. 2007062016 (SAFCA 2009) (Phase 2 SEIR); and

- *Draft Environmental Impact Statement/Draft Environmental Impact Report on the Natomas Levee Improvement Program, Phase 3 Landside Improvements Project*, State Clearinghouse No. 2008072060 (USACE and SAFCA 2009) (Phase 3 DEIS/DEIR).

Relevant portions of these documents, where specifically noted, are summarized throughout this EIS/EIR. Printed copies of these documents are available to the public at SAFCA's office at 1007 7th Street, 7th Floor, Sacramento, California, during normal business hours, and are also available on SAFCA's Web site, at http://www.safca.org/Programs_Natomas.html.

The previous NLIP documents listed above included a programmatic and cumulative impact analysis of all NLIP project phases (1–4), including the phase now referred to as the Phase 4a Project. Refer to Chapter 1.0, "Introduction and Statement of Purpose and Need," for a summary of each project phase and **Table 1-3**, which presents the proposed components and construction timing of the NLIP Phase 1, 2, 3, and 4 Projects.

These analyses of cumulative impacts from previous program- and project-level analysis are incorporated by reference for purposes of tiering the discussion of cumulative impacts for the Phase 4a Project in the following section.

5.1.3.1 Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area (SAFCA 2007a)

Project Impacts that Would Not Be Cumulatively Considerable

In the Local Funding EIR (SAFCA 2007a), SAFCA analyzed the environmental effects associated with the creation of a new assessment district to fund necessary flood damage reduction measures in the Sacramento region. This funding supports projects including the NLIP and the Phase 4a Project, and thus analyzes, at a programmatic level, the environmental effects for a program of flood damage reduction projects in the region, including the NLIP (Phases 1–4).

For the following resource areas, SAFCA found that implementation of local funding mechanisms to fund the NLIP, among other projects, would not result in a cumulatively considerable contribution to the following significant impacts. These effects of the proposed project would not be added to the effects of other related projects because the effects were temporary, localized, or isolated:

- **Geology and Soils:** With the application of mitigation measures, temporary, localized soil erosion and topsoil loss resulting from the project's grading and other earthmoving activities would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hydrology:** Because of the project design, drainage disruption and alteration of runoff patterns from the proposed project would be limited to the project site; therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Water Quality and Fisheries and Aquatic Resources:** Through compliance with the existing regulatory regimes and the implementation of mitigation measures for instream habitat improvements and shaded riverine aquatic (SRA) habitats, the project's impacts to water quality and fish resulting from past and present actions, the creation of an assessment district and subsequent funded improvements, as well as reasonably

foreseeable future actions, would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Terrestrial Biological Resources:** SAFCA found that implementation of local funding mechanisms had the potential to contribute to the loss or degradation of sensitive habitats and to adversely affect special-status species (special-status plants, Swainson's hawks, burrowing owls, other nesting raptors, giant garter snakes, valley elderberry longhorn beetle host plants, and others). Because SAFCA would implement avoidance and compensation measures in accordance with the requirements of the Federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), and California Fish and Game Code Section 1602 (Streambed Alteration Agreement), and would include additional habitat protection and enhancement components, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Paleontological Resources:** Earthmoving activities resulting from projects funded by creation of local funding mechanisms could damage unknown unique paleontological resources. SAFCA determined the project would not result in a cumulatively considerable contribution to a significant cumulative impact because potential impacts would be located in discrete locations and would be mitigated.

- **Transportation and Circulation:** Construction activities related to levee and channel improvement projects would temporarily increase traffic levels on local and regional roadways, sometimes substantially. Considering that impacts on traffic would be localized, intermittent, and temporary, SAFCA found that projects funded by new local funding mechanisms would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Noise:** Construction noise effects associated with the proposed projects made possible by new local funding were considered to be significant and unavoidable, but because they would be localized, intermittent, and temporary, the incremental effects of the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Recreation:** The analysis focused on project effects on water-dependent recreational activities on the Lower American River and Sacramento River, and on impacts related to encroachment onto the American River Parkway land. Impacts on recreation were primarily related to foreseeable improvements to Folsom Dam. Effects of levee repair and strengthening and of erosion control activities would be limited to localized areas within the Sacramento area, which has an abundance of water-dependent and water-enhanced recreation opportunities. Temporary construction effects and minor permanent impacts would be minimized through replacement of parkway land, design modifications, and coordination with the public and recreation agencies ensuring that any residual effects would be minimized. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Utilities and Service Systems:** Implementation of flood damage reduction funded by new local funding mechanisms could result in impacts to utilities and service systems. The effects resulting from temporary disruptions to service would be geographically isolated and short in duration. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hazards and Hazardous Materials:** If hazardous materials are encountered during construction of improvements funded by the new local funding mechanisms, effects would be localized and would not be expected to be additive with the effects of other actions. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

Project Impacts that Would Be Cumulatively Considerable

As identified in the Local Funding EIR (SAFCA 2007a), implementation of local funding mechanisms (referred to below as "the project") would result in a cumulatively considerable contribution to significant cumulative impacts for the following resource areas:

- **Agriculture and Land Use:** In combination with the permanent conversions of Important Farmland associated with past, current, and future projects, particularly in the Natomas area, the contribution caused by improvements funded by the project would be significant and unavoidable because there are no feasible means of replacing Important Farmland after it has been converted to nonagricultural uses. For these reasons, the project and related projects would result in a cumulatively considerable (i.e., significant) impact associated with agricultural land conversion, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Cultural Resources:** SAFCA found that it is likely that known or unknown archaeological resources could be disturbed, and cultural resources damaged or destroyed during project-related construction activities. Significant and unavoidable losses of a unique archaeological resource as defined in Public Resources Code (PRC) Section 21083.2 could occur where excavations encounter archaeological deposits that cannot be removed or recovered (e.g., under levees). Historic resources could also be damaged or require removal from areas near flood damage reduction facilities under levee integrity program activities. If these resources would meet the definition of historical resources as defined in PRC Section 21084.1 or are eligible for listing on the National Register of Historic Places according to Section 106, their modification or destruction would be considered significant. Although mitigation would be implemented to reduce effects on potentially significant cultural resources, significant impacts, particularly on archaeological resources, may still occur. Losses of archaeological resources would add to an historical trend in the loss of these resources as artifacts of cultural significance and as objects of research importance. For these reasons, the project and related projects would result in a cumulatively considerable (i.e., significant) impact associated with cultural resources, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Air Quality:** The project would fund construction of improvements which would result in significant and unavoidable temporary and short-term construction-related air quality impacts associated with generation of oxides of nitrogen (NO_X) and respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), even with implementation of mitigation measures. Other medium-sized and large reasonably foreseeable projects, such as the anticipated developments in the Natomas area, would similarly contribute substantially to air quality impacts. Given the large scale of development that is expected in the Natomas Basin alone, as well as the nonattainment status of the Sacramento Valley Air Basin for ozone and PM_{10}, cumulative construction-related air quality impacts are expected to be significant and unavoidable. For these reasons, the project and related projects would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Visual Resources:** Levee improvements in the Natomas area funded by the project would include the removal of trees, other vegetation, and possibly agricultural structures where the levee toe needs to be widened or a berm would be constructed. Bank protection and long-term levee integrity program actions in this area could also require the removal of vegetation and other features that currently add to the rural and riverine character of views in the area. SAFCA found that these changes would contribute to the substantial degradation of scenic resources in Natomas and determined that changes to scenic resources resulting from the proposed project when combined with the past and anticipated future actions would be significant and unavoidable. For these reasons, the project and related projects would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

5.1.3.2 Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project (SAFCA 2007b)

The construction of flood damage reduction measures in the Natomas Basin were analyzed in the Phase 2 EIR at a program- and a project-level. The improvements would provide 100-year flood damage reduction while laying the groundwork for creation of 200-year flood damage reduction over time (SAFCA 2007b).

Project Impacts that Would Not Be Cumulatively Considerable

For the following resource areas, SAFCA found that implementation of the Landside Improvements Project (referred to below as "the project"), including the Phase 4a Project, evaluated in the Phase 2 EIR (SAFCA 2007b), would not result in a cumulatively considerable contribution to the following significant cumulative impacts because the effects of the proposed project would not be added to the effects of other related projects as the effects were either temporary, localized, or isolated:

- **Geology and Soils:** SAFCA found that through the implementation of Best Management Practices (BMPs) during grading and other earthmoving activities would reduce the temporary and localized soil erosion and topsoil loss to a less-than-significant level. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Local Drainage:** The widening of levees and construction of landside seepage berms along the Sacramento River east levee, associated modification of irrigation and drainage infrastructure, and borrow activities on large parcels could interfere with the functioning of drainage systems and alter surface drainage. Project design would incorporate measures to prevent a significant drainage disruption or alteration in runoff patterns, and any temporary effects would be limited to the vicinity of the individual disturbance sites. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Water Quality and Fisheries and Aquatic Resources:** Construction activities have the potential to temporarily degrade water quality and fish habitat and populations through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff. SAFCA determined that by complying with the regulatory regime and through design features for fish habitat and SRA habitat that the projects impacts on water quality and fish when added with past, present, and future projects, would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Terrestrial Biological Resources:** Implementation of the proposed project has the potential to contribute to the loss or degradation of sensitive habitats and to adversely affect special-status terrestrial species (special-status plants, valley elderberry longhorn beetle, giant garter snake, Swainson's hawk, burrowing owl, and others). These effects could contribute to species declines and losses of habitat that have led to the need to protect these species under the Federal ESA and CESA. Because SAFCA would implement minimization, avoidance, and compensation measures in accordance with the requirements of ESA, CESA, and other relevant regulatory requirements, and the project would include additional habitat protection and enhancement components, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Paleontological Resources:** Earthmoving activities could damage unknown unique paleontological resources, but potential damage would occur in discrete locations and the significance would be reduced to a less-than-significant level with the incorporation of mitigation measure. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Transportation and Circulation:** The proposed construction activities would temporarily increase traffic levels on local and regional roadways. Mitigation would be implemented to reduce effects to the extent feasible, but the proposed project would still result in substantial temporary increases in traffic in relation to the existing traffic load. Because of the limited potential for the traffic associated with the proposed project to combine with increased traffic from other probable future projects, and because of the short-term, intermittent nature of any cumulative traffic impacts, SAFCA determined that the project not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Recreation:** Effects of the proposed project on recreational uses would be limited to potential disturbance of access to facilities in the western part of the Natomas Basin during construction, potential temporary degradation in the quality of recreational experiences as a result of construction activity and noise, and potential removal of land at the City of Sacramento's undeveloped Costa Park site from future recreational use. Because of the temporary nature of the construction effects, these effects are not considered substantial enough to make a cumulatively considerable contribution to a cumulative impact. The potential encroachment on the Costa Park site would be a localized effect that would be offset through compensation in the form of payment or land. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Utilities and Service Systems:** SAFCA found that disruption to utilities and services resulting from construction of the landside improvements would be localized and temporary. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hazardous Materials:** With the implementation of mitigation, SAFCA found that the potential exposure of people or the environment to hazardous materials encountered during construction activity or to fire hazards would not expected to be additive with the effects of other past, present, and probable future actions. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hazards Related to Airport Operations:** The potential for night lighting of project areas that would adversely affect aircraft operations is a function of the location of construction areas in relation to the Sacramento International Airport Critical Zone and the runway approaches. There are no other known projects that would affect lands within the Airport Critical Zone. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

Project Impacts that Would Be Cumulatively Considerable

As identified in the Phase 2 EIR (SAFCA 2007b), the Landside Improvements Project (referred to below as "the project") would result in a cumulatively considerable contribution to significant cumulative impacts for the following resource areas:

- **Agricultural Resources:** Implementation of the project would involve the permanent conversion of large acreages of Important Farmland (Prime Farmland and Farmland of Statewide Importance). SAFCA found that the conversion of agricultural land that would result from the project in combination with the past conversions and expected future conversions of Important Farmland in the Natomas Basin would be significant and unavoidable because it is not feasible to replace farmland by creating new farmland after it has been converted to nonagricultural uses. For these reasons, the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with agricultural land conversion, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Cultural Resources:** SAFCA determined that it is likely that known or unknown archaeological resources could be disturbed and cultural resources damaged or destroyed during construction activities for the

proposed project. Historic resources could also be damaged or require removal from areas near flood damage reduction facilities under the proposed project. Losses of archaeological resources would add to a historical trend in the loss of these resources as artifacts of cultural significance and as objects of research importance. Despite the implementation mitigation measures, the project has the potential to result in a significant and unavoidable impact on cultural resources. For these reasons, the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with cultural resources, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Air Quality:** Probably future projects will contribute to air pollutant emissions in Sutter and Sacramento Counties and to the nonattainment status of the Feather River Air Quality Management District (FRAQMD) and the Sacramento Metropolitan Air Quality Management District (SMAQMD) for ozone and PM_{10}. When taken in total with other projects in the region, the project's construction-related emissions was considered significant and unavoidable cumulatively considerable. For these reasons, the project and related projects would result in cumulatively considerable (i.e., significant) impacts associated with temporary and short-term air quality impacts (ozone and PM_{10}), and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

  In comparison to criteria air pollutants, such as ozone and PM_{10}, carbon dioxide (CO_2) emissions persist in the atmosphere for a much longer period of time. Greenhouse gas (GHG) emissions generated by the proposed project would predominantly be in the form of CO_2. Project construction would result in a net increase in emissions to occur over a period of 3 years (2008–2010), despite the implementation of mitigation measures. While any increase in GHG emissions would add to the quantity of emissions that would contribute to global climate change, it is noteworthy that emissions associated with the proposed project occur over a finite period of time (3 years), as opposed to operational emissions, which would occur over the lifetime of a project. SAFCA determined that the project's incremental contribution to climate change from construction emissions would be significant and unavoidable. For these reasons, the project and related projects would result in cumulatively considerable (i.e., significant) GHG impact and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Noise:** The project would have a temporary significant effect on noise levels experienced by the occupants of residences that are near sites of construction activity or haul routes for construction traffic. In some locations along the Sacramento River east levee, construction work could take place simultaneously as part of the proposed project on the landside of the Sacramento River east levee and/or the west end of the NCC and on the waterside of the levee as part of SAFCA's bank protection project. These two projects, if constructed in the same locations during the same time periods, have the potential to cumulatively affect noise levels at residences on the waterside of the levee. SAFCA found that residents in these locations could be exposed simultaneously to increased noise levels from levee improvements on the landside of the levee and bank protection activities on the waterside, including during noise-sensitive hours. No feasible mitigation measures are available. For these reasons, the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with noise, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Visual Resources:** The project would include the removal of trees, other vegetation, and structures from the landside of the Sacramento River east levee within the footprint of the adjacent levee and berms, may include the removal of some vegetation and structural encroachments from the waterside of the Sacramento River east levee as part of encroachment removal actions, and would include the removal of trees from areas along the waterside of the NCC south levee. These changes would contribute to the substantial degradation of scenic resources in Natomas that are expected to result with various reasonably foreseeable development projects and expansion of Airport facilities. Although the project includes the establishment of a substantial acreage of woodland plantings around the basin to offset the significant effect of the project on scenic resources, the contributions of the project to changes in the visual character and scenic resources of the Natomas Basin in

the near term, before the new plantings become well established, would be cumulatively considerable. This impact, in the near term, would be significant and unavoidable. For these reasons, the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with the degradation of visual resources, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

5.1.3.3 Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project (USACE 2008)

The environmental effects from SAFCA's Phase 2 Project were analyzed in an EIS, for which USACE issued a record of decision (ROD) in January 2009.

Project Impacts that Would Not Be Cumulatively Considerable

For the following resource areas, USACE found that implementation of the NLIP, including the Phase 4a Project, would not result in making a cumulatively considerable contribution to a significant cumulative impact because the effects of the proposed project would not be added to the effects of other projects (i.e., no cumulative impact is expected to occur), or because the contribution of the project would not result in a cumulatively considerable contribution to a significant cumulative impact:

- **Geology and Soils:** Grading and other earthmoving activities could result in temporary, localized soil erosion and topsoil loss. These effects would be site specific, particularly with implementation of construction BMPs and any residual effects are not expected to be additive with the effects of any other activities. USACE determined that the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Local Drainage:** The widening of levees along the Sacramento River east levee, associated modification of irrigation and drainage infrastructure, and borrow activities on large parcels could interfere with the functioning of drainage systems and alter surface drainage. Project design would incorporate measures to prevent a significant drainage disruption or alteration in runoff patterns, and any temporary effects would be limited to the vicinity of the individual disturbance sites. Therefore, USACE determined that the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Water Quality and Fish and Aquatic Habitat:** The project would have the potential to degrade water quality and fish habitat by releasing soil and construction materials into directly into water bodies or through runoff. Implementation of BMPs and a storm water pollution prevention plan would ensure that these impacts are less than significant and would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Groundwater:** USACE found that Phase 2 improvements would not have a significant effect on groundwater; however, the Phase 3, 4a, and 4b Projects have the potential to result in significant impacts on groundwater recharge. USACE further found that it would be unlikely that other projects described above would substantially adversely affect groundwater recharge, although as lands are converted from agricultural use to developed uses, some reduction in groundwater recharge from deep percolation of irrigation water can be expected. Mitigation measures require SAFCA to remediate direct and significant cumulative effects; therefore, this impact would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Sensitive Aquatic Habitats:** The project would include excavation and the placement of fill in sensitive aquatic habitats, resulting in both temporary and permanent effects. With the exception of TNBC-managed

lands and Airport mitigation sites that have been developed in the last decade, the overall trend in wetlands and other aquatic habitats within the Natomas Basin is a reduction in acreage and habitat values. Because the project would include the creation of acreages of waters of the United States that are expected to more than offset the filling and dewatering of waters of the United States included in the project, and because new jurisdictional habitats would be created and managed in a manner that minimizes maintenance disturbance and provides the essential functions of the habitats that would be lost, USACE determined that overall effects of the project would be beneficial. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Terrestrial Biological Resources:** Implementation of the project has the potential to contribute to the loss or degradation of sensitive habitats and to adversely affect special-status terrestrial species (special-status plants, valley elderberry longhorn beetle, giant garter snake, Swainson's hawk, burrowing owl, and others). SAFCA determined that implementation of project components and mitigation measure would similarly ensure that potential adverse effects on other special-status species and on sensitive habitats are reduced to a less-than-significant level. Therefore, USACE determined that the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Paleontological Resources:** Earthmoving activities could damage unknown unique paleontological resources, but potential damage would be limited by mitigation and would be limited to individual resources in discrete locations. USACE determined that the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Transportation and Circulation:** Effects of construction activities on emergency access would be site-specific, intermittent, and temporary, and are not expected to be cumulatively considerable. The proposed construction activities would temporarily increase traffic levels on some local and regional roadways, but the majority of truck trips would take place off of public roads. In general, the temporary traffic increases associated with the proposed action would be limited to specific roadways. There are no other anticipated projects in the vicinity of the project that are likely to compound the significant temporary traffic effects of the project. Because of the limited potential for the traffic associated with the project to combine with increased traffic from other future projects, and because of the short-term, intermittent nature of any effects, USACE determined that the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Noise:** The project would have a significant effect on noise levels experienced by the occupants of residences that are near sites of construction activity or haul routes for construction traffic. However, there are no other known projects in the vicinity of proposed project activity (borrow sites, rural roadways, and levee and canal construction areas) that would generate noise levels noticeably above ambient noise levels, which are generated by sources that include aircraft operations, truck traffic on area roadways, and agricultural activity. Therefore, the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Recreation:** Effects of the proposed project on recreational uses would be limited to potential disturbance of access to facilities in the western part of the Natomas Basin during construction, potential temporary degradation in the quality of recreational experiences as a result of construction activity and noise, and potential removal of land at the City of Sacramento's undeveloped Costa Park site from future recreational use. USACE determined that the construction effects and access restrictions or degradation of the quality of recreational experiences would be temporary and therefore not cumulatively considerable. Potential encroachment on the Costa Park site would be a localized effect that would be offset through compensation in the form of payment or land. USACE determined there would be USACE determined that the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Utilities and Service Systems:** Construction may damage irrigation systems and public utility infrastructure, resulting in temporary disruptions to service. Coordination with irrigation system users and consultation with service providers and implementation of appropriate protection measures would minimize the possibility that any significant effect would occur. Any such incidents would be isolated and would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hazardous Materials:** Mitigation would be implemented to minimize the potential for exposure of people or the environment to hazardous materials encountered during construction activity or to fire hazards. If hazardous materials are encountered or a fire outbreak occurs, the effects would be localized and would not be expected to be additive with the effects of other projects. USACE determined that the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hazards Related to Airport Operations:** The potential for night lighting of project areas to affect aircraft operations is a function of the location of construction areas in relation to the Airport Critical Zone and the runway approaches. Potential effects would be reduced through lighting restrictions and coordination with the Sacramento County Airport System (SCAS). The project has the possibility of causing increased bird strikes resulting from broad changes to managed land cover types in or near the Airport Critical Zone. There are no other known projects that would affect lands within the Airport Critical Zone. USACE found that the project would not result in a cumulatively considerable contribution to a significant cumulative impact.

Project Impacts that Would Be Cumulatively Considerable

As identified in the Phase 2 EIS (USACE 2008), the NLIP (referred to below as "the project") would result in a cumulatively considerable contribution to significant cumulative impacts for the following resource areas:

- **Agricultural Resources:** Implementation of the project would involve the conversion of large acreages of Important Farmland (Prime Farmland and Farmland of Statewide Importance) to managed marsh and managed grassland at borrow sites, and would entail the conversion of portions of agricultural parcels to nonagricultural uses at levee toe widening, berm, and new canal alignment locations. The proposed project would result in the conversion of agricultural land to non-agricultural uses and, in combination with the conversions of Important Farmland in the Natomas Basin associated with past, current, and probable future projects. For these reasons, USACE determine that the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with agricultural land conversion, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Cultural Resources:** Prehistoric human habitation sites are common in riverbank and floodplain areas, and burial sites are often encountered in the course of ground-disturbing activities. It is likely that known or unknown archaeological resources could be disturbed and cultural resources damaged or destroyed during construction activities for the project. Losses of a unique archaeological resource could occur where excavations encounter archaeological deposits that cannot be removed or recovered (e.g., under levees), or where recovery would not be sufficient to prevent the loss of significance of the cultural materials. Historic resources could also be damaged or require removal from areas near flood damage reduction facilities under the proposed project. If these resources would be eligible for National Register of Historic Places (NRHP) listing, their modification or destruction would be considered significant. Although mitigation would be implemented to reduce effects on potentially significant cultural resources, adverse effects, particularly on archaeological resources, may still occur. Losses of archaeological resources would add to a historical trend in the loss of these resources as artifacts of cultural significance and as objects of research importance. For these reasons, despite the implementation of mitigation measures, USACE determined that the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with cultural resources, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Air Quality:** Future projects will contribute to air pollutant emissions in Sutter and Sacramento Counties and to the nonattainment status of the FRAQMD and the SMAQMD for ozone and respirable particulate matter 10 micrometers or less (PM_{10}). The project would cause an impact to air quality through construction emissions. For these reasons, USACE determined that the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with temporary with short-term construction-related ozone and PM_{10} emissions, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

  In comparison to criteria air pollutants, such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a much longer period of time. GHG emissions generated by the proposed project would predominantly be in the form of CO_2. Project construction would result in a net increase in emissions to occur over a period of 3 years (2008–2010), despite the implementation of mitigation measure. Because of the intensity and duration of construction activities, and the lack of available mitigation measures to abate GHG emissions from heavy-duty construction equipment exhaust and on-road hauling emissions, the project's construction emissions would be significant and unavoidable with respect to climate change. For these reasons, USACE determined that the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with GHGs, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Visual Resources:** The project would include the removal of trees, other vegetation, and structures from the landside of the Sacramento River east levee within the footprint of the adjacent setback levee and berms, may include the removal of some vegetation and structural encroachments from the waterside of the Sacramento River east levee as part of encroachment removal actions, and would include the removal of trees from areas along the waterside of the NCC south levee. The additional levee and bank protection improvements needed to achieve a 200-year level of flood damage reduction in the Natomas Basin along with SAFCA's proposed levee integrity program would also require the removal of vegetation and other features that currently add to the rural and riverine character of views in the area. These changes would contribute to the substantial degradation of scenic resources in Natomas that are expected to result with various development projects and expansion of Airport facilities. Although the project includes the establishment of a substantial acreage of woodland plantings around the basin to offset the significant effect of the project on scenic resources (oak and other native trees), the plantings would require several years to become well established. For these reasons, USACE determined that the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with changes in visual character and scenic resources, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact in the Natomas Basin in the near term.

5.1.3.4 SUPPLEMENT TO THE ENVIRONMENTAL IMPACT REPORT ON THE NATOMAS LEVEE IMPROVEMENT PROGRAM, LANDSIDE IMPROVEMENTS PROJECT––PHASE 2 PROJECT (SAFCA 2009)

After the November 2007 certification of the Phase 2 EIR, SAFCA made minor modifications to the design of the Phase 2 Project. The Phase 2 SEIR (SAFCA 2009) was prepared by SAFCA to evaluate these modifications; the SAFCA Board of Directors certified the SEIR in January 2009, at which time the Board also approved the modifications to the Phase 2 Project.

No new cumulative impacts were identified in the Phase 2 SEIR.

5.1.3.5 DRAFT ENVIRONMENTAL IMPACT STATEMENT/DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE NATOMAS LEVEE IMPROVEMENT PROGRAM PHASE 3 LANDSIDE IMPROVEMENT PROJECT (USACE AND SAFCA 2009)

The environmental effects from SAFCA's Phase 3 Project were analyzed in an EIS/EIR. Two action alternatives were addressed: the Proposed Action (adjacent levee) and the Levee-Raise-in-Place Alternative.

Cumulative Impact Analysis: Project Impacts That Would Not Be Cumulatively Considerable

For the following resource areas, USACE and SAFCA found that implementation of the NLIP, including the Phase 4a Project, would not result in making a cumulatively considerable contribution to a significant cumulative impact because the effects of the project would not be added to the effects of other projects (i.e., no cumulative impact is expected to occur), or because the contribution of the project would not result in a cumulatively considerable contribution to a significant cumulative impact:

- **Geology and Soils:** Grading and other earthmoving activities could result in temporary, localized soil erosion and topsoil loss. These site-specific impacts would be less than significant, with implementation of construction BMPs, and any residual impacts are not expected to be additive with the effects of any other activities. USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hydrology and Hydraulics (Excluding Groundwater):** The project would not significantly alter water surface elevations in the project area or in the larger SRFCP, or contribute cumulatively to any such alteration. The widening of levees along the Sacramento River east levee, associated modification of irrigation and drainage infrastructure, and borrow activities on large parcels could interfere with the functioning of drainage systems and alter surface drainage. Project design would incorporate measures to prevent a significant drainage disruption or alteration in runoff patterns and any temporary impacts would be limited to the vicinity of the individual disturbance sites. Each related project that would discharge stormwater runoff would also be required to comply with NPDES discharge permits from the Central Valley RWQCB, which are designed to prevent significant water quality-related impacts. Therefore, USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Groundwater:** The impacts of the project include reduction in irrigated lands covered by the footprint of the proposed levee improvements, increase in recharge from the proposed canal improvements, and changes in land use and irrigation practices following excavation of soil and reclamation of the potential borrow sites. Overall, the project would have a small positive impact on groundwater supplies in the Natomas Basin and a small negative impact on groundwater east of the Natomas Basin based on existing conditions. There would be a small positive change in groundwater storage in the Natomas Basin with the project. Overall, the cumulative impact of the project on future groundwater conditions is predicted to be negligible. Therefore, USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Sensitive Aquatic Habitats:** The project would include excavation and the placement of fill in sensitive aquatic habitats, resulting in both temporary and permanent effects. With the exception of TNBC-managed lands and Airport mitigation sites that have been developed in the last decade, the overall trend in wetlands and other aquatic habitats within the Natomas Basin is a reduction in acreage and habitat values. Because the project would include the creation of acreages of waters of the United States that are expected to more than offset the filling and dewatering of waters of the United States included in the project, and because new jurisdictional habitats would be created and managed in a manner that minimizes maintenance disturbance and provides the essential functions of the habitats that would be lost, USACE and SAFCA determined that

overall effects of the project on sensitive aquatic habitats would be beneficial. Therefore, neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Paleontological Resources:** Earthmoving activities could damage unknown unique paleontological resources, but potential damage would be limited by implementation of mitigation measures, and would be limited to individual resources in discrete locations. Because of the low probability that any project would encounter unique, scientifically-important fossils, and the benefits that would occur from recovery and further study of those fossils if encountered, development of the related projects and other development in the region are not considered to result in a cumulatively considerable impact related to paleontological resources. Therefore, USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Transportation and Circulation:** Impacts of construction activities on emergency access would be site-specific, intermittent, and temporary, and are not expected to be cumulatively considerable. The proposed construction activities would temporarily increase traffic levels on some local and regional roadways, but the majority of truck trips would take place off of public roads. There are no other anticipated projects in the vicinity that are likely to compound the significant temporary traffic impacts of the project. Because of the limited potential for the traffic associated with the project to combine with increased traffic from other future projects, and because of the temporary, short-term, intermittent nature of any impacts, no cumulatively significant traffic impacts are expected to occur. Therefore, USACE and SAFAC determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Noise:** Both action alternatives would have a significant and unavoidable project-level impact on noise levels experienced by the occupants of residences that are near sites of construction activity or haul routes for construction traffic. A substantial number of residences are located adjacent to the NEMDC where cutoff walls would be installed. However, there are no other known projects in the vicinity of proposed project activity (borrow sites, rural roadways, levee and canal construction areas) that would generate noise levels noticeably above ambient noise levels, which are generated by sources that include aircraft operations, truck traffic on area roadways, and agricultural activity. Therefore, USACE and SAFCA determined that neither action alternative is expected to contribute to any significant cumulative noise impact. This localized impact would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Recreation:** Impacts of the project on recreational uses would be limited to potential temporary disturbance of access to facilities on the western, eastern, and southern perimeter of the Natomas Basin during construction; potential temporary degradation in the quality of recreational experiences as a result of construction activity and noise; and damage to recreational facilities on and adjacent to the NEMDC (Ueda Parkway bicycle trail and Gardenland Park). Reconstruction and restoration of damaged park facilities would be required. Because of the temporary nature of the construction impacts and the likelihood that any access restrictions or degradation of the quality of recreational experiences would last for less than one construction season in any location, USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Utilities and Service Systems:** Construction may damage irrigation systems and public utility infrastructure, resulting in temporary disruptions to service. Coordination with irrigation system users and consultation with service providers and implementation of appropriate protection measures would minimize the possibility that any significant effect would occur. Because utility and service system impacts would be fully mitigated on a project-by-project basis, USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hazards and Hazardous Materials:** Mitigation would be implemented to minimize the potential for exposure of people or the environment to hazardous materials encountered during construction activity. If hazardous materials are encountered, the impacts would be localized and would not be expected to be additive

with the impacts of other projects. Because hazards and hazardous materials impacts would occur on a project-specific basis rather than a cumulative basis, USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Airport Safety:** The potential for night lighting of project areas to affect aircraft operations is a function of the location of construction areas in relation to the Airport Critical Zone and the runway approaches. Potential impacts would be reduced through lighting restrictions and coordination with SCAS. The potential of the project to increase the possibility of collisions between aircraft and wildlife is a result of the project including broad changes to managed land cover types in or near the Airport Critical Zone. There are no other known projects that would affect lands within the Airport Critical Zone; therefore, USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Wildfire Hazards:** Mitigation would be implemented to minimize the potential for wildland fires. If a wildland fire outbreak occurs, the impacts would be localized and would not be expected to be additive with the impacts of other projects. Wildfire hazard impacts would occur on a project-specific basis rather than a cumulative basis, and any such incidents would be isolated; therefore, USACE and SAFCA determined that neither action alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

Cumulative Impact Analysis: Project Impacts that Could be Cumulatively Considerable

As identified in the Phase 3 DEIS/DEIR (USACE and SAFCA 2009), the NLIP (referred to below as "the project") would result in a cumulatively considerable contribution to significant cumulative impacts for the following resource areas:

- **Agricultural Resources:** Implementation of the project would involve the conversion of large acreages of Important Farmland to managed marsh and managed grassland at borrow sites, and would entail the conversion of portions of agricultural parcels to nonagricultural uses for levee widening, seepage berms, and new canal alignment locations. The project would result in the conversion of agricultural land to non-agricultural uses in combination with the conversion of Important Farmland in the Natomas Basin associated with past, current, and probable future projects. For these reasons, USACE and SAFCA determined that both action alternatives and related projects would result in a cumulatively considerable impact associated with agricultural land conversion, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Water Quality/Fisheries:** Construction activities have the potential to temporarily degrade water quality and fish habitat through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff. Other projects, including the extensive array of development projects anticipated in the Natomas Basin and SAFCA's bank protection projects, would have a similar potential to release materials into watercourses that support fish and other aquatic resources. In addition, vegetation that may provide SRA habitat would be removed under all alternatives. The implementation of BMPs and adherence to the conditions of a storm water pollution prevention plan would ensure that the requirements of the Clean Water Act and Porter-Cologne Water Quality Control Act are met. Given the temporary nature of any impacts and the protections afforded by regulatory programs under the Clean Water Act and Porter-Cologne Water Quality Control Act, any degradation of surface waters by construction activities of the Proposed Action and other projects would be minimized. Consequently, the potential impacts of project construction are not expected to make a considerable contribution to a significant cumulative impact on water quality, fish or fish habitat, or other aquatic species. Therefore, the Proposed Action would not result in a cumulatively considerable contribution to a significant cumulative impact.

Under the Levee Raise-in-Place Alternative, however, removal of woody vegetation from the waterside of the Sacramento River east levee to conform with USACE guidance regarding levee encroachments could have a substantial effect on SRA habitat along this levee. The loss of SRA habitat along the Sacramento River and reduction in input of woody debris associated with this removal could be a significant contribution to historical loss; it is unknown whether adequate mitigation could be provided to compensate for this impact. Given these circumstances, USACE and SAFCA determined that the Levee Raise-in-Place Alternative could result in a cumulatively considerable contribution to a significant cumulative impact.

- **Terrestrial Biological Resources:** Implementation of the project has the potential to contribute to the loss or degradation of sensitive habitats and to adversely affect special-status terrestrial species (special-status plants, valley elderberry longhorn beetle, giant garter snake, northwestern pond turtle, Swainson's hawk and other special-status birds, and burrowing owl). Implementation of the Proposed Action and mitigation measures would ensure that the impacts of the project are reduced or avoided in accordance with the requirements of the ESA and CESA and other regulatory programs that protect habitats. The project incorporates habitat creation, modification, and preservation components designed to offset the project's adverse impacts. In addition, mitigation measures require further development of these habitat improvement components, including preparation and approval of management plans. Successful implementation of these mitigation measures would result in permanent protection and management of giant garter snake habitat, including creation and enhancement of connectivity between giant garter snake populations in the Natomas Basin, which is expected to result in an overall improvement of habitat conditions for giant garter snakes in the Basin. An increase in permanently protected foraging habitat for Swainson's hawk, eventual increase in potential nesting habitat, and preservation of existing nest sites would also maintain or improve current conditions for this species in the Natomas Basin. Implementation of the Proposed Action and mitigation measures would similarly ensure that potential adverse impacts on other special-status species and on sensitive habitats would not result in a cumulatively considerable contribution to a significant cumulative impact on terrestrial biological resources.

  Because of its inclusion of erosion control improvements at one site along the Sacramento River east levee, the Levee Raise-in-Place Alternative would involve removal of as much as 22.5 acres of riparian woodland on the waterside of the levee. In addition to its overall value as habitat for various species, this woodland supports active Swainson's hawk nests, elderberry shrubs, and other important biological resources. Adverse impacts on these resources on the waterside of the levee would be more difficult to mitigate than the adverse impacts from the adjacent setback levee footprint on the landside of the levee under the Proposed Action, and it is uncertain whether adequate compensation could be developed for the extensive loss of mature waterside vegetation under this alternative. USACE and SAFCA determined that it is possible that the Levee Raise-in-Place Alternative could result in a potentially significant and unavoidable impact on terrestrial biological resources and that this impact would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Cultural Resources:** Prehistoric human habitation sites are common in riverbank and floodplain areas, and burial sites are often encountered in the course of ground-disturbing activities. It is likely that known or unknown archaeological resources could be disturbed and cultural resources damaged or destroyed during construction activities for the project. Losses of a unique archaeological resource could occur where excavations encounter archaeological deposits that cannot be removed or recovered (e.g., under levees), or where recovery would not be sufficient to prevent the loss of significance of the cultural materials. Historic resources could also be damaged or require removal from areas near flood damage reduction facilities under the proposed project. If these resources would be eligible for NRHP listing, their modification or destruction would be considered significant. Although mitigation would be implemented to reduce effects on potentially significant cultural resources, adverse effects, particularly on archaeological resources, may still occur. Losses of archaeological resources would add to a historical trend in the loss of these resources as artifacts of cultural significance and as objects of research importance. For these reasons, despite the implementation of

mitigation measures, USACE and SAFCA determined that both action alternatives would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Air Quality:** Future projects will contribute to air pollutant emissions in Sutter and Sacramento Counties and to the nonattainment status of the FRAQMD and the SMAQMD for ozone and PM_{10}. The project would cause an impact to air quality through construction emissions. For these reasons, USACE determined that the project and related projects would result in cumulatively considerable (i.e., significant) impact associated with temporary with short-term construction-related ozone and PM_{10} emissions, and the project would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

  In comparison to criteria air pollutants, such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a much longer period of time. GHG emissions generated by the proposed project would predominantly be in the form of CO_2. Project construction would result in a net increase in emissions to occur over a period of 3 years (2008–2010), despite the implementation of mitigation measure. Because of the intensity and duration of construction activities, and the lack of available mitigation measures to abate GHG emissions from heavy-duty construction equipment exhaust and on-road hauling emissions, the project's construction emissions would be significant and unavoidable with respect to climate change. For these reasons, USACE and SAFCA determined that both action alternatives would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

- **Visual Resources:** Both action alternatives would include the removal of trees, other vegetation, and structures from the landside and/or waterside of the Sacramento River east levee within the footprint of the adjacent setback levee and berms, and may include the removal of some vegetation and structural encroachments from the waterside of the Sacramento River east levee as part of encroachment removal actions. These changes would contribute to the substantial degradation of scenic resources in the Natomas Basin that are expected to result with various development projects and expansion of Airport facilities, as the area's visual character changes from rural agricultural landscape to urban/suburban setting. The project includes the establishment of a substantial acreage of woodland plantings around the Basin to offset the significant effect of the project on scenic resources (oak and other native trees). The plantings; however, would require several years to become well established. Therefore, the Proposed Action would make a cumulatively significant contribution to changes in the visual character and scenic resources of the Natomas Basin in the near term. This impact would be significant and unavoidable in the near term, but less than significant in the long term and would not result in a cumulatively considerable contribution to a significant cumulative impact The Levee-Raise-in-Place Alternative, however, would result in the loss of high-aesthetic-value woodlands along the waterside of the levee. Because the replacement plantings would be placed in the landside of the levee, this alternative would make a considerable contribution to a significant cumulative long-term impact associated with the loss of waterside woodlands.

5.1.4 SAFCA NATOMAS LEVEE IMPROVEMENT PROGRAM

The SAFCA NLIP includes:

- NLIP Natomas Cross Canal South Levee Phase 1 Improvements (Phase 1 Project),
- Post-2010 NLIP Seepage Remediation Projects,
- NLIP Bank Protection Project/Erosion Control Projects;,
- Phase 2 Project,
- Phase 3 Project,
- Phase 4a Project (the subject of this EIS/EIR), and
- Phase 4b Project (the subject of a future, separate EIS/EIR).

5.1.4.1 Potential Simultaneous Construction of the Phase 2, 3, and 4a Projects

The Phase 2 Project was analyzed in the Phase 2 EIR, Phase 2 SEIR, and Phase 2 EIS; and the Phase 3 Project was analyzed in the Phase 3 DEIS/DEIR (see Section 1.5.4.2, "Phase 2 Project," and Section 1.5.4.3, "Phase 3 Project"). The environmental impacts of the Phase 2 and 3 Projects are summarized in **Table 2-1** in Section 2.2.3, "No-Action Alternative—NLIP Phase 1, 2, and 3 Projects Implementation Only." As noted in the above-referenced sections, the Phase 2 and 3 Projects could be constructed on a stand-alone basis, assuming no further action on the balance of the NLIP is taken. Construction of the Phase 2 Project began in May 2009 and is anticipated to be completed in 2010, assuming receipt of all required environmental clearances and permits. Because the Phase 2 EIS process was lengthier than originally anticipated, most of Phase 2 Project construction, which was originally planned for 2008, is now scheduled for 2009 and would extend into 2010, which then could coincide with construction of the Phase 3 Project. Construction of the Phase 4a Project is expected to begin in 2010 and is expected to be completed in 2011, assuming receipt of all required environmental clearances, permits, and approvals for project implementation. If permitted, the Phase 4a Project could be constructed at the same time as the Phase 3 Project and with up to 30% of the Phase 2 Project. **Table 5-2** lists the impacts that overlapped construction would intensify in the event that the Phase 2 (up to 30%), 3, and 4a Projects are constructed simultaneously, and summarizes the effect of this overlap. The mitigation measures required for each impact identified in the environmental document for each project phase would be adopted by SAFCA and implemented. Quantitative analysis of potential air quality impacts resulting from this potential concurrent construction scenario is provided in Section 4.13, "Air Quality."

Table 5-2
Summary of Impacts of Overlapping Construction of the Phase 2, 3, and 4a Projects

Phase 4a Project Impact (and Significance Conclusion)	Effect on Impact from Overlapping Construction
Impact 4.7-f: Impacts on Swainson's Hawk and Other Special-Status Birds (Significant and Unavoidable)	Visual and noise disturbance of active nests could be increased where the Phase 3 and 4a Projects are adjacent to each other in Reaches 9B –10 of the Sacramento River east levee. This impact could also occur in the event that Phase 4a Project haul trucks would transport soil material from the Elkhorn Borrow Area south using the landside off -road haul route through the overlap between the Phase 3 and 4a Projects' construction sites in Reaches 9B–10 of the Sacramento River east levee. The potential effects on nesting of special-status birds from overlapping construction are speculative in nature, but this possible occurrence would tend to intensify this impact, which would remain significant and unavoidable.
Impact 4.7-h: Impacts on Other Special-Status Wildlife Species, Including Burrowing Owl and Northwestern Pond Turtle (Less than Significant with Mitigation Incorporated)	Same as above for Impact 4.7-f.
Impact 4.10-a: Temporary Increase in Traffic on Local Roadways (Significant and Unavoidable)	Construction of the Phase 3 and 4a Projects may overlap in terms of use of borrow areas during the same construction season; however, the two project phases would use different haul routes and therefore would not add to each other's traffic loads on public roads.
Impact 4.10-c: Temporary Disruption of Emergency Service Response Times and Access (Less than Significant with Mitigation Incorporated)	Overlap of the Phase 2, 3 and 4a Projects' construction-related temporary road closures could result in temporary increases in traffic levels as traffic is detoured or slowed on some local roadways and SR 99/70 potentially interfering emergency access and evacuation routes. Temporary construction closures, including an approximately 8- to 12-week closure of one lane of Garden Highway would interfere with emergency access to these

Table 5-2 Summary of Impacts of Overlapping Construction of the Phase 2, 3, and 4a Projects	
Phase 4a Project Impact (and Significance Conclusion)	Effect on Impact from Overlapping Construction
	residences and businesses. The extent and intensity of project construction activities may affect access for emergency services. Because the Proposed Action could result in delays in emergency service response times, this impact is considered potentially significant.
Impact 4.11-a: Temporary Emissions of ROG, NO_X, and PM_{10} during Construction (Significant and Unavoidable)	The combination of construction equipment from the Phase 2, 3, and 4a Projects operating simultaneously would generate greater total emissions compared to the emissions generated by construction of a single Phase 2, 3, or 4a Project. See Section 4.11, "Air Quality," for quantitative analysis. This impact would be significant and unavoidable.
Impact 4.11-b: General Conformity with the Applicable Air Quality Plan (Less than Significant with Mitigation Incorporated)	Construction-generated emissions were estimated under the worst-case assumption that the Phase 2, 3, and 4a Projects would be constructed in the same year. See Section 4.11, "Air Quality," for quantitative analysis. This impact would be potentially significant.
Impact 4.12-c: Temporary, Short-term Exposure of Residents to Increased Traffic Noise Levels from Truck Hauling Associated With Borrow Activity (Significant Unavoidable Impacts for exterior residential noise standards)	Construction of the Phase 3 and 4a Projects may overlap in terms of use of borrow areas during the same construction season; however, the two project phases would use different haul routes and therefore would not add to each other's traffic noise on public roads. In the event that Phase 4a Project haul trucks would transport soil material from the Elkhorn Borrow Area south using the landside off -road haul route through the overlap between the Phase 3 and 4a Projects' construction sites in Reaches 9B–10, an increase in noise could result along the Sacramento River east levee. Sensitive noise receptors in this area, however, are located on the opposite side (waterside) of the levee, and would be shielded.
Impact 4.14-a Potential Temporary Disruption of Irrigation Water Supply and Impact 4.14-b Potential Disruption of Utility Service (Less than Significant with Mitigation Incorporated)	Detailed project design would include consultation with all known service providers to identify infrastructure locations and appropriate protection measures, and consultation would continue during construction to ensure avoidance/protection of facilities as construction proceeds to minimize service disruptions. The extent and intensity of project construction activities may affect service providers' abilities to quickly repair damage and/or restore interrupted service.
Impact 4.15-d: Interference with an Adopted Emergency Evacuation Plan (Less than Significant with Mitigation Incorporated)	The Proposed Action and the RSLIP Alternative would increase traffic on local roadways associated with construction trips. In addition, temporary road closures associated with levee improvements could cause or contribute to temporary increases in traffic levels as traffic is detoured or slowed on some local roadways and SR 99/70. Increased traffic congestion could interfere with the use of main roadways for emergency evacuation routes. The extent and intensity of project construction activities may affect emergency service providers' abilities maintain evacuation routes.
Notes: DFG = California Department of Fish and Game; ROG = reactive organic gases; RSLIP Alternative = Raise and Strengthen Levee in Place Alternative; NO_X = oxides of nitrogen; PM_{10} =respirable particulate matter with an aerodynamic diameter of 10 micrometers or less Source: Data compiled by EDAW in 2008 and 2009	

5.1.4.2 Phase 4a and 4b Projects

As described in Section 1.5.4, "Natomas Levee Improvement Program Environmental Documentation," the environmental impacts of the Phase 4a and 4b Project improvements were evaluated at a program level in the Local Funding EIR (SAFCA 2007a), Phase 2 EIR (SAFCA 2007b), and Phase 2 EIS (USACE 2008). The Phase 4 Project was divided into two sub-phases to provide the flexibility to construct this phase over more than one construction season. Both of the sub-phases have their own independent utility, can be accomplished with or without the other sub-phase, and provide additional flood risk reduction benefits to the Natomas Basin whether implemented individually or collectively. This EIS/EIR provides a project-level evaluation of the direct, indirect, and cumulative effects of the Phase 4a Project. The environmental impacts of the Phase 4b Project will be evaluated in a separate, future EIS/EIR.

5.1.5 RELATED PROJECTS IN THE NATOMAS BASIN

Past, present, and probable future projects, as described in the Local Funding EIR (also addresses Phase 1 Project), Phase 2 EIR, and Phase 2 EIS, are those projects that have already been constructed, are currently under construction, or are in various stages of planning but that have yet to initiate construction. Some of these projects are planned to be under construction during the period in which the Phase 4a Project would be under construction (anticipated 2010–2011), while others are expected to be developed after 2011. These projects are organized into the following five categories, as in the previous environmental documents:

- SAFCA Natomas Levee Improvement Program elements,
- other flood damage reduction system improvements,
- Sacramento International Airport Master Plan,
- development projects, and
- utility infrastructure projects.

The related projects included in the previous documents are listed below by category with their current (as of June 2009) approval/construction status. Since preparation of the earlier documents, a few additional related projects have become reasonably foreseeable. Those new projects are described in detail below. Those projects in which there have been no substantial changes are only listed.

5.1.5.1 SAFCA Natomas Levee Improvement Program

The elements of the SAFCA NLIP are listed above under Section 5.1.4.

5.1.5.2 Other Flood Damage Reduction System Improvements

Other flood damage reduction system improvement projects previously addressed are:

- SAFCA Levee Integrity Program: As part of its long-term program to improve the Natomas Basin levee system, SAFCA expects to continue waterside and landside levee strengthening efforts, including increasing bank protection, levee armoring, levee toe stabilization, and flattening of landside levee slopes. Specific construction activities are not yet planned, designed, or funded, and their timing is not known.

- California Department of Water Resources/USACE Repairs to Critical Erosion Sites: On February 24, 2006, Governor Arnold Schwarzenegger declared a state of emergency for California's levee system. Soon after, he signed Executive Order S-01-06, directing the California Department of Water Resources to identify and repair eroded levee sites on the State/Federal levee system to prevent catastrophic flooding and loss of life. To date, nearly 250 levee repair sites have been identified, and repairs to more than 100 of the most critical sites have been completed. Two of these sites are along the bank of the Sacramento River east levee between the NCC and

the American River. Rock toe protection has been installed at these sites. These improvements do not overlap temporally with construction for the Proposed Action and alternatives under consideration.

- SCAS Management of Land Acquired via the SAFCA/SCAS Land Exchange: As noted in Section 2.3.9, "Land Exchange Between Sacramento Area Flood Control Agency and Sacramento County Airport System," SAFCA and SCAS would carry out a land exchange as part of the Phase 4a Project that would support expansion of Airport bufferlands along the eastern edge of the proposed new Elkhorn Irrigation Canal and provide SAFCA additional habitat mitigation land along the upper portion of the Sacramento River east levee outside of the 10,000 foot Airport Critical Zone. This exchange would involve SAFCA's acquisition of three SCAS properties (totaling approximately 68 acres) on each side of SAFCA's Lausevic property in Reach 4A of the Sacramento River east levee. In exchange, SCAS would acquire the remainder of the Horangic and Binford-DeYoung properties (totaling approximately 45 acres and located within the 10,000 foot Airport Critical Zone) that would not be developed as part of the Phase 2 and 3 Projects. SCAS would manage these properties in accordance with FAA AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports* (FAA 2007). Any changes in land use required to comply with AC 150/5200-33B that may affect agricultural resources or habitat would be addressed by SCAS through future, separate environmental review.

5.1.5.3 Sacramento International Airport Master Plan

The Sacramento International Airport Master Plan (SCAS 2007) is an adopted plan; phases previously addressed in the documents listed in Section 5.1.3 are:

- SMF Master Plan Phase 1 (2007–2013) (currently under construction),
- SMF Master Plan Phase 2 (2014–2020), and
- SMF Master Plan Phase 4a (After 2020).

5.1.5.3 Development Projects

The following development projects were previously addressed in the documents listed in Section 5.1.3:

- Camino Norte Project (annexation hearing anticipated December 2010),
- Greenbriar (annexation completed May 2008),
- Sutter Pointe Specific Plan (EIR certified and specific plan adopted June 2009), and
- Metro Airpark Specific Plan (approved plan, but not in construction at this time).

The following development projects that were not previously addressed include:

- Natomas Panhandle Annexation: The City of Sacramento is currently processing a proposal to annex a strip of land (approximately 595 acres) located adjacent to the eastern edge of the NNCP area. Specifically, the area is located north of Del Paso Road, south of Elkhorn Boulevard, west of East Levee Road and Sorento Road, and east of the North Natomas Community Plan area. This area is proposed to be developed as a Planned Unit Development with a variety of low-, medium-, and high-density residential uses (total of 3,075 residential units), commercial uses, an elementary school, a middle/high school, and recreation and park spaces. Streets, water and sewer lines, and drainage facilities would be installed as part of the proposed development. The annexation hearing for this project is anticipated in summer 2009.

- West Lakeside: As detailed in the Memorandum of Understanding for the Natomas Joint Vision, the City of Sacramento has been identified as the appropriate agent for planning new growth in Natomas (City of Sacramento and County of Sacramento 2002). An application for development within the Joint Vision area is on file for the West Lakeside project, but there has been no recent activity on the application. The Natomas Unified School District is currently proposing a high school on the site. No other applications for the Joint

Vision area have been filed and its future development potential is in the early consideration stage by the City of Sacramento and Sacramento County.

5.1.5.4 Utility Infrastructure Projects

The following utility infrastructure projects were previously addressed in the documents listed in Section 5.1.3:

- American Basin Fish Screen Habitat Improvement Project (ROD issued April 2009),
- Western Area Power Administration Transmission Line/Sacramento Area Voltage Support Project (in environmental review),
- Placer Parkway Corridor Preservation Project (implementation anticipated by 2020),
- Downtown-Natomas-Airport Light Rail Transportation Project (environmental review complete for first segment, construction anticipated to commence in summer 2009),
- Sacramento Municipal Utility District Power Line–Elkhorn Substation Capacity Expansion Project (in construction),
- Sacramento River Water Reliability Study (on-going), and
- Upper and Lower Northwest Interceptor Projects (LNWI has been completed; UNWI anticipated to be completed in 2010).

5.1.6 PROJECTS REQUIRING USACE 33 UNITED STATES CODE 408 AUTHORIZATION

As described previously in Chapter 1.0, "Introduction and Statement of Purpose and Need," to implement the Proposed Action, SAFCA is requesting permission from USACE pursuant to Section 14 of the Rivers and Harbors Act of 1899 (Title 33 of the United States Code, Section 408 [33 USC 408]), hereinafter referred to as "Section 408," to alter a Federal project levee. There are other projects in the Sacramento and San Joaquin River systems where USACE has completed Section 408 authorizations, is currently processing requests for Section 408 authorizations, or expects to receive requests for Section 408 authorizations in the near future. These projects are listed below in **Table 5-3**.

5.1.7 CUMULATIVE IMPACT ANALYSIS: PROJECT IMPACTS THAT WOULD NOT BE CUMULATIVELY CONSIDERABLE

This section describes cumulative effects of all past, present, and probable future projects in relation to SAFCA's Phase 4a Project that were found not to be cumulatively considerable. For the following resource areas, the Proposed Action and the RSLIP Alternative would not be expected to make a cumulatively considerable contribution to an impact because it is expected that the project impacts would not be added to the impacts of other projects (i.e., no cumulative impact is expected to occur), or because the proposed project's contribution to any potential cumulative impact would be isolated or very minor and not cumulatively considerable.

Geology, Soils, and Mineral Resources: Grading and other earthmoving activities associated with the Proposed Action and the RSLIP Alternative could result in temporary, localized soil erosion and topsoil loss. These site-specific impacts would be less-than-significant, with implementation of construction BMPs (Mitigation Measure 4.4-a[1]), and any residual impacts are not expected to be additive with the effects of any other activities. Each project would implement construction BMPs. Therefore, implementation of the proposed project and related

Table 5-3
Other Section 408 Projects

Flood Damage Reduction Project or System	Project Title	Lead Agency/Agencies	Status of Section 408 Request
Previously Approved Section 408 Projects			
Sacramento River Flood Control Project	Feather River Segment 1 and 3 Improvements	Three Rivers Levee Improvement Authority	Approved
Sacramento River Flood Control Project	Feather River Segment 2 Improvements	Three Rivers Levee Improvement Authority	Approved
Sacramento River Flood Control Project	Natomas Cross Canal and Sacramento River modifications – Phase 2 Project	SAFCA	Approved
Sacramento River Flood Control Project	Feather River Levee Setback at Star Bend	Levee District 1 of Sutter County	Approved
Ongoing Section 408 Projects			
Sacramento River Flood Control Project	Natomas Levee Improvement Program – Phase 3 Project	SAFCA	Decision anticipated fall 2009
Sacramento River Flood Control Project	Natomas Levee Improvement Program – Phase 4a Project (evaluated in this EIS/EIR)	SAFCA	Decision anticipated winter 2009/2010
Sacramento River Flood Control Project	River Islands	Califia, LLC	Decision anticipated 2010
Sacramento River Flood Control Project	2010 Improvements	West Sacramento Flood Control Agency	Decision anticipated spring 2010
Sacramento River Flood Control Project	2011 Improvements	West Sacramento Flood Control Agency	Decision anticipated winter 2011
Anticipated Future Section 408 Projects			
Sacramento River Flood Control Project	Natomas Levee Improvement Program – Phase 4b Project	SAFCA	Decision anticipated 2010
San Joaquin River Flood Control System	100-year improvements	Reclamation District 17	Decision anticipated 2011
San Joaquin River Flood Control System	200-year improvements	Reclamation District 17	Decision anticipated 2011
San Joaquin River Flood Control System	Urban Protection Project	San Joaquin Area Flood Control Agency	Decision anticipated 2011
Sacramento River Flood Control Project	Bay Delta Conservation Plan	California Department of Water Resources	Decision anticipated 2011

Source: Data provided by USACE in 2009 and compiled by EDAW in 2009

projects would not result in a cumulatively considerable contribution to a significant cumulative impact on geology and soils because the impact would be temporary and soil erosion and loss of topsoil would be localized. Most of the Natomas Basin has been designated MRZ-1, where it has been determined that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence (City of Sacramento 2009). Some small MRZ-3-designated zones, where the significance of mineral deposits in that area cannot be evaluated from existing data, are located in the northwestern and southeastern parts of the Basin. One of these designated MRZ-3 zones includes a portion of the proposed Fisherman's Lake

Borrow Area, where SAFCA would excavate borrow material, potentially removing economically valuable minerals, if they are present. However, given that the presence of economically valuable minerals in MRZ-3 zones is undetermined, the cumulative condition in the Natomas Basin is unknown. Therefore, the potential contribution of the Phase 4a Project to this impact is too speculative for meaningful consideration.

- **Hydrology and Hydraulics (Groundwater is addressed below):** As discussed in Section 4.5, "Hydrology and Hydraulics," and in **Appendix C1**, a hydraulic impact analysis was performed to analyze the cumulative impacts of combining the proposed project with federally authorized "early implementation" improvements to Folsom Dam and improvements to the Sacramento River Flood Control Project's (SRFCP's) urban levees aimed at providing urban areas outside the Natomas Basin with 200-year flood damage reduction. The project would not significantly alter water surface elevations in the project area or in the larger SRFCP, or contribute cumulatively to any such alteration. The widening of levees along the Sacramento River east levee, associated modification of irrigation and drainage infrastructure, and borrow activities on large parcels could interfere with the functioning of drainage systems and alter surface drainage. Project design would incorporate measures to prevent a significant drainage disruption or alteration in runoff patterns (Mitigation Measure 4.5-b), and any temporary impacts would be limited to the vicinity of the individual disturbance sites. Each related project that would discharge stormwater runoff would also be required to comply with NPDES discharge permits from the Central Valley RWQCB, which are designed to prevent significant water quality-related impacts. Therefore, implementation of the Proposed Action or the RSLIP Alternative and related projects would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Groundwater:** The evaluation of potential groundwater impacts prepared by Luhdorff & Scalmanini Consulting Engineers (LSCE) investigated the impacts of the Proposed Action, in combination with existing and projected land and water use changes in the Natomas Basin and on the Basin's groundwater budget (see **Appendix C2** for the full report, which was prepared in May 2009). The impacts of the Proposed Action under the Phase 4a Project include a small net loss in deep percolation (16 acre feet per year [afy]) because of a reduction in irrigated lands as a result of conversion of irrigated agricultural lands to non-irrigated grasslands, and the relocation of Riverside Canal. The simulation conducted for the NLIP, however, shows that without the Proposed Action there is an overall reduction in groundwater storage of 4,971 afy in the Natomas Basin. With the Proposed Action, the decrease in groundwater storage would be slightly smaller (3,376 afy). Subsurface outflow from the Natomas Basin to the east would decrease slightly (from 21,738 afy to 20,731 afy) as a result of the Proposed Action. Overall, implementation of all phases of the NLIP would have a small positive impact on groundwater supplies in the Natomas Basin and a small negative impact on groundwater east of the Natomas Basin relative to existing conditions.

  The results of the 2030 simulation without the Proposed Action show a positive change in groundwater storage in the Natomas Basin of 1,572 afy. With the Proposed Action, the results indicate that, on average, SAFCA's construction activities would have a positive effect on groundwater levels in the Natomas Basin, resulting in an additional increase in storage of 348 afy (to 1,920 afy). The proposed cutoff walls would cause a small increase in groundwater outflow (from 1,200 to 1,238 afy). To evaluate impacts to groundwater levels from the addition of a proposed cutoff wall in Reach 4B of the Sacramento River east levee, which was not evaluated in the May 2009 report, LSCE prepared a supplemental technical memorandum (**Appendix C4**), which concluded that the groundwater impacts that would result from the addition of a cutoff wall in Reach 4B would not have a measurable effect on groundwater conditions in the area and would not change the conclusion reached in the original groundwater evaluation. LSCE also prepared a supplemental technical memorandum (**Appendix C5**) that evaluates impacts to groundwater levels from the construction and operation of 5 wells to provide a water supply to habitat mitigation sites. The analysis determined that the limited groundwater extraction from these 5 wells would not be sufficient to cause overdraft or affect Basinwide groundwater levels. Overall, the cumulative impact of the Proposed Action on future groundwater conditions is predicted to be negligible. The cumulative contribution of the RSLIP Alternative to cumulative impacts on groundwater would be similar to that of the Proposed Action. Therefore, neither the Proposed

Action nor the RSLIP Alternative would result in a cumulatively considerable contribution to a significant cumulative impact.

- **Sensitive Aquatic Habitats:** With the exception of TNBC-managed lands and Airport mitigation sites that have been developed in the last decade, the overall trend in wetlands and other aquatic habitats within the Natomas Basin is a reduction in acreage and habitat functions. As described in the NBHCP, approximately one-fourth to one-fifth of the 53,000-acre Basin contained areas of seasonal open water or riparian scrub historically, as indicated by 1908 mapping. Since 1914, land reclamation and reclamation facilities, canals, levees, and pumping stations have allowed over 80% of the Basin to be converted to agricultural production, with irregular small-scale topographic features of the earlier landscape having largely been eliminated by agriculture. As part of this conversion, the drainage pattern of the Basin was altered to collect runoff into canals, from which it is pumped into the surrounding canals and Sacramento River. Except on TNBC parcels and other mitigation lands, natural vegetation in the Basin is now primarily found along irrigation canals, drainage ditches, pastures, and uncultivated fields.

  The Phase 4a Project Proposed Action would result in permanent impacts to less than approximately 19.76 acres and temporary impacts to 1 acre of wetlands and other waters of the United States. Proposed mitigation for the these impacts includes the creation of at least 1 acre of irrigation/drainage canal or 1 acre of seasonal wetland for every acre that is lost and/or that irrigation/drainage function shall be replaced (Mitigation Measure 4.7-c). The mitigation ratio that is ultimately required will be determined by USACE through the Section 404 permitting process. Features planned in the Phase 4a Project (under both action alternatives) would provide aquatic habitat that has been designed to offset the effects described above. These features include the creation of approximately 15 acres of aquatic habitat resulting from construction of the relocated and extended Riverside Canal and creation of up to 100 acres of managed marsh in the vicinity of Fisherman's Lake, much of which would meet the criteria for waters of the United States, including wetlands.

  Overall, because the Proposed Action would include the creation of waters of the United States that are expected to be more extensive than those filled by the project, and because implementing this mitigation measure would ensure that new jurisdictional waters would be managed in a manner that minimizes maintenance disturbance and provides the essential functions of the habitats that would be lost, the Proposed Action, with implementation of Mitigation Measure 4.7-c, would be beneficial, and thus would not result in a cumulatively considerable contribution to a significant cumulative impact.

  Impacts to waters of the United States under the RSLIP Alternative would be similar to the Proposed Action except that there would be erosion control improvements implemented along the river bank at the waterside toe of the Sacramento River east levee. This alternative would result in permanent impacts to less than approximately 28.35 acres and temporary impacts to 1 acre of wetlands and other waters of the United States. The proposed mitigation for these impacts would be the same as described for the Proposed Action. With implementation of Mitigation Measure 4.7-c, this alternative would be beneficial, and thus would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Paleontological Resources:** Under the Proposed Action and RSLIP Alternatives, earthmoving activities could damage unknown unique paleontological resources, but potential damage would be limited by implementation of Mitigation Measure 4.9-a, and would be limited to individual resources in discrete locations. Because of the low probability that any project would encounter unique, scientifically-important fossils, and the benefits that would occur from recovery and further study of those fossils if encountered, development of the related projects and other development in the region are not considered to result in a cumulatively considerable impact related to paleontological resources. Therefore, the Phase 4a Project and related projects would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Transportation and Circulation:** Impacts of construction activities on emergency access would be site-specific, intermittent, and temporary, and are not expected to be cumulatively considerable. The proposed construction activities would temporarily increase traffic levels on some local and regional roadways, but the majority of haul truck trips would take place off of public roads. Temporary traffic increases associated with the Proposed Action—in addition to Phase 3 Project construction and up to 30% of Phase 2 Project construction that would also take place in 2010—would be limited to the roadways shown on **Plate 2-7**. There are no other anticipated projects in the vicinity that are likely to compound the significant temporary traffic impacts of the project. Because of the limited potential for the traffic associated with the project to combine with increased traffic from other future projects, and because of the temporary, short-term, intermittent nature of any impacts, no cumulatively significant traffic impacts are expected to occur. Therefore, the Proposed Action would not result in a cumulatively considerable contribution to a significant cumulative impact. For the same reasons as the Proposed Action, the RSLIP Alternative would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Recreation:** No recreational facilities are present within the Phase 4a Project area; therefore, the Proposed Action and the RSLIP Alternative would not contribute to significant cumulative impacts on recreational facilities.

- **Light and Glare:** The Proposed Action would involve nighttime construction lighting that would be clearly visible from nearby residences. Nighttime lighting related to 24/7 construction in particular could create a new source of substantial light or glare that would adversely affect nighttime views in the area. However, construction-related nighttime lighting would be localized and temporary and there are no other projects in the area that would contribute to a cumulative increase in light and glare. The Proposed Action would not make a considerable contribution to a significant cumulative impact. For the same reasons as the Proposed Action, the RSLIP Alternative would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Utilities and Service Systems:** Construction activities may damage irrigation systems and public utility infrastructure, resulting in temporary disruptions to service. Coordination with irrigation system users and consultation with service providers and implementation of appropriate protection measures (Mitigation Measures 4.14-a and 4.14-b) would minimize the possibility that any significant effect would occur. Because utility and service system impacts would be fully mitigated on a project-by-project basis, implementation of either the Proposed Action or the RSLIP Alternative along with other related flood facility improvement projects would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Hazards and Hazardous Materials:** Mitigation would be implemented to minimize the potential for exposure of people or the environment to hazardous materials encountered during construction activity (Mitigation Measure 4.15-b). If hazardous materials are encountered, the impacts would be localized and would not be expected to be additive with the impacts of other projects. Because hazards and hazardous materials impacts would occur on a project-specific basis rather than a cumulative basis, implementation of either the Proposed Action or the RSLIP Alternative along with other related projects would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Airport Safety:** The potential for night lighting of project areas to affect aircraft operations is a function of the location of construction areas in relation to the Airport Critical Zone and the runway approaches. Potential impacts would be reduced through lighting restrictions and coordination with SCAS (Mitigation Measure 4.15-e). Neither the Proposed Action nor the RSLIP Alternative would result in changes to managed land cover types in or near the Airport Critical Zone; therefore, these alternatives would not increase attractive habitat for hazardous wildlife in the Airport Critical Zone. There are no other known projects that would affect lands within the Airport Critical Zone, therefore implementation of either the Proposed Action or the

RSLIP Alternative along with other related projects would not result in a cumulatively considerable contribution to a significant cumulative impact.

- **Wildfire Hazards:** Mitigation would be implemented to minimize the potential for wildland fires (Mitigation Measures 4.15-g). If a wildland fire outbreak occurs, the impacts would be localized and would not be expected to be additive with the impacts of other projects. Because wildfire hazard impacts would occur on a project-specific basis rather than a cumulative basis, and any such incidents would be isolated, therefore implementation of either the Proposed Action or the RSLIP Alternative along with other related projects would not result in a cumulatively considerable contribution to a significant cumulative impact.

5.1.8 CUMULATIVE IMPACT ANALYSIS: PROJECT IMPACTS THAT COULD BE CUMULATIVELY CONSIDERABLE

The following subsections discuss the potential for the Proposed Action and the RSLIP Alternative to result in cumulatively considerable incremental contributions to the following cumulatively significant impacts:

- agricultural resources,
- water quality/fisheries,
- terrestrial biological resources,
- cultural resources,
- air quality,
- noise, and
- visual resources.

The contribution to cumulatively considerable impacts was made by considering all project components, proposed construction of such improvements, excavation of borrow from the sites listed in **Table 2-10**, use of roadways in the Basin, and temporary and permanent changes in land cover and vegetation.

5.1.8.1 AGRICULTURAL RESOURCES

Proposed Action

As described in Section 4.2, "Agricultural Resources," the estimated maximum total of Important Farmland that is expected to be permanently converted as a result of implementation of the Proposed Action under the Phase 4a Project would total 676 acres, for a total of approximately 1,350 acres for the entire NLIP.

The Phase 4b Project is expected to result in the conversion of some additional Important Farmland to non-agricultural uses in Reach 16 of the Sacramento River east levee; however, lands adjacent to the levee in Reaches 17–20 are largely urbanized and are not classified as Important Farmland. Further, the land acquired by SACAS from SAFCA as part of the land exchange described in Section 5.1.5.2, above, would be managed by SCAS in accordance with FAA AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports* (FAA 2007). Because agricultural crops tend to attract hazardous wildlife during some phase of production, the FAA recommends against the use of Airport property for agricultural production. Therefore, use of this land as Airport bufferlands would likely result in an incremental decrease (approximately 50–100 acres) in the amount of agriculture production in the Natomas Basin (Sacramento and Sutter Counties). Land in Sacramento County would likely be changed from row crop production to grassland or fallow agriculture (undeveloped land), and land in Sutter County would likely be converted from field crop to a grassland/woodland mix that provides nesting and foraging habitat for bird species.

The Natomas Basin has already experienced the conversion of a substantial area of agricultural land, much of it Prime Farmland and other categories of Important Farmland, to residential and commercial development. The

Natomas Basin is the focus of much of the growth planning in the Sacramento area, in both Sutter County and Sacramento County, and substantial losses of Important Farmland to urban development are expected to continue in this area. As noted in Section 3.2.2, "Agricultural Resources," Important Farmland in the Natomas Basin totaled approximately 40,000 acres in 2006, the last year for which California farmland mapping data are available, representing 6% of the total of approximately 715,000 acres of Important Farmland mapped by the Farmland Mapping and Monitoring Program in Sutter and Sacramento Counties in 2006. Of this amount, approximately half is expected to be converted to developed uses and half maintained in agriculture or in a condition compatible with future agricultural use (i.e., undeveloped) within TNBC parcels, Airport north bufferlands, lands anticipated to be maintained in an undeveloped condition as part of the Joint Vision, and land managed by SAFCA. The loss of an additional approximately 20,000 acres in the Natomas Basin would continue an overall trend of net loss of Important Farmland that has been documented in Sutter and Sacramento Counties for each consecutive 2-year interval of mapping by the California Department of Conservation from 1992 through 2006. As described elsewhere in this EIS/EIR, development of land in the Natomas Basin is consistent with regional land use planning efforts (see Section 5.2, "Growth Inducement") which promote the concentration of urban growth within the borders of existing cities and their immediate adjacent areas, including the Natomas Basin specifically, and discourage both sprawling development and development expansion into existing nonurbanized floodplains that would result in greater regional conversion of agricultural land to nonagricultural uses. (See Section 5.2, "Growth Inducement"; Section 6.11, "Executive Order 11988, Floodplain Management"; and Section 6.14, "Farmland Protection Policy Act," for more discussion of this issue.)

Nevertheless, the Proposed Action would result in the conversion of agricultural land to nonagricultural uses and, in combination with the conversions of Important Farmland in the Natomas Basin associated with past, current, and future projects, would result in cumulatively considerable (i.e., significant) impact associated with agricultural land conversion, and the Proposed Action would result in a cumulatively considerable incremental contribution to this cumulatively significant impact.

Raise and Strengthen Levee in Place Alternative

The RSLIP Alternative has a narrower landside footprint than does the Proposed Action. However, because of the increased requirement for woodland habitat creation, the RSLIP Alternative would convert approximately 593 acres of Important Farmland to nonagricultural uses. The conversion of Important Farmland within the canal footprints and borrow sites would be similar to the conversion associated with the Proposed Action. Therefore, the contribution of the RSLIP Alternative to the cumulative loss of Important Farmlands, would be similar to the Proposed Action, and would result in cumulatively considerable (i.e., significant) incremental contribution to this cumulatively significant impact.

5.1.8.2 Water Quality

Construction activities have the potential to temporarily degrade water quality through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff. Other projects in areas designated for development in adopted general plans in the Natomas Basin and SAFCA's bank protection projects, would have a similar potential to release materials into waterways.

Proposed Action

The implementation of BMPs and adherence to the conditions of a storm water pollution prevention plan (Mitigation Measures 4.6-a and 4.6-b) would ensure that the requirements of the Clean Water Act and Porter-Cologne Water Quality Control Act are met. Given the temporary nature of any impacts and the protections afforded by regulatory programs under the Clean Water Act and Porter-Cologne Water Quality Control Act, any degradation of surface waters by construction activities of the Proposed Action and other projects would be minimized. Consequently, the potential impacts of project construction are not expected to make a considerable

contribution to a significant cumulative impact on water quality. In a similar fashion, other projects in the Natomas Basin would be required to implement similar measures to prevent adverse impacts to water quality.

Raise and Strengthen Levee in Place Alternative

This alternative differs from the Proposed Action primarily in the nature of proposed changes to the Sacramento River east levee which would be raised and widened in place. Unlike the Proposed Action, this alternative does not require construction of a new drainage system along Garden Highway in Reaches 10–11B of the Sacramento River east levee, or construction of an associated drainage swale with the potential to degrade surface water quality in the Sacramento River. Other project elements are the same under this alternative as the Proposed Action. Although construction activity under the RSLIP Alternative has the potential to temporarily degrade water quality through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff, this alternative would be subject to Mitigation Measure 4.6-a. Implementation of this mitigation would reduce the impact for the RSLIP Alternative on water quality to a level that is less than significant. The RSLIP Alternative would not result in a cumulatively considerable contribution to a significant cumulative impact.

5.1.8.3 Fisheries

Construction activities have the potential to temporarily degrade water quality through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff. Other projects, including the extensive array of development projects anticipated in the Natomas Basin and SAFCA's bank protection projects, would have a similar potential to release materials into waterways that support fish and other aquatic resources. Potential sedimentation, increased turbidity, or the release and exposure of contaminants could adversely affect fish and aquatic habitats. In addition, vegetation that may provide SRA habitat would be removed to some extent under all alternatives. As noted in Section 3.7.2.1, under "Fisheries," modifications of the channels bordering the Natomas Basin have resulted over time in homogenous, trapezoidal channels lacking in-stream structure with narrow and sparse bands of riparian vegetation that provide only limited SRA habitat functions and limited recruitment of large woody debris. Combined, these alterations have resulted in marginal habitat conditions that provide only limited habitat functions for most native fish species and other aquatic organisms.

Proposed Action

The implementation of BMPs and adherence to the conditions of a storm water pollution prevention plan (Mitigation Measures 4.6-a and 4.6-b) would ensure that the requirements of the Clean Water Act and Porter-Cologne Water Quality Control Act are met and degradation of surface waters by construction activities of the Proposed Action and other projects would be minimized. Consequently, the potential impacts of project construction are not expected to make a considerable contribution to a significant cumulative impact on habitats that support fish and other aquatic resources. In a similar fashion, other projects in the Natomas Basin would be required to implement similar measures to prevent adverse impacts to fisheries. Consequently, the Proposed Action would not result in a cumulatively considerable contribution to a significant cumulative impact.

Raise and Strengthen Levee in Place Alternative

Unlike the Proposed Action, this alternative does not require construction of a new drainage system along Garden Highway in Reaches 10–11B of the Sacramento River east levee, or construction of an associated drainage swale, with associated potential to degrade fish habitat in the Sacramento River. Other project elements are the same under this alternative as the Proposed Action. While construction activity under the RSLIP Alternative has the potential to temporarily degrade water quality and fish habitat through the direct release of soil and construction materials into water bodies or the indirect release of contaminants into water bodies through runoff, this alternative would be subject to Mitigation Measure 4.6-a. Implementation of this mitigation would reduce the

impact for the RSLIP Alternative on water quality to less than significant. This alternative, however, would have a greater impact on SRA due to the removal of 21 acres of waterside woodlands (discussed below). SAFCA's bank protection project would incorporate features that would compensate for temporary impacts on SRA habitat and result in long-term increases in nearshore and SRA cover values relative to pre-project conditions, creating beneficial effects. However, this effort would not fully compensate for the temporary loss of SRA habitat functions for fish during construction and revegetation. Therefore, the RSLIP Alternative would result in cumulatively considerable contribution to a significant cumulative impact on fisheries resources.

5.1.8.2 TERRESTRIAL BIOLOGICAL RESOURCES

Implementation of the project has the potential to contribute to the loss or degradation of sensitive habitats and to adversely affect special-status terrestrial species (special-status plants, valley elderberry longhorn beetle, giant garter snake, northwestern pond turtle, Swainson's hawk and other special-status birds, and burrowing owl). Potential impacts of the Proposed Action and the RSLIP Alternative related to wildlife would be associated with vegetation removal needed to clear the path for the Phase 4a Project, construction disturbances of wildlife and their habitats, as well as permanent loss of habitat for the affected species. These impacts could contribute to species declines and losses of habitat that have led to the need to protect these species under the Federal ESA and the CESA.

Proposed Action

As described above, the proposed land swap between SAFCA and the Airport could result in a change in the amount of bird foraging habitat in the Natomas Basin (Sacramento and Sutter Counties). Land in Sacramento County would likely be changed from row crop production to grassland or fallow agriculture (undeveloped land), thus resulting in an overall decrease in the quantity and quality of foraging habitat in the Basin. Land in Sutter County would likely be converted from field crop to a grassland/ woodland mix, which would increase the nesting and foraging habitat for bird species. Although the details of the agreement have not yet been finalized and may not for some time, it is conceivable that the swap may result in a zero net loss of foraging habitat and an increase in nesting habitat for birds.

Proposed NCMWC projects, including the Sankey Diversion and Fish Screen Project, would also result in habitat and wildlife disturbances during construction. The Sankey Diversion would include permanent loss of habitat for some special-status species, including giant garter snake, but an appropriate habitat replacement and management plan is being developed in consultation with USFWS and DFG to provide adequate compensation for the loss. Despite construction-related adverse impacts from the fish screen project, the overall impact would be beneficial and habitat quality would improve and thus, would not result in a cumulatively considerable contribution to a significant cumulative impact.

The Airport Master Plan includes a number of components that are anticipated to result in adverse impacts on sensitive habitats and special-status species. The majority of these impacts would be associated with Phases 2 and 3 of the Airport Master Plan, which would not commence until 2014. Adverse impacts in all phases could include a combination of permanent habitat loss and construction-related impacts. There could also be impacts from expanded long-term operation of the Airport. SCAS has identified some habitat enhancement and protection measures that would be implemented to compensate for adverse impacts, and additional measures are anticipated to be identified as subsequent NEPA/CEQA evaluation and regulatory permitting is completed.

Significant adverse impacts on special-status species and sensitive habitats would be associated with the extensive future urban growth expected to occur in the Natomas Basin. This growth would continue to reduce the amount of habitat available to support populations of special-status species. Potential adverse impacts from future approved expansion within the Basin have been addressed through the development of the NBHCP, and successful implementation of the NBHCP would ensure that there is no overall adverse impact on special-status species from

implementation of these projects. Similarly, an HCP is being implemented for the Metro Air Park Project. Additional urban expansion is being promoted through the Joint Vision, which would result in development and open space conservation within the Sacramento County portion of the Natomas Basin that was not covered in the NBHCP. Potential impacts on biological resources from implementation of this potential future development are at various stages of evaluation. Projects would be required to incorporate adequate impact avoidance and minimization measures and permanent habitat conservation to mitigate and compensate for the anticipated adverse impacts.

Implementation of the Proposed Action under the Phase 4a Project and mitigation measures in Section 4.7, "Biological Resources," of this EIS/EIR would ensure that the impacts of the project are reduced or avoided in accordance with the requirements of the ESA and CESA and other regulatory programs that protect habitats, such as Section 404 of the Clean Water Act and Section 1602 of the California Fish and Game Code. As discussed in Chapter 2.0, "Alternatives," the project incorporates habitat creation, modification, and preservation components designed to offset the project's adverse impacts. In addition, mitigation measures require further development of these habitat improvement components, including preparation and approval of management plans. Successful implementation of these mitigation measures would result in permanent protection and management of giant garter snake habitat, including creation and enhancement of connectivity between giant garter snake populations in the Natomas Basin, expected to result in an overall improvement of conditions for giant garter snakes in the Basin. An increase in permanently protected foraging habitat for Swainson's hawk, eventual increase in potential nesting habitat, and preservation of existing nest sites would also maintain or improve current conditions for this species in the Natomas Basin. Implementation of the Proposed Action and mitigation measures would similarly ensure that potential adverse impacts on other special-status species and sensitive habitats would not result in a cumulatively considerable contribution to a significant cumulative impact on terrestrial biological resources.

Successful implementation of the NBHCP depends on a number of assumptions that could be jeopardized by implementation of other projects and activities in the Basin, including the Proposed Action and the various cumulative projects. The Proposed Action has been designed to support achievement of the goals and objectives of the NBHCP, and implementation of Mitigation Measure 4.7-k would ensure that the Proposed Action does not jeopardize successful implementation of the NBHCP.

The Proposed Action would include minimization, avoidance, and compensation measures in accordance with the requirements of ESA, CESA, and other relevant regulatory requirements, as well as additional habitat protection and enhancement components. As a result of these measures, the Proposed Action would not contribute to a cumulatively significant impact on terrestrial biological resources, including special-status species.

Raise and Strengthen Levee in Place Alternative

Because of its inclusion of erosion control improvements at five sites along the Sacramento River east levee in Reaches 10–11B, and in order to comply with USACE encroachment guidance, the RSLIP Alternative would involve a slightly different set of impacts to terrestrial biological resources than the Proposed Action. The narrower landside levee footprint of the RSLIP Alternative would avoid some losses of woodland and grassland habitat that would be unavoidable under the Proposed Action. However, under the RSLIP Alternative, as much as 21 acres of riparian woodland on the waterside of the levee in Reaches 10–15 of the Sacramento River east levee could be removed to conform with USACE guidance regarding levee encroachments. In addition to its overall value as habitat for various species, this woodland supports active Swainson's hawk nests, elderberry shrubs, and other important biological resources. Adverse impacts on these resources on the waterside of the levee would be more difficult to mitigate than the adverse impacts from the adjacent levee footprint on the landside of the levee under the Proposed Action, both in terms of the acreage of habitat lost and the quality of that habitat. Implementation of this alternative would include minimization, avoidance, and compensation measures in accordance with the requirements of ESA, CESA, and other relevant regulatory requirements. However, it is uncertain whether adequate compensation could be developed for the extensive loss of mature waterside

vegetation under this alternative. Therefore, it is possible that the RSLIP Alternative could result in a potentially significant and unavoidable impact on terrestrial biological resources, including special-status bird species for which the waterside trees provide important nesting habitat. This impact would result in a cumulatively considerable contribution to a significant cumulative impact.

5.1.8.3 CULTURAL RESOURCES

Proposed Action

Prehistoric human habitation sites are common in riverbank and floodplain areas, and burial sites are often encountered in the course of ground-disturbing activities. It is likely that known or unknown archaeological resources could be disturbed and cultural resources damaged or destroyed during construction activities for the Proposed Action. Losses of a unique archaeological resource could occur where excavations encounter archaeological deposits that cannot be removed or recovered (e.g., under levees), or where recovery would not be sufficient to prevent the loss of significance of the cultural materials. Historic resources could also be damaged or require removal from areas near flood damage reduction facilities under the Proposed Action. However, USACE and the SHPO have concurred that most identified historic resources lack significance that might make them eligible for listing on the NRHP or the California Register of Historic Resources. Although mitigation would be implemented to reduce impacts on potentially significant cultural resources, adverse impacts, particularly on prehistoric archaeological resources, may still occur. Losses of archaeological resources would add to a historical trend in the loss of these resources as artifacts of cultural significance and as objects of research importance. For these reasons, despite the implementation of Mitigation Measures 4.8-b, 4. 8-c, and 4.8-d, the Proposed Action has the potential to result in a significant and unavoidable impact. Thus, the Proposed Action would result in a cumulatively considerable contribution to a significant cumulative impact.

Raise and Strengthen Levee in Place Alternative

Because the elements of the RSLIP Alternative would be the same as described for the Proposed Action except for the method of levee raising and rehabilitation, cumulative impacts associated with the RSLIP Alternative would be similar to that of the Proposed Action and, therefore, would result in a cumulatively considerable contribution to a significant cumulative impact.

5.1.8.4 AIR QUALITY

Proposed Action

Future projects will contribute to air pollutant emissions in Sutter and Sacramento Counties and to the nonattainment status of FRAQMD and SMAQMD for ozone and PM_{10}. The Proposed Action would cause a temporary impact on air quality through construction emissions. When taken in total with other projects in the region, this impact would be significant and unavoidable, and would result in a cumulatively considerable contribution to a significant cumulative impact on air quality in the region.

Currently, the California Air Resources Board (ARB), FRAQMD, or SMAQMD, have not identified a significance threshold for analyzing GHG emissions generated by a proposed project or a methodology for analyzing cumulative impacts related to global warming. Although the state of California has identified GHG reduction goals through adoption of Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, the effect of GHG emissions as they relate to global climate change is inherently a cumulative impact issue. Although the emissions of one single project would not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulatively considerable contribution to a significant cumulative impact with respect to global climate change.

To meet AB 32 goals, California would need to generate less GHGs than current levels. It is recognized, however, that for most projects there is no simple metric available to determine if a single project would substantially increase or decrease overall GHG emission levels.

The primary objective of AB 32 is to reduce California's contribution to global warming by reducing California's total annual production of GHG emissions. The impact that GHG emissions have on global climate change does not depend on whether they were generated by stationary, mobile, or area sources or whether they were generated in one region or another. Thus, the net change in total GHG levels generated by a project or activity is the best metric for determining whether a project would contribute to global warming. In the case of the Proposed Action and the alternatives under consideration, if the size of the increase in emissions from the project is considered to be substantial, then the impact of the project would be cumulatively considerable.

In comparison to criteria air pollutants, such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a much longer period of time. GHG emissions generated by the Proposed Action would predominantly be in the form of CO_2. Project construction would result in a net increase in emissions to occur over a period of 3 years (2010–2012), despite the implementation of Mitigation Measure 4.11-a. While any increase in GHG emissions would add to the quantity of emissions that would contribute to global climate change, it is noteworthy that emissions associated with the Proposed Action occur over a finite period of time (3 years), as opposed to operational emissions, which would occur over the lifetime of a project. The project would have no net increase in operational GHG emissions. Nonetheless, because of the intensity and duration of construction activities, and the lack of available mitigation measures to abate GHG emissions from heavy-duty construction equipment exhaust and on-road hauling emissions, the project's construction emissions would make an incremental contribution to climate change.

Previous GHG analyses conducted for the Phase 2 EIR (SAFCA 2007), Phase 2 EIS (USACE 2008), and Phase 3 DEIS/DEIR (USACE and SAFCA 2009) concluded that the project's contribution to cumulative GHG impacts would be considerable and would be a significant and unavoidable cumulative impact (see Sections 5.1.3.2 and 5.1.3.3, above). The quantification methodologies and threshold concepts from the California Air Pollution Control Officers Association (CAPCOA) in the *CEQA & Climate Change* document (CAPCOA 2008), from the California Office of Planning and Research (OPR) in the *Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions* (OPR 2009), and from the California Air Resources Board (ARB) in the recently adopted *AB32 Scoping Plan* (ARB 2008a) and the *Preliminary Draft Staff Proposal Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act* (ARB 2008b), have allowed further refinement of the GHG analysis in this EIS/EIR. Using this guidance, it is possible to discuss the project's emissions of GHG in a larger context.

As calculated in **Appendix F**, construction of the Phase 2, 3, and 4a Projects would generate approximately 12,159 tons (11,031 metric tons) of CO_2 during 2010 associated with mobile equipment exhaust. CO_2 emissions in subsequent years (2011–2012) would be equal to or less than in 2010.

To establish additional context in which to consider the order of magnitude of project-generated GHG emissions, it may be noted that facilities (i.e., stationary, continuous sources of GHG emissions) that generate greater than 25,000 metric tons CO_2/year are mandated to report GHG emissions to the California Air Resources Board (ARB) pursuant to AB 32. In addition, a threshold of 10,000 metric tons CO_2/year was recommended by the Market Advisory Committee for inclusion in a GHG cap and trade system, a threshold of 10,000 metric tons CO_2e/year adopted by the South Coast Air Quality Management District for stationary/industrial projects, and a draft preliminary threshold of 7,000 metric tons of CO_2e/year for industrial projects by ARB. Absent any agency-adopted threshold for GHG emissions, it is notable that the Proposed Action would generate emissions substantially less than 25,000 metric tons CO_2/year (and other recommended targets). This information is presented for informational purposes, and it is not the intention of SAFCA to adopt 25,000 metric tons CO_2/year as a numeric threshold. Rather, the intention is to put project-generated GHG emissions in the appropriate statewide context in order to evaluate the contribution to the

global impact of climate change. Because the project's emissions would be temporary and short-term in nature, and far below the minimum standard for reporting requirements under AB 32, the project's GHG emissions would not result in a cumulatively considerable contribution to a significant cumulative impact on GHG emissions and global climate change.

Raise and Strengthen Levee in Place Alternative

The RSLIP Alternative would require a similar level of trips for hauling material than the Proposed Action. In addition, construction of the RSLIP Alternative would result in approximately 8,079 tons (7,329 metric tons) of CO_2 emissions during 2010. This would be well below 25,000 metric tons CO_2/year, the minimum GHG emissions level for facility mandatory reporting to ARB pursuant to AB 32. For the same reasons described under the Proposed Action, would not result in a cumulatively considerable contribution to a significant cumulative impact on global climate change under the RSLIP Alternative.

5.1.8.5 NOISE

Proposed Action

The Proposed Action would have a significant and unavoidable project-level impact on noise levels experienced by the occupants of residences that are near sites of construction activity or haul routes for construction traffic. A substantial number of residences are located adjacent to the Sacramento east levee where cutoff walls would be installed. However, there are no other known projects in the vicinity of proposed project activity (borrow sites, rural roadways, levee and canal construction areas) that would generate noise levels noticeably above ambient noise levels, which are generated by sources that include aircraft operations, truck traffic on area roadways, and agricultural activity. Therefore, the Proposed Action is not expected to contribute to a significant cumulative noise impact. This localized impact would not result in a cumulatively considerable contribution to a significant cumulative impact.

Raise and Strengthen-Levee-in-Place Alternative

Under the RSLIP Alternative, levee improvement activity would occur directly along the Sacramento River east levee at many locations adjacent to residences on the waterside of Garden Highway, and to a lesser extent, the landside of the levee. The combined effect of noise from simultaneous construction of erosion control improvements on the waterside and levee improvements on the landside would be amplified and would affect a small number of residences on Garden Highway in the vicinity of the erosion control site, causing a project-level significant impact. However, this impact could be decreased by scheduling construction of the erosion control improvements to occur before or after the nearby levee improvement work. Furthermore because these impacts would be temporary, they would not be combined with future ongoing noise impacts, if any. Therefore, the RSLIP Alternative would not result in a cumulatively considerable contribution to a significant cumulative impact.

5.1.8.6 VISUAL RESOURCES

Proposed Action

The Proposed Action would include the removal of trees, other vegetation, and structures from the landside of the Sacramento River east levee within the footprint of the adjacent levee and berms, and may include the removal of some vegetation from the waterside of the Sacramento River east levee These changes would contribute to the substantial degradation of scenic resources in the Natomas Basin that are expected to result with various development projects and expansion of Airport facilities, as the area's visual character changes from rural agricultural landscape to urban/suburban setting. Although the project includes the establishment of a substantial acreage of woodland plantings around the Basin to offset the significant effect of the project on scenic resources

(oak and other native trees), the plantings would require several years to become well established. Therefore, the Proposed Action would make a cumulatively significant contribution to changes in the visual character and scenic resources of the Natomas Basin in the near term. This impact would be significant and unavoidable in the near term, but less than significant in the long term. The long-term impact is anticipated to be less than significant, and the effects from the Proposed Action would not result in a cumulatively considerable contribution to a significant cumulative impact on visual resources in the long term.

Raise and Strengthen-Levee-in-Place Alternative

The RSLIP Alternative would result in similar impacts to visual resources as the Proposed Action except that the Sacramento River east levee would be raised and widened in place, requiring greater removal of riparian woodlands on the waterside of these levee reaches to conform with USACE guidance regarding levee encroachments. Tree removal for the relocation and extension of Riverside Canal would be the same as under the Proposed Action; however, overall fewer landside trees would be removed than under the Proposed Action. The RSLIP Alternative, however, would result in the loss of high-aesthetic-value woodlands along the waterside of the levee. Because the replacement plantings would be planted in the landside of the levee, these actions would result in cumulatively considerable near-term and long-term contributions to changes in the visual character and scenic resources of the Natomas Basin, which would be greater than the cumulative impact under the Proposed Action. This alternative would make a considerable contribution to a significant cumulative long-term impact associated with the loss of waterside woodlands.

5.2 GROWTH INDUCEMENT

Both NEPA (40 CFR 1508[a] and [b]) and CEQA (State CEQA Guidelines [CCR Section 15126.2(d)] require an examination of the direct and indirect impacts of the proposed project, including the potential of the project to induce growth leading to changes in land use patterns and population densities and related impacts on environmental resources. Specifically, CEQA states that the EIR shall:

> Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also, discuss the characteristics of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Direct growth inducement would result if a project involved construction of new housing. Indirect growth inducement would result, for instance, if implementing a project resulted in any of the following:

- substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises);
- substantial short-term employment opportunities (e.g., construction employment) that indirectly stimulates the need for additional housing and services to support the new temporary employment demand; and/or
- removal of an obstacle to additional growth and development, such as removing a constraint on a required public utility or service (e.g., construction of a major sewer line with excess capacity through an undeveloped area).

Growth inducement itself is not an environmental effect, but it may foreseeably lead to changes in land use patterns and population densities and related impacts on environmental resources.

Within the project area, population growth and urban development are driven by local, regional, and national economic conditions. Local land use decisions are within the jurisdiction of the cities and counties within the project area: the City of Sacramento and Sacramento and Sutter Counties. Each of these agencies has adopted a general plan consistent with state law. These general plans provide an overall framework for growth and development within the jurisdiction of each agency, including the project area. Although each of these agencies is a member of SAFCA, as a joint powers agency, SAFCA is limited to exercising powers common to all of its constituent members, including RD 1000 and American River Flood Control District, neither of which has any land use planning authority. Accordingly, SAFCA has no authority to permit development and has only limited authority to impose conditions on the development that is permitted.

This section summarizes the growth-inducing effects that were previously evaluated for the NLIP. NEPA and CEQA documents that are incorporated by reference here include the same documents listed above in Section 5.1.3, "Summary of Cumulative Impact Analyses from Previous NLIP Environmental Documents," with the State Clearinghouse numbers as required by the State CEQA Guidelines (CCR Section 15150[d]). In addition, the following document, which analyzes the growth-inducing effects of the NBHCB, is hereby incorporated by reference and summarized below: *Draft Environmental Impact Report/Environmental Impact Statement, Natomas Basin Habitat Conservation Plan* (City of Sacramento 2002). Printed copies of this document are available at SAFCA's office at 1007 7th Street, 7th Floor, Sacramento, California.

These documents evaluated expected growth that could occur with implementation of the local general plans for the City of Sacramento and Sacramento and Sutter Counties. They also considered growth projected in the SACOG Blueprint, which is a joint vision for regional growth through the year 2050, endorsed by the SACOG counties (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba) and the 22 cities within these counties. The State Plan of Flood Control, which would require new development to have a minimum of 200-year flood damage reduction, was described in relation to the Proposed Action. Using the above information, which is incorporated by reference, combined with an evaluation of residual flood damage, SAFCA concluded that there is substantial evidence that the project evaluated for the NLIP as a whole would accommodate anticipated growth in the project area in a manner that would be consistent with adopted local and regional growth management plans and with an emerging State Plan of Flood Control. The growth-inducing effects of the NBHCP were completely analyzed in the adopted and approved HCP EIR (City of Sacramento 2002). This document indentified no growth-inducing effects associated with the creation and ongoing operation of the HCP (City of Sacramento 2002:4-168).

Thus, the Phase 4a Project, which is a component of the NLIP, while accommodating planned regional growth is not growth inducing itself. This finding is hereby incorporated by reference.

5.3 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

NEPA requires that an EIS include a discussion of the relationship between short-term uses of the environment and long-term productivity. Within the context of this EIS/EIR, "short-term" refers to the construction period, while "long-term" refers to the operational life of the project and beyond.

Project construction would result in short-term construction-related effects such as interference with local traffic and circulation, and increased air emissions, ambient noise levels, dust generation, and disturbance of wildlife. These effects would be temporary, occurring only during construction, and are not expected to alter the long-term productivity of the natural environment. Project implementation would also result in long-term effects, including permanent loss of farmland, changes in visual resources, and adverse effects on existing waters, wetlands, and woodland habitat.

Project implementation would also assist in the long-term productivity of the environment by improving the levee system that protects the Natomas Basin by providing at least a 100-year level of flood damage reduction by the end of 2010 and a 200-year level of protection by the end of 2012, and reducing wildlife hazards in the vicinity of the Airport. In addition, it would also preserve and improve, over the long term, important habitat upon which the Natomas Basin species of concern to USFWS and DFG depend, by increasing acreages, connectivity, and habitat quality of wetlands and other waters of the United States in the Basin.

These long-term beneficial effects of the Phase 4a Project would outweigh its potentially significant short-term impacts to the environment.

5.4 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL IMPACTS

State CEQA Guidelines CCR Section 21100(b)(2)(A) provides that an EIR shall include a detailed statement setting forth "any significant effect on the environment that cannot be avoided if the project is implemented." Chapter 4.0, "Environmental Consequences and Mitigation Measures," provides a detailed analysis of all potentially significant, direct and indirect, environmental impacts of the project, feasible mitigation measures that could reduce or avoid the project's significant impacts, and whether these mitigation measures would reduce these impacts to less-than-significant levels. The project's significant cumulative impacts are discussed in Section 5.1, "Cumulative Impacts," above. If a specific impact cannot be reduced to a less-than-significant level, it is considered a significant and unavoidable impact. The project would have the following significant and unavoidable environmental impacts (direct, indirect, and/or cumulative), which are presented in the order they appear in Chapter 4.0, "Environmental Consequences and Mitigation Measures":

- conversion of Important Farmland to nonagricultural uses;
- conflicts with lands under Williamson Act Contracts;
- potential to temporarily physically divide or disrupt an established community;
- potential loss of mineral resources;
- loss of woodland habitats (10–15 years until maturity);
- impacts on Swainson's hawk and other special-status birds;
- potential damage or disturbance to known prehistoric resources from ground-disturbance or other construction-related activities;
- potential damage to or destruction of previously undiscovered cultural resources from ground-disturbance or other construction-related activities;
- potential discovery of human remains during construction;
- temporary increase in traffic on local roadways;
- temporary emissions of ROG, NO_X, and PM_{10} during construction;
- generation of temporary, short-term construction noise;
- temporary, short-term exposure of residents to increased traffic noise levels from hauling activity;

- alteration of scenic vistas, scenic resources, and existing visual character of the project area; and
- new sources of light and glare (temporary) that adversely affect views.

Where feasible mitigation exists, it has been included to reduce these impacts; however, the mitigation would not be sufficient to reduce the impacts to a less-than-significant level.

5.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires that an EIS include a discussion of the irreversible and irretrievable commitments of resources which may be involved should the project be implemented. Similarly, the State CEQA Guidelines require a discussion of the significant irreversible environmental changes that would be caused by the project should it be implemented.

The irreversible and irretrievable commitment of resources is the permanent loss of resources for future or alternative purposes. Irreversible and irretrievable resources are those that cannot be recovered or recycled, or those that are consumed or reduced to unrecoverable forms. Project implementation would result in the irreversible and irretrievable commitment of energy and material resources during project construction and maintenance, including the following:

- construction materials, including such resources as soil and rocks;
- land and water area committed to new/expanded project facilities; and
- energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction, operation, and maintenance.

The use of these nonrenewable resources is expected to account for only a small portion of the region's resources and would not affect the availability of these resources for other needs within the region. Construction activities would not result in inefficient use of energy or natural resources. Construction contractors selected would use best available engineering techniques, construction and design practices, and equipment operating procedures. Long-term project operation would not result in substantial long-term consumption of energy and natural resources.

6 COMPLIANCE WITH FEDERAL ENVIRONMENTAL LAWS AND REGULATIONS

This chapter summarizes the Federal environmental laws and regulations that apply to the Phase 4a Project, aside from NEPA, and describes the Phase 4a Project's compliance with those laws and regulations.

6.1 CLEAN WATER ACT (SECTION 404)

The U.S. Environmental Protection Agency (EPA) is the lead Federal agency responsible for water quality management. The Clean Water Act of 1972 (CWA) is the primary Federal law that governs and authorizes water-quality control activities by EPA as well as the states. Various elements of the CWA address water quality, as discussed below.

CWA Section 404 establishes a requirement for a project proponent to obtain a permit from the U.S. Army Corps of Engineers (USACE) before engaging in any activity that involves discharge of dredged or fill material into "waters of the United States," including wetlands. Fill material means material placed in waters of the United States where the material has the effect of replacing any portion of a water of the United States with dry land, or changing the bottom elevation of any portion of a water of the United States. Examples of fill material include but are not limited to rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mining or other excavation activities, and material used to create any structure or infrastructure in waters of the United States. Waters of the United States include navigable waters of the United States; interstate waters; all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce; tributaries to any of these waters; and wetlands that meet any of these criteria or that are adjacent to any of these waters. Wetlands are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Jurisdictional wetlands must meet three criteria: hydrophytic vegetation, hydric soil, and wetland hydrology. In addition, under Section 404, jurisdictional wetlands must: be adjacent to traditional navigable waters; directly about relatively permanent waters; or have a significant nexus with a traditional navigable water.

Before USACE can issue a permit under CWA Section 404, it must determine that the project is in compliance with the CWA Section 404(b)(1) Guidelines. The Section 404(b)(1) Guidelines specifically require that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (CFR Title 40, Section 230.10[a] [40 CFR 230.10(a)]). To comply with this provision, the applicant is required to evaluate opportunities that would result in less adverse impact on the aquatic ecosystem. A permit cannot be issued for a project, therefore, in circumstances where a less environmentally damaging practicable alternative exists that would fulfill the project purpose. An alternative is practicable if it is available and capable of being done after cost, existing technology, and logistics are taken into consideration in light of the overall project purpose as determined by USACE. If it is otherwise a practicable alternative, an area not presently owned by the project applicant(s) that could reasonably be obtained, used, expanded, or managed to fulfill the purpose of the proposed activity may be considered.

As described in Section 4.7, "Biological Resources," implementation of either the Proposed Action or Raise and Strengthen Levee in Place (RSLIP) Alternative would require an individual permit from USACE under Section 404 of the CWA for the discharge of fill into waters of the United States, including wetlands. USACE verified the wetland delineation prepared for the Phase 2 Project on July 24, 2008. The Sutter Pointe and Dunmore borrow sites were surveyed for wetlands as part of the Phase 3 Project wetland delineation. A preliminary jurisdictional determination form was issued by USACE in November 2008 for the Phase 3 Project area. A supplemental wetland delineation report for the Phase 3 Project was submitted to USACE in April 2009 and a Phase 4a Project

wetland delineation report will be submitted to USACE in August 2009. This EIS/EIR will be used to support USACE's decision whether to grant SAFCA an individual permit for the Proposed Action or RSLIP Alternative.

6.2 RIVERS AND HARBORS ACT OF 1899, AS AMENDED

6.2.1 SECTION 14

Under Section 14 of the Rivers and Harbors Act of 1899 (33 United States Code [USC] 408), referred to as "Section 408," the Secretary of the Army, on the recommendation of the Chief of Engineers, may grant permission for the alteration of a Federal project levee by a non-Federal entity if the alteration is not injurious to the public interest and does not impair the usefulness of the project. This EIS/EIR will be used to support USACE's decision whether to grant permission for the Phase 4a Project pursuant to Section 408.

6.2.2 SECTION 10

Under Section 10 of the Rivers and Harbors Act of 1899, work in, over, or under navigable waters of the United States is regulated by USACE. Navigable waters of the United States are defined as those waters subject to the ebb and flow of the tide shoreward to the mean high-water mark and those that are currently used, have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. The jurisdiction of USACE under CWA overlaps and extends beyond the geographic scope of its jurisdiction under the Rivers and Harbors Act. USACE permitting authority under the Rivers and Harbors Act is not subject to EPA oversight or any other restrictions specific to the CWA, and, in some cases the Rivers and Harbors Act alone will apply to waters. A permit from USACE is required prior to any work in, over, or under navigable waters of the United States.

As part of the Phase 4a Project, modifications to Reclamation District (RD) 1000 Pumping Plants Nos. 3 and 5 involve raising and extending discharge pipes, replacing or modifying pumps and motors, and performing other seepage remediation, including relocation of the stations away from the levee to accommodate raising the discharge pipes above the 200-year design flood elevation. Modifications to NCMWC's Riverside Pumping Plant includes raising and extending discharge pipes, and modifying or replacing the existing Riverside Pumping Plant pumps and motors to reflect raising the discharge pipes above the 200-year design flood elevation. These Phase 4a Project elements would be subject to permission from USACE under Section 10. Under the RSLIP Alternative, proposed rip rap would also be subject to permission from USACE under Section 10.

6.3 FISH AND WILDLIFE COORDINATION ACT OF 1934, AS AMENDED

The Fish and Wildlife Coordination Act (FWCA) ensures that fish and wildlife receive consideration equal to that of other project features for projects that are constructed, licensed, or permitted by Federal agencies. The FWCA requires that the views of the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the applicable state fish and wildlife agency (in this case, the California Department of Fish and Game [DFG]) be considered when impacts are evaluated and mitigation needs determined.

USACE is coordinating with USFWS, NMFS, and DFG to determine the effects of the Proposed Action on fish and wildlife in the project area. USFWS will provide USACE with a FWCA report. USACE and SAFCA are providing USFWS, NMFS, and DFG with copies of this EIS/EIR for review and comment.

6.4 ENDANGERED SPECIES ACT OF 1973, AS AMENDED

Pursuant to the Federal Endangered Species Act (ESA), USFWS and NMFS have regulatory authority over Federally listed species. Under ESA, a permit to "take" a listed species is required for any Federal action that may harm an individual of that species. Take is defined under ESA Section 9 as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Under Federal regulation, take

is further defined to include habitat modification or degradation where it would be expected to result in death or injury to listed wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. ESA Section 7 outlines procedures for Federal interagency cooperation to conserve Federally listed species and designated critical habitat. Section 7(a)(2) requires Federal agencies to consult with USFWS and/or NMFS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species.

SAFCA held meetings to discuss project features with USFWS during the NLIP alternatives formulation and CEQA compliance process (see Section 7.3, "Coordination with Other Federal, State, and Local Agencies"). USACE and SAFCA subsequently held informal consultation meetings in January through September 2008 to clarify project details and discuss information needs for ESA permitting.

In October 2008, a programmatic Biological Opinion (BO) was issued by USFWS for the NLIP with incidental take authorization for the Phase 2 Project; an amended BO was issued in May 2009. A Biological Assessment (BA) for the Phase 4a Project is under development and will be similar to the Phase 2 and 3 Project BAs. The Phase 3 and 4a Project BAs will request incidental take authorization for these respective project phases and will be appended to the programmatic BO. BOs for the Phase 3 Project are expected to be issued by USFWS and NMFS in fall 2009.

USACE and SAFCA are providing USFWS, NMFS, and DFG with copies of this EIS/EIR for review and comment.

6.5 MIGRATORY BIRD TREATY ACT OF 1918

The Migratory Bird Treaty Act (MBTA) implements a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes several hundred species and essentially includes all native birds. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and personal property.

Compliance with the MBTA is being addressed through compliance with the ESA and the California Endangered Species Act (CESA). The Phase 4a Project incorporates mitigation measures that would help ensure that construction activities do not result in the take of migratory birds, as discussed in Section 4.7, "Biological Resources."

6.6 BALD EAGLE PROTECTION ACT OF 1940

The Bald Eagle Protection Act provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds.

The Phase 4a Project area does not contain bald eagle or golden eagle nesting habitat, and the Phase 4a Project would not result in the take of bald or golden eagles. The Phase 4a Project incorporates mitigation measures that would ensure that construction activities do not result in the take of any raptors, as discussed in Section 4.7, "Biological Resources."

6.7 CLEAN AIR ACT OF 1963, AS AMENDED

The Federal Clean Air Act (CAA) required EPA to establish national ambient air quality standards (NAAQS). EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, respirable particulate matter with an aerodynamic diameter of 10 micrometers or less (PM_{10}), fine particulate matter with an aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP).

Under the CAA, the primary responsibility for planning for attainment and maintenance of the NAAQS rests with the state and local agencies. Accordingly, state and local air quality agencies are also designated as the primary permitting and enforcement authorities for most CAA requirements. During preparation of the Phase 2 EIR, the air management districts with jurisdiction over the project area, the Feather River Air Quality Management District (FRAQMD) and the Sacramento Metropolitan Air Quality Management District (SMAQMD), were given the opportunity to comment on the project with regard to the scope and content of the Phase 2 EIR in relation to each agency's statutory responsibilities and regulatory oversight of the project. In addition, FRAQMD was also consulted through several written and verbal exchanges regarding its air emissions regulations. SMAQMD provided written comments on the Phase 2 EIR, and revisions to the air quality information were incorporated into the Phase 2 Final EIR based on this input.

The air quality effects analysis and associated mitigation measures in this EIS/EIR are consistent with the approach that was used in the Phase 2 EIR, Phase 2 EIS, and Phase 3 DEIS/DEIR. Mitigation Measure 4.11-a in this EIS/EIR directs SAFCA to implement control measures recommended by FRAQMD and SMAQMD to minimize temporary emissions of reactive organic gases (ROG), oxides of nitrogen (NO_X), and PM_{10} during project construction, and comply with all applicable rules and regulations of FRAQMD and SMAQMD. As described under Impact 4.11-b, the Proposed Action (including implementation of proposed mitigation measures) would not exceed the EPA's general conformity *de minimis* thresholds or hinder the attainment of air quality objectives in the local air basin with mitigation implementation.

USACE and SAFCA are providing FRAQMD and SMAQMD with copies of this EIS/EIR for review and comment.

6.8 NATIONAL HISTORIC PRESERVATION ACT OF 1966, AS AMENDED

Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 Code of Federal Regulations [CFR] 800, as amended in 2004) require Federal agencies to consider the potential effects of their proposed undertakings on historic properties. Historic properties are cultural resources that are listed on, or are eligible for listing on, the National Register of Historic Places (NRHP) (36 CFR 800.16[l]). Undertakings include activities directly carried out, funded, or permitted by Federal agencies. Federal agencies must also allow the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the proposed undertaking and its potential effects on historic properties.

As noted in Section 2.8, "Cultural Resources," inventories of all Phase 4a Project features that involve ground-disturbing work in native soils, including borrow locations, are ongoing; SAFCA will also complete evaluations, findings of effect, and treatment of identified resources where required. The project incorporates treatment measures to protect resources listed on or eligible for listing on the NRHP, as discussed in Section 4.8, "Cultural Resources." Determinations of the specific mitigation measures to be implemented will be made by USACE and SAFCA in consultation with the SHPO as part of the determination and eligibility and effect process, as required by NHPA Section 106. Implementation of the selected mitigation measures will be ensured through the execution of a Programmatic Agreement (PA). Signatories to the PA are SAFCA, USACE, and the SHPO. The ACHP has been consulted and waived participation as a signatory to the PA.

The PA addresses the scope of the Area of Potential Effect (APE) and provides that the APE will be defined for each project phase. The APE for each phase will be submitted with the cultural resources inventory reports, and will be consulted upon by SHPO. If areas are added to the project development activities subsequent to the SHPO concurrence on the map of the APE for a specific phase, SAFCA will complete an inventory of historic properties within the expanded APE. If historic properties that would be adversely affected by the project are identified in cultural resources inventories, SAFCA will prepare a Historic Properties Treatment Plan (HPTP) for review and written approval by USACE and the SHPO for those specific properties. Areas of archaeological sensitivity will be monitored in accordance with the HPTPs. A final report documenting the results of work prepared under the HPTPs will be submitted to USACE and the SHPO. The PA provides for public notice and consultation with Native Americans and the public. The signed and executed PA is included in **Appendix E1**.

The regulations implementing Section 106 hold that:

> Compliance with the procedures established by an approved programmatic agreement satisfies the agency's section 106 responsibilities for all individual undertakings of the program covered by the agreement until it expires or is terminated by the agency, the president of NCSHPO when a signatory, or the Council (36 CFR Part 800.14[b][2][iii]).

The regulations further clarify that execution of agreement documents under 36 CFR Part 800.6, *Resolution of Adverse Effects* (including programmatic agreements adopted under that section per 36 CFR Part 800.14[b][3]) evidence satisfaction of Section 106 (36 CFR Part 800.6[b][3]):

> A memorandum of agreement executed and implemented pursuant to this section evidences the agency official's compliance with section 106 and this part and shall govern the undertaking and all of its parts. The agency official shall ensure that the undertaking is carried out in accordance with the memorandum of agreement.

Thus, execution of the PA, which was prepared through the process provided in 36 CFR Part 800.6 evidences USACE's compliance with Section 106. This does not mean that technical management activities under the PA are complete; they in fact are ongoing, as described above.

Appendix E2 contains a number of documents that are part of the record demonstrating Section 106 compliance. These include the following:

- June 7, 2007, letter from SAFCA's project archaeologist to the Native American Heritage Commission (NAHC) requesting a list of Native American individuals and organizations to contact regarding the project;
- June 19, 2007, response letter from the NAHC to SAFCA's project archaeologist supplying a list of the requested individuals and organizations;
- June 21, 2007, letters from SAFCA's project archaeologist to Native American individuals and organizations soliciting concerns and any information about cultural resources in the project area;
- July 9, 2007, telephone record of conversation between SAFCA's project archaeologist and Rose Enos (referred to by the NAHC as "Miwok/Maidu") regarding Ms. Enos' general concern regarding avoidance of burial sites and request to be contacted if work is conducted on such sites;
- January 2008 letter (and enclosures) from USACE to the SHPO initiating Section 106 consultation;
- February 1, 2008, letter from USACE to the United Auburn Indian Community of Auburn regarding an invitation to participate as a concurring party in the PA [note: this is an example of about 20 letters that were sent to tribal entities inviting them to participate in the PA];

- May 8, 2008, letter from Shingle Springs Rancheria to the SHPO, USACE, and SAFCA regarding comments on the Draft PA and a request for formal consultation;

- June 11, 2008, response letter from USACE to Shingle Springs Rancheria regarding May 8, 2008 letter;

- June 12, 2008, response letter from SAFCA to Shingle Springs Rancheria regarding May 8, 2008 letter and the June 4, 2008, meeting; and

- July 23, 2008, letter from SAFCA to the California Department of Water Resources (DWR) providing further agency and public notice of the PA, per Stipulation VI of the PA, Native American and Other Consultation and Public Notice. (Note: This is an example of letters that were sent to local municipalities, relevant state agencies, Native American individuals and organizations, and local preservation societies.)

While this record is not necessarily exhaustive, it documents the critical steps for Section 106 compliance completed by USACE.

6.9 AMERICAN INDIAN RELIGIOUS FREEDOM ACT

The American Indian Religious Freedom Act of 1978 is also applicable to Federal undertakings. This act established "the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions…including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites" (Public Law 95-431). Consultations with Native Americans to determine concerns regarding the Phase 4a Project are discussed in Section 7.2, "Native American Consultation."

6.10 WILD AND SCENIC RIVERS ACT

The Wild and Scenic Rivers Act (16 USC 1271 et seq.) establishes a National Wild and Scenic Rivers System for the protection of rivers with important scenic, recreational, fish and wildlife, and other values. Rivers are classified as wild, scenic, or recreational. The act designates specific rivers for inclusion in the System and prescribes the methods and standards by which additional rivers may be added. The lower American River is included in the System and is designated as "Recreational."

None of the internal water features of the project are tributary to the lower American River or any other river included in the System. Therefore, the Phase 4a Project would have no effect on Wild and Scenic Rivers.

6.11 EXECUTIVE ORDER 11988, FLOODPLAIN MANAGEMENT

Executive Order (EO) 11988, Floodplain Management (May 24, 1977), directs Federal agencies to issue or amend existing regulations and procedures to ensure that the potential effects of any action it may take in a floodplain are evaluated and that its planning programs and budget requests reflect consideration of flood hazards and floodplain management. The purpose of this directive is "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." Guidance for implementation of EO 11988 is provided in the floodplain management guidelines of the U.S. Water Resources Council (40 CFR 6030; February 10, 1978) and in *A Unified National Program for Floodplain Management*, prepared by the Federal Interagency Floodplain Management Taskforce.

Recognizing that improving the Natomas Basin perimeter levee system would indirectly support population growth within the Basin, USACE in 1991 conducted extensive studies of the feasibility of constructing a cross levee spanning the Basin from east to west to limit the extent of flood protection improvements and associated floodplain development to the southern one-half to two-thirds of the Basin. The present study reconsidered a

cross-levee measure. For the reasons described in Section 2.1.5.1, "Alternatives Evaluated and Rejected in Previous SAFCA NLIP Environmental Documents," this flood protection alternative has been determined to be impracticable and unlikely to prevent the urbanization of the northern portion of the Basin without a very costly program for acquiring flowage easements and retiring development rights on the lands north of the cross levee. Consequently, improvements to the Natomas Basin perimeter levee system have been determined by USACE, the State, and SAFCA to be the feasible method of providing adequate flood protection to existing development within the Basin and to the planned development. Although improving the perimeter levee system would fail to discourage further development within the Basin, this action is consistent with efforts by the State of California to comprehensively address floodplain development and flood risk on a regional scale. This comprehensive approach differentiates between flood protection requirements for urbanized and nonurbanized floodplain areas and will direct urban development away from those floodplains where a 200-year level of flood protection cannot be achieved while ensuring that this level of protection is provided for already heavily populated areas such as the Natomas Basin.

The Phase 4a Project would reduce the risk of flood damage and minimize the impact of floods on human health, safety, and welfare by strengthening existing flood damage reduction infrastructure (see Section 4.5, "Hydrology and Hydraulics," for a discussion of the methodology and analysis of the Phase 4a Project's potential flood-related impacts). As noted in Section 2.5.1, "Residual Risk of Flooding," implementation of the Phase 4a Project would substantially lessen the probability of a flood in the Basin due to levee failure; however, the Natomas Basin would remain subject to a residual risk of flooding under both of the action alternatives. SAFCA would be required to maintain an ongoing residual risk management program, as described in Section 2.5.1. The Phase 4a Project would also create natural habitat that would serve ecological functions associated with natural floodplains (see Section 2.3.4, "Habitat Improvements"). Because there is no practicable alternative to the urban floodplain development indirectly associated with the project, the project would reduce flood damage and provide habitat values, and SAFCA would maintain an ongoing residual risk management program, it satisfies EO 11988.

In 1982, the Interagency Task Force on Floodplain Management published additional guidance on the implementation of EO 11988. Additional standards were developed to protect human safety, health, and welfare. These standards apply to "critical actions," which are defined by the Water Resources Council Floodplain Management Guidelines as "any activity for which even a slight chance of flooding would be too great. The critical action floodplain is defined as the 500-year floodplain."

To assist in determining whether a proposed action is a "critical action," the following questions must be answered. If any answer is in the affirmative, the proposed action is considered a "critical action," and therefore subject to a higher standard.

- If flooded, would the proposed action create an added dimension to the disaster, as could be the case for liquefied natural gas terminals and facilities producing and storing highly volatile, toxic, or water-reactive materials?

- Given the flood warning lead-time available, would the occupants of buildings such as hospitals, schools, and nursing homes be insufficiently mobile to avoid loss of life and injury?

- Would essential and irreplaceable records, utilities, and/or emergency services be lost or become inoperative if flooded? (Interagency Task Force on Floodplain Management 1982)

The NLIP is a program of levee improvements; it would not place sensitive land uses (e.g., hazardous materials storage facilities, senior care facilities, hospitals, schools, etc.) within a floodplain. Further, as described in Section 5.2, "Growth Inducement," and elsewhere in this EIS/EIR, SAFCA does not have any authority over what types of land uses would be placed in the Natomas Basin, with or without implementation of the NLIP. Therefore, SAFCA has concluded that the NLIP is not a "critical action."

6.12 EXECUTIVE ORDER 11990, PROTECTION OF WETLANDS

The purpose of EO 11990 is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, EO 11990 requires Federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. EO 11990 applies to: acquisition, management, and disposition of Federal lands and facilities construction and improvement projects which are undertaken, financed or assisted by Federal agencies; and Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities. SAFCA has taken actions to minimize project effects on wetlands where possible and to create new wetlands as part of the project, and has applied for a CWA Section 404 permit from USACE. The replacement of Elkhorn Reservoir with a new sediment basin, part of the Phase 2 Project, is being designed to incorporate setbacks from the adjacent slough to minimize disturbance of wetlands there.

Implementation of the Phase 4a Project as proposed would ensure no net loss of aquatic resource function and services through SAFCA's proposed compensatory mitigation. Wetlands and other waters of the United States that would be created as part of the project are described in Section 2.3.4, "Habitat Improvements." Wetlands that would be created as part of the project include marsh habitat in a portion of the Fisherman's Lake Borrow Area after being reclaimed, for which SAFCA has developed a preliminary design.

6.13 EXECUTIVE ORDER 12898, FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

EO 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (59 Federal Register 7629 [1994]) requires Federal agencies to identify and address disproportionately high and adverse health or environmental effects on minority populations, low-income populations, and Native Americans that may result from any proposed action. The Council on Environment Quality (CEQ) has oversight of the Federal government's compliance with the EO. To facilitate compliance, CEQ prepared and issued, in association with EPA, "Environmental Justice Guidance Under the National Environmental Policy Act" (CEQ December 1997). The Environmental Justice Guidance provides six principles by which environmental justice issues should be identified and addressed (CEQ 1997:9):

1. Consider the composition of the affected area to determine whether minority populations, low-income populations, or Indian tribes are present in the area affected by the proposed action, and if so, determine if human health or environmental affects would be disproportionately high on those populations.

2. Consider relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards including historical patterns of exposure to hazards.

3. Recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the action.

4. Develop effective public participation strategies.

5. Assure meaningful community representation in the process.

6. See tribal representation in the process.

While not currently residing in the local project vicinity as a distinct population group, Native American tribes are known to have lived in the project study area in the past and there is evidence of their occupation of the project

study area. The sites of occupation by Native American tribes are considered culturally significant and, therefore, are addressed in this EIS/EIR.

See Section 3.3.16 and 4.16, "Environmental Justice," for more information on project effects of minority and low-income populations, as well as on Native American tribes.

6.14 FARMLAND PROTECTION POLICY ACT

The Natural Resources Conservation Service (NRCS) is the agency primarily responsible for implementing the Federal Farmland Protection Policy Act (FPPA). The purpose of the FPPA is to minimize Federal contributions to the conversion of farmland to nonagricultural uses by ensuring that Federal programs are administered in a manner compatible with state government, local government, and private programs designed to protect farmland.

NRCS administers the FPPA, which is a voluntary program that provides funds to help purchase development rights to keep productive farmland in agricultural uses. The program provides matching funds to state, local, or tribal government entities and nongovernmental organizations with existing farmland protection programs to purchase conservation easements. Participating landowners agree not to convert the land to nonagricultural uses and retain all rights to the property for future agriculture. A minimum 30-year term is required for conservation easements, and priority is given to applications with perpetual easements. NRCS provides up to 50% of the fair market value of the easement (NRCS 2004).

Implementation of the Proposed Action or RSLIP Alternative would require converting areas of farmland along the Natomas Basin perimeter levee system to non-agricultural uses. Additional areas of farmland would be used as sources of soil borrow material. The topsoil on these lands would be retained and replaced after several feet of underlying soil is removed, and most of these lands would continue to be farmable, although some would be converted to marsh habitat. In addition, mitigation intended to reduce project effects on farmland is included in this EIS/EIR. Also, the proposed modifications of the agricultural irrigation and drainage infrastructure included in the action alternatives would support the maintenance of agricultural practices on the west side of the Natomas Basin.

The project complies with the FPPA because it provides for compensation for unavoidable direct conversion of agricultural land to nonagricultural uses, would provide infrastructure that would support the continuation of agricultural uses on the west side of the Natomas Basin, and is consistent with state and regional planning efforts that will protect farmland on a regional scale from development. Consultation with the NRCS (including submittal of the Farmland Conservation Impact Rating form) does not apply to Federal activities involving permitting and licensing (see 7 CFR 658) and therefore is not required for the project.

6.15 WILDLIFE HAZARDS ON OR NEAR AIRPORTS

The FAA addresses control of hazardous wildlife in Advisory Circular (AC) 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports* (FAA 2007). The FAA provides direction on where public-use airports should restrict land uses that have the potential to attract hazardous wildlife. FAA recommends a distance of 10,000 feet separating wildlife attractants and aircraft movement areas. The area within a 10,000-foot radius of the Airport Operations Area is designated as the Critical Zone. The FAA definition of wildlife attractants in AC 150/5200-33B includes human-made or natural areas, such as poorly drained areas, retention ponds, agricultural activities, and wetlands. AC 150/5200-33B recommends against the use of airport property for agricultural production within a 5-mile radius of the Airport Operations Area unless the income from the agricultural crops is necessary for the economic viability of the airport.

Section 2.3.5, "Aviation Safety Components," describes FAA's regulatory interest in managing wildlife attractants within 5 miles of the edge of the Airport's Area of Operations. Potential borrow sites within this area have been identified based on balancing multiple management priorities (including flood risk reduction, aviation

safety, and habitat conservation) and minimizing the cost and environmental effects of borrow haulage activities. Within the 10,000-foot Airport Critical Zone, management of the grasslands created by borrow operations would also be consistent with the Airport's *Wildlife Hazard Management Plan* (Sacramento County Airport System 2007).

6.16 FEDERAL EMERGENCY MANAGEMENT AGENCY

6.16.1 LEVEE REQUIREMENTS

For a levee accredited by the Federal Emergency Management Agency (FEMA) as providing a 100-year level of flood protection, the levee must be shown to satisfy several criteria, including protection of the embankment against erosion. Specific requirements are contained in Code of Federal Regulations Title 44, Section 65.10.

6.16.2 FLOOD ZONE DESIGNATIONS

Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area. In January 2008, FEMA proposed remapping the Natomas Basin as an AE zone, with the designation to take effect in December 2008. FEMA defines AE zones as areas with a 1% annual chance of flooding. The designation would result in the requirement that the bottom floor of all new buildings be constructed at or above base flood elevation—as little as 3 feet in some areas of Natomas but up to 20 feet above the ground level in much of the Basin. It is therefore anticipated that this designation would effectively stop any projects that are not issued building permits by the time the new map takes effect. An alternative to this designation, the A99 zone, may be applied where it can be shown that an area with a 1% annual chance of flooding will be protected by a Federal flood damage reduction system where construction has reached specified legal requirements. The main requirements are that 100% of the cost of the flood protection system restoration project must be authorized, 60% must be appropriated, 50% must be expended, and "critical features" must be under construction and 50% completed (FEMA 2007). Construction is not constrained and there are no FEMA-specified building elevation requirements with an A99 designation. Mandatory flood insurance purchase requirements apply to both designations, however.

6.17 SUSTAINABLE FISHERIES ACT

In response to growing concern about the status of United States fisheries, Congress passed the Sustainable Fisheries Act of 1996 (Public Law [PL] 104-297) to amend the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265), the primary law governing marine fisheries management in the Federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect essential fish habitat (EFH). EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem. The Sacramento River and the lowermost segment of the NEMDC have been designated as Essential Fish Habitat by the Pacific Fishery Management Council.

Phase 4a Project-related impacts to EFH in the Sacramento River are discussed in Section 4.7, "Biological Resources," and mitigation measures are identified.

6.18 RESOURCE CONSERVATION AND RECOVERY ACT

The primary Federal agency regulating the generation, transport, and disposal of hazardous substances is EPA, under the authority of the Resource Conservation and Recovery Act (RCRA). RCRA established an all-encompassing Federal regulatory program for hazardous substances that is administered in California by the

Department of Toxic Substances Control (DTSC). Under RCRA, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous substances. RCRA was amended in 1984 by the Hazardous and Solid Waste Amendments of 1984, which specifically prohibits the use of certain techniques for the disposal of various hazardous substances. The Federal Emergency Planning and Community Right-to-Know Act of 1986 imposes hazardous materials planning requirements to help protect local communities in the event of accidental release.

Based on an extensive records search, no known hazardous materials sites are located within the specific sites proposed for project-related excavation; however, multiple sites were identified along the Sacramento River east levee with possible contamination issues. In addition, hazardous substances may exist within the Natomas Basin and/or be brought in and used for project construction. The Phase 4a Project's potential impacts related to hazards and hazardous materials are described under Impact 4.15-b in Section 4.15, "Hazards and Hazardous Materials."

6.19 UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT

All or portions of parcels within the Phase 4a Project footprint would need to be acquired for project construction. Federal, state, local government agencies, and others receiving Federal financial assistance for public programs and projects that require the acquisition of real property, must comply with the policies and provisions set forth in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended in 1987 (42 USC 4601 *et seq.*) (Uniform Act), and implementing regulation, Title 49 CFR Part 24. Relocation advisory services, moving costs reimbursement, replacement housing, and reimbursement for related expenses and rights of appeal are provided for in the Uniform Act.

Project implementation would require acquisition of property in the Phase 4a Project footprint to construct flood damage reduction facilities and habitat improvements (applies to both the Proposed Action and the RSLIP Alternative); and closure of Garden Highway in 1.5- to 2-mile segments for approximately 8–12 weeks at a time, preventing access to residences in these areas and, thus, potentially requiring affected residents to relocate during that time period (applies only to the RSLIP Alternative).

Property acquisition and relocation services, compensation for living expenses for temporarily relocated residents, and negotiations regarding any compensation for temporary loss of business would be accomplished in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act.

6.20 FEDERAL EARTHQUAKE HAZARDS REDUCTION ACT

In October 1997, the U.S. Congress passed the Earthquake Hazards Reduction Act to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program." To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through postearthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHRPA designates FEMA as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and USGS.

The closest active fault to the Phase 4a Project area is located approximately 15 miles to the northwest, as shown in **Table 3.4-1**. Because there are no active faults within or near the Phase 4a Project footprint, the risk of fault ground rupture is low. In addition, geotechnical investigations of borrow materials and flood risk reduction improvements are designed in consideration of the longevity of the levee system, including secondary seismic hazards such as shaking, liquefaction, subsidence, and seiches.

7 CONSULTATION AND COORDINATION

This chapter summarizes public and agency involvement activities undertaken by USACE and SAFCA that have been conducted to date, are ongoing, and/or will be conducted for this project, and which satisfy NEPA and CEQA requirements for public scoping and agency consultation and coordination.

Additionally, Native American consultation activities are described.

7.1 PUBLIC INVOLVEMENT UNDER NEPA AND CEQA

7.1.1 NOTICE OF INTENT, NOTICE OF PREPARATION, AND SCOPING MEETING

USACE published the notice of intent (NOI) to prepare the Phase 4a EIS in the *Federal Register* on March 27, 2009. SAFCA filed the notice of preparation (NOP) of the Phase 4a EIR with the State Clearinghouse and released it publicly on March 27, 2009. In addition to the State Clearinghouse's distribution of the NOP to potentially interested state agencies, copies of the NOP were mailed to a distribution list of approximately 1,000 recipients, including Federal, state, regional, and local agencies; non-profit and private organizations; homeowners associations; partnerships; businesses; and individual residents in the project area to solicit input as to the scope and content of this EIS/EIR (see Section 7.4, "List of Recipients"). The NOI and NOP are included in **Appendix A1**.

A joint NEPA/CEQA public scoping meeting was held on April 13, 2009 from 4:30 to 6:30 p.m. at the South Natomas Community Center (Activity Room) in Sacramento, California, to brief interested parties on the Phase 4a Project, and obtain the views of agency representatives and the public on the scope and content of this EIS/EIR. **Appendix A2** contains the public outreach materials for the April 13, 2009 scoping meeting.

Verbal and written comments were received during the scoping meeting, and additional written comments from agencies and individuals were received throughout the CEQA scoping period, which ended on April 27, 2009. There is no mandated time limit for the NEPA scoping period. All comment letters received during the scoping period are included in **Appendix A1** and are summarized in **Table 7-1**.

Table 7-1
Written Comments Received on the NOI/NOP

Commenter	Date
U.S. Department of Homeland Security, FEMA Region IX	April 1, 2009
► Recommends that USACE and SAFCA review the effective Flood Insurance Rate Maps, revised December 8, 2009, for Sacramento County and maps revised December 2, 2008, for Sutter County. ► Notes that Sacramento and Sutter Counties are participants in the National Flood Insurance Program (NFIP) and are subject to floodplain management building requirements. ► Summarizes the NFIP floodplain management building requirements. ► Recommends contacting the Sacramento and Sutter Counties' floodplain managers for more information on local floodplain management building requirements.	
U.S. Department of Homeland Security, United States Coast Guard	January 31, 2008
► Notes that waterways in the project area are subject to tidal influence and considered navigable for bridge permitting purposes. ► Requests that the Coast Guard be included on the mailing list and in the NEPA scoping process. ► Notes that under the provisions of the General Bridge Act of 1946 clearances for bridges over navigable waters of the U.S. must be approved by the Commandant of the U.S. Coast Guard. Notes that the applicant should be directed to contact the U.S. Coast Guard office for guidance on bridge permitting and application process.	

Table 7-1 Written Comments Received on the NOI/NOP	
Commenter	Date
► Notes that the U.S. Coast Guard agrees to serve as a Cooperating Agency for satisfying NEPA requirements and from a navigational standpoint and should be listed as such in the Draft and Final EIS.	
State Department of Conservation, Division of Land Resource Protection	June 26, 2008
► Indicates intent to comment by April 28, 2009.	
State Department of Conservation, Division of Land Resource Protection	June 4, 2009
► Requests that the EIR provide location and extent of Important Farmland in and adjacent to the project area. ► Requests that the EIR describe current and past agricultural use of the project area and provide data on types of crops grown, yields, and sales values. ► Recommends use of economic multipliers to assess the total contribution of the site's potential or actual agricultural production to the local, regional, and state economies. ► Recommends that the EIR provide type, amount, and location of farmland conversion that would result either directly or indirectly from the project and address growth inducing effects. ► Recommends that the EIR describe the project's impacts on current and future agricultural operations, including land-use conflicts, increased in land value, taxes, and vandalism. ► Recommends that the EIR describe the incremental impacts leading to cumulative impacts on agricultural land. ► Notes that impacts on agricultural resources may be quantified using of established thresholds of significance using the California version of the U.S. Department of Agriculture Land Evaluation and Site Assessment model. ► Recommends the use of agricultural conservation easements at least a 1:1 ratio for size and quality of land to compensate for permanent conversion of agricultural land. ► Notes that under CCR 15206(b)(3) a project is of statewide, regional, or area-wide significance if it will cause cancellation of Williamson Act contracts for a parcel of 100 acres or more. ► Recommends that the EIR include a map with the location of agricultural preserves and Williamson Act contracted land and that the EIR provide the number of Williamson Act acres, according to Important Farmland type that would be affected. ► Recommends that the EIR discuss Williamson Act contracts that may be terminated as a result of the project and probable impacts on nearby properties in the context of growth inducement brought about by land value changes. ► Recommends that the EIR address proposed uses of lands in the project area that will remain under Williamson Act contract and notes that uses must meet compatibility standards in Government Code Sections 51238-51238.3. ► Recommends that the EIR discuss any proposed general plan designation or zoning within agricultural preserves affected by the project. ► Notes that notification provisions for public agency acquisition of Williamson Act contracted lands are in Government Code Section 51291(b) and that acquisition by a public agency must comply with Government Code Section 51290-51295.	
California State Lands Commission	April 8, 2009
► Notes that the California State Lands Commission (CSLC) has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable river, sloughs, and lakes and retains residual and review authority for "sovereign lands" legislatively granted in trust to local jurisdictions. ► Notes that all tidelands, submerged lands, and beds of navigable waterways are subject to the Public Trust easement. ► Notes that the use of any tidelands, submerged lands, or beds of navigable waters for any part of the project requires that the applicant first obtain a lease from CSLC. ► Requests greenhouse gas emissions information consistent with the California Global Warming Solutions Act (Assembly Bill 32) and subsequent legislation.	
State of California Governor's Office of Planning and Research, State Clearinghouse and Planning Unit.	March 27, 2009
► Courtesy notice that specifies that responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency.	

Table 7-1
Written Comments Received on the NOI/NOP

Commenter	Date
Sacramento County Department of Transportation	April 6, 2009
► Requests that the project proponent enter into a maintenance agreement with the Maintenance and Operations Section of Sacramento County Department of Transportation (SACDOT) to cover the maintenance and repair of any roadway damaged by the project's construction activities. ► Requests that the proposed roadway closure and detour plans be coordinated with SACDOT staff. ► Requests that project proponent coordinates the proposed improvement plans for geometric changes at side street intersections of Elkhorn Boulevard, Powerline Road, Radio Road, and San Juan Road with Garden Highway with SACDOT staff.	
Sutter County	April 6, 2009
► Requests that the NLIP Phase 4a EIS/EIR mention the existing agreement between Sutter County and SAFCA for road repairs, dated August 21, 2008, as a mitigation measure.	
City of Sacramento Department of Transportation	May 1, 2009
► Requests that the EIR/EIS assess the impacts to residents, businesses, and emergency response due to the closure of Garden Highway during construction. ► Requests that any portion of the Garden Highway closure that falls within the incorporated city must be reviewed and approved by the city. ► Requests that the EIR/EIS assess any noise and dust impacts of haul trucks on Del Paso Road and San Juan Road. ► Requests that the city review and approve any haul routes on city streets to minimize impacts to the community and prevent pavement and bridge damage.	
Rio Linda and Elverta Recreation and Park District	April 21, 2009
► Notes that a major portion of the Phase 4a Project is within the boundaries of the Rio Linda and Elverta Recreation and Park District. ► Requests that the District be involved in the work being done within their boundaries Southeast of SR 99, North of Elkhorn Boulevard. ► Requests to be kept informed about the project.	
Sacramento Area Bicycle Advocates	April 20, 2009
► Requests that the EIS/EIR acknowledge that Garden Highway (within the project area) is used for utilitarian transportation (e.g., commuting) and recreational cycling. ► Requests that the EIS/EIR address impacts on bicycle transportation and recreation as part of a traffic management and safety plan that is reviewed and approved by the Sacramento County Bicycle Coordinator. ► Requests inclusion of effective signage and notification for bicyclists regarding road closures and detour routes. ► Requests early notification to local bicycle organizations of project-related road closures for posting on their websites.	
Wickland Pipelines, LLC	April 13, 2009
► Notes that Wickland owns and operates a jet fuel pipeline, which supplies jet fuel to Sacramento International Airport. ► Expresses concern regarding the jet fuel pipeline in Reach 11B of the Sacramento River east levee and requests that their concerns regarding project construction and the fuel pipeline continue to be addressed with appropriate planning and engineering.	
Ed Bianchi	April 13, 2009
► Expresses concern regarding the width of the footprint south of Teal Bend Golf Club and impacts on his ability to farm this area. ► Expresses concern regarding the borrow site plans and the impact the borrow sites would have on his ability to farm.	
Frances Tennant	April 13, 2009
► Expresses concern about SAFCA taking her home by eminent domain and proper compensation for her home and property.	

Source: Compiled by EDAW in 2009

7.1.2 OTHER PUBLIC OUTREACH ACTIVITIES

To help the community stay informed about current project activities, information is provided in a variety of ways:

- USACE and SAFCA each maintain Web sites (http://www.spk.usace.army.mil and http://www.safca.org/Programs_Natomas.html, respectively) that contain public documents related to the NLIP. Additionally, SAFCA's Web site contains public notices, project maps, schedule updates, news articles, SAFCA Board of Director meeting agendas and meeting summaries, and other project-related materials;

- SAFCA periodically mails Executive Director Updates to property owners located adjacent to the NLIP project footprint;

- NLIP updates are provided at the monthly SAFCA Board of Directors meetings, which typically occur on the third Thursday of each month. These meetings are held at the Sacramento County Board of Supervisors Chambers at 700 H Street, Sacramento, California, 95814 and begin at 3:00 p.m.; and

- Additionally, SAFCA has held several meetings with landowner groups and other interest groups during conceptual project design and will continue to meet with these groups to address concerns and interests.

7.1.3 MAJOR AREAS OF CONTROVERSY

Based on the comments received during the scoping period and the history of the NEPA and CEQA processes undertaken by USACE and SAFCA, respectively, the major areas of public controversy associated with the project are:

- temporary, construction-related effects on Garden Highway residents (including potential 24/7 cutoff wall construction along the Sacramento River east levee);

- concerns regarding the hydraulic modeling used to analyze the project's hydraulic impacts;

- construction-related impacts on cultural and biological resources,

- vegetation and tree removal and relocation of power poles

- removal of agricultural lands and loss of opportunity for future development, and

- SAFCA's ability to fund mitigation measures.

The first two issues were the subject of a lawsuit, filed in December 2007, by the Garden Highway Community Association challenging the Phase 2 EIR prepared by SAFCA, which was settled. A copy of the settlement agreement is included as **Appendix A3**, and applies to all affected Garden Highway residents. SAFCA intends to voluntarily apply the design and construction provisions in the agreement to all Sacramento River east levee components of the project. Agreements made by SAFCA in the settlement regarding construction practices are incorporated into the project or reflected, as appropriate, in the mitigation measures in this EIS/EIR.

Other issues, including potential 24/7 cutoff wall construction along the Sacramento River east levee, vegetation and tree removal, relocation of power poles, and impacts to agricultural lands have been raised in comment letters by affected property owners. USACE and SAFCA have and will continue to respond to these issues, most recently in responses to comments on the Phase 3 DEIS/DEIR. Additionally, SAFCA continues to work individually with these property owners to respond to concerns.

Allegations regarding construction-related impacts on cultural and biological resources and SAFCA's ability to fund mitigation measures were the subject of a Petition for Writ of Mandate and Complaint for Injunctive Relief (Petition) filed in March 2009 by the Garden Highway Community Association challenging the adequacy of the Phase 2 SEIR under CEQA. In June 2009, both the Garden Highway Community Association and the Association for the Environmental Preservation of the Garden Highway filed Petitions challenging certification of the Phase 3 EIR. Both petitions made allegations similar to those contained in the 2007 lawsuit and in comment letters submitted on the Phase 3 DEIS/DEIR, including the issues described above. In July 2009, the Association for the Environmental Preservation of the Garden Highway dismissed its lawsuit.

7.1.4 ADDITIONAL STEPS IN THE ENVIRONMENTAL REVIEW PROCESS

In accordance with NEPA and CEQA review requirements, this EIS/EIR is being distributed for public and agency review and comment for a 45-day period. This distribution ensures that interested parties have an opportunity to express their views regarding the significant environmental effects and other aspects of the project, and to ensure that information pertinent to permits and approvals is provided to the decision makers of USACE, SAFCA, NEPA cooperating agencies, and CEQA responsible and trustee agencies. This document will be available for public review during normal business hours at the following locations:

- USACE, Sacramento District office: 1325 J Street, Sacramento, California;
- SAFCA: 1007 7th Street, 7th Floor, Sacramento, California;
- Sacramento Central Library: 828 I Street, Sacramento, California; and
- Sutter County Library: 750 Forbes Avenue, Yuba City, California.

Additionally, this document can be viewed at USACE's and SAFCA's Web sites at http://www.spk.usace.army.mil and http://www.safca.org/Programs_Natomas.html, respectively.

A public meeting will be held before the SAFCA Board of Directors on September 17, 2009 at 3:00 p.m. in the Sacramento County Board of Supervisors Chambers located at 700 H Street, Sacramento, California, at which it will receive input from agencies and the public on the DEIS/DEIR. In addition, written comments from the public, reviewing agencies, and stakeholders will be accepted throughout the public comment period.

Following consideration of these comments, an FEIS and FEIR will be prepared, in which USACE and SAFCA, respectively, will provide responses to comments on the DEIS/DEIR. The FEIS will constitute a reprint of the entire DEIS/DEIR, and will include comment letters, responses to comments, any minor modifications to the Phase 4a Project as a result of engineering and design refinements, and any text changes/clarifications. The FEIR will be a separate volume containing responses to comments and any text changes/clarifications.

The SAFCA Board of Directors will then consider certifying the EIR if it is determined to be in compliance with CEQA, and will rely on the certified EIR when considering project approval. To support a decision on the project, the SAFCA Board of Directors must prepare and adopt written findings of fact for each significant environmental impact identified in the EIS/EIR; a Statement of Overriding Considerations, if needed; and a Mitigation Monitoring and Reporting Program (MMRP) to ensure implementation of the mitigation measures and project revisions, if any, identified in the EIS/EIR. Following EIR certification and project approval, a Notice of Determination (NOD) documenting the decision will be issued.

USACE will circulate the FEIS for 30 days prior to taking action on the project and issuing its record of decision (ROD). The ROD will identify USACE's decision regarding the alternatives considered, address substantive comments received on the FEIS, and determine whether the Proposed Action complies with Sections 408, 404, and 10.

7.2 NATIVE AMERICAN CONSULTATION

7.2.1 SECTION 106 COMPLIANCE

USACE is the lead agency for Native American consultation under NEPA. On May 1, 2008, the California State Historic Preservation Officer (SHPO) signed the Programmatic Agreement (PA) among USACE, SAFCA, and SHPO, regarding the issuance of permission under the authority of Section 408 and Section 404 for the NLIP Landside Improvements Project. USACE consulted the Ione Band of Miwok Indians, the Shingle Springs Band of Miwok Indians, and the United Auburn Indian Community, and invited them to concur in this PA. On June 23, 2008, the Central Valley Flood Protection Board concurred in the PA. The PA envisioned that preparation of inventory reports for consultation between USACE and SHPO for identification of Areas of Potential Effect (APEs) would be based on phases of construction work. USACE, SAFCA, and SHPO compiled a list of members of the interested public who were provided notice of this PA. The Section 106 process requires that USACE make good faith efforts to identify and take into account the opinions and preferences of local Native Americans with cultural ties to the APE, as well as the public for historic preservation actions taken in accordance with the PA. Native American monitors have been assisting SAFCA in the treatment of Native American human remains and items associated with Native American burials discovered during project activities in accordance with California Public Resources Code Section 5097.98 and California Health and Safety Code Section 7050.5(b) and 7050.5(c).

In April 2008, in response to requests from the project archaeologists, the Native American Heritage Commission (NAHC) identified a Most Likely Descendant (MLD) for discoveries of human remains at CA-Sac-485/H, Mr. John Tayaba of the Shingle Springs Rancheria. Mr. Tayaba is being consulted with regard to the disposition of prehistoric remains encountered in preliminary archaeological investigations in the project area. Shingle Springs Rancheria is a Federally recognized tribe and is actively participating in consultation regarding the identification and treatment of cultural resources subject to Section 106 of the National Historic Preservation Act.

In implementing the provisions of the PA, USACE archaeologists, SAFCA, SAFCA's project archaeologists, and tribal representatives meet weekly to discuss project progress, and the general approach to inventory, evaluation, and treatment of cultural resources for the project. Discussions include specific consideration of preferred construction methods from a tribal perspective, and treatment of identified and significant resources. Section 106 consultation is ongoing, and conducted in close coordination with Native Americans.

7.2.2 NATIVE AMERICAN CONSULTATION UNDER CEQA

SAFCA is the lead agency for Native American consultation under CEQA. During the scoping period for the Phase 2 Project, SAFCA's project archaeologists sent a letter of inquiry to the NAHC on June 12, 2007, asking for information or concerns regarding the project area, as well as a list of individuals or organizations that might have information or concerns regarding the project area. On June 19, 2007, Debbie Pilas-Treadway of the NAHC responded and indicated that no known sites were found in the Sacred Lands File that were located within the project area or in the immediate vicinity. Ms. Pilas-Treadway also provided the project archaeologists with a list of individuals who could be contacted concerning cultural resources in the project area. These individuals were sent contact letters on June 21, 2007, with information regarding the proposed project and a request for any information they might provide or concerns that they might have about the project. No written responses were received; therefore, follow-up phone calls were made on July 9, 2007. Only one individual, Rose Enos (referred to by the NAHC as "Miwok/Maidu"), answered. Ms. Enos expressed general concern regarding avoidance of burial sites and asked to be contacted if work is conducted on such sites. Messages were left for the remaining people on the contact list; however, no response from any of these individuals was received.

In addition, Randy Yonemura of the Ione Band of the Miwok was contacted in January 2008 for information on areas of concern. Mr. Yonemura led an archaeologist on a field visit of the project area and provided anecdotal information on areas of potential Native American burials. Since spring 2008, Native American monitors have been observing archaeological field efforts, as appropriate, and offering insight and advice regarding cultural

resources finds. SAFCA and USACE continue to consult closely with the MLD designated under California Public Resources Code 5097.98 regarding the effect of the NLIP on cultural resources of concern to the Native American community.

7.3 COORDINATION WITH OTHER FEDERAL, STATE, REGIONAL, AND LOCAL AGENCIES

Chapter 6.0, "Compliance with Federal Environmental Laws and Regulations," describes the project's compliance with applicable Federal laws and regulations, including consultation to date with various agencies. The following briefly summarizes these consultation and coordination efforts.

7.3.1 COORDINATION WITH THE FEDERAL AVIATION ADMINISTRATION AND THE SACRAMENTO COUNTY AIRPORT SYSTEM

The Federal Aviation Administration (FAA) is acting as a cooperating agency under NEPA for the Phase 4a Project. USACE and SAFCA met with the FAA and the Sacramento County Airport System (SCAS) on September 10, 2008, regarding project features within the Sacramento International Airport (Airport) north bufferlands. The FAA and SCAS have noted that the Airport has developed the Airport's *Wildlife Hazard Management Plan* (WHMP), with which the Phase 4a Project would comply, to the extent practicable and feasible, to ensure aviation safety. Further, the FAA and SCAS have expressed concern that the project, if inappropriately designed, could change existing vegetation and wildlife habitat in ways that could attract wildlife hazardous to aviation safety and increase wildlife-aircraft collisions.

The FAA continues to be involved in reviewing environmental documents related to the Landside Improvements Project. USACE and SAFCA meet with the FAA as needed to discuss design of project components as it relates to the Airport and to ensure that the project would not interfere with implementation of the WHMP.

7.3.2 RESOURCE AGENCY COORDINATION

Over the course of project planning and environmental review for the NLIP Landside Improvements Project, USACE and SAFCA have coordinated informally with the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the California Department of Fish and Game (DFG), and The Natomas Basin Conservancy (TNBC). **Table 7-2** includes permits and other resource agency coordination activities for current and future NLIP project construction phases. A copy of the programmatic Biological Opinion and USACE Jurisdictional Determinations are included in **Appendix D**.

Table 7-2
NLIP Resource Agency Coordination[1]

Agency	Permit/Authorization/Approval	Status
Programmatic		
USFWS	Programmatic Biological Opinion	Issued October 2008 Amendment issued May 2009
DFG, Central Valley RWQCB, USACE, and USFWS	Long Term Management Plan Approval	Granted May 2009
Phase 2 Project		
USACE	Section 408 Permission	Granted January 2009
USACE	Section 404 Permit	Issued January 2009 Amendment issued May 2009[2] 2nd Amendment anticipated August

Table 7-2 NLIP Resource Agency Coordination[1]		
Agency	Permit/Authorization/Approval	Status
		2009
Central Valley RWQCB	Section 401 Water Quality Certification	Issued January 2009
DFG	Section 2081 Incidental Take Authorization	Issued May 2009
NMFS	Concurrence of Determination of Not Likely to Adversely Affect	January 2009
DFG	Section 1602 Streambed Alteration Agreement	Issued January 2009
USFWS	Biological Opinion	Issued October 2008 Amendment issued May 2009
USFWS	Fish and Wildlife Coordination Act Report	October 2008
Sacramento County	SMARA Exemption	Granted February 2009
Sutter County	SMARA Exemption	Granted February 2009
DFG, Central Valley RWQCB, USACE, and USFWS	MMP	Approval granted May 2009
SWRCB	Section 402 NPDES Permit	Notice of Intent filed March 2009
Phase 3 Project[3]		
USACE	Section 408 Permission	Under review, permission anticipated late summer/fall 2009
USACE	Section 404 Permits[3]	Under review, Phase 3a permit anticipated October 2009, Phase 3b permit anticipated fall/winter 2009, and Phase 3c permit anticipated 2011
USACE	Section 10 Permit	In preparation, permit anticipated late summer/fall 2009
Central Valley RWQCB	Section 401 Water Quality Certifications[3]	In preparation, certification anticipated September 2009 for Phase 3a, late summer/fall for Phase 3b, and 2011 for Phase 3c
DFG	Section 2081 Incidental Take Authorization	In preparation, authorization anticipated September 2009
DFG	Section 1602 Streambed Alteration Agreement[4]	In preparation, landside canal footprint agreement anticipated September 2009, later stages anticipated winter 2009
USFWS	Biological Opinion	Biological Assessment under review, opinion anticipated September 2009
NMFS	Biological Opinion (Phase 3b only)	Anticipated September 2009
USFWS	Fish and Wildlife Service Coordination Act Report	Draft received June 2009, final anticipated August 2009
Sacramento County	SMARA Permit or Exemption	In preparation, permit or exemption anticipated winter 2009
Sutter County	SMARA Permit or Exemption	In preparation, permit or exemption anticipated winter 2009 (if needed)
DFG, Central Valley RWQCB, USACE, and	MMP	In preparation, approval anticipated fall 2009

Table 7-2 NLIP Resource Agency Coordination[1]		
Agency	Permit/Authorization/Approval	Status
USFWS		
SWRCB	Section 402 NPDES Permit	In preparation, permit anticipated fall 2009
Phase 4a Project		
USACE	Section 408 Permission	Anticipated winter 2010
USACE	Section 404 Permit	Anticipated winter 2010
USACE	Section 10 Permit	Anticipated winter 2010
Central Valley RWQCB	Section 401 Water Quality Certification	Anticipated winter 2010
DFG	Section 2081 Incidental Take Authorization	Anticipated winter 2010
DFG	Section 1602 Streambed Alteration Agreement	Anticipated winter 2010
USFWS/NMFS	Biological Opinion	Anticipated winter 2009
USFWS	Fish and Wildlife Service Coordination Act Report	Anticipated winter 2009
Sacramento County	SMARA Permit or Exemption	In preparation, permit or exemption anticipated winter 2010 or spring 2011
DFG, RWQCB, USACE, and USFWS	MMP	Anticipated winter 2010
SWRCB	Section 402 NPDES Permit	Anticipated winter 2010
Phase 4b Project – Anticipated 2010–2011[5]		

Notes: USFWS = U.S. Fish and Wildlife Service; NMFS = National Marine Fisheries Service; DFG = California Department of Fish and Game; RWQCB = Regional Water Quality Control Board; USACE = U.S. Army Corps of Engineers; SMARA = Surface Mining and Reclamation Act; MMP = Mitigation and Monitoring Plan; SWRCB = State Water Resources Control Board; NPDES = National Pollutant Discharge Elimination System

[1] Although Phase 1 Project permitting and regulatory requirements were fulfilled, they are not included in this table because construction is complete.

[2] The Phase 2 Project Section 404 permit was amended based on the Amended Phase 2 Biological Opinion.

[3] The Phase 3 Project Section 404 permit has been separated into 3 subphases (a, b, and c).

[4] The Phase 3 Project DFG 1602 Streambed Alteration Agreement will be separated into (at least) 3 stages.

[5] The Phase 4b Project will require similar permits and regulatory approvals/authorizations as the Phase 2, 3, and 4a Projects.

Source: Data compiled by EDAW in 2009

7.4 LIST OF RECIPIENTS

7.4.1 ELECTED OFFICIALS AND REPRESENTATIVES

- Doris Matsui, Congresswoman, 5th Congressional District
- Tom McClintock, Congressman, 4th Congressional District
- Roger Dickinson, Sacramento County Supervisor, District 1
- Jimmie Yee, Sacramento County Supervisor, District 2
- Susan Peters, Sacramento County Supervisor, District 3
- Roberta MacGlashan, Sacramento County Supervisor, District 4
- Don Nottoli, Sacramento County Supervisor, District 5
- James Gallagher, Sutter County Supervisor, District 5
- Mayor Kevin Johnson, Sacramento City Council
- Ray Tretheway, Sacramento City Council, District 1

- Sandy Sheedy, Sacramento City Council, District 2
- Steve Cohn, Sacramento City Council, District 3
- Rob Fong, Sacramento City Council, District 4
- Lauren Hammond, Sacramento City Council, District 5
- Kevin McCarty, Sacramento City Council, District 6
- Robbie Waters, Sacramento City Council, District 7
- Bonnie Pannell, Sacramento City Council, District 8
- William Kristoff, West Sacramento City Council

7.4.2 GOVERNMENT DEPARTMENTS AND AGENCIES

UNITED STATES GOVERNMENT

- Bureau of Indian Affairs, Pacific Regional Office
- Federal Aviation Administration
- Federal Emergency Management Agency, Region IX
- National Marine Fisheries Service
- Natural Resources Conservation Service
- U.S. Bureau of Reclamation, Central Valley Operations
- U.S. Coast Guard
- U.S. Department of Agriculture, National Rural Development Council
- U.S. Environmental Protection Agency, Division 9
- U.S. Fish and Wildlife Service

TRIBAL GOVERNMENT

- Shingle Springs Rancheria

STATE OF CALIFORNIA

State agencies that will receive the document via the State Clearinghouse are marked (*)

- California Bay-Delta Authority
- California Air Resources Board*
- California Department of Boating and Waterways, Regulations Unit
- California Department of Conservation*
- California Department of Education*
- California Department of Fish and Game, Region 2
- California Department of General Services*
- California Department of Health Services*
- California Department of Transportation, District 3*
- California Department of Toxic Substances Control*
- California Department of Water Resources
- California Environmental Protection Agency
- California Integrated Waste Management Board*
- California Regional Water Quality Control Board, Central Valley Region*
- Central Valley Flood Protection Board
- Native American Heritage Commission
- Office of Emergency Services*
- Office of Historic Preservation, State Historic Preservation Officer
- Office of Planning and Research, State Clearinghouse
- State Lands Commission, Division of Environmental Planning and Management

- State Water Resources Control Board*

REGIONAL, COUNTY, CITY, AND OTHER LOCAL AGENCIES

- Amador County
- American River Flood Control District
- Butte County
- Central Valley Flood Control Association
- City of Davis
- City of Sacramento
- City of Sacramento Department of General Services
- City of Sacramento Department of Parks and Recreation
- City of Sacramento Department of Transportation Engineering Services
- City of Sacramento Department of Utilities
- City of Stockton
- City of West Sacramento
- City of Woodland
- Colusa County
- Contra Costa County
- El Dorado County
- Feather River Air Quality Management District
- Natomas Central Mutual Water Company
- Natomas Unified School District
- Placer County
- Placer County Water Agency
- Port of Sacramento
- Reclamation District 150
- Reclamation District 307
- Reclamation District 537
- Reclamation District 730
- Reclamation District 785
- Reclamation District 900
- Reclamation District 999
- Reclamation District 1000
- Reclamation District 1001
- Reclamation District 1500
- Reclamation District 1600
- Reclamation District 2035
- Reclamation District 2068
- Regional Water Authority
- Rio Linda and Elverta Recreation and Park District
- Robla School District
- Sacramento Area Council of Governments
- Sacramento Area Sewer District
- Sacramento County
- Sacramento County Airport System
- Sacramento County Clerk/Recorder
- Sacramento County Department of Environmental Management
- Sacramento County Department of Environmental Review and Assessment
- Sacramento County Department of Regional Parks
- Sacramento County Department of Transportation
- Sacramento County Department of Water Resources

- Sacramento County Local Agency Formation Commission
- Sacramento County Municipal Services Agency
- Sacramento County Planning and Community Development Department
- Sacramento County Water Agency
- Sacramento Metropolitan Air Quality Management District
- Sacramento Metropolitan Fire District
- Sacramento Municipal Utility District
- Sacramento Regional County Sanitation
- San Joaquin County
- San Joaquin County Flood Control and Water Conservation District
- Solano County
- Sutter County
- Sutter County Clerk of the Board
- Sutter County Department of Public Works
- Sutter County Environmental Health Services
- Sutter County Planning Department
- Sutter County Resource Conservation District
- Sutter County Water Resources Division
- Three Rivers Levee Improvement Authority
- Twin Rivers Unified School District
- Yolo County
- Yolo County Flood Control and Water Conservation District
- Yolo County Parks and Natural Resources Management Division
- Yolo County Planning and Public Works Department
- Yuba County
- Yuba County Water Agency
- Yuba-Sutter County Farm Bureau

7.4.3 NONPROFIT ORGANIZATIONS, PARTNERSHIPS, PRIVATE ORGANIZATIONS, AND BUSINESSES

- Alamar Restaurant
- APCO Worldwide
- California Native Plant Society, Sacramento Valley Chapter
- Cassidy & Associates
- Citizens for Good Government
- Community Watchdog Committee
- Creekside Natomas Neighborhood Association
- Dawson and Associates
- Delta Citizens Municipal Advisory Council
- Downtown Partnership
- Environmental Council of Sacramento
- Friends of the River
- Friends of the Sacramento River Greenway
- Friends of the Swainson's Hawk
- Garden Highway Community Association
- Gardenland-Northgate Neighborhood Association
- The Gualco Group
- Habitat 2020
- Heritage Park Homeowners Association
- Law Offices of Gregory Thatch
- Metro Airpark

- Natomas Chamber of Commerce
- Natomas Community Association
- Natomas Park Master Association
- North Natomas Alliance
- North Natomas Community Association
- Pacific Gas & Electric Company
- Planning & Conservation League
- Port of Sacramento
- Regency Park Community Association
- Rio Linda Union School District
- Rio Ramaza Marina
- River Oaks Community Association
- River Oaks Ranch in Natomas, LLC
- Sacramento Area Bicycle Advocates
- Sacramento Association of Realtors
- Sacramento Builders Exchange
- Sacramento County Farm Bureau
- Sacramento County Taxpayers
- Sacramento Groundwater Authority and Regional Water Authority
- Sacramento Metro Chamber
- Sacramento Public Library, Central Library, Federal Documents
- Sacramento River Property Owners Association
- Save Our Sandhill Cranes
- Save the American River Association
- Sierra Club, Mother Lode Chapter
- Steinberg & Associates
- Sutter County Resource Conservation District
- Swabbies
- Terrace Park Neighborhood Association
- The Natomas Basin Conservancy
- The Nature Conservancy, Sacramento River Program
- Urban Creeks Council
- Valley View Acres Community Association
- Water Forum
- West Natomas Community Association
- West Sacramento Chamber of Commerce
- Wickland Pipelines, LLC

7.4.4 MEDIA

- Daily Recorder
- Folsom Telegraph
- N Magazine
- Natomas Journal
- Sacramento Bee
- Sacramento Business Journal
- Sacramento News & Review

7.4.5 INDIVIDUAL PROPERTY OWNERS

- Names withheld for privacy

8 REFERENCES

ARB. *See* California Air Resources Board.

BBN. *See* Bolt Beranek and Newman Inc.

Caltrans. *See* California Department of Transportation.

CAPCOA. *See* California Air Pollution Control Officers Association.

Central Valley RWQCB. *See* Central Valley Regional Water Quality Control Board.

CNDDB. *See* California Natural Diversity Database.

DFG. *See* California Department of Fish and Game.

DWR. *See* California Department of Water Resources.

EPA. *See* U.S. Environmental Protection Agency.

FAA. *See* Federal Aviation Administration.

FEMA. *See* Federal Emergency Management Agency.

FHWA. *See* Federal Highway Administration.

FRAQMD. *See* Feather River Air Quality Management District.

HUD. *See* U.S. Department of Housing and Urban Development.

ITE. *See* Institute of Transportation Engineers.

LSCE. *See* Luhdorff & Scalmanini, Consulting Engineers.

NMFS. *See* National Marine Fisheries Service.

NRCS. *See* Natural Resources Conservation Service.

OPR. *See* Governor's Office of Planning and Research.

PSMFC. *See* Pacific States Marine Fisheries Commission.

SAFCA. *See* Sacramento Area Flood Control Agency.

SACOG. *See* Sacramento Area Council of Governments.

Sacramento LAFCo. *See* Sacramento County Local Agency Formation Commission.

SCAS. *See* Sacramento County Airport System.

SGA. *See* Sacramento Groundwater Authority.

SMAQMD. *See* Sacramento Metropolitan Air Quality Management District.

TNBC. *See* The Natomas Basin Conservancy.

UCMP. *See* University of California Museum of Paleontology.

USACE. *See* U.S. Army Corps of Engineers.

USACE and SAFCA. *See* U.S. Army Corps of Engineers and Sacramento Area Flood Control Agency.

USFWS. *See* U.S. Fish and Wildlife Service.

EXECUTIVE SUMMARY

Sacramento Area Flood Control Agency. 2006 (July 14). *Natomas Levee Evaluation Study Final Report Prepared for SAFCA in Support of the Natomas Basin Components of the American River Common Features*.

———. 2007a (February). *Final Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area.* State Clearinghouse No. 2006072098. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

———. 2007b (October). *Natomas Levee Improvement Project: Economic and Risk Analysis*. Prepared by David Ford Consulting Engineers, Inc. Sacramento, CA.

———. 2007c (November). *Final Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project.* State Clearinghouse No. 2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

———. 2009a (January). *Final Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project—Phase 2 Project.* State Clearinghouse No. 2007062016. Prepared by EDAW, Sacramento, CA.

———. 2009b (May). *Final Environmental Impact Report on the Natomas Levee Improvement Program Phase 3 Landside Improvements Project.* State Clearinghouse No. 2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

Sacramento County Airport System. 2007. *Sacramento International Airport Wildlife Hazard Management Plan*. Sacramento, CA.

U.S. Army Corps of Engineers. 2008 (November). *Final Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project, Sacramento, CA.* Prepared by EDAW, Sacramento, CA.

U.S. Army Corps of Engineers and Sacramento Area Flood Control Agency. 2009 (February). *Draft Environmental Impact Statement/Draft Environmental Impact Report on the Natomas Levee Improvement Program Phase 3 Landside Improvements Project.* State Clearinghouse No. 2007062016. Prepared by EDAW, Sacramento, CA.

1.0 INTRODUCTION AND STATEMENT OF PURPOSE AND NEED

California Reclamation Board and U.S. Army Corps of Engineers. 2002 (December). *Sacramento and San Joaquin River Basins Comprehensive Study Technical Studies Documentation, Appendix B, Synthetic Hydrology Technical Documentation, Attachment B.6.* Tables B.6-1, B.6-6, B.6-15, B.6-17, and B.6-24. Sacramento, CA.

Federal Aviation Administration. 2007. *Hazardous Wildlife Attractants on or Near Airports*. FAA Advisory Circular 150/5200-33B. Available: <http://www.faa.gov/airports_airtraffic/airports/ resources/ advisory circulars/ index.cfm?template=Document_Listing&Keyword=150/5200-33&DocumentSelected=1>.

Roos, Maurice. 1997 (June 28). The Great New Year's Flood of 1997 in Northern California. In *Proceedings of 1997 California Weather Symposium*. Sierra College. Rocklin, CA.

Sacramento Area Flood Control Agency. 2006 (July 14). *Natomas Levee Evaluation Study Final Report Prepared for SAFCA in Support of the Natomas Basin Components of the American River Common Features*.

———. 2007a (February). *Final Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area.* State Clearinghouse No. 2006072098. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

———. 2007b (October). *Natomas Levee Improvement Project: Economic and Risk Analysis*. Prepared by David Ford Consulting Engineers, Inc. Sacramento, CA.

———. 2007c (November). *Final Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project.* State Clearinghouse No. 2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

———. 2009a (January). *Final Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project—Phase 2 Project.* State Clearinghouse No. 2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

———. 2009b (May). *Final Environmental Impact Report on the Natomas Levee Improvement Program Phase 3 Landside Improvements Project.* State Clearinghouse No. 2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

U.S. Army Corps of Engineers. 2008 (November). *Final Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project, Sacramento, CA*. Prepared by EDAW, Sacramento, CA.

U.S. Army Corps of Engineers and Sacramento Area Flood Control Agency. 2009. *Draft Environmental Impact Statement/Draft Environmental Impact Report on the Natomas Levee Improvement Program, Phase 3 Landside Improvements Project*. State Clearinghouse No. 2008072060. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

2.0 ALTERNATIVES

Federal Aviation Administration. 2007. Advisory Circular (AC) 150/5200-33B, Hazardous Wildlife Attractants on or Near Airports.

National Agricultural Imagery Program. 2006. Available: <http://datagateway.nrcs.usda.gov/GatewayHome.html>.

Sacramento Area Council of Governments. 2004. Sacramento Regional Blueprint. Available: <http://www.sacregionblueprint.org/sacregionblueprint/the_project/scenariomap_region.html>. Accessed: Spring 2009.

———. 2007. Regional Street Centerlines. Available: <http://www.sacog.org/mapping/clearinghouse/>.

Sacramento Area Flood Control Agency. 2007a. *Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area* .State Clearinghouse Number 2006072098.

———. 2007b. *Environmental* Impact *Report on the Natomas Levee Improvement Program, Landside Improvements Project* State Clearinghouse Number 2007062016.

———. 2009a (January). *Final Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project—Phase 2 Project.* State Clearinghouse No. 2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

———. 2009b (May). *Final Environmental Impact Report on the Natomas Levee Improvement Program Phase 3 Landside Improvements Project.* State Clearinghouse No. 2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

———. 2009c (February). Proposition 1E Early Implementation Program NLIP Capital Outlay Grant Application. Available: <http://www.safca.org/documents/Combined20State20Submittalsmall.pdf>.

———. 2009d (July). *Levee Cutoff Construction Considerations, Natomas Levee Improvement Program*. Sacramento, CA.<http://www.safca.org/documents/NLIP%20main%20page%20stuff/09JUL28CutoffWall247ConstructionMemowFigures.pdf>. Accessed August 11, 2009.

Sacramento County Department of Water Resources. 2008. Natomas Basin Projected Flood Inundation Map Effective December 8, 2008 (Levees Provide Less Than 100yr Flood Protection). Available: <http://www.msa.saccounty.net/waterresources/stormready/maps/Natomas%20Flood%20Depth.pdf>. Accessed July 23, 2009.

———. 2009. Flood Depth and Evacuation Plan Maps. Available: <http://www.msa.saccounty.net/waterresources/stormready/default.asp?page=maps>. Accessed July 23, 2009.

U.S. Army Corps of Engineers. 2000 (January 1). *Engineering and Design Guidelines for Landscape Planting and Vegetation Management at Floodwalls, Levees, and Embankment Dams*. Engineering Manual 1110-2-301. Available: <http://140.194.76.129/publications/eng-manuals/em1110-2-301/entire.pdf>. Accessed January 12, 2009.

———. 2008. *Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project. Sacramento, CA*. Prepared by EDAW, Sacramento, CA.

U.S. Army Corps of Engineers and Central Valley Flood Protection Board. 2009. *Draft Initial Study and Proposed Mitigated Negative Declaration for The 5 Bank Protection Sites, 2009 and 2010, Sacramento River Bank Protection Project*, State Clearinghouse No. 2009042057.

U.S. Army Corps of Engineers and Sacramento Area Flood Control Agency. 2009. *Draft Environmental Impact Statement/Draft Environmental Impact Report for the Natomas Levee Improvement Program Phase 3 Landside Improvement Project*, State Clearinghouse No. 2008072060. Prepared by EDAW, Sacramento, CA.

Woodbridge, B. 1998. Swainson's Hawk (*Buteo swainsoni*). In *The Riparian Bird Conservation Plan: A Strategy for Reversing the Decline of Riparian-Associated Birds in California. California Partners in Flight.* Available: <http://www.prbo.org/calpif/htmldocs/species/riparian/swainsons_hawk.htm>.

3.1 GENERAL SITE CONDITIONS

None.

3.2 AGRICULTURAL RESOURCES

California Department of Conservation, Division of Land Resource Protection. 2007. Williamson Act Program. Available: <http://www.conservation.ca.gov/dlrp/lca/Pages/Index.aspx>.

_____. 2008. 2004–2006 Land Use Conversion, Farmland Mapping and Monitoring Program. Available: <ftp.consrv.ca.gov/ pub/dlrp/fmmp>. Last updated 2008. Accessed August 6, 2008.

City of Sacramento, Sutter County, and The Natomas Basin Conservancy. 2003. *Final Natomas Basin Habitat Conservation Plan*. Sacramento, CA.

Lee, H., D. A. Sumner and R. Howtt. 2001 (March-April). Potential economic impacts of irrigation-water reductions estimated for the Sacramento Valley. *University of California Agriculture On-Line*. 55(2):33–40. Available: <ucanr.org/repository/>. Accessed June 9, 2009.

Natural Resources Conservation Service. 1988. Soil Survey of Sutter County.

_____. 1993. Soil Survey of Sacramento County.

Sacramento County. 1993 (December). *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Accessed 2007.

Sacramento County Agricultural Commissioner. 2008 (August). Sacramento County 2007 Crop Report. Sacramento, CA.

3.3 LAND USE, SOCIOECONOMICS, AND POPULATION AND HOUSING

Airport Land Use Commission. 1994 (January). *Sacramento International Airport (Formerly Sacramento Metropolitan Airport) Comprehensive Land Use Plan*. Amended January 1994. Sacramento, CA. Cited in City of Sacramento and Sacramento LAFCo.

California Department of Transportation. 2002. *California Airport Land Use Planning Handbook*. Sacramento, CA. Available: <www.dot.ca.gov/hq/planning/aeronaut/documents/>.

City of Sacramento Planning Department. 2006. South Natomas Community Plan Web site. Available: <http://www.cityofsacramento.org/planning/long-range/community-and-neighborhood/community-plans/south-natomas.cfm>. Last updated May 7, 2008. Accessed October 3, 2008.

_____. 2007. North Natomas Community Plan website. Available: <http://www.cityofsacramento.org/planning/long-range/community-and-neighborhood/community-plans/north-natomas.cfm>. Last updated May 28, 2008. Accessed October 3, 2008.

City of Sacramento, Sutter County, Natomas Basin Conservancy. 2003. *Final Natomas Basin Habitat Conservation Plan*. Available: <www.natomasbasin.org/content/view/144/118/>. Accessed September 2008.

Sacramento County. 1974. *Scenic Highways Element of the Sacramento County General Plan*.

_____. 1993. *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>.

Sacramento County Airport System. 2007. *Sacramento International Airport Master Plan*. Sacramento, CA.

Sacramento County Department of Environmental Review and Assessment. 2007. Notice of Preparation for the Sacramento County General Plan 2030. Sacramento, CA.

Sutter County. 1996 (November). *County of Sutter General Plan 2015 Policy Document*. Available: <http://www.co.sutter.ca.us/doc/government/depts/cs/ps/cs_planning_services>. Yuba City, CA.

Sacramento Area Council of Governments. 2005. SACOG Projections Adopted 12/16/04 for RAD 2005–2025. Available: <http://sacog.org/demographics/projections/files/split/>. Last updated May 31, 2005. Accessed November 2006.

U.S. Census Bureau. 2000. Results of electronic record search. Census 2000 American Factfinder. Available: <http://factfinder.census.gov>.

U.S. Department of Housing and Urban Development. 2000. HUD USER home page. FY 2000 income Limits. Available: <http://www.huduser.org/DATASETS/il/fmr00/index.html>. Last updated March 31, 2005.

———. 2003. FY 2003 HUD Income Limits Briefing Material. February 2003. Available: <http://www.huduser.org/Datasets/IL/FMR03/BRIEFING-MATERIAL-3-1-03.pdf>.

3.4 GEOLOGY AND SOILS

Anderson, Byron C. Senior Engineer Geologist. Kleinfelder West, Inc, Sacramento, CA. June 26, 2008—letter to John Bassett regarding a preliminary evaluation of naturally occurring asbestos that may be present in the Natomas Levee Improvement Project area including Sacramento and Sutter Counties, California.

California Geological Survey. 1999. Index to Official Maps of Alquist-Priolo Earthquake Fault Zones. Available: <http://www.consrv.ca.gov/CGS/rghm/ap/Map_index/index.htm>. Accessed July 2007.

Dupras, Don L. 1999. Mineral Land Classification Map of PCC-Grade Aggregate Resources in Sacramento County. Prepared in Compliance with the Surface Mining and Reclamation Act of 1975, Article 4, Section 2761.

Hart, E. W., and W. A. Bryant. 1999. Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zone Maps. California Division of Mines and Geology, Special Publication 42.

Helley, E. J., and D. S. Harwood. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California. U.S. Geological Survey MF-1790.

Jennings, C. W. 1994. Fault Activity Map of California and Adjacent Areas. California Division of Mines and Geology. Geologic Data Map No. 6.

Kleinfelder. 2008 (November 14). *Draft Geotechnical Basis of Design Report Sacramento River East Levee Phase 1 (Reaches 1 Through 4a) Natomas Levee Improvement Program, Sacramento and Sutter Counties, California*. Sacramento, CA.

Merry, Scott. Kleinfelder, Inc. Tucson, AZ. July 16, 2009—telephone conversation with Marianne Lowenthal of EDAW regarding soil samples within the Phase 4a Project footprint.

Natural Resources Conservation Service. 1988. Soil Survey of Sutter County.

_____. 1993. Soil Survey of Sacramento County.

Petersen, M. D., W. A. Bryant, C. H. Cramer, T. Chao, M. S. Reichle, A. D. Frankel, J. J. Lienkaemper, P. A. McCory, and D. P. Schwartz. 1996. *Probabilistic Seismic Hazard Assessment for the State of California*. California Division of Mines and Geology Open-File Report 96-08 and U.S. Geological Survey Open-File Report 96-706.Piper, A. M., H. S. Gale, H. E. Thomas, and T. W. Robinson. 1939. Geology and Ground-Water Hydrology of the Mokelumne Area, California. U.S. Geological Survey Water-Supply Paper 780.

Sacramento County. 1993 (December). *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Sacramento, CA. Accessed 2007.

3.5 HYDROLOGY AND HYDRAULICS

California Department of Water Resources. 1997. *Feasibility Report – American Basin Conjunctive Use Project*. Sacramento CA.

_____. 2003. *Bulletin 118 – Description of the North American Subbasin*. Available: <http://www.dpla2.water.ca.gov/publications/groundwater/bulletin118/basins/pdfs_desc/5-21.64.pdf.> Accessed January 31, 2008.

Luhdorff & Scalmanini Consulting Engineers. 2008 (February 21). *Evaluation of Potential Groundwater Impacts Due to Proposed Sacramento River East Levee Improvements with Emphasis on Reaches 2 and 3. Woodland, CA*. Prepared for Sacramento Area Flood Control Agency, Sacramento, CA.

MWH. 2001. Final Letter Report – Sacramento River Watershed Project (Common Feature), CA: Sacramento River East-Side Levee Strengthening Project Cut-Off Wall Evaluation. Sacramento, CA. Prepared by Mary Paasch; submitted by Sergio Jimenez to Barry Jarvis, Civil Engineer, U.S. Army Corps of Engineers.

Placer County Water Agency. 2003. *West Placer Groundwater Management Plan*. Adopted October 6, 1998; updated November 6, 2003.

Sacramento County. 1993 (December). *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.sacounty.net/general-plan/index.html>. Sacramento, CA. Accessed 2007.

Sacramento Groundwater Authority. 2002. *State of the Basin Report 2002.* Citrus Heights, CA.

_____. 2003 (December). *Sacramento Groundwater Authority Groundwater Management Plan*. Citrus Heights, CA.

3.6 WATER QUALITY

California Department of Water Resources. 2005 (December). *Department of Water Resources Bulletin 160-05. California Water Plan Update 2005*. Volume 3 Chapter 6 Sacramento River Hydrologic Region. Sacramento CA. December 2005.

_____. 2006. *California's Groundwater. Bulletin 118. Sacramento Valley Groundwater Basin, North American Subbasin*. Last updated January 20, 2006. Sacramento, CA.

Central Valley Regional Water Quality Control Board. 2002. 2002 CWA Section 303(d) List of Water Quality Limited Segment, Central Valley Regional Water Quality Control Board. Approved by U.S. Environmental Protection Agency, July 2003. Available: <http://www.swrcb.ca.gov/tmdl/docs/202reg5303dlist.pdf>. Accessed August, 2007.

_____. 2007. *Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River Basin*. Fourth Edition, revised February 2007 (with approved amendments). Rancho Cordova, CA.

United States Geologic Survey. 2000. *U.S. Geologic Survey Open File Report 00-391*. Water Quality Assessment of the Sacramento River Basin, California: Water Quality, Sediment and Tissue Chemistry, and Biological Data 1995–1998.

3.7 BIOLOGICAL RESOURCES

Barnhart, R. A. 1986 (June). *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest)—Steelhead*. (Biological Report 82 [11.60], TREL-82-4.) U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Coastal Ecology Group, Waterways Experiment Station. Slidell, LA.

Baxter, R. D. 1999. *Status of Splittail in California*. California Fish and Game 85(1):28–30.

California Department of Fish and Game. 1994. *Staff Report on Mitigation for Impacts to Swainson's hawks* (Buteo swainsoni) *in the Central Valley of California*. Sacramento, CA.

_____. 1998. *A Status Review of the Spring-Run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento River Drainage*. Report to the Fish and Game Commission, Candidate Species Status Report 98-01.

_____. 2000. *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities* (Revision of 1983 Guidelines). Sacramento, CA.

_____. 2006. Weekly Anadromous Fish Counts. Available: <http://www.dfg.ca.gov/lands/fh/weekly_counts/feather.htm>. Last updated December 3, 2005. Accessed June 8, 2006.

California Department of Water Resources. 1997. Implications of the Delay at the Suisun Marsh Salinity Control Gates on Chinook Salmon Upstream Migrants. Environmental Services Office. Sacramento, CA.

California Native Plant Society. 2007. Electronic Inventory of Rare and Endangered Vascular Plants of California. Rare Plant Scientific Advisory Committee, D. P. Tibor, Convening Ed. Sacramento, CA.

California Natural Diversity Database. 2007. Results of electronic record search. California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA.

_____. 2008. Results of electronic record search. California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA.

Cramer, S. P., and D. B. Demko. 1997. *The Status of Late-Fall and Spring Chinook Salmon in the Sacramento River Basin Regarding the Endangered Species Act*. Submitted to the National Marine Fisheries Service on behalf of the Association of California Water Agencies and California Urban Water Agencies.

City of Sacramento, Sutter County, and The Natomas Basin Conservancy. 2003. Final Natomas Basin Habitat Conservation Plan. Sacramento, CA.

England, A. S., M. J. Bechard, and C. S. Houston. 1997. *Swainson's Hawk* (Buteo swainsoni). In A. Poole and F. Gill (eds.), The Birds of North America, No. 265. The Academy of Natural Sciences and The American Ornithologists' Union. Philadelphia, PA, and Washington, DC.

Estep, J. A. 1984. Diurnal Raptor Eyrie Monitoring Program. California Department of Fish and Game, Nongame Wildlife Investigations. Project Report W-65-R-1, Job No. II-2.0. Sacramento, CA.

_____. 1989. Biology, Movements, and Habitat Relationships of the Swainson's Hawk in the Central Valley of California, 1986–87. California Department of Fish and Game, Nongame Bird and Mammal Section Report. Sacramento, CA.

_____. 2003. *Nesting Swainson's Hawks* (Buteo swainsoni) *in the Natomas Basin Habitat Conservation Plan Area,. 2003* Annual Survey Results, Public Document. Sacramento, CA. Prepared by James A. Estep, Sacramento, CA.

_____. 2007. Estep Environmental Consulting, Sacramento, CA. July 20 and August 16, 2007─personal communication with Leo Edson and Anne King of EDAW regarding the value of types of foraging habitat.

Fisher, F. W. 1994. Past and Present Status of Central Valley Chinook Salmon. *Conservation Biology* 8(3):870–873.

Hallock, R. J., and F. W. Fisher. 1985. Status of the Winter-Run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento River. (Anadromous Fisheries Branch Office Report.) California Department of Fish and Game. Sacramento, CA.

Hansen, E. C. 1998. Cherokee Canal Sediment Removal Project Post-construction Giant Garter Snake (*Thamnophis gigas*) Surveys. Unpublished final report for California Department of Water Resources, Contract No. B-81535. Sacramento, CA.

Hansen, G. E. 1988. Review of the Status of the Giant Garter Snake (*Thamnophis couchii gigas*) and its Supporting Habitat during 1986–87. Unpublished final report for the California Department of Fish and Game, Contract C-2060. Sacramento, CA.

Hansen, G. E., and J. M. Brode. 1980. Status of the Giant Garter Snake Thamnophis couchii gigas (Fitch). Inland Fisheries Endangered Species Special Publication 80(5):1–14. California Department of Fish and Game, Sacramento, CA.

Jennings, M. R., and M. P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. California Department of Fish and Game. Sacramento, CA.

Jones & Stokes. 2001 (June 20). *Change in Potential Stranding Losses of Splittail and Juvenile Chinook Salmon in the Sacramento Bypass, 1999–2001. Final Report.* (J&S FO32.) Sacramento, CA. Prepared for U.S. Army Corps of Engineers, Sacramento, CA.

Kohlhorst, D. W., L. W. Botsford, J. S. Brennan, and G. M. Cailliet. 1991. *Aspects of the Structure and Dynamics of an Exploited Central California Population of White Sturgeon* (Acipenser transmontanus). Pages 277–283 in P. Williot (ed.), Acipenser: Actes du premier colloque international sur l'esturgeon. CEMAGREF, Bordeaux, France.

McEwan, D., and T. A. Jackson. 1996. *Steelhead Restoration and Management Plan for California.* California Department of Fish and Game, Inland Fisheries Division. Sacramento, CA.

Moyle, P. B. 2002. *Inland Fishes of California, Revised and Expanded*. 2nd edition. University of California Press. Berkeley, CA.

Moyle, P. B., P. J. Foley, and R. M. Yoshiyama. 1992. *Status of Green Sturgeon, Acipenser medirostris, in California*. Final report submitted to National Marine Fisheries Service. University of California, Davis. Davis, CA.

Moyle, P. B., R. M. Yoshiyama, J. E. Williams, and E. D. Wikramanayoke. 1995. *Fish Species of Special Concern of California*. California Department of Fish and Game. Rancho Cordova, CA.

National Marine Fisheries Service. 2005. Green Sturgeon (*Acipenser medirostris*) Status Review Update. Prepared by Biological Review Team, Santa Cruz Laboratory, Southwest Fisheries Science Center. Santa Cruz, CA.

Pacific Fisheries Management Council. 2003. Pacific Coast Salmon Plan (as revised through Amendment 14). Adopted March 1999. Portland, OR.

Pacific States Marine Fisheries Commission. 1996. *Green Sturgeon*. Available: <http://www.psmfc.org /habitat/edu_gsturg_fact.html>. Last updated December 16, 1996. Accessed June 24, 2009.

Raleigh, R. F., W. J. Miller, and P. C. Nelson. 1986. *Habitat Suitability Index Models and Instream Flow Suitability Curves: Chinook Salmon*. Biological Report 82 (10.122). U.S. Fish and Wildlife Service. Washington, DC.

Reynolds, F. L., T. Mills, R. Benthin, and A. Low. 1993. *Central Valley Anadromous Fisheries and Associated Riparian and Wetlands Areas Protection and Restoration Action Plan.* Draft. California Department of Fish and Game, Inland Fisheries Division. Sacramento, CA.

Sacramento County. 1993a (December). Sacramento County General Plan. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Sacramento, CA. Accessed 2009.

Schlorff, R., and P. H. Bloom. 1984. Importance of Riparian Systems to Nesting Swainson's Hawks in the Central Valley of California. Pages 612–618 in R. E. Warner and K. M. (eds.), *California Riparian Systems: Ecology, Conservation, and Productive Management*. University of California Press. Berkeley, CA.

Sommer, T., R. Baxter, and B. Herbold. 1997. Resilience of Splittail in the Sacramento–San Joaquin Estuary. *Transactions of the American Fisheries Society* 126:961–976.

Sommer, T. R., M. L. Nobriega, W. C. Harrell, W. Batham, and W. J. Kimmerer. 2001. Floodplain Rearing of Juvenile Chinook Salmon: Evidence of Enhanced Growth and Survival. *Canadian Journal of Fisheries and Aquatic Sciences* 58:325–333.

The Natomas Basin Conservancy. 2008. Biological Effectiveness Monitoring for the Natomas Basin Habitat Conservation Plan Area 2007 Annual Survey Results. Sacramento, CA.

Thelander, C. G. (ed.). 1994. Life on the Edge: A Guide to California's Endangered Natural Resources and Wildlife. Biosystems Analysis, Inc.

Tracy, C. 1990. *Memorandum: Green Sturgeon Meeting and Comments*. State of Washington Department of Fisheries.

U.S. Fish and Wildlife Service, City of Sacramento, and Sutter County. 2003. Natomas Basin Habitat Conservation Plan Final Environmental Impact Report/Environmental Impact Statement. Sacramento, CA.

U.S. Fish and Wildlife Service. 1993a. *Abundance and Survival of Juvenile Chinook Salmon in the Sacramento–San Joaquin Estuary*. (1992 Annual Progress Report.) Stockton, CA.

_____. 1993b. *Biological assessment of the effects of Coleman National Fish Hatchery operations on winter-run chinook salmon*. Prepared by USFWS, Northern Central Valley Fishery Resource Office, Red Bluff, CA.

_____. 1997 (November 13). Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California. Sacramento Fish and Wildlife Office. Sacramento, CA. Available: <http://www.fws.gov/sacramento/es/documents/ggs%20programmatic%20bo.pdf >. Accessed April 2009.

_____. 1999. Draft Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*). Portland, OR.

_____. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Portland, OR.

_____. 2006. Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) 5-Year Review: Summary and Evaluation. Sacramento Fish and Wildlife Office. Sacramento, CA.

Wang, J. C. S. 1986. *Fishes of the Sacramento–San Joaquin Estuary and Adjacent Waters, California: a Guide to the Early Life Histories. (FS/10-4ATR86-9.)* California Department of Water Resources. Sacramento, CA. Prepared for Interagency Ecological Study Program for the Sacramento–San Joaquin Estuary, Sacramento, CA.

Woodbridge, B. 1998. Swainson's Hawk (*Buteo swainsoni*). In The Riparian Bird Conservation Plan: A Strategy for Reversing the Decline of Riparian-Associated Birds in California. California Partners in Flight. Available: <http://www.prbo.org/calpif/htmldocs/species/riparian/swainsons_hawk.htm>.

Yoshiyama, R. M., F. W. Fisher, P. B. Moyle. 1998. Historical Abundance and Decline of Chinook Salmon in the Central Valley Region of California. *North American Journal of Fisheries Management* 18:487–521.

3.8 CULTURAL RESOURCES

Bouey, P. D., and R. Herbert. 1990. *Intensive Cultural Resources Survey and National Register Evaluation: Sacramento Urban Area Flood Control Project*. Report on file, North Central Information Center, California State University, Sacramento, CA.

Bouey, P. D., J. Berg, and C. A. Hunter. 1991. *Cultural Resources Test Excavations, Sacramento Urban Area Flood Control Project, Sacramento County, California*. Report on file, North Central Information Center, California State University, Sacramento, CA.

Dames & Moore. 1993. *Department of Parks and Recreation Series 523 Site Record forms for CA-Sac-16H*. On file, North Central Information Center, California State University, Sacramento, CA.

_____. 1994a. *Historic Property Treatment Plan for Reclamation District 1000 Rural Historic Landscape District for the Cultural Resources Inventory and Evaluations for the American River Watershed Investigation, Sacramento and Sutter Counties, California*. Report on file, North Central Information Center, California State University, Sacramento, CA.

_____. 1994b. *Archaeological Inventory Report, Natomas Locality, Cultural Resources Inventory and Evaluation, American River Watershed Investigation, El Dorado, Placer, Sacramento, and Sutter Counties, California*. Report on file, North Central Information Center, California State University, Sacramento, CA.

Derr, E. 1983. *Historic Resource Evaluation Report for the Arden-Garden Connector Project CT-03-30274.B1 Sacramento County*, California.

Kroeber, A. L. 1925. *Handbook of the Indians of California*. Reprinted in 1976 by Dover Publications. New York, NY.

Kauffman, E., and K. Kauffman. 1987. California Department of Parks and Recreation Series 523 Site Record forms for CA-Sac-16H. On file, North Central Information Center, California State University, Sacramento, CA.

Moratto, M. J. 1984. *California Archaeology*. Academic Press. New York, NY.

Peak, A. S., H. L. Crew, and R. Gerry. 1984. *The 1971 Archaeological Salvage of the Bennett Mound, CA-SAC-16, Sacramento, CA.* Report on file, North Central Information Center, California State University, Sacramento, CA.

Sacramento Area Flood Control Agency. 2007 (November). *Final Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project*. State Clearinghouse No. 2007062016. Prepared by EDAW, Sacramento, CA.

Wilson, N. L., and A. H. Towne. 1978. Nisenan. R. F. Heizer (ed.), *Handbook of North American Indians*, Vol. 8. Smithsonian Institution Press. Washington, DC.

3.9 PALEONTOLOGICAL RESOURCES

Davis, S. N., and F. R. Hall. 1959. Water Quality of Eastern Stanislaus and Northern Merced Counties, California. Stanford University Publications, *Geological Sciences*, Vol. 6, No. 1.

Hay, O. P. 1927. The Pleistocene of the Western Region of North America and its Vertebrated Animals. *Carnegie Institute Washington*, Publication 322B.

Helley, E. J., and D. S. Harwood. 1985. Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California. U.S. Geological Survey MF-1790.

Hilton, R. P., D. C. Dailey, and H. G. McDonald. 2000. A Late Pleistocene Biota from the Arco Arena Site, Sacramento, California. *PaleoBios Abstracts 20(1)*, April 15, 2000. University of California Museum of Paleontology. Berkeley, CA.

Jefferson, G. T. 1991a. A Catalogue of Late Quaternary Vertebrates from California: Part One, Nonmarine Lower Vertebrate and Avian Taxa. Natural History Museum of Los Angeles County, Technical Report no. 5.

_____. 1991b. A Catalogue of Late Quaternary Vertebrates from California: Part Two: Mammals. Natural History Museum of Los Angeles County, Technical Report no. 7.

Kolber, M. 2004. Mammoth Coup: Discovery of Huge Fossil Near Elk Grove is a Big Deal for Northern California. *Sacramento Bee*, July 27, 2004.

Lundelius, E. L., Jr., R. W. Graham, E. Anderson, J. Guilday, J. A. Holman, D. W. Steadman, and S. D. Webb. 1983. Late Quaternary Environments of the United States. Volume 1, *The Late Pleistocene*. University of Minnesota Press. Minneapolis.

Marchand, D. E., and A. Allwardt. 1981. Late Cenozoic Stratigraphic Units, Northeastern San Joaquin Valley, California. U.S. Geological Survey Bulletin 1470.

Piper, A. M., H. S. Gale, H. E. Thomas, and T. W. Robinson. 1939. Geology and Ground-Water Hydrology of the Mokelumne Area, California. United States Department of the Interior, Geological Survey. Water-Supply Paper 780. Washington, DC.

Savage, D. E. 1951. Late Cenozoic Vertebrates of the San Francisco Bay Region. *Univ. Calif. Public. Geol. Sci.*, Vol. 28, No. 10.

Stirton, R. A. 1939. Late Cenozoic Vertebrates of the San Francisco Bay Region. *Univ. Calif. Public. Geol. Sci*., Vol. 24.

Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources—Standard Guidelines. *Society of Vertebrate Paleontology News Bulletin* 163:22–27.

———. 1996. Conditions of Receivership for Paleontologic Salvage Collections [final draft]. *Society of Vertebrate Paleontology News Bulletin* 166:31–32.

University of California Museum of Paleontology. 2006. Paleontology Collections Database. University of California, Berkeley. Available: <http://bscit.berkeley.edu/ucmp/loc.shtml>. Accessed September 11, 2006.

Wagner, D. L., C. W. Jennings, T. L. Bedrossian, and E. J. Bortugno. 1987. Geologic Map of the Sacramento Quadrangle. Regional Geologic Map Series, Map No. 1A. California Division of Mines and Geology.

3.10 TRANSPORTATION AND CIRCULATION

City of Sacramento. 2005 (June). *2030 General Plan Technical Background Report*. Sacramento, CA.

City of Sacramento Environmental Planning Services and Sacramento Local Agency Formation Commission. 2006 (July). *Greenbriar Development Project, Sacramento, California, Draft Environmental Impact Report*. State Clearinghouse #2005062144. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

Sacramento County. 2007a. Municipal Services Agency Department of Transportation Traffic Count Program. Available: <http://www.sacdot.com/services/traffic_counts.asp>. Accessed August 26, 2007.

_____. 2007b (March). *Draft Environmental Impact Report for the Sacramento International Airport Master Plan*. Sacramento, CA.

Sutter County. 1996 (May). *County of Sutter General Plan 2015 Background Report*. Community Services Department. Yuba City, CA.

3.11 AIR QUALITY

California Air Resources Board. 2009a. Air Quality Data Statistics. Available: <www.arb.ca.gov/adam/welcome.html>.

———. 2009b. Area Designation Maps / State and National. Available: <www.arb.ca.gov/desig/adm/adm.htm#state>.

Churchill, R. K., and R. L. Hill. 2000. *A General Location Guide for Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos. California Division of Mines and Geology Open-File Report 2000–19.*

Clinkenbeard, J., R. Churchill, and K. Lee. 2002. *Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California.* Special Publication 124. Available: <http://www.consrv.ca.gov/cgs/minerals/hazardous_minerals/asbestos/Asbestos_Guidelines_SP124.pdf>. Accessed April 2007.

Higgins, C. T., and Clinkenbeard J. R. 2006. *Relative Likelihood for the Presence of Naturally Occurring Asbestos in Eastern Sacramento County California. California Geological Survey*. Special Report 192.

U.S. Environmental Protection Agency. 2009. Monitor Values Report. Available: <http://www.epa.gov/air/data/reports.html>.

3.12 NOISE

California Department of Transportation. 1998 (October). *Traffic Noise Analysis Protocol: Technical Noise Supplement*. Sacramento, CA.

City of Sacramento. 2009. *Sacramento 2030 General Plan*. Adopted March 3, 2009. Sacramento, CA.

Egan, David M. 1988. *Architectural Acoustics.* McGraw-Hill, Inc. San Francisco, CA.

Follas, Dale. Associate Planner. Sutter County Planning Department, Yuba City, CA. September 7, 2007—telephone conversation with Chris Shields of EDAW regarding noise ordinance in Sutter County.

Governor's Office of Planning and Research. 2003. State of California General Plan Guidelines. Sacramento, CA.

Lipscomb, D. M., Ph.D., and A. C. Taylor, Jr., Ph.D. 1978. *Noise Control Handbook of Principles and Practices*. Van Nostrand Reinhold Company. New York, NY.

Sacramento County. 1993 (December). *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Sacramento, CA. Accessed 2007.

Sutter County. 1996 (May). *County of Sutter General Plan 2015 Background Report.* Community Services Department. Yuba City, CA.

U.S. Department of Housing and Urban Development, Office of Community Planning and Development. *The Noise Guide Book.* Available: <http://www.hud.gov/offices/cpd/environment/training/guidebooks/noise/>. Accessed: Spring 2009.

3.13 VISUAL RESOURCES

Sacramento County. 1974. *Scenic Highways Element of the Sacramento County General Plan*. Sacramento, CA.

———. 1993 (December). *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Sacramento, CA. Accessed 2007.

3.14 UTILITIES AND SERVICE SYSTEMS

Butler, Myles. General Manager. Wickland Pipelines, LLC. March 12, 2009—email to Marianne Lowenthal regarding engineering details of the Wickland Pipeline located within the Project Footprint.

California Integrated Waste Management Board. 2009. Solid Waste Information System (SWIS) facility database. Available: <http://www.ciwmb.ca.gov/SWIS/Search.asp>. Accessed March 2009.

Sacramento County Airport System. 2004. Media Advisory: Sacramento County Airport System Unveils Jet Fuel Pipeline & Tank Farm. Available: <http://www.sacairports.org/int/news/Press%20Releases/Press%20Releases%2004/Fuel%20Farm%20Advisory.pdf.> Accessed March 8, 2009.

Sacramento County Local Agency Formation Commission. 2007. Directory of Sacramento County Service Providers. Available: < http://www.saclafco.org/service-providers/maps/index.html>. Accessed August 2007.

3.15 HAZARDS AND HAZARDOUS MATERIALS

California Department of Forestry and Fire. 2007a. Available: <http://frap.cdf.ca.gov/data/frapgismaps/select.asp?record=fhsz_map>. [Wildland] Fire Threat. Last updated October 20, 2005. Accessed July 17, 2007.

_____. 2007b. Very High Fire Hazard Severity Zones (AB 337). Available: <http://frap.cdf.ca.gov/webdata/maps/sacramento/ab337_map.34.pdf>. Last updated December 5, 2005. Accessed April 23, 2007.

_____. 2007c. State Responsibility Areas (SRA) for Fire Protection for Sutter County. Available: <http://frap.cdf.ca.gov/webdata/maps/sutter/sramap.pdf>. Last updated December 18, 2006. Accessed August 1, 2008.

_____. 2007d. State Responsibility Areas (SRA) for Fire Protection for Sacramento County. Available: <http://frap.cdf.ca.gov/webdata/maps/sacramento/sramap.34.pdf>. Last updated July 31, 2007. Accessed August 1, 2008.

City of Sacramento, Sutter County, Natomas Basin Conservancy. 2003. *Final Natomas Basin Habitat Conservation Plan*. Available: <www.natomasbasin.org/content/view/144/118/>. Accessed September 2008.

Federal Aviation Administration. 2007. Hazardous Wildlife Attractants on or Near Airports. FAA Advisory Circular 150/5200-33B. Available: <http://www.faa.gov/airports_airtraffic/airports/resources/>.

Kleinfelder. 2009a. *Natomas Levee Improvement Program. Initial Site Survey and Phase I Environmental Site Assessment*. Volumes 6, 9, 10, 11, and 12. Sacramento, CA.

_____. 2009b (August). *Borrow Site Environmental Conditions South Sutter/Thornton Property (APN 201-0250-015, 201-0270-002, -037), Novak Property (APN 225-0090-040), Huffstutler/Johnson Trust Property (APN 225-0110-019, -020, -037), Sacramento County, California.* Sacramento, CA.

Sacramento County. 1993 (December). *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Sacramento, CA. Accessed 2007.

Sacramento County Airport System. 2007. *Sacramento International Airport Wildlife Hazard Management Plan*. Sacramento, CA.

State Water Resources Control Board Geotracker Database. 2009. Results of electronic record search. State Water Resources Control Board. Sacramento, CA.

3.16 ENVIRONMENTAL JUSTICE

U.S. Census Bureau. 2000. Results of electronic record search. Census 2000 American Factfinder. Available: <http://factfinder.census.gov>.

4.0 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

4.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

Sacramento Area Flood Control Agency. 2007. *Final Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project.* State Clearinghouse No. 2007062016.

_____ 2009. *Final Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project*. State Clearinghouse No. 2007062016.

U.S. Army Corps of Engineers. 2008. *Final Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project. Sacramento, CA*. Prepared by EDAW, Sacramento, CA.

U.S. Army Corps of Engineers and Sacramento Area Flood Control Agency. 2009 (February). *Draft Environmental Impact Statement/Draft Environmental Impact Statement on the Natomas Levee Improvement Program Phase 3 Landside Improvements Project.* State Clearinghouse No. 2007062016. Prepared by EDAW, Sacramento, CA.

4.2 AGRICULTURAL RESOURCES

California Department of Conservation, Division of Land Resource Protection. 2008. 2004-2006 Land Use Conversion, Farmland Mapping and Monitoring Program. Available: <ftp.consrv.ca.gov/pub/dlrp/fmmp>. Last updated 2008. Accessed August 6, 2008.

Natural Resource Conservation Service. 1988. Soil Survey of Sutter County.

_____. 1993. Soil Survey of Sacramento County.

Sacramento County. 1993 (December). *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Sacramento, CA. Accessed 2007.

Sutter County. 1996 (November). *County of Sutter General Plan 2015 Policy Document*. Available: <http://www.co.sutter.ca.us/doc/government/depts/cs/ps/cs_planning_services>. Yuba City, CA.

4.3 LAND USE, SOCIOECONOMICS, AND POPULATION AND HOUSING

Sacramento County. 1993. *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Sacramento, CA.

Sacramento County Airport System. 2007. *Sacramento International Airport Wildlife Hazard Management Plan*. Sacramento, CA.

Sacramento County Board of Supervisors. 2008 (November 4). Summary Report – Continuity of Airport Operations Flood Contingency Action Plan For Sacramento County Airport Systems. Sacramento, CA. Available: <http://www.agendanet.saccounty.net/sirepub/pubmtgframe.aspx?meetid=9774&doctype=summary>. Accessed January 26, 2009.

Sutter County. 1996 (November). *County of Sutter General Plan 2015 Policy Document. Available:* <http://www.co.sutter.ca.us/doc/government/depts/cs/ps/cs_planning_services>.Yuba City, CA.

4.4 GEOLOGY AND SOILS

Kleinfelder. 2008 (November 14). *Draft Geotechnical Basis of Design Report Sacramento River East Levee Phase 1 (Reaches 1 Through 4a) Natomas Levee Improvement Program, Sacramento and Sutter Counties, California*. Sacramento, CA.

Natural Resources Conservation Service. 1988. Soil Survey of Sutter County.

_____. 1993. Soil Survey of Sacramento County.

U.S. Army Corps of Engineers. 2000 (April 30). Design and Construction of Levee. Washington, DC.

4.5 HYDROLOGY AND HYDRAULICS

Kleinfelder. 2007. Evaluation of Cutoff Walls Impacts on Groundwater Recharge, Sacramento East Levee, Natomas Levee Improvement Program.

Luhdorff & Scalmanini Consulting Engineers. 2008. Draft Evaluation of Potential Groundwater Impacts Due to Proposed Construction for Natomas Levee Improvement Program.

MBK Engineers. 2009. Sacramento Area Flood Control Agency, Natomas Levee Improvement Program, Summary Report on Hydraulic Impact Analyses.

4.6 WATER QUALITY

California Department of Water Resources. Stormwater Utility. Stormwater Quality Program. 2007. (May). *Stormwater Quality Design Manual for the Sacramento and South Placer Regions.*

Lahontan Regional Water Quality Control Board. 2007 (December 14). Truckee River Basin Stormwater Management Program. Program Year 2007-2012. Prepared by Placer County Department of Public Works, Auburn, CA. Available: <http://www.placer.ca.gov/Departments/Works/~/media/dpw/npdes/documents/TruckeeRiverBasinSWMP.ashx>. Accessed April 2009.

4.7 BIOLOGICAL RESOURCES

California Department of Fish and Game. 1995. *Staff Report on Burrowing Owl Mitigation*. Sacramento, California.

California Natural Diversity Database. 2008. Results of electronic record search. California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch. Sacramento, CA.

City of Sacramento, Sutter County, and The Natomas Basin Conservancy. 2003. Final Natomas Basin Habitat Conservation Plan. Sacramento, CA.

Estep. J. A. 1989. Biology, Movement, and Habitat Relationships of the Swainson's Hawk in the Central Valley of California, 1986-87. California Department of Fish and Game, Nongame Bird and Mammal Section Report. Sacramento, CA.

_____. 2008 (March). The Distribution, Abundance, and Habitat Associations of the Swainson's Hawk (Buteo swainsoni) in Yolo County. Prepared for Yolo Natural Heritage Program, Woodland, CA. Prepared by Estep Environmental Consulting. Sacramento, CA.

Hansen, Eric. Consulting Herpetologist. Sacramento, CA. November 25, 2008─personal communication with Kelly Fitzgerald of EDAW regarding giant garter snake in the Natomas Basin.

Hansen, G. E. and J. M. Brode. 1993. Results of relocating canal habitat of the giant garter snake (*Thamnophis gigas*) during widening of State Route 99/70 in Sacramento and Sutter counties, California. Final report for Caltrans Interagency Agreement 03E325 (FG7550) (FY 87/88-91-92). Unpublished. 36 pp.

Laughlin, J. 2005. Effects of Pile Driving on Fish and Wildlife. Presentation to National Academy of Sciences - Transportation Research Board.

Sacramento County and Sacramento Area Flood Control Agency. 2009. Master Agreement between the County of Sacramento and the Sacramento Area Flood Control Agency regarding the Natomas Levee Improvement Program. Sacramento, CA.

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley.*

The Natomas Basin Conservancy. 2007. *Biological Effectiveness Monitoring for the Natomas Basin Habitat Conservation Plan Area 2006 Annual Survey Results*. Sacramento, CA.

The Natomas Basin Conservancy. 2008. *Biological Effectiveness Monitoring for the Natomas Basin Habitat Conservation Plan Area 2007 Annual Survey Results*. Sacramento, CA.

U.S. Army Corps of Engineers and Central Valley Flood Protection Board. 2009. *Draft Initial Study and Proposed Mitigated Negative Declaration for The 5 Bank Protection Sites, 2009 and 2010, Sacramento River Bank Protection Project*, State Clearinghouse No. 2009042057.

U.S. Fish and Wildlife Service. 1997. *Guidelines for the Restoration and/or Replacement of Giant Garter Snake Habitat*.

_____. 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. U.S. Fish and Wildlife Service. Portland, Oregon.

Waters, T. F. 1995. *Sediment in Streams: Sources, Biological Effects, and Control.* American Fisheries Society Monograph 7. Bethesda, MD.

Woodbridge, B. 1998. Swainson's Hawk (*Buteo swainsoni*). In *The Riparian Bird Conservation Plan: A Strategy for Reversing the Decline of Riparian-Associated Birds in California. California Partners in Flight.* Available: <http://www.prbo.org/calpif/htmldocs/species/riparian/swainsons_hawk.htm>.

4.8 CULTURAL RESOURCES

Peak & Associates. 1997. Historic American Engineering Record Reclamation District 1000 HAER No. CA-187. Prepared for Sacramento Area Flood Control Agency. Sacramento, CA.

Sacramento Area Flood Control Agency. 2007. *Draft Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project*. State Clearinghouse No. 2007062016. Prepared by EDAW, Sacramento, CA.

———. 2009 (January). *Final Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program, Landside Improvements Project—Phase 2 Project.* State Clearinghouse No. 2007062016. Prepared by EDAW, Sacramento, CA.

U.S. Army Corps of Engineers. 1991. *American River Watershed Investigation, California: Feasibility Report.* U.S. Army Corps of Engineers Sacramento District and The Reclamation Board, State of California. Sacramento, CA.

_____. 2008. *Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project.*

U.S. Army Corps of Engineers and Sacramento Area Flood Control Agency. 2009. *Draft Environmental Impact Statement/Draft Environmental Impact Report on the Natomas Levee Improvement Program, Phase 3 Landside Improvements Project*. State Clearinghouse No. 2008072060. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

4.9 PALEONTOLOGICAL RESOURCES

Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources—Standard Guidelines. *Society of Vertebrate Paleontology News Bulletin* 163:22–27.

4.10 TRANSPORTATION AND CIRCULATION

California Department of Transportation. 1996. *Traffic Manual Chapter 5 Traffic Controls for Construction Zones and Maintenance Work Zones*. Sacramento, CA.

Institute of Transportation Engineers. 1989. Traffic Access and Impact Studies for Site Development. Transportation Planners Council. Washington, DC.

Klinker, Dan, Associate Civil Engineer. Alternative Modes Coordinator. Sacramento County Department of Transportation, Sacramento, CA. May 22, 2009—e-mail message to Melinda Rivasplata of EDAW regarding designated bicycle routes within the Phase 4a Project area.

Sacramento Area Flood Control Agency. 2009 (May). *Final Environmental Impact Report on the Natomas Levee Improvement Program Phase 3 Landside Improvements Project.* State Clearinghouse No. 2008072060. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

Sacramento County. 1993 (December). *Sacramento County General Plan*. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Sacramento, CA. Accessed 2007.

4.11 AIR QUALITY

Feather River Air Quality Management District. 1998. Indirect Source Review Guidelines. Marysville, CA.

_____. 2007. CEQA Planning: Air Quality CEQA Review. FRAQMD Web site. Available: <http://www.fraqmd.org/PlanningTools.htm>. Accessed July 2007 and July 9, 2008.

Sacramento Metropolitan Air Quality Management District. 2004 (July). Guide to Air Quality Assessment in Sacramento County. Sacramento, CA.

Salinas, Julio. Staff Toxicologist. Office of Health Hazard Assessment, Sacramento, CA. August 3, 2004—telephone conversation with Kurt Legleiter of EDAW regarding exposure period for determining heath risk.

4.12 NOISE

Bolt Beranek and Newman Inc. 1981. *Noise Control for Buildings and Manufacturing Plants*. Cambridge MA.

California Department of Transportation. 2002 (February 20). *Transportation Related Earthborne Vibrations.* Sacramento, CA.

City of Sacramento. 2009. *Sacramento 2030 General Plan.* Adopted March 3, 2009. Sacramento, CA.

Federal Highway Administration. 1978 (December). Federal Highway Traffic Noise Prediction Model.

Federal Transit Administration. 2006 (May). *Transit Noise and Vibration Impact Assessment*. Washington, DC. Prepared by: Harris Miller Miller & Hanson Inc., Burlington, MA.

Sacramento County. 1993 (December). *Sacramento County General Plan*. Noise Element. Includes revisions as of May 2, 1997. Sacramento, CA. Available: <http://www.planning.saccounty.net/general-plan/index.html>. Accessed 2007.

Sutter County. 1996 (November). *County of Sutter General Plan 2015 Policy Document. Available:* <http://www.co.sutter.ca.us/doc/government/depts/cs/ps/cs_planning_services>. Yuba City, CA.

U.S. Environmental Protection Agency. 1971 (December). *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*. Washington, DC.

4.13 VISUAL RESOURCES

California Department of Transportation. 2007. California Scenic Highway Mapping System. Available: <http://www.dot.ca.gov/hq/ LandArch/scenic_highways/index.htm>. Last updated December 7, 2007.

4.14 UTILITIES AND SERVICE SYSTEMS

California Integrated Waste Management Board. 2009. Solid Waste Information System (SWIS) facility database. Available: <http://www.ciwmb.ca.gov/SWIS/Search.asp>. Accessed March 2009.

4.15 HAZARDS AND HAZARDOUS MATERIALS

Chevron Energy Research & Technology Company. 2003. Materials Safety Data Sheet. Aviation Turbine Fuel. Available: <www.chevronglobalaviation.com/docs/aviation_turbine_fuel.doc>. Last updated April 18, 2003. Accessed May 28, 2009.

Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2004. Wildlife Strikes to Civil Aircraft in the United States, 1990–2003. Federal Aviation Administration, National Wildlife Strike Database, Serial Report Number 10. Federal Aviation Administration, Office of Airport Safety and Standards. Washington D.C. Available: <http://wildlife.pr.erau.edu/Bash90-03.pdf>.

Federal Aviation Administration. 2007. Hazardous Wildlife Attractants on or Near Airports. FAA Advisory Circular 150/5200-33B. Available: <http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/index.cfm?template=Document_Listing&Keyword=150/5200-33&DocumentSelected=1>.

Kleinfelder. 2009a. *Natomas Levee Improvement Program. Initial Site Survey and Phase I Environmental Site Assessment*. Volumes 6, 9, 10, 11, and 12. Sacramento, CA.

_____. 2009b (August). *Borrow Site Environmental Conditions South Sutter/Thornton Property (APN 201-0250-015, 201-0270-002, -037), Novak Property (APN 225-0090-040), Huffstutler/Johnson Trust Property (APN 225-0110-019, -020, -037), Sacramento County, California.* Sacramento, CA.

Sacramento County Airport System. 2007. *Sacramento International Airport Wildlife Hazard Management Plan*. Sacramento, CA.

4.16 ENVIRONMENTAL JUSTICE

Council on Environmental Quality. 1997. *Environmental Justice: Guidance Under the National Environmental Policy Act*. Council on Environmental Quality, Washington, D.C.

U.S. Census Bureau. 2006. Poverty Thresholds 1999. Available: <http://www.census.gov/hhes/www/poverty/threshld/thresh99.html>. Accessed March 11, 2009.

5.0 CUMULATIVE AND GROWTH-INDUCING IMPACTS, AND OTHER STATUTORY REQUIREMENTS

California Air Pollution Control Officers Association. 2008. *CEQA & Climate Change.*

California Air Resources Board. 2008a (October). *Climate Change Proposed Scoping Plan.*

_____. 2008b. *Preliminary Draft Staff Proposal Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act.*

City of Sacramento. 2002 (August) *Draft Environmental Impact Report/Environmental Impact Statement, Natomas Basin Habitat Conservation Plan.* Sacramento, CA.

_____. 2009. *Sacramento 2030 General Plan.* Adopted March 3, 2009. Sacramento, CA.

City of Sacramento and County of Sacramento. 2002 (December 10). *Resolution No. 2002-830. A Resolution Authorizing the City Manager to Execute a Memorandum of Understanding Between the City and County of Sacramento Regarding Principles of Land Use and Revenue Sharing for the Natomas Area* (Joint Vision). (M02-014). Sacramento, CA.

Governor's Office of Planning and Research. 2009. *Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions*.

Sacramento Area Flood Control Agency. 2007a (February). *Final Environmental Impact Report on Local Funding Mechanisms for Comprehensive Flood Control Improvements for the Sacramento Area.* State Clearinghouse #2006072098. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

———. 2007b (November). *Final Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project.* State Clearinghouse #2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

_____. 2009 (January). *Final Supplement to the Environmental Impact Report on the Natomas Levee Improvement Program Landside Improvements Project—Phase 2 Project.* State Clearinghouse 2007062016. Sacramento, CA. Prepared by EDAW, Sacramento, CA.

Sacramento County Airport System. 2007. *Sacramento International Airport Master Plan*. Sacramento, CA.

U.S. Army Corps of Engineers. 2008 (November). *Final Environmental Impact Statement for 408 Permission and 404 Permit to Sacramento Area Flood Control Agency for the Natomas Levee Improvement Project, Sacramento, CA*. Prepared by EDAW, Sacramento, CA.

U.S. Army Corps of Engineers and Sacramento Area Flood Control Agency. 2009 (February). *Draft Environmental Impact Statement/Draft Environmental Impact Statement on the Natomas Levee Improvement Program Phase 3 Landside Improvements Project.* State Clearinghouse No. 2007062016. Prepared by EDAW, Sacramento, CA.

6.0 COMPLIANCE WITH FEDERAL ENVIRONMENTAL LAWS AND REGULATIONS

Council on Environmental Quality. 1997. *Environmental Justice: Guidance Under the National Environmental Policy Act*. Council on Environmental Quality, Washington, D.C.

Federal Aviation Administration. 2007. *Hazardous Wildlife Attractants on or Near Airports*. FAA Advisory Circular 150/5200-33B. Available: <http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars/index.cfm?template=Document_Listing&Keyword=150/5200-33&DocumentSelected=1>.

Federal Emergency Management Agency. 2007 (September 27). Letter to Ray Kerridge, City Manager, City of Sacramento. Available: <http://www.cityofsacramento.org/utilities/flood/FEMA_Letter_100807.pdf>. Accessed February 17, 2008.

Natural Resources Conservation Service. 2004. Farm and Ranchlands Protection Program. Available: <http://www.nrcs.usda.gov/programs/frpp/>. Accessed September 2008.

Sacramento County Airport System. 2007. *Sacramento International Airport Wildlife Hazard Management Plan*. Sacramento, CA.

7.0 CONSULTATION AND COORDINATION

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Leo Edson	B.S. Biological Studies; 25 years experience	Biological Resources Senior Reviewer
Mike Aviña	B.A. Anthropology; J.D. Law; 13 years experience	Cultural Resources, Environmental Justice
Steve Heipel	B.S. Anthropology; 37 years experience	Cultural Resources Senior Reviewer
Jake Weirich	B.S. Sound Engineering; 4 years experience	Air Quality and Noise
Honey Walters	B.S. Environmental Science; M.S. Atmospheric Science; 12 years experience	Air Quality and Noise Senior Reviewer
Lisa Clement	B.S. Environmental and Resource Sciences; 10 years experience	Geographic Information Systems
Phi Ngo	B.A. Communication (GIS Minor); 4 years experience	Geographic Information Systems
Julie Nichols	B.A. Political Science; M.S. Journalism; 20 years experience	Technical Editing
Christy Seifert	B.A. English; 11 years experience	Technical Editing
Lorrie Jo Williams	B.S. Design; 22 years experience	Graphics
Christy Anderson	B.A. Fine Art; 30 years experience	Graphics
Deborah Jew	23 years experience	Word Processing, Document Production
Amber Giffin	16 years experience	Word Processing, Document Production

MBK ENGINEERS

Name	Qualifications	Participation
Joseph D. Countryman, P.E.	B.S. Civil Engineering; 43 years experience	Hydraulic Modeling Review
Ric Reinhardt, P.E.	B.S. Civil Engineering; M.S. Civil Engineering; 14 years experience	Hydraulic Modeling Review
Mike Archer, P.E.	B.S. Civil Engineering; M.S. Civil Engineering; 26 years experience	Hydraulic Modeling

HDR ENGINEERING

Name	Qualifications	Participation
Christopher Krivanec, P.E., G.E.	B.S. Civil Engineering; M.S. Civil Engineering (Geotechnical); M.E. Civil Engineering (Geotechnical); 17 years experience	Project Manager for Sacramento River East Levee Design

MEAD & HUNT

Name	Qualifications	Participation
Steve Sullivan, P.E.	B.S. Civil Engineering; 28 years experience	Project Manager for Canal Design and Borrow Investigation

WOOD RODGERS

Name	Qualifications	Participation
Jonathan Kors, P.E.	B.S. Civil Engineering; 12 years experience	Project Manager for Natomas Cross Canal South Levee, Pleasant Grove Creek Canal West Levee, and Natomas East Main Drainage Canal West Levee Design

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