Willits Bypass Project

Mitigation and Monitoring Proposal

U.S. Highway 101

Mendocino County, near the City of Willits, California

PM 43.1-52.3

01-26200

USACE file no. 1991-194740N

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Caltrans

CALIFORNIA DEPARTMENT OF TRANSPORTATION

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STATE OF CALIFORNIA
Department of Transportation

Prepared By: _____ Date: 1/9/2012

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List of Abbreviated Terms

2005 Feasibility Study;	project's wetland mitigation feasibility study
73 Federal Register [FR 19594–19705; 2008 Mitigation Rule	USACE's April 2008 Compensatory Mitigation for Losses of Aquatic Resources Final Rule
af	acre-feet
afy	acre-feet per year
APN	Assessor's Parcel Number
BMPs	best management practices
CalFire	California Department of Forestry and Fire Protection
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CE	conservation easement
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic foot per second
CMP	Conceptual Mitigation Plan
CNPS	California Native Plant Society
CRZ	clear recovery zone
CWA	Clean Water Act
DEIS/DEIR	draft environmental impact statement/draft environmental impact report
DWR	California Department of Water Resources
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ESA	environmentally sensitive area
FAC	facultative
FACW	facultative wetland
FEI	functional equivalent index
FEIS/FEIR	final EIS/EIR
FHWA	Federal Highway Administration
FR	Federal Register
GPS	global position system
in/yr	inches per year
IPMP	invasive plant management plan
ITP	Incidental Take Permit
LEDPA	least environmentally damaging practicable alternative
LOS	level of service
MCRCD	Mendocino County Resource Conservation District
mi^2	square miles
MMP	mitigation and monitoring proposal
mph	miles per hour
MPR	mitigation parcels report
MRP	Monitoring and Reporting Program
NEPA/404 MOU	1994 National Environmental Policy Act/Clean Water Act Section 404 Integration Process Memorandum of Understanding
NIDIS	National Integrated Drought Information System

NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
OBL	obligate
OHWM	ordinary high water mark
project	Willits Bypass Project
RCB	reinforced concrete box
RSP	rock slope protection
RWB	North Coast Regional Water Quality Control Board
SONCC	Southern Oregon/Northern California Coast
SR	State Route
SWPPP	storm water pollution and prevention plan
TRMs	turf reinforcement mats
US 101	U.S. Highway 101
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WWTP	Willits Wastewater Treatment Plant

Chapter 1 Introduction

The California Department of Transportation (Caltrans), in conjunction with the Federal Highway Administration (FHWA), is proposing to construct the Willits Bypass Project (project), a new section of U.S. Highway 101 (US 101) that will bypass the city of Willits in Mendocino County (Figure 1-1). The project will result in unavoidable impacts on federal Clean Water Act (CWA) Section 404 jurisdictional wetlands and other waters of the United States (i.e., aquatic resources) in and adjacent to the project's right-of-way.

This document is a mitigation and monitoring proposal (MMP) that proposes compensatory mitigation for the impacts of the project on wetlands and other waters of the United States. This MMP will be used to support compliance with CWA Section 404. Its format and content are in accordance with guidelines established by the U.S. Army Corps of Engineers (USACE) (33 Code of Federal Regulations [CFR] Parts 325 and 332) and U.S. Environmental Protection Agency (EPA) (40 CFR Part 230). This introductory chapter identifies the responsible parties for the project and presents an overview of the project, including features, impacts, and refinements to the project design to avoid and further reduce impacts. The balance of the document is organized as shown below.

- Chapter 2, Objectives, describes the aquatic resource types and amounts that will be affected; summarizes the proposed mitigation; and describes the mitigation objectives, resource types and amounts that will be provided, and method of compensation (establishment, rehabilitation, and/or re-establishment). It also describes the functions and services of the affected aquatic resources.
- Chapter 3, Site Selection Criteria, describes the factors considered in identifying parcels for offsite mitigation.
- Chapter 4, Site Protection Instruments, presents information on provisions for long-term mitigation site protection and management.
- Chapter 5, Baseline Information, describes the existing ecological characteristics of the affected aquatic resources in the impact area and on the mitigation parcels.
- Chapter 6, Determination of Credits, describes the amount and type of acreage to be provided by mitigation for each affected aquatic resource and includes a brief rationale for the determination.
- Chapter 7, Mitigation Work Plan, describes the implementation plan for on- and offsite mitigation.
- Chapter 8, Mitigation Maintenance Plan, describes the on- and offsite mitigation maintenance, including post-implementation plant establishment period and the short-term maintenance period and maintenance activities that will be implemented.
- Chapter 9, Performance Standards, describes performance standards used to determine whether compensatory mitigation is achieving its objectives.

- Chapter 10, Monitoring Requirements, describes the parameters to be monitored to determine whether the mitigation is on track to meet performance standards or whether adaptive management is needed, and includes a schedule for monitoring activities.
- Chapter 11, Long-Term Management Plan, summarizes the proposed management of mitigation after performance standards have been achieved to ensure long-term sustainability, as well as long-term financing mechanisms and the responsible party for long-term management.
- Chapter 12, Adaptive Management Plan, presents a management strategy to address unforeseen changes in site conditions or other components of compensatory mitigation, including a description of the process and the responsible party for implementing adaptive management measures.
- Chapter 13, Financial Assurances, describes financial assurances that will be provided, as well as justification of their sufficiency to ensure a high level of confidence in successful completion of compensatory mitigation in accordance with performance standards.
- Chapter 14, References, lists the references used in preparation of the MMP.
- Chapter 15, List of Preparers and Reviewers, identifies the staff responsible for the preparation and quality control of the MMP, including internal and external reviewers.

Several appendices are included as part of the MMP.

- Appendix A, Nomenclature of Plant and Animal Species Mentioned in the MMP.
- Appendix B, Aquatic Resources Impact Maps.
- Appendix C, Aquatic Resources on Mitigation Parcels and Proposed Mitigation Actions.
- Appendix D, Design Plans for Onsite Wetland and Riparian Re-establishment.
- Appendix E, Design Plans for Offsite Mitigation.
- Appendix F, Haehl and Upp Creek Stream Restoration and Fish Passage Design Plans.
- Appendix G, Invasive Plant Management Plan for Offsite Mitigation Parcels.
- Appendix H, Assessment of Erosion Sites on Offsite Mitigation Parcels in Little Lake Valley.
- Appendix I, Data Collection Forms from the USACE Mitigation Parcel Assessments.
- Appendix J, Wetland Hydrology and Soil Analysis for Offsite Wetland Establishment Areas.
- Appendix K, Vegetation Sampling of Proposed (Group 1) Wetland Establishment Sites.
- Appendix L, Property Analysis Record for the U.S. Army Corps of Engineers Jurisdictional Wetland Mitigation and Monitoring Plan.
- Appendix M, Wetland Inundation Mapping for Onsite Mitigation Areas.
- Appendix N, Wetland Inundation Mapping for Offsite Mitigation Areas.

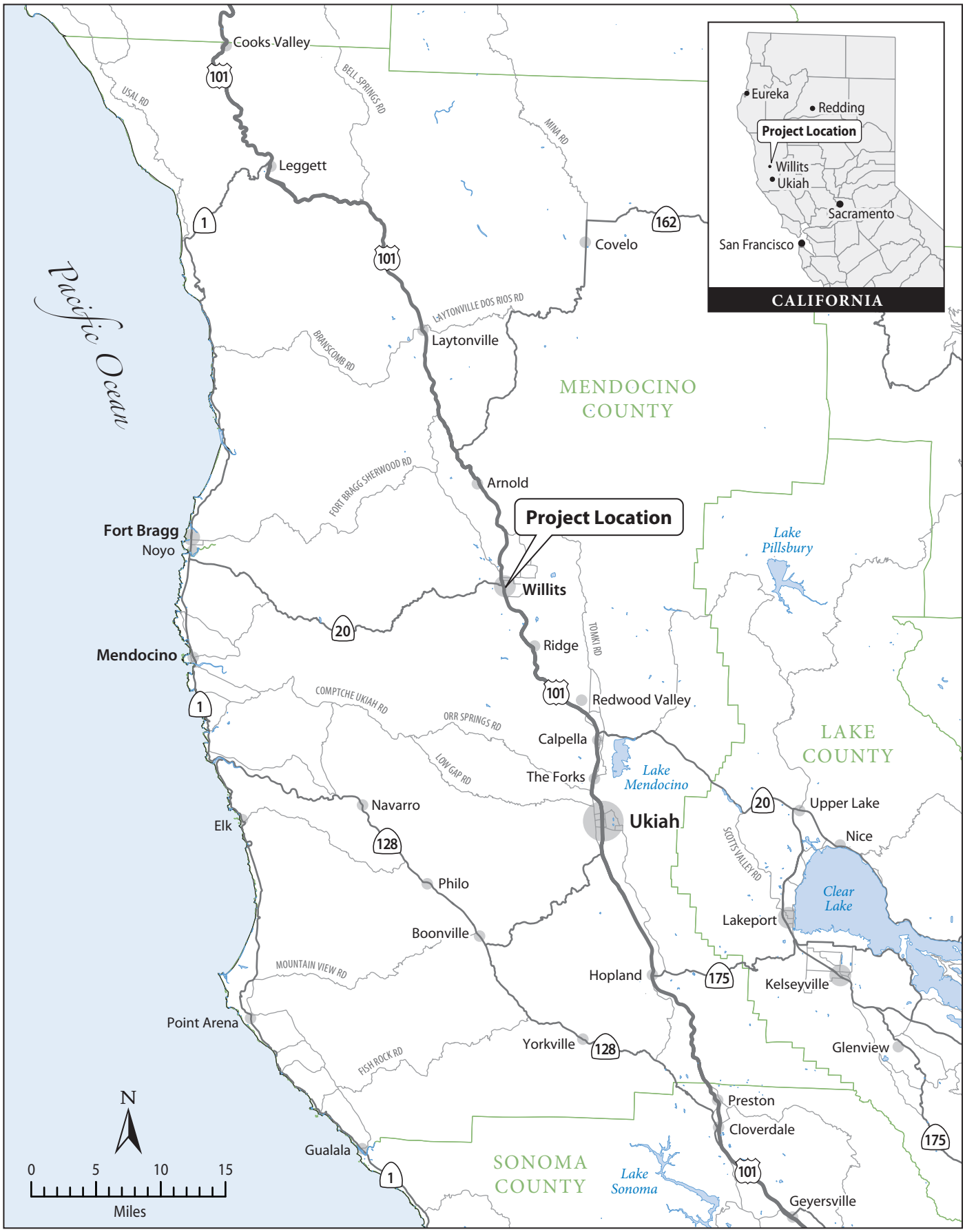

Figure 1-1
Regional Location

The appendices are bound separately from this document in three sets: Appendices A and G–L; Appendices B–D, M, and N; and Appendices E and F.

Caltrans has developed construction-level plans for the Willits Bypass Project. These plans will be provided to USACE as a stand-alone submittal from this MMP. These plans contain the preproject elevations which will be used to guide the re-contouring effort to establish pre-project conditions.

1.1 Project Overview

The project is a four-lane highway with several bridges spanning creeks and local roads, viaducts spanning a floodplain, and interchanges with existing US 101 at each end of the bypass. Maps of project features are located at the end of this chapter (Figures 1-2a to 1-2d). The bypass alignment meanders through the southwestern portion of Little Lake Valley, just east of Willits in Mendocino County. The 5.9-mile bypass begins approximately 0.6 mile south of the current Haehl Creek crossing of US 101 and ends approximately 1.8 miles south of Reynolds Highway.

The bypass alignment passes through the 100-year floodplains of Haehl, Baechtel, Broaddus, Mill, and Upp Creeks, all of which are tributaries of Outlet Creek, a tributary of the Eel River. To avoid increasing the base flood elevation of the floodplain, the bypass design incorporates 1.2-mile viaducts consisting of two parallel elevated structures (one for each direction of traffic) spanning the floodplain (Figure 1-2c).

Because of funding constraints, the bypass will be constructed in two phases. Phase 1 entails construction of a functional interim facility consisting of a two-lane highway. These two lanes will run the entire length of the project limits and will serve as the southbound lanes in the ultimate configuration under Phase 2.

Phase 2 entails construction of the other two lanes—creating a full four-lane facility—when sufficient funding becomes available. The environmental study limits encompass the proposed full four-lane bypass. Right-of-way purchased for the bypass will satisfy the requirements of the full four-lane facility. This MMP addresses the mitigation needs for Phase 1 (two-lane highway) only. A separate mitigation plan will be approved prior to construction of Phase 2 of the Willits Bypass Project. USACE approval of this additional proposal will be required prior to the beginning of the work associated with Phase 2.

For the purpose of this MMP, *bypass* refers to the four-lane bypass alignment footprint, which comprises the area disturbed by construction activities and the footprint of completed structures. Parcels located *within* the bypass alignment footprint are referred to as *onsite mitigation area* throughout this document. Parcels located *outside* the bypass alignment footprint that are included in the project's compensatory mitigation package are referred to as *offsite mitigation parcels*. Because the bypass alignment footprint passes through several offsite mitigation parcels (Benbow, Brooke, Ford, Lusher, and Niesen), these locations are referred to in both onsite and offsite parcel discussions. Although the contractor may choose not to use the proposed fill material borrow site at Oil Well Hill, and the borrow site is not within the limits of the bypass alignment footprint, the site is considered part of the onsite parcels. All aquatic resources at the

Oil Well Hill parcel have been excluded from the borrow site area so there will be no impacts from this proposed work (Chapter 2, Figure 2-2).

Section 1.1.2 below discusses the proposed four-lane facility.

1.1.1 Design Revisions after Final Environmental Impact Statement/Final Environmental Impact Report

As part of the environmental review process, several project alternatives were developed, and Modified Alternative J1T was selected as the preferred alternative. Although this alternative was not identified specifically as an alternative in the draft environmental impact statement/draft environmental impact report (DEIS/DEIR), it evolved from the CWA Section 404(b)(1) analysis, which seeks to identify the least environmentally damaging practicable alternative (LEDPA). Modified Alternative J1T shares similar project design elements with other alternatives discussed in the DEIS/DEIR, such as the J1T and LT alternatives, but it further reduces environmental and community impacts.

Since publication of the final EIS/EIR (FEIS/FEIR) in December 2006, Modified Alternative J1T has undergone several design revisions. The primary reasons for the design revisions were: (1) to avoid or further reduce impacts on sensitive resources, including avoiding conflicts with the planned Willits Wastewater Treatment Plant (WWTP) expansion project; and (2) to accommodate phased construction of the bypass. Additional design refinements to avoid or minimize impacts on sensitive resources are discussed further in Section 1.2.

The design revisions to Modified Alternative J1T are minor but have important implications for minimizing impacts on sensitive resources. The project remains a four-lane highway bypass with several bridges spanning creeks and local roads, viaducts spanning a floodplain, and interchanges at either end of the bypass. However, as noted above, because of funding constraints, the bypass will be constructed in two phases.

A functional interim two-lane facility will be constructed initially; the remaining lanes will be constructed later, when adequate funding becomes available, to complete the four-lane facility. This phased approach necessitated design revisions, including modifying the Quail Meadows interchange at the north end of the bypass. Phasing the construction of the original Quail Meadows interchange proved geometrically complex and wasteful; therefore, the interchange was shifted approximately 1,200 feet north and redesigned as a two-lane interchange in Phase 1. A roundabout was added to the west side of the interchange to connect two ramps to local roads. One of the benefits of the project is that an existing box culvert under US 101 at Upp Creek can be removed to address existing fish passage issues. In addition, all crossings of Upp Creek, previously planned as box culverts, now will be clear-span bridges (Appendix F).

Relocating the Quail Meadows interchange moved the interchange ramps such that they no longer constrained vertical clearance over the railroad, so the profile for the bypass could be lowered. Additionally, the railroad agreed to temporarily reduce clearance during construction, so the profile could be lowered further. These profile reductions, along with the interchange relocation, decreased the overall footprint of the project.

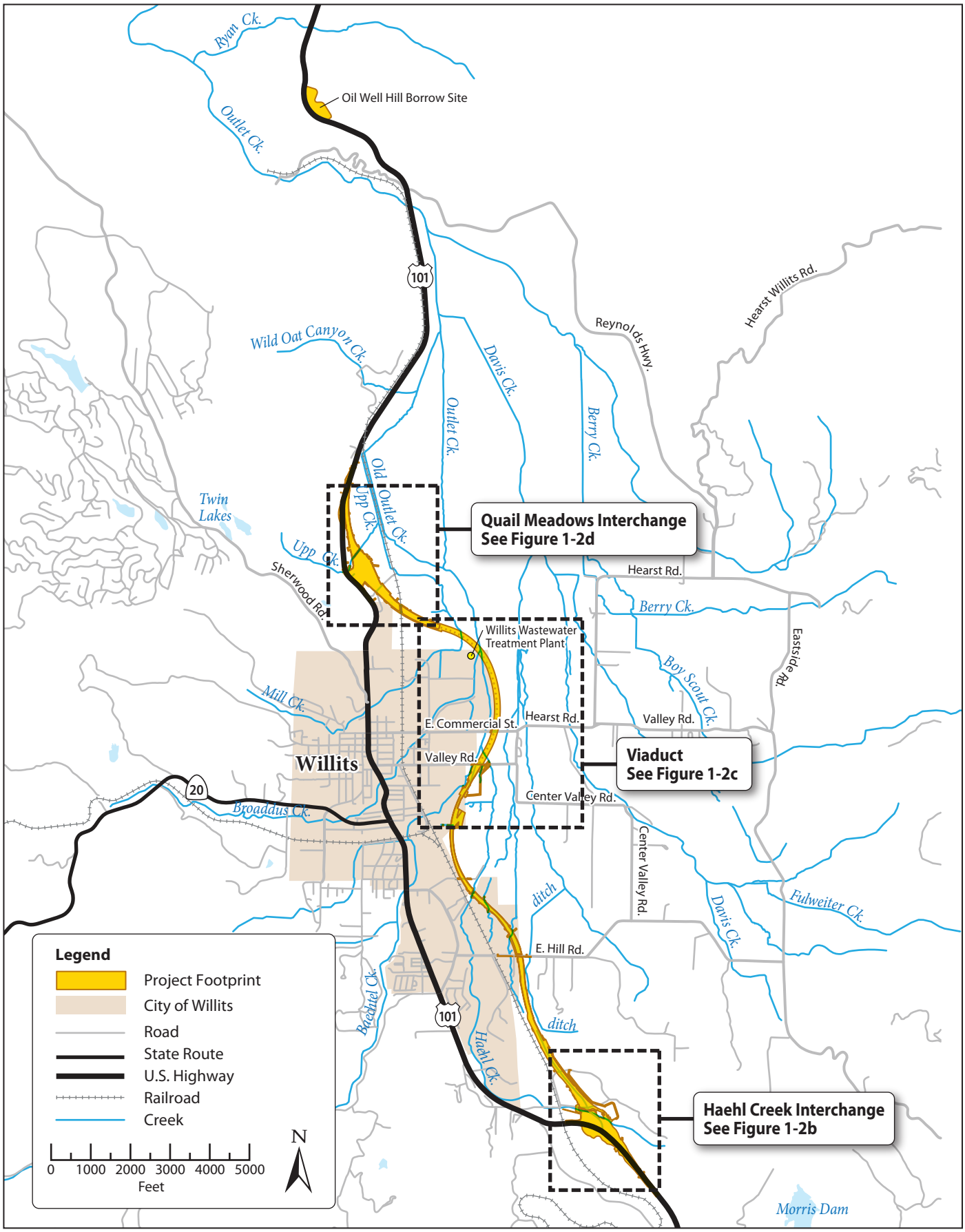

Figure 1-2a
Project Footprint—Overview Phase 1
Willits Bypass Project

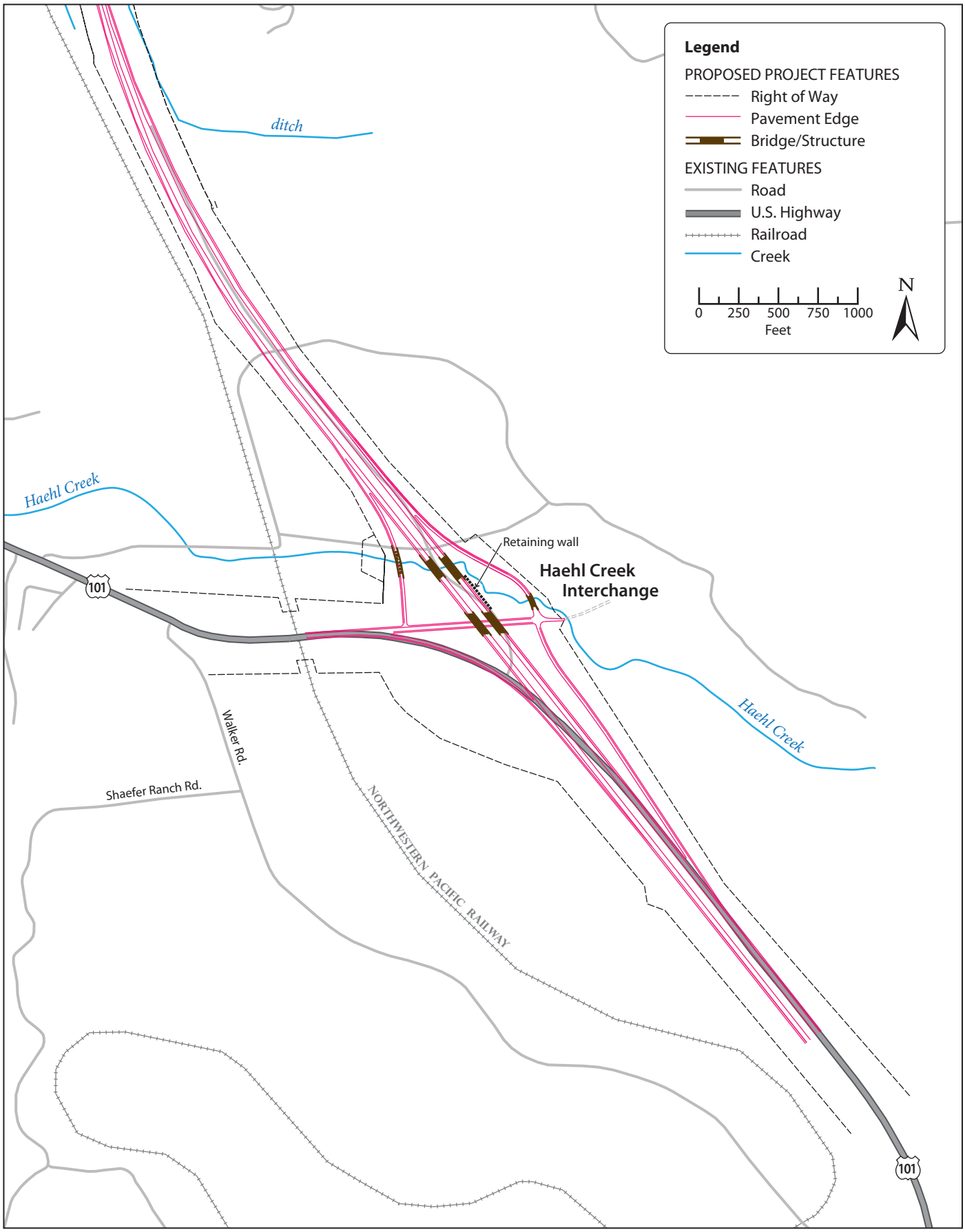

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Figure 1-2b
Southern End Project Features—Haehl Creek Interchange Phase 1
Willits Bypass Project

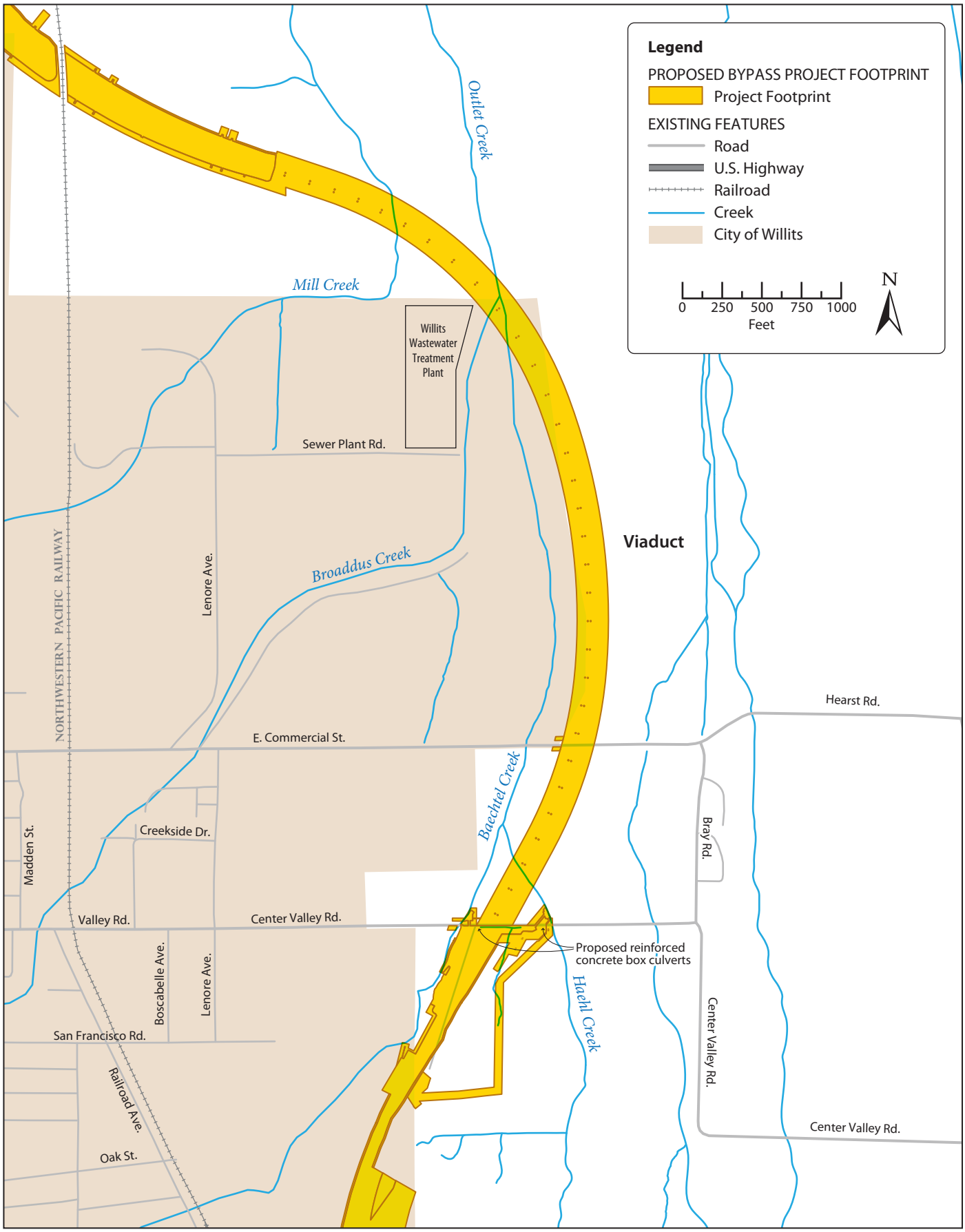


Figure 1-2c
Middle Project Footprint—Viaduct Phase 1
Willits Bypass Project

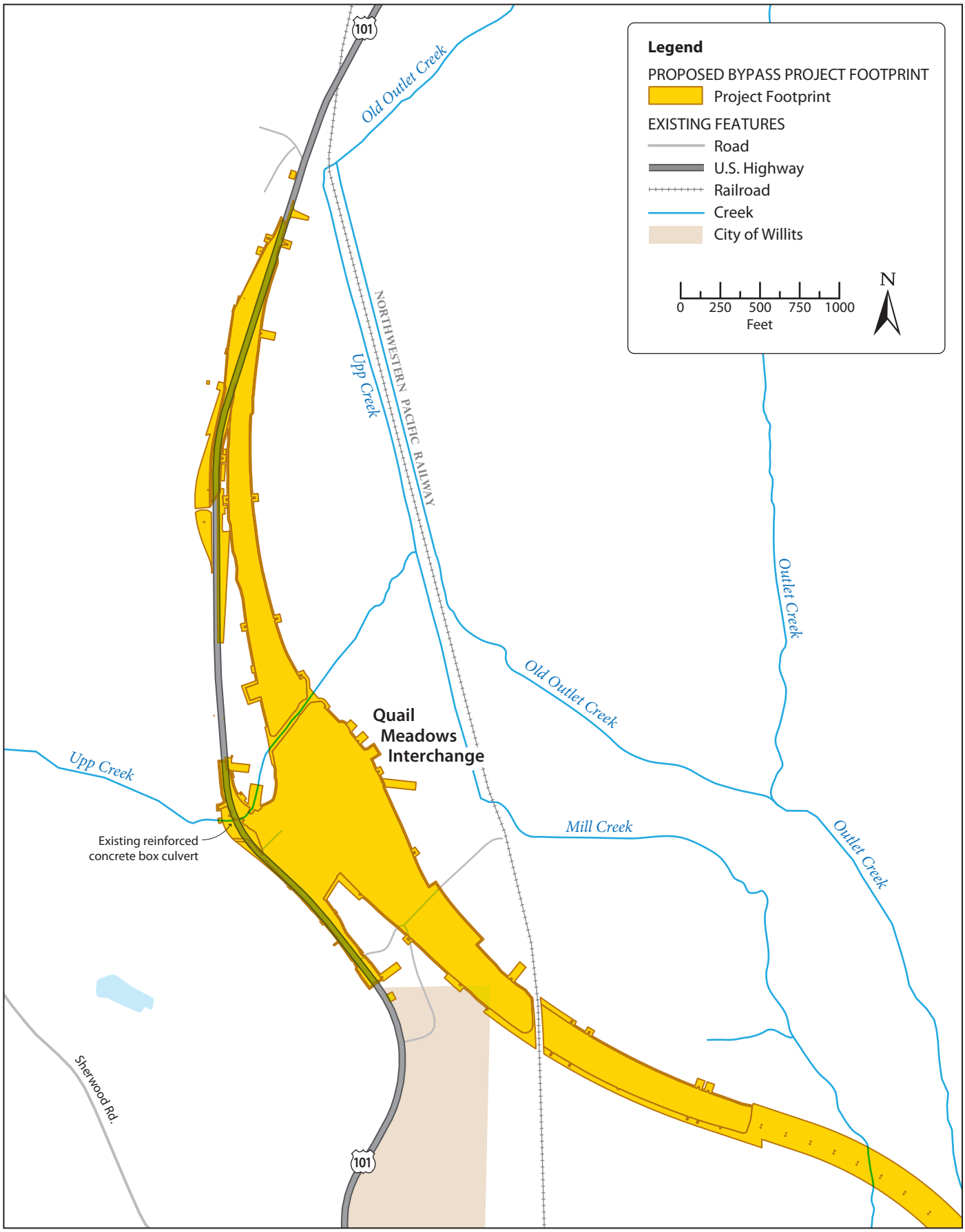


Figure 1-2d
North End Project Footprint—Quail Meadows Interchange Phase 1
Willits Bypass Project

1.1.2 Project Description

The following design elements will be incorporated into the project.

1.1.2.1 Roadway Design

The bypass is designed to accommodate the predicted interregional average annual daily traffic in 2028 at a level of service (LOS) of C or better. The bypass will be a four-lane highway with a 22-foot-wide median and barrier separating the northbound and southbound lanes. Each lane will be 12 feet wide. The inside shoulder width (nearest the median) will be 5 feet, and the outside shoulder width will be 10 feet. The highway sections will be designed for a maximum design speed of 68 miles per hour (mph) and will meet the purpose of providing at least LOS C. Where local roads will be improved or constructed, there will be two 12-foot lanes and shoulder widths meeting local design standards. The bypass alignment is shown in detail in Appendix B.

1.1.2.2 Interchanges

Two interchanges will be constructed for the bypass. The Haehl Creek interchange, at the south end of the bypass near Haehl Creek, will connect the existing US 101 south of Willits with the new facility (Figure 1-2b). The Quail Meadows interchange, near the north end of Little Lake Valley, will connect the new facility to the existing two-lane highway north of Willits (Figure 1-2d). The interchange ramps will be one lane.

1.1.2.3 Bridges and Other Structures

The bypass will traverse creeks, riparian corridors, streets, and railroad rights-of-way using 22 bridges, overcrossings, and viaducts and one retaining wall, as listed below and shown in Figures 1-2a to 1-2d:

- Six bridges in the Haehl Creek interchange area:
  - Northbound highway lanes separation with State Route (SR) 20
  - Southbound highway lanes separation with SR 20
  - Southbound off-ramp over Haehl Creek
  - Northbound on-ramp over Haehl Creek
  - Northbound highway lanes over Haehl Creek
  - Southbound highway lanes over Haehl Creek
- Two overcrossings at East Hill Road:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)
- Two clear-span bridges crossing the middle reach of Haehl Creek south of Shell Lane:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)

- One retaining wall on the west side of the southbound highway lanes just south of Center Valley Road
- Two viaducts spanning the 100-year floodplain:
  - Southbound (Phase 1)
  - Northbound (Phase 2)
- Two overcrossings of the railroad tracks in the Quail Meadows interchange area:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)
- Two overcrossings at the new connector road to the existing US 101 in the Quail Meadows interchange area:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)
- Six clear-span bridges crossing Upp Creek directly north of the Quail Meadows interchange:
  - Southbound highway lanes (Phase 1)
  - Northbound highway lanes (Phase 2)
  - Northbound on-ramp (Phase 1)
  - Northbound on-ramp (Phase 2)
  - Southbound off-ramp
  - Local intersection (roundabout)

1.1.2.4 Viaducts

The bypass alignment encroaches on the 100-year floodplain and includes two elevated structures, approximately 20 feet high, referred to as the *viaducts*. This design feature is intended to minimize floodplain and wetland impacts. The viaducts will be located in the central part of the bypass and will span Center Valley Road, the lower reach of Haehl Creek just upstream of the confluence with Baechtel Creek, East Commercial Street, Baechtel and Broaddus Creeks at the confluence with Outlet Creek, and Mill Creek (Figure 1-2c). The viaducts will span wetlands on two offsite mitigation parcels (Benbow parcels 007-010-04 and 007-020-03).

The approximately 6,000-foot-long viaducts will consist of separate northbound and southbound elevated superstructures, each approximately 42.6 feet wide. The edge-to-edge distance between the structures will be approximately 10 feet, and each generally will have at least 16.5 feet minimum clearance underneath.

1.1.2.5 Culverts

Two large reinforced concrete box (RCB) culverts and numerous smaller culverts will be built as part of the project. The RCB culverts will cross under Center Valley Road, near Shuster's

Trucking, and will mitigate floodplain impacts associated with the roadway embankment south of Center Valley Road. The two culverts crossing Center Valley Road will be concrete boxes and will use turf reinforcement mats (TRMs) to minimize the use of rock slope protection (RSP) at the inlets and outlets.

1.1.2.6 Retaining Walls

One concrete retaining wall will be constructed just before the south end of the viaducts near Baechtel Creek. The retaining wall will be built to avoid the potential for the roadway embankment to be undermined by Baechtel Creek.

1.1.2.7 Excavation, Embankment, and Imported Borrow Material

The estimated embankment (i.e., fill) requirement for Phase 1 is approximately 1.4 million cubic yards. Because all soil that is excavated onsite will be reused as embankment, no disposal sites will be required for the bypass. From just north of the Haehl Creek interchange to the south abutment of the viaducts, and from the north abutment of the viaducts to the terminus of the bypass, the alignment is on embankment. Cut slopes generally will vary between 1:2 (vertical: horizontal) and 1:2.5. Fill slopes will vary between 1:2 and 1:4.

Because Modified Alternative J1T will be constructed largely on embankment, it will require imported borrow material in addition to material excavated onsite. The construction contractor will have the option to determine whether the source of material for earthwork fill will be the Caltrans-designated borrow site at Oil Well Hill, a commercial borrow site, or another site. Standard best management practices (BMPs) will be used to control the potential spread of invasive plants to and from the borrow site.

1.1.2.8 Fish Passage

Current fish passage opportunities at Haehl and Upp Creeks are constrained or absent as the result of the existing stream channel alignment or presence of artificial barriers (e.g., culverts) within the Caltrans right-of-way. Therefore, the project design incorporates improvements at these stream crossing locations to facilitate fish passage and improve instream habitat. Fish passage design elements were developed in consultation with the California Department of Fish and Game (CDFG) and National Marine Fisheries Service (NMFS).

Stabilization of both creek channels that pass through the interchange areas (the Haehl Creek interchange on upper Haehl Creek and the Quail Meadows interchange on Upp Creek) will consist of grade control structures at appropriate heights and intervals for the distance necessary to stabilize the natural stream gradient. Fish passage design elements comply with guidelines established by CDFG and NMFS. Additional details of these fish passage design elements are included in Section 3.3.1 and Appendix F.

1.1.2.9 Landscaping, Lighting, and Fencing

Permanently affected areas such as the cut-and-fill slopes adjacent to the roadway and along interchange ramps, as well as the median between the inside roadway shoulders, will be

revegetated with native plants appropriate for Little Lake Valley. In compliance with Caltrans design standards, no trees will be planted within the clear recovery zone (CRZ) where errant vehicles could hit them. Only shrubs and herbaceous native species may be planted in these areas to prevent abrupt slowing, redirection, or launching of stray vehicles.

Highway lighting will be provided at the Haehl Creek and Quail Meadows interchanges. No lighting will be provided along the viaducts.

Fencing will be erected along the bypass right-of-way where appropriate. Right-of-way fencing is not expected to be installed at creek crossings or along the viaducts.

1.1.2.10 Streambank Stabilization

To prevent bank erosion and damage to the bypass, RSP will be required along short lengths of creek banks. The use of RSP will be minimized through the substitution of TRMs in appropriate locations where water velocities would not result in significant bank scour.

At locations where Haehl and Upp Creeks cross the project right-of-way, the stream channel will be designed to improve fish passage in accordance with guidelines established by NMFS and CDFG.

1.2 Design Refinements to Avoid and Minimize Impacts

Caltrans has developed a bypass alignment that avoids or minimizes impacts on aquatic resources, including wetlands and other waters of the United States. Following public circulation of the DEIS/DEIR in May 2002, a final alternatives analysis was prepared (California Department of Transportation 2005b), which identified Modified Alternative J1T as the LEDPA for the project. In accordance with CWA Section 404(b)(1) guidelines, USACE and EPA issued letters of concurrence in 2005 that Modified Alternative J1T constitutes the LEDPA and that the other alternatives considered do not meet the LEDPA criterion because of their overall environmental impacts.

Since adoption of the FEIS/FEIR and record of decision, several design elements/refinements have been incorporated into the project that further reduce the overall project footprint and impact area, avoiding or minimizing effects on aquatic resources. These design elements are listed below.

- Reduction in the roadway median width to reduce the bypass alignment footprint.
- Incorporation of steeper-than-standard embankment slopes at some locations, with additional erosion control measures to minimize the bypass alignment footprint.
- Extension of the length of the floodway viaducts to reduce the amount of fill in wetlands.
- Reduction in the height of the railroad overcrossing to reduce the footprint of the embankment.

- Shift in the alignment to avoid the WWTP expansion project and thereby avoid wetland impacts that would have been necessary to relocate the WWTP aeration ponds.
- Installation of clear-span bridges, rather than culverts, at the Haehl Creek interchange and the Quail Meadows interchange across Upp Creek to avoid permanent fill in other waters of the United States, decrease future maintenance-related impacts, and provide better passage for fish and wildlife.
- Lowering of profile near Quail Meadows overcrossing.
- Relocation of the Quail Meadows interchange to reduce the bypass alignment footprint.
- Elimination of the Center Valley Road interchanges from the project, thereby reducing the bypass alignment footprint.
- Removal of fish barrier culverts at Haehl and Upp Creeks.

These design elements have further reduced the extent of permanent impacts on aquatic resources by reducing the bypass alignment footprint. As discussed in Chapter 2, additional resource-specific minimization measures have been or will be employed before and during project construction to further reduce impacts on aquatic resources.

1.3 Developing Mitigation and Monitoring Proposal

Caltrans has developed this MMP to offset the unavoidable project impacts on wetlands and other waters of the United States. Proposed compensatory mitigation includes establishment, re-establishment, and rehabilitation of wetlands and other waters of the United States. Compensatory mitigation will increase the functions of wetlands and other waters of the United States and will be self-sustaining in perpetuity. These mitigation measure terms are defined in Chapter 2. Caltrans habitat restoration experts assessed each available parcel using the following criteria.

- Feasibility of acquisition (i.e., which property owners would be willing sellers).
- Inventory of habitats present or historically present (i.e., opportunities for establishment, rehabilitation, or re-establishment).
- Capacity of each parcel to achieve the performance standards.

Caltrans reviewed historical information to facilitate understanding of lost ecological functions that feasibly could be regained and, in coordination with USACE, evaluated the ongoing natural vegetation succession to identify which mitigation efforts would result in a sustainable natural ecosystem.

Based on a review of historical aerial photographs and other information, it was determined that the entire Little Lake Valley was generally wetter than it is today. Consequently, the valley would have supported extensive riparian forests, meandering streams, and wide floodplains fringed with marshes and wet meadows. Drier areas in the valley would have supported extensive oak savanna and grassland. Dense forests of mixed oaks and conifers would have been

present on the surrounding hills. This MMP seeks to compensate for the project's impacts by maximizing the wetland functions that the current hydrologic and landscape conditions can support by eliminating agricultural management that degrades the wetland functions in Little Lake Valley. This will be achieved through establishing, rehabilitating, and re-establishing wetlands and other waters of the United States. Further details of the mitigation are presented in Section 2.4.

1.4 Agency Coordination in Development of Mitigation Vision

Development of this MMP has been a collaborative effort between Caltrans and USACE. Numerous meetings and onsite field reviews have been held with Caltrans and USACE staff to develop this MMP. This document was preceded by the following studies.

- Wetlands mitigation feasibility study (California Department of Transportation 2005b).
- Conceptual mitigation plan (California Department of Transportation 2006).
- Mitigation parcels report (California Department of Transportation 2007).
- Feasibility study of additional parcels inside and outside Little Lake Valley (ICF Jones & Stokes 2009a).
- Willits Bypass Final Mitigation and Monitoring Proposal (California Department of Transportation 2010).
- Wetland successional assessment (U.S. Army Corps of Engineers 2011).
- Extensive baseline surveys for hydrology, geomorphology, surface water quality, and vegetation (California Department of Transportation 2011).

These studies focused on the identification of suitable/available mitigation properties in Little Lake Valley, and development of the general extent and nature of mitigation strategies to offset temporary and permanent impacts. This MMP provides the temporary and permanent impact quantities for the bypass and detailed information on how the mitigation effort will be implemented to help offset the project's impacts on wetlands and other waters of the U.S. The Mendocino County Resource Conservation District (MCRCD) is the intended partner in implementing this MMP and will act as the long-term manager, but Caltrans may need other entities to perform specific tasks related to implementation and long-term management. The MCRCD has provided Caltrans with a letter of intent confirming their commitment to fill these roles. Caltrans, however, will remain the responsible entity to ensure compliance in implementing this MMP and meeting the required performance standards.

Chapter 2 Objectives

The overall goal of this MMP is to compensate for unavoidable permanent and temporary impacts on wetlands and other waters of the United States due to project construction by establishing wetlands, by improving the functions and services of existing wetlands and other waters on the offsite mitigation properties, and by re-establishing habitat functions and services on wetlands and other waters on the onsite parcels. The establishment and re-establishment mitigation together with the proposed rehabilitation mitigation of existing wetland and other waters will meet the policy of no net loss of wetlands and other waters functions and services in Little Lake Valley. Existing wetlands have relatively intact wetland hydrology and hydric soils with managed hydrophytic plant communities. Increases in aquatic functions will be small, requiring large acreages to compensate for the loss of functions associated with the net acreage loss. Therefore, compensatory mitigation will be accomplished through a combination of establishment, re-establishment, and rehabilitation. These terms are identified and defined in USACE's April 2008 Compensatory Mitigation for Losses of Aquatic Resources Final Rule (73 Federal Register [FR] 19594–19705; 2008 Mitigation Rule). Specific definitions are provided below.

- *Establishment* means manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. It results in a gain in aquatic resource area and functions.
- *Re-establishment* means manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historical functions to a former aquatic resource. It results in rebuilding a former aquatic resource and in a gain in aquatic resource area and functions.
- *Rehabilitation* means manipulation of the physical, chemical, or biological characteristics of a site with the goal of rehabilitating natural or historical functions to a degraded aquatic resource. It results in a gain in aquatic resource function, but not a gain in aquatic area.

USACE has determined that the jurisdictional wetlands presented in this MMP do not meet its definition for preservation outlined in the 2008 Mitigation Rule and therefore will not grant compensatory credit for preservation.

This chapter discusses the mitigation objectives and provides information on waters of the United States and other affected sensitive biological resources. Information also is presented on various components of the mitigation plan, such as impact minimization measures; establishment, re-establishment, and rehabilitation efforts.

2.1 Sensitive Biological Resources in the Bypass Alignment Footprint

This MMP presents compensatory mitigation for permanent and temporary impacts on jurisdictional wetlands and other waters of the United States located within the Phase I bypass alignment footprint. These waters are described below. Caltrans also is obligated to satisfy state agency mitigation requirements. Some of these requirements involve aquatic resources or species that rely on aquatic resources that can geographically overlap USACE jurisdictional areas. To provide a more complete picture of these interrelated resources, and because this overlap played a part in developing mitigation for the USACE wetland and other waters, this MMP discusses these other sensitive biological resources throughout the document. These resources include:

- **Federally listed fish:** Southern Oregon/Northern California Coast (SONCC) coho salmon, California coastal Chinook salmon, and northern California steelhead.
- **Riparian habitat:** In some areas, this encompasses protected fishery resources.
- **State-listed plants:** North Coast semaphore grass and Baker's meadowfoam.

These resources also occur on the onsite and offsite mitigation properties. Descriptions of the existing conditions of these resources on the offsite mitigation properties are provided in Chapter 5. Scientific names of plants and animal species mentioned in this MMP are included in Appendix A.

2.1.1 Jurisdictional Wetlands and Other Waters of the United States

For the purpose of this document, *wetlands* refers to all aquatic resources that were found to satisfy the definition outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys and Coast Region* (U.S. Army Corps of Engineers 2008b). *Other waters* refers to all other jurisdictional drainages and water bodies that do not fall under the wetlands classification. Other waters discussed in this document are creeks or streams, ponds, and drainage ditches. USACE has verified jurisdictional wetland and other waters delineations for the bypass alignment footprint and offsite mitigation properties. Wetlands and other waters in the bypass alignment footprint are shown on figures in Appendix B; wetlands and other waters on the offsite mitigation properties are shown on figures in Appendix C.

2.1.1.1 Jurisdictional Wetlands

USACE requires that wetlands be categorized using the Cowardin classification system (Cowardin et al. 1979). Table 2-1 shows the Cowardin system categories and corresponding riparian vegetation communities, and these wetland habitats are described in Chapter 5.

Table 2-1. Wetland Habitat Types in the Bypass Alignment Footprint

Vegetation Type	Wetland Habitat Type; *Cowardin Classification*
Riparian	Willow riparian scrub; *Palustrine scrub-shrub broad-leaved deciduous*
	Mixed riparian scrub; *Palustrine scrub-shrub broad-leaved deciduous*
	Mixed riparian woodland*; Palustrine forested broad-leaved deciduous*
	Oregon ash riparian woodland; *Palustrine forested broad-leaved deciduous*
	Valley oak riparian woodland; *Palustrine forested broad-leaved deciduous*
Marsh	Mixed marsh; *Palustrine emergent persistent*
	Tule marsh; *Palustrine emergent persistent*
Wet meadow	Wet meadow; *Palustrine emergent non-persistent*
Swale	Wetland swale; *Palustrine emergent non-persistent*
Vernal pool	Vernal pool; *Palustrine emergent non-persistent*

2.1.1.2 Other Waters of the United States

The project is in the Southern subbasin of the Outlet Creek Basin. The Outlet Creek Basin complex is one of the headwater tributaries of the Eel River, the third-largest river system in California. The five major streams intersecting the bypass alignment footprint are Haehl, Baechtel, Broaddus, Mill, and Upp Creeks. Several smaller jurisdictional streams are present in the southern end of the bypass alignment footprint.

Except for Upp Creek, the streams that traverse the bypass alignment footprint are shaded by mature riparian vegetation. These streams provide fish habitat and support juvenile and adult salmonids. Instream habitat consists of pools, riffles, and shallow runs and glides. Streambanks are typically steep and channels incised.

All five streams within the bypass alignment footprint and the lower parts of their tributaries provide important habitat for adult and juvenile anadromous salmonids migrating to and from Outlet Creek. These streams are considered essential fish habitat (EFH) for coho and Chinook salmon. Some spawning and seasonal rearing may occur in some reaches of these creeks in the bypass alignment footprint (Jones & Stokes Associates 1997; Harris pers. comm.). California roach and introduced warmwater species (e.g., sunfish, largemouth bass) are predominant during reduced flow periods in summer and early fall. The need to improve water quality and general stream habitat conditions exists at several locations. The general conditions of the five streams are discussed in more detail in Chapter 5.

2.1.2 Other Sensitive Biological Resources

2.1.2.1 Protected Fisheries and Riparian Habitats

Hydrologic alterations, fish barriers, increased fine sediment load, nonnative invasive perennial grass management for cattle grazing, crop production and other agricultural uses, and the introduction of invasive species have negatively affected the wetland functions and services of riparian corridors throughout Little Lake Valley.

Three salmonid species listed as threatened occur in Little Lake Valley: SONCC coho salmon, California coastal Chinook salmon, and northern California steelhead. All three species have similar life histories and habitat requirements and therefore are discussed together as *anadromous fish* or *salmonids*. Based on CDFG and NMFS consultation, five tributary streams of Outlet Creek (Haehl, Baechtel, Broaddus, Mill, and Upp Creeks) and their adjacent riparian zones within the bypass alignment footprint are designated critical habitat for anadromous fish. For the purpose of this project, the riparian zones along these anadromous fish streams and their tributaries have been categorized based on their relationship to designated critical habitat areas for listed anadromous fish. Consequently, impacts on anadromous fish and mitigation for these impacts are discussed in the context of the protected fisheries and riparian habitat.

- *Protected fisheries* are riparian habitats that occur along streams where anadromous fish are known to occur (Haehl, Baechtel, Broaddus, Mill, and Upp Creeks—all tributaries of Outlet Creek) (Figure 1-2a). These corridors provide designated critical habitat for anadromous fish. The health of these corridors has an immediate, direct effect on anadromous fish populations. The zone for protected fisheries extends to riparian vegetation 100 feet (ft) from the ordinary high water mark (OHWM) on each side of the stream.
- *Riparian habitat* refers to areas of riparian habitat not directly associated with anadromous fish–bearing streams. These areas are found mostly along other waters that are tributary to streams supporting anadromous fish (protected fisheries) and wetlands.

2.1.2.2 State-Listed Plant Species

North Coast semaphore grass and Baker’s meadowfoam are state-listed plants—generally called *listed plants* in this MMP—that occur in the bypass alignment footprint and offsite mitigation parcels, and are listed in Table 2-2. The plant status designated by the California Native Plant Society (CNPS) is identified in Table 2-2. No federally listed plants are known to occur in the bypass alignment footprint or on the offsite mitigation properties. The habitat requirements and locations for North Coast semaphore grass and Baker’s meadowfoam in the project area and on the offsite mitigation properties are described in Chapter 5.

Table 2-2. Listed Plants in the Project Vicinity

Common and Scientific Name	Status		Natural Communities	Blooming Period
	State[1]	CNPS[2]		
North Coast semaphore grass (*Pleuropogon hooverianus*)	T	1B.1	Broadleaf upland forest; meadows and seeps; North Coast coniferous forest areas; mesic openings and edges	April–June
Baker's meadowfoam (*Limnanthes bakeri*)	R	1B.1	Meadows and seeps; marshes and swamps (freshwater); valley and foothill grassland (vernally mesic); vernal pools	April–May

[1] California state status codes:

T = Listed as threatened under the California Endangered Species Act (CESA). Species likely to become endangered in the foreseeable future.

R = Listed as rare under the CESA. Species that, although not presently threatened with extinction, may become endangered in the foreseeable future. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.

[2] CNPS status codes:

1B.1 = Rare, threatened, or endangered in California and elsewhere; seriously threatened in California (high degree/immediacy of threat).

2.2 Impacts on Waters of the United States and Other Sensitive Biological Resources in the Bypass Alignment Footprint

Construction of the project will result in temporary and permanent impacts on wetlands and other waters of the United States (Table 2-3). These impacts will result in the loss of aquatic functions and services associated with those features. Impacts on aquatic functions and services will comprise loss of physical, chemical, and biologic functions, including flood storage, flood desynchronization, groundwater recharge, base flow, sediment removal and sequestration, transformation of pollutants, food chain support, and wildlife habitat and botanical resources.

Construction of the project also will result in temporary and permanent impacts on anadromous fish critical habitat, North Coast semaphore grass, Baker’s meadowfoam, and riparian vegetation; these impacts will be described in a separate MMP developed by Caltrans to address the mitigation requirements of CDFG and the North Coast Regional Water Quality Control Board (RWB).

Determination of temporary and permanent impacts on wetlands and other waters of the United States were calculated as shown below. Temporary impacts are areas that are filled temporarily during construction.

- All areas under new roadways and associated embankments were considered permanently affected. Temporary impacts were calculated as the area from the roadway embankment catchpoint (i.e., the toe of the embankment) to 3 meters beyond and any areas around new drainages that will be temporarily disturbed.
- Areas under newly placed utility poles were considered permanent impacts, and impacts from trenching to the new utility pole locations were considered temporary.
- The construction areas along the viaducts extend out 100 ft east and 55 ft west of the viaducts. Within the construction area, the areas where pier footings will be placed were calculated as permanent. The remaining areas were calculated as temporary impacts.

- A portion of the Rutledge pond will be filled. This area was considered a permanent impact. In addition, the pond will be reconfigured to allow for the same water retention as is currently afforded. The area occupied by the reconfigured pond was considered a permanent impact.

Table 2-3 presents Phase 1 impact acreages for wetlands (by type) and other waters.

Table 2-3. Phase 1 Project Impacts on Wetlands (by Type) and Other Waters

Wetland Type/Other Waters	Project Impacts (acres)[1]		
	Temporary	Permanent	Total
Marsh	1.00	6.10	**7.10**
Riparian Wetland	2.32	2.47	**4.79**
Swale	0.07	0.41	**0.48**
Vernal Pool	0.05	0.15	**0.20**
Wet Meadow	17.08	31.34	**48.42**
Total Wetlands	**20.52**	**40.47**	**60.99**
Other Waters	2.37	2.29	**4.66**
Total All Waters	**22.89**	**42.76**	**65.65**

Note:
[1] Numbers rounded for presentation, totals in table reflect sum of nonrounded numbers.

Phase 1 of the project is expected to result in 40.47 acres of permanent and 20.52 acres of temporary impacts on jurisdictional wetlands. Phase 1 is also expected to result in 2.29 acres of permanent and 2.37 acres of temporary impacts on jurisdictional other waters.

The ultimate four-lane project will result in a total of 52.97 acres of permanent impacts and 27.95 acres of temporary impacts on wetlands. It also will result in a total of 2.69 acres of permanent impacts and 3.12 acres of temporary impacts on jurisdictional other waters.

2.3 Determination of Required Wetland Mitigation Ratios

The objectives of this MMP are to offset unavoidable impacts on wetlands and other waters of the United States by replacing and increasing wetland functions primarily through the establishment and rehabilitation of wetlands that reflect fully functional successional unmanaged wetlands with respect to current circumstances in Little Lake Valley and will be self-sustaining in perpetuity (33 CFR 332.7[b]). Self-sustaining wetlands will have persistent functions and services, with little to no human intervention or management (e.g., water pumping, dredging, grazing or other means of vegetative management).

In general, the USACE San Francisco District requires a minimum mitigation ratio of 1:1, but typically increases mitigation requirements based on the wetland/functional components of the impact areas or the proposed compensatory mitigation areas. Impacts and compensatory mitigation are usually measured by surface area. Factors considered in assigning ratios include temporal delays between impacts and target mitigation conditions, speculative consideration of proposed mitigation, change in wetland types, loss of identified principal wetland functions not being replaced at compensatory mitigation sites, wetland-consuming mitigation proposals, rare

or regionally significant wetland types, and site- or project-specific issues. The absence of a practical or institutionally recommended functional assessment process requires USACE to rely on best professional judgment. Typically, determinations are based on rendered field observations at the impact and mitigation sites.

To determine what was needed for no net loss of functions and services of waters of the United States, USACE undertook a direct assessment (USACE Phase 1 Impact Assessment) of the permanent and temporary impacts on waters of the United States for Phase 1 of the project. This assessment was used to assign preliminary mitigation ratios to impacts based on the current functions and services of the affected wetlands.

Subsequent to the USACE Phase 1 Impact Assessment, USACE and Caltrans held several meetings to discuss the wetland mitigation approach and associated mitigation ratios. The result of these meetings was the basis for the mitigation action approach and wetland mitigation crediting system. A description of the wetland mitigation crediting system is provided in Chapter 6.

2.3.1 U.S. Army Corps of Engineers Phase 1 Impact Assessment

In March 2011, USACE assessed the current condition of waters and wetlands affected by Phase 1 of the project. This information was used to assign mitigation ratios.

The USACE impact assessment resulted in the grouping of permanent impact areas into four units based on having similar wetland characteristics and conditions. Temporary impact areas were grouped into four units based on wetland type and proposed impact. Each group's range of wetland qualities was captured in the site characteristics for most of the impacts.

The permanent and temporary impact groupings and recommended mitigation ratios are summarized below and in Table 2-4.

- **Permanent Impact Group 1—Palustrine Emergent Wetland Nonagricultural +/- Disturbed:** This group included a small number of emergent wetlands at the south end of the project. Most were previously affected by disturbances associated with grading from roads, runoff from roads, or drainage impediments from earth movement. Total area for this group is 1.26 acres, and a 1:1 mitigation ratio was recommended.
- **Permanent Impact Group 2—Palustrine Emergent Wetland Agricultural Managed:** This group included most of the permanent impacts and was scattered across the length of the project. Wetlands in this group had various degrees of disturbance, from horse and cattle pasture to hayed/grazed fields. In general, wetland soil and hydrology were intact for the current circumstance for the unit's landscape position. Functions associated with the wetland hydrology and hydric soils would be lost for these areas. Areas proposed for enhancement have similar soil types, wetland hydrology, and plant communities. Total area for this group is 31.03 acres, and a mitigation ratio of 1.25:1 was recommended.
- **Permanent Impact Group 3—Palustrine Emergent Wetland Fallow:** This group included mostly abandoned agricultural lands and prolonged ponded areas that have

succeeded to perennial marsh. Wetlands in this group are fully developed for wetland criteria in their landscape position. Proposed enhancement areas would need to undergo prolonged plant succession or aggressive planting to replace developed plant communities. Total area for this group is 5.84 acres, and a mitigation ratio of 3:1 was recommended.

- **Permanent Impact Group 4—Palustrine Forested Wetland Fallow and Riparian:** This group included a small number of wooded, abandoned agricultural fields and areas of wetland woody vegetation removal at perennial stream crossings. Wetlands in this group are fully developed for wetland criteria in their landscape position. The wetland riparian community provides aquatic functions unique to its landscape position. Proposed enhancement areas would need to undergo prolonged plant succession or aggressive planting to replace developed plant communities. Total area for this group is 2.33 acres, and a mitigation ratio of 3:1 was recommended.
- **Temporary Impact Group 2—Palustrine Emergent Wetland Fill:** This group included large areas associated mostly with the edges of the actual fill footprint or with the viaducts. Impacts on the wetlands in this group are understood to be available to contractors for the duration of the project and may include placement of fill, stockpiling materials, trenching for utilities, removing vegetation, and other activities that would affect the character of the wetlands. Because of the uncertain impacts and duration of work in wetlands associated with this group, compensatory mitigation will be required. Wetland areas will be returned to their original topographic and soil condition after project completion as a special condition of the USACE permit. Long-term impacts on some plant communities under the viaducts may occur because of shading and vegetation management associated with the road. Total area for this group is 18.17 acres, and a mitigation ratio of 1:1 was recommended.
- **Temporary Impact Group 4—Palustrine Forested Wetland Fill:** This group included areas of woody vegetation associated mostly with perennial or intermittent streams. Impacts on the wetlands in this group are understood to be available to contractors for the duration of the project and may include placement of fill, stockpiling materials, removing vegetation, and other activities that would affect the character of the wetlands. Because of the uncertain impacts and duration of work in wetlands associated with this group, compensatory mitigation will be required. Wetland areas will be returned to their original topographic and soil condition after project completion as a special condition of the USACE permit. Some permanent impacts on vegetation may occur because of vegetation management associated with the road. Total area for this group is 2.32 acres, and a mitigation ratio of 2:1 was recommended.

There are a number of linear units generally outside the bypass construction footprint. These palustrine emergent and forested wetland areas are available to the contractors during construction for vehicle access during the dry season. These areas do not qualify as fill in a wetland and are not included in the sum of the temporary impacts; they require no compensatory mitigation. Wetland areas will be monitored to confirm that they are not affected and that they are in their original condition after project completion.

2.3.2 Phase 1 Impact Assessment—Additional Information

Further clarification of project impacts has been provided by Caltrans subsequent to the USACE impact assessment. This information includes clarification on the level of temporary disturbance from utility relocations. In addition, USACE and Caltrans have been in discussion regarding the final compensation ratio for temporary impacts. USACE has requested further clarification of the projects' temporary impacts. The following information provides a more complete review of the temporarily affected areas and their mitigation than what was previously available to USACE at the time of their assessment of required credits.

- Baseline information for the temporary impact areas is available in Sections 5.1 and 5.2. A wetland delineation prepared for the bypass impact area provides more information on existing vegetation, hydrology, and soils. In addition, inundation mapping for both impact sites and mitigation areas was made available to USACE subsequent to the completion of their impact assessment.
- Temporary impacts resulting from the project will be fully re-established on-site. The contractor will be required to restore temporarily affected areas to the currently existing grade and elevation (original ground) as marked on project plans. Project features such as culverts and the floodplain viaducts will perpetuate existing hydrology. Performance standards in Chapter 9 require the re-establishment of wetland vegetation and hydrology.
- Restoration plans for the re-establishment of temporary impacts are available in Appendix D.
- Areas within the Caltrans right-of-way will be maintained in accordance with the Caltrans Maintenance Manual. Water quality is subject to permitting requirements of the State Water Resources Control Board and Regional Water Quality Control Boards. Any future impacts on resources remaining in the right-of-way covered by the CWA are subject to further permitting requirements.

Table 2-4. Summary of USACE-Determined Mitigation Ratios

Impact Group	Impacts (acres)	Mitigation Ratio	Required Mitigation (acres)
Permanent Group 1—Palustrine Emergent Wetland Non-Agricultural	1.262	1:1	1.262
Permanent Group 2—Palustrine Emergent Wetland Agricultural Managed	31.034	1.25:1	38.793
Permanent Group 3—Palustrine Emergent Wetland Fallow	5.844	3:1	17.532
Permanent Group 4—Palustrine Forested Wetland Fallow and Riparian	2.328	3:1	6.984
Subtotal	**40.468**	**–**	**64.571**
Temporary Group 2—Palustrine Emergent Wetland Fill	18.175	1:1	18.175
Temporary Group 4—Palustrine Forested Wetland Fill	2.315	2:1	4.63
Subtotal	**20.490**	**–**	**22.805**
Total	**60.958**	**–**	**87.376**

2.4 Functions and Services of Wetlands

Wetland functions and services were considered in developing the mitigation objectives and strategies/actions. *Wetland functions* are the processes by which the normal physical and biological properties of wetlands are supported and maintained (Brinson 1993; Smith et al. 1995). Not all wetlands perform the same functions or levels of functions; rather, these vary with wetland category, size, proximity to other wetlands, type and degree of previous and current disturbances, and adjacent land uses. In general, *wetland services* are benefits that wetland functions provide to human society, such as flood protection, maintenance of water quality, and recreation (Mitsch and Gosselink 2007) and societal value. Wetlands in the bypass alignment footprint and vicinity perform functions in three basic categories: hydrology functions, water quality and related functions, and flora and fauna habitat support.

Farming and urban development have resulted in major changes to the landscape of Little Lake Valley. Past and current land use has reduced the areal extent and degraded the functional capacity of wetlands and streams (other waters) that once covered most of Little Lake Valley. These wetlands and streams once provided high-function fish, wildlife, and plant habitat long into summer. These wetland and stream complexes allowed anadromous fish to feed and migrate through the valley into foothill spawning areas. Wetlands served as a natural filter to retain fine sediment carried into the valley by numerous streams. They also recharged groundwater aquifers. The extensive modern-day reduction and degradation of wetlands throughout the valley have severely affected the environmental quality of the Outlet Creek Basin.

The aquatic resources described above and other biological resources described in Chapter 5 are threatened by current land use practices, including intensive grazing and haying, vegetation management to increase or retain pastureland, cattle access to streambeds and streambanks, and water diversions for irrigation and draining wetlands. Not only do these practices negatively affect aquatic resources in Little Lake Valley, but they also affect downstream water quality and habitat for aquatic species. These practices degrade wetlands, diminishing their functionality in absorbing nutrients and sediments from the surrounding uplands. These practices also limit the capacity of the streams and associated riparian habitat in providing important dispersal corridors to areas up- and downstream of Little Lake Valley and in providing breeding and foraging habitat for fish and wildlife, including anadromous fish.

2.4.1 Hydrology Functions

Wetland hydrology comprises “all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season” (Environmental Laboratory 1987). Wetland hydrology provides the basis for all wetland functions. Wetlands in the project vicinity carry out three general hydrologic functions:

- Groundwater recharge.
- Groundwater discharge.
- Floodflow alteration.

2.4.1.1 Groundwater Recharge

Groundwater recharge is the process in which surface flows are stored for a period sufficient for water to percolate into the soil or groundwater table. Groundwater recharge helps maintain the wetland hydrology of wet meadows. In the project vicinity, the potential for groundwater recharge is generally low. The terrain is relatively flat, but numerous artificial drainages and swales convey surface runoff into streams. Mixed marsh, which is found in internally drained basins and low-lying troughs in the northern portion of Little Lake Valley, has the highest potential for groundwater recharge. Vernal pools also have basins, but the subsurface restrictive layer that causes inundation prevents percolation.

2.4.1.2 Groundwater Discharge

Groundwater discharge occurs where the groundwater table intercepts the soil surface. It is important for maintaining stream flows during summer, as well as maintaining seeps, springs, and wetlands that depend on a shallow groundwater table. In the project vicinity, the potential for groundwater discharge is generally low. Groundwater discharge occurs in some areas of wet meadow where seeps and springs are present. These wetlands serve as a possible partial source of water for Outlet Creek downstream of Little Lake Valley, where it becomes a perennial stream during summer, when the stream reaches in the valley are usually dry.

2.4.1.3 Floodflow Attenuation

Short-term water storage decreases the amount and velocity of runoff, reducing peak floods and distributing storm flows over longer periods. The dissipation of energy in moving water reduces its erosive impact and helps reduce downstream sedimentation. This function is provided primarily by vegetated wetlands associated with riverine and lacustrine ecosystems, especially when the tributaries have natural broad floodplains in unchannalized/natural channels with unmanaged vegetation and secondarily by infiltration and detention on wet meadows. Surface roughness (e.g., thatch) increases detention time, promoting infiltration and shallow base discharge. Stream channels in the project vicinity have moderate to high potential for floodflow attenuation, with the highest potential occurring in riparian habitat and in the broad wetland meadows between tributaries. Marsh communities also have moderate potential for floodflow attenuation because they occur in shallow basins, but this potential is limited by the size and depth of the basins. Riparian communities not associated with stream channels, wet meadows, vernal pools, and swales help slow floodflow velocities but have low potential for floodflow retention because they lack basins.

2.4.2 Water Quality and Related Functions

Water quality and related functions (biogeochemical functions) are the characteristics that enable wetland ecosystems to transport and transform particulates, organics, and inorganic materials. Wetlands remove dissolved substances from water through various means, such as absorption, adsorption, solubilization, oxidation, biological transformation, and precipitation. Wetlands, by definition, are vegetated, and this vegetation is responsible for a wide range of physical and

biochemical processes. Wetlands in the project vicinity carry out three general biogeochemical functions.

- **Sediment and toxicant retention:** Currently, water moves quickly through Little Lake Valley because of the shortened floodflow attenuation period associated with the managed vegetation and human-made hydrologic modifications. Mitigation actions on the offsite mitigation properties will improve both sediment and toxicant retention by allowing water to move more slowly through thatch and mature wetland vegetation consisting of both woody and herbaceous species. Bank stabilization measures also will create a net benefit for the retention of sediments in the valley.
- **Nutrient removal and transformation:** High nutrient loads in Little Lake Valley are a product of agricultural activities and other upstream land uses (LeDoux-Bloom and Downie 2008). The offsite mitigation will improve nutrient removal and transformation through wetland establishment and rehabilitation. Moreover, removal and reduction of grazing will allow water to move more slowly through the valley. Removal of grazing likely will result in an increase in herbaceous wetland and grassland biomass and the natural recruitment of riparian and oak woodland trees, shrubs, and herbaceous wetland species. Removal of grazing also will likely result in a decrease in fecal coliforms and organics.
- **Production export:** Much of the wetland area in Little Lake Valley is contiguous, with differing agricultural management activities among fields separated by fencing. Most of the wetland establishment and rehabilitation areas on the offsite mitigation properties are designed to increase production and nutrient export in the valley. Reduction of erosional areas, enhancement of water retention, and provision of more natural flow regimes through the valley will increase production and allow more effective export and nutrient movement.

2.4.2.1 Sediment and Toxicant Retention

Vegetation slows the velocity of water, reducing its ability to hold particles in suspension. Water in watersheds with more wetlands tends to have lower specific conductance (a measure of the total concentration of dissolved substances) and lower concentrations of chloride, lead, inorganic nitrogen, suspended solids, and total dissolved phosphorus than does water in watersheds with fewer wetlands. Also, certain wetland plant species help remove heavy metals. Therefore, wetlands improve water quality by removing both dissolved substances and suspended particulates.

In the project vicinity, the marsh community has a high potential for sediment and toxicant retention because it occurs in shallow basins, allowing water to be impounded and acted on by the vegetation. Most other wetland communities in the project vicinity have low potential for sediment and toxicant retention because they lack the ability to impound water.

Riparian habitat on and adjacent to channel banks has moderate potential to remove sediment because the vegetation, together with riffle and pool complexes, slows the water flow, but the streams do not impound water long enough for the vegetation to remove toxicants. Other riparian

communities, oak woodlands, and grasslands occurring on floodplain surfaces also have the potential to remove sediment.

2.4.2.2 Nutrient Removal and Transformation

Growing vegetation removes dissolved nutrients and other substances from the water and soil, often metabolizing them and sometimes sequestering them in plant tissues. Bacteria growing in the soil or plant roots also break down or alter these substances so that they are removed from the water, either by plants or as a gas.

In the project vicinity, the marsh community has a high potential for nutrient removal and transformation because it occurs in a shallow basin, allowing water to be impounded and acted on by the vegetation. Most wetland communities in the project vicinity have a low level of nutrient removal and transformation because they lack the ability to impound water. Other riparian communities, oak woodlands, and grasslands occurring on floodplain surfaces also contribute to nutrient removal.

2.4.2.3 Production Export

The nutrients and carbon fixed by plants are cycled when the plants are eaten by herbivores or when the plants die and decompose. The flow of water through wetlands provides the efficient movement and distribution of nutrients and energy throughout the entire ecosystem.

In the project vicinity, none of the wetland communities has high potential for production export. Both wet meadow and marsh are highly productive communities, but the spread of nutrients in these communities and export to other communities are limited by the seasonal wetland hydrology and lack of connectivity with other habitats. Riparian habitat has relatively high primary productivity, but much of that productivity is stored in woody material and is not readily available for export.

2.4.3 Flora and Fauna Habitat Support

Wetlands are productive environments that provide diversity in the landscape. The flux of nutrients and energy in wetlands is relatively high because of the high growth rate and rapid turnover of the wetland vegetation. Dead organisms and other organic matter in wetlands are broken down into organic compounds by bacterial action, providing food for invertebrates. These invertebrates are the foundation of the food web that supports a broad array of wildlife species, from shorebirds to amphibians. Wetlands provide habitat where many plants and animals can fulfill one or more life cycle stages. Wetlands in the project vicinity carry out three general flora and fauna habitat support functions: wildlife habitat diversity, connectivity of wetland corridors for wildlife, and aquatic habitat diversity.

2.4.3.1 Wildlife Habitat Diversity

Wetlands support a diverse array of trophic (feeding) levels in both the wetland and surrounding upland environments. Many species use wetlands for feeding and uplands for nesting. Habitat

connectivity, fragmentation, vertical structure, and patch size all affect the capability of wildlife movement in a wetland, and between the wetland and adjacent upland habitat. Barriers between the wetlands and adjacent uplands (e.g., roads, berms, culverts, fencing, presence of grazing livestock, haying) prevent some species from moving into or out of the wetlands, making them unable to reproduce or complete their life cycle. Large mammals, birds, and flying insects are affected less by such barriers. Changing land uses in or adjacent to wetlands alters their function as habitat and limits the ability of wildlife to move between habitat patches.

Disturbance also lowers the wildlife habitat function of wetlands. The more intensely the landscape is disturbed, the more the characteristic vegetation can change. With disturbance from grazing, plowing, or grading, the characteristic vegetation can be susceptible to invasive species (both native and exotic). When wetlands are farmed or overgrazed so that the existing wetland vegetation is removed from the soil surface, wildlife use changes. Habitat for some species is diminished because there is insufficient vegetation to provide food, shelter, and nesting opportunities.

Wetlands in the project vicinity generally have moderate to high potential for wildlife habitat function. Riparian habitat and marsh all have high structural diversity and open water areas that provide both foraging and breeding habitat. The wet meadow community has low structural diversity because of agricultural management. Vernal pools and swales exist in complexes with wet meadows and have similar wildlife habitat functions, but they also provide habitat for species that are uniquely adapted to vernal pools.

2.4.3.2 Connectivity of Wetland Corridors for Wildlife

Buffers and wetland habitat can function as wildlife habitat and migration corridors that are created by contiguous parcels, promoting dispersal and movement. The offsite mitigation properties surround Outlet Creek, the major stream draining Little Lake Valley, and several of Outlet Creek’s upstream tributaries (Haehl, Baechtel, Broaddus, Mill, and Upp Creeks). Mitigation provided by the project will ensure the existence of the wildlife habitat and migration corridors surrounding Outlet Creek and its tributaries in perpetuity. Connecting riparian corridors and increasing their size also will improve landscape connectivity and breeding and foraging habitat for riparian-dependent bird species. Riparian vegetation surrounding Category I riparian corridors will be added throughout the length of the offsite mitigation properties, creating a continuous cover for wildlife protection. Wetlands in the project vicinity have high potential for wildlife corridor habitat function. Specific jurisdictional wetland types providing this function include wet meadow and riparian habitat.

2.4.3.3 Aquatic Habitat Diversity

Some wetlands and waters in the project vicinity have high potential for aquatic habitat functions. Streams, together with their associated riparian habitat, provide fish habitat, including EFH for coho salmon, Chinook salmon, and steelhead, and support juvenile and adult salmonid runs. They also provide habitat for California roach and introduced warmwater species (e.g., sunfish, largemouth bass). When inundated, wetland pools provide habitat for aquatic invertebrates.

Disturbance lowers the aquatic habitat diversity of wetlands. The introduction of nonnative plant species, including the perennial pasture grasses that dominate most of the vegetation communities in the mitigation parcels, land disturbance (e.g., plowing, grading), cultivation of pasture grasses, overgrazing, and other land uses, results in the loss or degradation of aquatic native plant communities. Native wetland plants may be displaced by nonnative vegetation that forms monotypic stands, or the structural diversity of native vegetation may be altered by grazing. The functions of wetlands in the project area are discussed in Section 2.4.3.1.

2.4.4 Wetland Services

Many factors contribute to the services of wetlands in the project vicinity (e.g., provide habitat used by threatened or endangered species and are part of a unique wetland area). Little Lake Valley is one of the largest valleys in the North Coast Ranges. Geologically, the valley is a *graben*—a tectonically down-thrust block of ground surrounded by hills or mountains and separated from them by faults. Historically, the valley bottom contained extensive meadows, marshes, and riparian woodlands. Large expanses of these habitat types are unusual in the North Coast Ranges because wide graben-type valleys with poor drainage are uncommon. Because they are regionally uncommon, these extensive wetland and riparian habitats are particularly important to migrating waterfowl and other wildlife species such as black-tailed deer, elk, western pond turtle, yellow warbler, and yellow-breasted chat. Also, Baker's meadowfoam and North Coast semaphore grass are state-listed special-status species that contribute to the uniqueness and botanical heritage of Little Lake Valley.

2.5 Mitigation Goals and Objectives

This MMP was developed by evaluating Little Lake Valley through historical research and studying current conditions with a goal of developing a comprehensive and successful ecosystem restoration project with positive effects on waters of the U.S., including wetland and other waters functions and services to compensate for the lost functions resulting from project impacts.

The project will be constructed in Little Lake Valley, a mosaic of upland and wetland agricultural fields, human-altered stream corridors, and fallow wetlands. Historically, the valley flooded regularly during typical winter rains, creating large expanses of emergent wetlands, wet meadows, riparian forest, floodplain, and streams that flow north into Outlet Creek, the Eel River, and the Pacific Ocean (LeDoux-Bloom and Downie 2008). Based on historical aerial photographs from 1952, 1956, 1978, and 1988, information from historical reports, and more recent field studies, it has been determined that the valley historically supported wider floodplains, a series of meandering streams, and riparian forests surrounded by wet meadows, marshes, and oak savannas (Dean 1920; LeDoux-Bloom and Downie 2008). Carpenter and Millberry (1914:110–111) reported that:

> Little Lake Valley at the most contains about 12,000 acres, two-thirds of which is cultivatable land when properly drained. But little over half that amount is now so used, the balance being pastured or cut to wild hay…. As pasture land it is unrivaled in the county, the natural grasses keeping green until later summer, affording dairies the best of opportunity for profitable business.

The project's compensatory mitigation strategy is to establish, re-establish, and rehabilitate a mosaic of high-functioning wetlands and other waters to replace the loss of functions as a result of the unavoidable impacts associated with the project. This MMP describes the mitigation details for wetlands and other waters of the United States.

This mitigation strategy will be attained through the following mitigation goals.

- Implementing impact avoidance measures before and during project construction.
- Re-establishing all temporarily affected areas in the project footprint to their preproject condition or better.
- Establishing, re-establishing, and/or rehabilitating wetlands and other waters in Little Lake Valley to compensate for permanently affected wetlands and other waters.
- Improving the functions and services of aquatic resources in the Outlet Creek Basin.
- Reducing habitat fragmentation by using large contiguous parcels that are adjacent to existing habitats for mitigation.
- Improving riparian connectivity.
- Increasing habitat complexity by creating a mosaic of habitats in mitigation areas.
- Rehabilitating water quality through the improvement of aquatic functions.
- Preserving existing habitats through the acquisition of parcels that contain aquatic resources, special-status plant species, or sensitive habitats (e.g., critical habitat for anadromous fish).
- Promoting self-sustaining wetlands that allow for natural succession by removing management activities (e.g. haying, grazing).
- Protecting and maintaining all offsite mitigation properties in perpetuity.

To meet these goals, mitigation objectives were established that are linked to increasing the quantity and improving the existing functions and services of wetlands and other waters in Little Lake Valley. These mitigation objectives are discussed below.

- **Mitigation Objective 1:** Establish wetlands that are high-quality and self-sustaining. Performance standards to measure this objective are listed in Chapter 9.
- **Mitigation Objective 2:** Rehabilitate wetlands on offsite properties to improve aquatic wetland functions and promote fully functional successional unmanaged wetland vegetation communities with respect to the current circumstances of Little Lake Valley. Performance standards to measure this objective are listed in Chapter 9. The performance standards are the measurable characters for inferred functional lift of the suite of functions listed in Section 2.4 above.
- **Mitigation Objective 3:** Re-establish onsite wetlands temporarily affected by project construction to restore aquatic wetland functions and promote historical wetland vegetation communities. Performance standards to measure the re-establishment of wet meadow and riparian habitat are listed in Chapter 9.

- **Mitigation Objective 4:** Improve habitat quality for listed fish. Mitigation actions will improve fish passage, increase riparian cover, improve hydrology, and reduce sediment in streams. The performance standards that will be used to measure this objective will be discussed in the state MMP.
- **Mitigation Objective 5:** Promote cover and diversity of native plants. Increasing cover of riparian habitat also will increase riparian habitat connectivity. Native plant cover will be increased for riparian vegetation and measured through the performance standards listed in Chapter 9. Limiting invasive (establishment and re-establishment sites) and noxious plants (rehabilitation sites) also will be used to ensure that cover of native plants is maximized.
- **Mitigation Objective 6:** Manage invasive plants in established wetlands and rehabilitated areas on the offsite mitigation properties. The invasive plant performance standard listed in Chapter 9 will be used to measure this objective.

Portions of some of the offsite mitigation properties have been degraded by overgrazing, agricultural practices, and stream channelization. As part of the overall mitigation strategy for Little Lake Valley, compensatory mitigation per parcel may involve a combination of wetland establishment, grazing exclusion, establishing riparian plantings, and rehabilitating incised drainages, which will increase quantity and improve aquatic functions and services in the valley.

Some offsite mitigation parcels, such as Benbow (APN 108-020-06) and Watson (APN 037-250-05), contain representative examples of high-quality wet meadow wetlands. These areas helped to guide the design of wet meadow on the offsite mitigation properties. Most of the wetlands that will be established and rehabilitated as part of wetland mitigation efforts are in areas that have been altered over time by human-induced changes associated with flood control and grazing management. An array of activities will be used to establish, re-establish, or rehabilitate wetlands in Little Lake Valley to increase their functions and services.

After the bypass is in place and the compensatory mitigation is implemented, functions and services of wetland resources are anticipated to increase. Once mitigation construction is complete and after 10 years (5 years for certain wetlands) of management and monitoring, the valley as a whole will exhibit greater ecological function than existed before project construction. The valley will enjoy a long-term benefit because of increased functions provided by the offsite mitigation properties that will be protected in perpetuity. These properties will be publicly owned or managed, and will be managed adaptively to maintain and increase the functions and services of the aquatic resources. Overall, existing amounts of wetlands and riparian and oak woodlands will be increased, and barriers to wildlife passage and movement will be reduced or eliminated.

2.6 Summary of Mitigation Actions and Acreages

As outlined in Section 2.2, construction of the project will result in temporary and permanent impacts on waters of the United States and the loss of aquatic functions and services associated with those features. In addition, the project will result in impacts on anadromous fish (SONCC coho salmon, California coastal Chinook salmon, and northern California steelhead), Baker's

meadowfoam, and North Coast semaphore grass. Caltrans' proposed mitigation for impacts on waters of the United States is outlined in Table 2-5. Mitigation for impacts on other waters also will serve as mitigation for impacts on anadromous fish. Mitigation actions will be conducted to compensate for impacts on Baker's meadowfoam, North Coast semaphore grass, and other riparian habitats; however, these actions are not discussed in this document.

Table 2-5. Summary of Mitigation Actions for Wetlands and Other Waters of the United States

Parcel	Assessor's Parcel Number (APN)	Offsite Mitigation		
		Wetland Establishment (less acres of temporary wetland impacts)	Wetland Rehabilitation (acres)	Other Waters Rehabilitation (acres)
Benbow	007-020-03		17.13	
	007-010-04		23.27	
	108-040-13	1.65	32.23	
	108-030-07		19.57	
	108-020-06	1.34		
Ford	108-010-05		6.44	
	108-010-06	2.14	1.32	8.08
	108-020-04	6.48	27.04	
	108-030-02	1.86	27.17	
	108-030-05		61.75	
Goss	103-230-02	0.23		
Lusher	108-030-04	5.22	18.04	
MGC North	103-230-06	5.34		
MGC Middle	103-250-14	0.23	1.28	
Nance	108-050-06		3.49	
Niesen	108-040-02	5.12	1.47	
Watson	037-221-30	8.72	25.06	
	037-250-05		49.53	
Wildlands	108-020-07	2.18		0.35
	108-030-08		2.08	
	108-060-01	4.80	2.97	10.60
	108-070-08		7.09	
	108-070-09	4.27	9.83	
	108-060-02		7.33	
TOTAL		**49.58**	**344.63**	**19.03**

2.6.1 Impact Avoidance and Minimization

In addition to the establishment, re-establishment, and rehabilitation strategies included in this MMP, Caltrans has incorporated numerous avoidance and minimization measures as part of the refinement of the project design (see Section 1.2). Additional minimization measures to be implemented during project construction are listed below, and details are provided in Chapter 7.

- Establishment of work windows for instream construction and vegetation clearing to minimize impacts on water quality, listed fish, and nesting birds.
- Incorporation of BMPs as part of the stormwater pollution prevention plan (SWPPP).

- Seed collection and salvage of North Coast semaphore grass plants for replanting onsite.
- Seed collection and topsoil harvesting and reapplication at offsite locations to minimize impacts on Baker's meadowfoam.

Sample BMPs from the FEIR/FEIS are presented below.

- All construction-related materials shall be stored in designated staging areas at least 100 ft from perennial waterways and drainages.
- Refueling and vehicle maintenance shall be performed at least 100 ft from creeks and other water bodies.
- Operation of heavy equipment shall be minimized in perennial creeks (to the greatest extent possible). If equipment must access perennial creeks, this will occur during the late summer months when the stream flows are low, or when no water is in the channels. If water is flowing, the channels will be temporarily dewatered.
- Temporary sedimentation barriers, such as sandbags or siltation fencing, shall be installed to minimize the amount of silt entering the creeks and any ephemeral drainages with water present in the channel. The location of these barriers shall be determined by the resident engineer and environmental monitor, and shall be clearly marked in the field before construction activities begin.
- Additional BMPs shall be implemented to prevent runoff from adjacent lands from flowing across construction areas; slow down the runoff traveling across construction sites, remove sediment from onsite runoff before it leaves the site, and provide soil stabilization.
- To address potential water quality impacts during construction, Caltrans will require the contractor to use a combination of BMPs to control potential erosion and sedimentation from the project site. Caltrans has developed a suite of construction site BMPs that will be implemented on the proposed project. The construction site BMP manual can be downloaded at: http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm.
- Caltrans will prohibit the contractor from discharging oils, greases, chemicals, or spillage of concrete and grout into receiving waters. For example, on this project, equipment operating in water bodies will be required to be steam-cleaned prior to arrival onsite, and be maintained in a clean condition during the length of activities.
- Following the construction process, the contractor will stabilize disturbed soil areas through permanent revegetation or other means. An appropriate design will be used that will allow all finished slopes to achieve stabilization, even under severe conditions, and also provide erosion control BMPs at all point source discharges of stormwater runoff. Treatment BMPs, such as biofiltration, will be incorporated where feasible.
- As part of standard operation and maintenance procedures, Caltrans has developed a standard Hazardous Waste and Spill Response Plan, which Caltrans will ensure is implemented during the project. These BMPs address water quality issues associated with accidental spills.

2.6.2 Establishment, Re-Establishment, and Rehabilitation

This section describes the MMP actions for wetlands and other waters. The wetland establishment, re-establishment, and rehabilitation actions are described further in Chapter 7. The method for determining the mitigation credits, in terms of acreage, is described in Chapter 6.

Wetland establishment, re-establishment, and rehabilitation areas are shown on Figures 2-1a and 2-1b and the figures in Appendices C and D. Discussions of these interrelated strategies are presented below.

2.6.2.1 Establishment

Wetlands will be established on some of the offsite mitigation properties. Wetland establishment will aid in replacing wetland functions lost through the impacts of the project. Establishment areas were selected where feasible to improve habitat continuity. An important aspect of wetland establishment is the improvement of wetland functions and services, as discussed below and presented by parcel in Table 7-2.

- Groundwater recharge helps maintain the hydrology of wetlands dependent on groundwater discharge, such as marsh and wet meadow. Increased plantings of native riparian and wetland vegetation as part of wetland establishment will increase groundwater recharge.
- Floodflow attenuation will be provided by establishment of vegetated wetlands associated with riverine and lacustrine ecosystems. Specifically, this will occur in riparian habitat established adjacent to stream channels.
- Nutrient removal/transformation will take place in established habitats such as marsh and wet meadow in conjunction with some mitigation actions. Removal of cattle grazing on wetland rehabilitation parcels and exclusion of grazing from riparian corridors will decrease soil compaction, reduce streambank erosion, and reduce nutrient and bacteria loads.
- Reintroduction and planting of common, locally native wetland plant species in the wetlands and at the wetland-upland edge as part of habitat establishment, in conjunction with the removal of agricultural management (e.g. grazing, haying), will increase wildlife diversity and abundance, as well as aquatic diversity and uniqueness.

2.6.2.2 Rehabilitation

Rehabilitation actions are planned for offsite wetlands and other waters of the United States as well as riparian corridors associated with other waters of the United States. Wetland rehabilitation on the offsite parcels will include the removal of grazing and haying, reduction of nonnative plants and the recruitment and planting of native wetland species in designated areas, and control of noxious invasive species. Other waters rehabilitation on the offsite parcels will include the removal of grazing, recruitment and planting of native riparian species, and control of invasive species.

Project Bypass Footprint
- Permanent Impact Area
- Temporary Impact Area
- Right of Way

Mitigation Parcels
- Offsite Mitigation Parcel

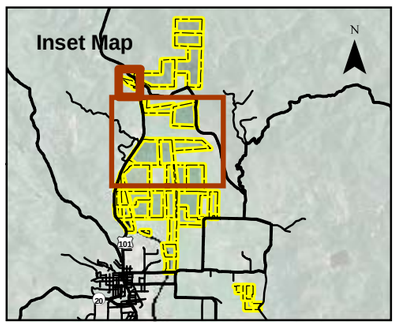
Wetland Establishment
- Group 1 (1.0 Credit)
- Group 2 (0.3 Credit)

Wetland Rehabilitation
- Type 1 (0.05 Credit)
- Type 2 (0.1 Credit)
- Type 3 (0.2 Credit)
- Type 4 (0.3 Credit)
- Type 5 (0.3 Credit)

Other Waters Rehabilitation
- Other Waters Rehabilitation
- Repair Headcut or Eroding Bank

Other Offsite Mitigation Actions, No Jurisdictional Credits Proposed
- Other Waters Rehabilitation
- Grazing
- Category I Riparian Corridor
- Category II Riparian Corridor
- Category III Riparian Corridor

N



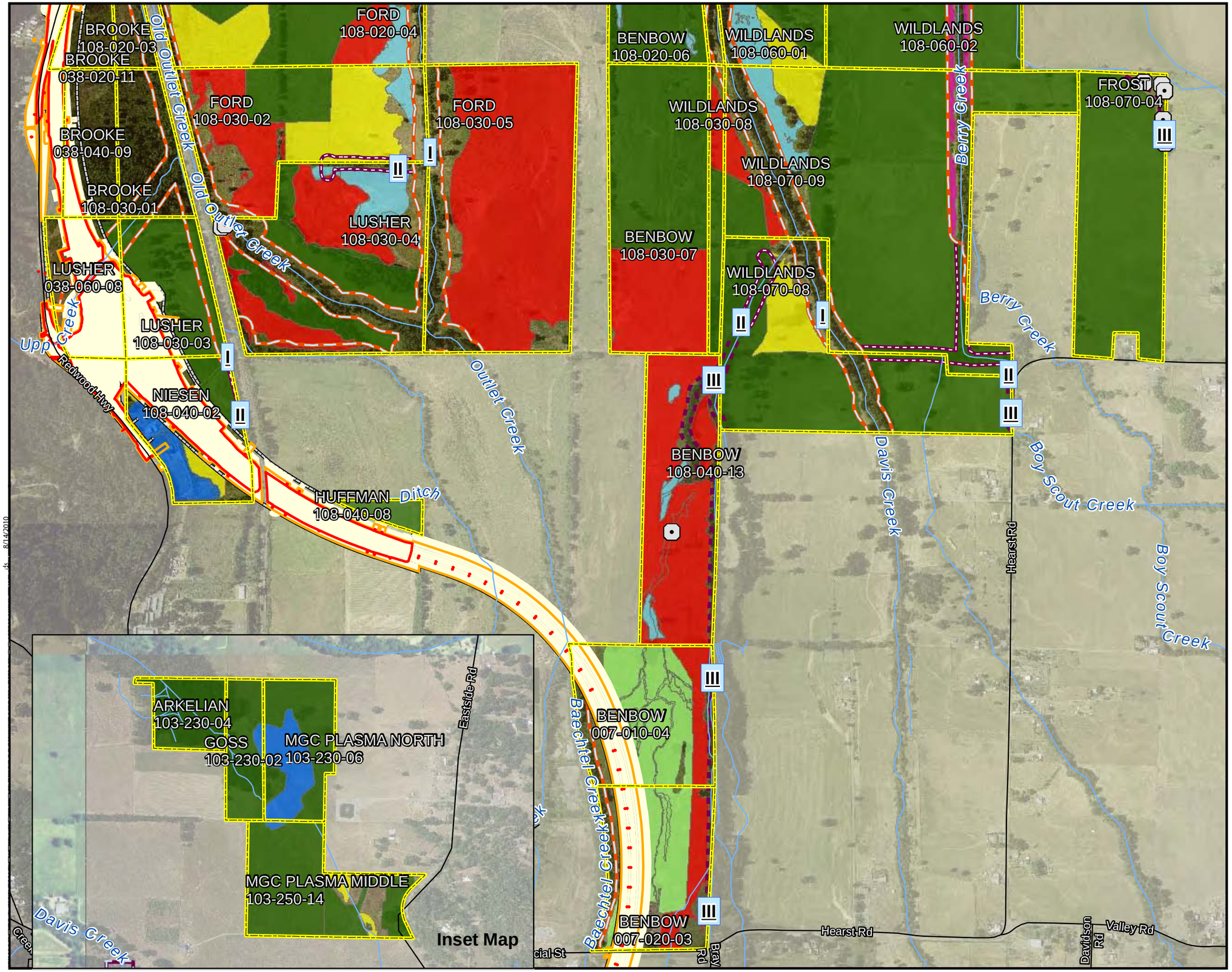
0 1000

Scale in Feet

Figure 2-1a

Offsite Mitigation Actions for Wetlands and Other Waters of the U.S.

Willits Bypass Project



Project Bypass Footprint
- Permanent Impact Area
- Temporary Impact Area
- Right of Way

Mitigation Parcels
- Offsite Mitigation Parcel

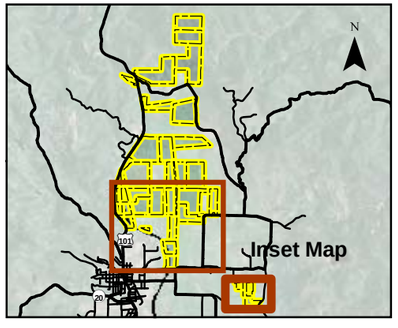
Wetland Establishment
- Group 1 (1.0 Credit)
- Group 2 (0.3 Credit)

Wetland Rehabilitation
- Type 1 (0.05 Credit)
- Type 2 (0.1 Credit)
- Type 3 (0.2 Credit)
- Type 4 (0.3 Credit)
- Type 5 (0.3 Credit)

Other Waters Rehabilitation
- Other Waters Rehabilitation
- Repair Headcut or Eroding Bank

Other Offsite Mitigation Actions, No Jurisdictional Credits Proposed
- Other Waters Rehabilitation
- Grazing
- Category I Riparian Corridor
- Category II Riparian Corridor
- Category III Riparian Corridor

N



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Scale in Feet

Figure 2-1b

Offsite Mitigation Actions for Wetlands and Other Waters of the U.S.

Willits Bypass Project

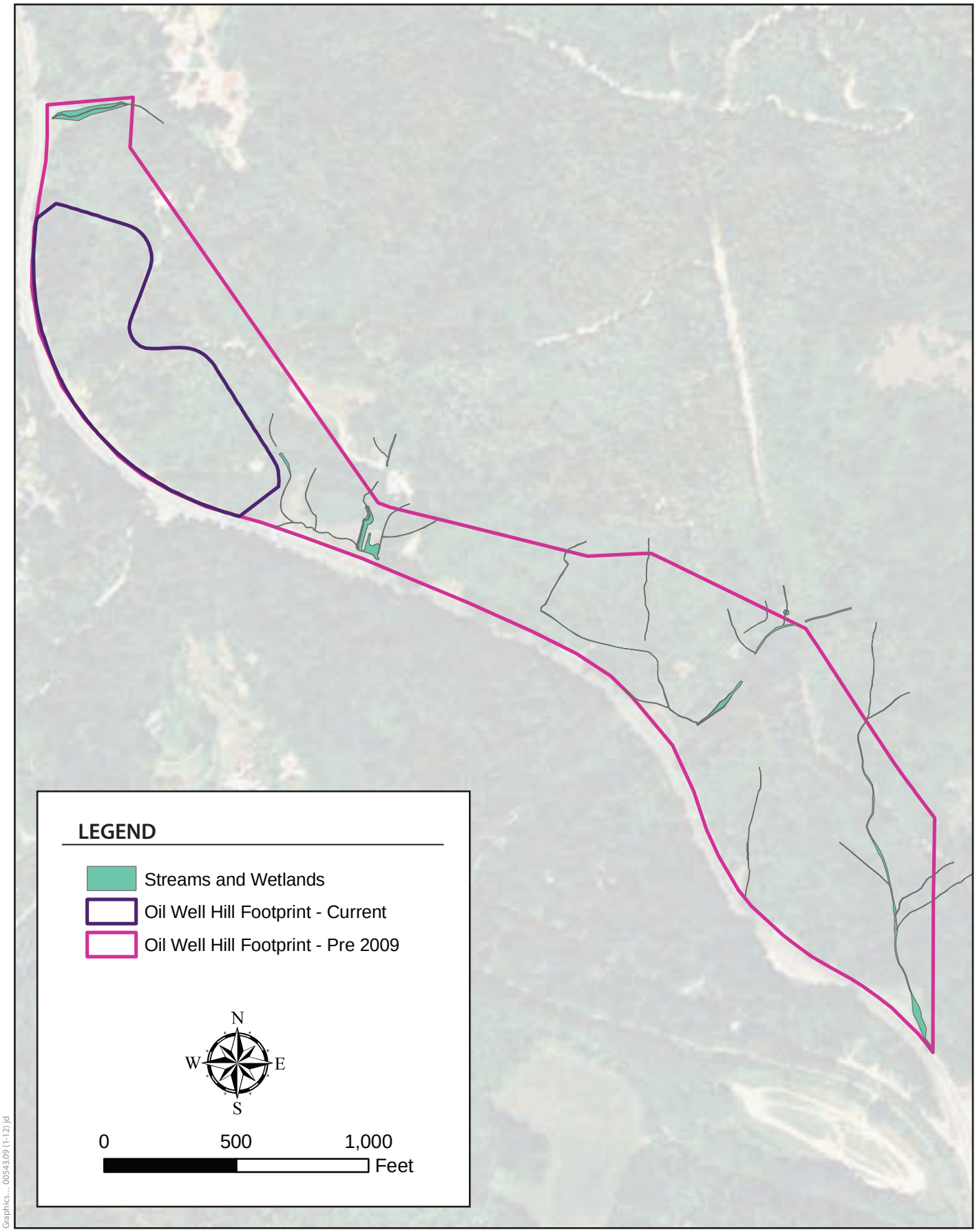

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Figure 2-2
Oil Well Hill Project Footprint and Jurisdictional Waters
Willits Bypass Project

Removal of fish passage barriers will improve the movement of anadromous fish through Little Lake Valley into the spawning areas in the surrounding foothills. Planting of riparian vegetation will improve shaded riverine aquatic habitat, reduce water temperature, and increase dissolved oxygen levels in the streams.

Control of invasive plant species will promote native plant diversity, recruitment, and abundance.

An important aspect of rehabilitation activities is the improvement of wetland functions and services as discussed below and presented by parcel in Table 7-2.

- Groundwater recharge helps maintain the wetland hydrology of wetlands dependent on groundwater discharge, such as wet meadow. Planned rehabilitation actions will increase groundwater recharge through removal of grazing, and increased plantings of native riparian and wetland vegetation.
- Removal of grazing will increase the amount of residual dry matter on the ground, in both uplands and wetlands, thereby reducing the amount of sediment entering drainages. Widening riparian corridors, including riparian wetlands, by planting will result in improved sediment and toxicant retention and reduced bank erosion. It also will greatly increase the areal extent of stream wetlands.
- Removal of grazing and the rehabilitation of herbaceous and woody vegetation in existing wetlands and riparian corridors will decrease soil compaction, reduce streambank erosion, and reduce nutrient and bacteria loads.
- Rehabilitation of wetlands will enhance wetlands through increase in biomass. Increased biomass will decrease water velocity during high-flow events and will establish additional forage and cover for wildlife.
- Reintroduction and planting of common, locally native wetland plant species at select offsite rehabilitation and establishment areas will increase wildlife diversity and abundance, as well as aquatic diversity and uniqueness.

2.6.2.3 Re-Establishment

Re-establishment refers to the repair of temporary impacts on wetland and riparian habitat in the onsite bypass alignment footprint and in the offsite mitigation areas where existing wetlands are disturbed during the construction of new wetlands. The onsite re-establishment areas will be recontoured, seeded, and replanted to encourage the reestablishment of vegetation and restoration of wetland functions. The riparian areas directly under the viaduct will be planted with woody riparian shrubs, instead of trees, to avoid the need to maintain or remove trees that could grow tall enough to interfere with the structure. The offsite re-establishment areas are those areas where wetland establishment activities will temporarily affect wetland habitat. These areas will be restored to pre-project conditions or better. For the purpose of this MMP, these actions are not considered compensatory mitigation for the project’s impacts.