

Avenue of the Giants – Four Bridges Project



Natural Environment Study

01-HUM-254-PM 0.88/43.02

EA 01-43060, EFIS 0100000186

February 2016



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STATE OF CALIFORNIA
Department of Transportation

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Summary

The California Department of Transportation is proposing a project to upgrade the bridge railings at four locations on State Route 254 in Humboldt County: Ohman Creek (Bridge No. 4-7, Post Mile (PM) 0.88), Elk Creek (Bridge No. 4-8, PM 10.43), Bridge Creek (Bridge No. 4-9, PM 10.80), and Bear Creek (Bridge No. 4-12, PM 43.02). The proposed project will include upgrading bridge railing, upgrading guard railing (including crash cushions,) and repaving the existing roadway approximately 200 feet on each side of the bridges.

Habitat for the following federal and state listed species, candidate species, and state species of special concern is present within the project limits:

- Federal and state threatened Southern Oregon/Northern California coho salmon (*Oncorhynchus kisutch*)
- Federal threatened and state species of special concern Northern California steelhead (*Oncorhynchus mykiss irideus*)
- Federal threatened California coastal Chinook salmon (*Oncorhynchus tshawytscha*)
- Essential Fish Habitat (EFH) for Chinook salmon and coho salmon
- Federal threatened and state candidate species northern spotted owl (*Strix occidentalis caurina*)
- Federal threatened and state endangered marbled murrelet (*Brachyramphus marmoratus*)
- State candidate species Townsend's big-eared bat (*Corynorhinus townsendii*)
- Federal candidate species and state candidate species Pacific fisher (*Pekania (Martes) pennanti (pacifica)*)

Suitable habitat for the southern Oregon/Northern California coho salmon (*Oncorhynchus kisutch*), Northern California steelhead (*Oncorhynchus mykiss*), and California coastal Chinook salmon (*Oncorhynchus tshawytscha*) and designated Critical Habitat for Northern California steelhead and California coastal Chinook salmon is present within the project limits. Effects to the species would be less than substantial. The proposed project is covered under the Programmatic Biological Opinion issued by NOAA's National Marine Fisheries Service (NMFS) on October 13, 2013 for Caltrans' routine maintenance and repair activities in Districts 1, 2, and 4, and individual Corps permits for these activities (NMFS 2013).

Essential Fish Habitat for Chinook salmon and coho salmon is present at all four project locations. The construction of the proposed project will not result in an adverse effect to Essential Fish Habitat.

Suitable habitat for the northern spotted owl and marbled murrelet is present at all four project locations. Suitable habitat for Townsend's big-eared bat and Pacific fisher is also present in the vicinity of all four project locations. Any effects to the species would be less than substantial. The proposed project is covered under the Programmatic Informal Consultation for the California Department of Transportation's Routine Maintenance and Repair Activities, and Small Projects Program for Districts 1 and 2 issued by the Arcata U. S. Fish and Wildlife Service (USFWS) office on April 9, 2014 (USFWS 2014). Caltrans has also coordinated with the California Department of Fish and Wildlife (CDFW) regarding potential impacts to the northern spotted owl, marbled murrelet, Townsend's big-eared bat, and Pacific fisher. In June 2014 Caltrans received concurrence from CDFW that the proposed project will not result in the take (as defined in the California Fish and Game Code) of the northern spotted owl, marbled murrelet, Townsend's big-eared bat, or Pacific fisher as long as avoidance and minimization measures were included in the project.

The following sensitive biological resources are present within the project limits:

- Other waters of the U. S. (perennial creeks)
- Waters of the State (perennial creeks and associated riparian vegetation)
- Riparian Vegetation
- *Sequoia sempervirens* (Redwood forest) Alliance
- Migratory birds

The proposed project would not result in adverse effects to other waters of the U.S. or waters of the State, or to migratory birds or their nests. The proposed project would result in minor, temporary adverse effects to riparian vegetation, and minor adverse effects to *Sequoia sempervirens* Alliance. These assessments are made without incorporation of avoidance and minimization measures.

The project proposes work in areas that fall under the jurisdiction of the North Coast Regional Water Quality Control Board (NCRWQCB) and CDFW. Caltrans will obtain a Report of Waste Discharge (ROWD) from NCRWQCB and a Section 1602 Streambed Alteration Agreement from CDFW prior to the start of construction. Any

additional avoidance or mitigation measures developed during the permitting process will be incorporated into the project.

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List of Abbreviated Terms

BMP	Best Management Practices
California State Parks	California Department of Parks and Recreation
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationships
dB	decibel
dbh	Diameter at breast height (~4 ft)
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESL	Environmental Study Limits
ESU	Evolutionarily Significant Unit
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
NCRWQCB	North Coast Regional Water Quality Control Board
NES	Natural Environment Study
NMFS	NOAA's National Marine Fisheries Service
NPPA	California Native Plant Protection Act
NRCS	Natural Resources Conservation Service
OHWM	Ordinary high water mark
PM	Post mile
RE	Resident Engineer
ROWD	Report of Waste Discharge
SB	Senate Bill
SR	State Route

SSP	Standard Special Provision
SWPPP	Storm Water Pollution Prevention Plan
TNW	Traditionally navigable water
USACE	U. S. Army Corps of Engineers
USFWS	U. S. Fish and Wildlife Service
USGS	U. S. Geological Survey
WBWG	Western Bat Working Group
WL	Watch List species

Chapter 1. Introduction

Studies for the proposed project began under a considerably larger project scope. At initiation, the project proposed widening of all four bridges to provide a minimum shoulder width of four feet, and replacement of Bridge Creek Bridge. The project was subsequently downscoped. Some avoidance and minimization measures, though, were developed under the previous, larger scope.

1.1. Project Description

The California Department of Transportation (Caltrans) is proposing a project to upgrade the railings on four bridges at the following locations on State Route (SR) 254 in Humboldt County:

- Location 1: Ohman Creek Bridge (Bridge No. 4-7, Post Mile (PM) 0.88)
- Location 2: Elk Creek Bridge (Bridge No. 4-8, PM 10.43)
- Location 3: Bridge Creek Bridge (Bridge No. 4-9, PM 10.80)
- Location 4: Bear Creek Bridge (Bridge No. 4-12, PM 43.02)

The proposed work will include upgrading bridge railing, abutment widening at Ohman Creek Bridge only, installation of guard rail and crash cushions, and repaving the existing bridge approaches. The proposed rail upgrade will consist of a modified Type-80 concrete barrier with bicycle railing. All railing barrier work will be done from the existing bridge decks. The overhangs of each structure will be reconstructed to carry the additional weight of the new bridge railing. The new bridge barrier will increase existing shoulder widths as shown in Table 1. The new bridge barrier is narrower than the existing rail. As a result, the bridges will be either slightly wider or slightly narrower than existing. A comparison of the existing and new bridge widths are shown in Table 2. Scuppers will also be added to the bridges to drain water from the roadway.

Table 1. Bridge Shoulder Widths

Location	Structure	Post Mile	Shoulder Widths (feet)	
			Existing Shoulder	New Shoulder
1	Ohman Creek Bridge	0.88	1.00	2.75
2	Elk Creek Bridge	10.43	1.00	2.00
3	Bridge Creek Bridge	10.80	1.00	1.71
4	Bear Creek Bridge	43.02	1.00	2.00

Table 2. Comparison of Existing and New Bridge Widths

Location	Structure	Post Mile	Bridge Width (feet)			
			New	Existing	Difference	Each Side
1	Ohman Creek Bridge	0.88	33.0	31.08	1.92	0.96
2	Elk Creek Bridge	10.43	31.50	30.33	1.17	0.585
3	Bridge Creek Bridge	10.80	30.92	31.58	-0.66	-0.33
4	Bear Creek Bridge	43.02	31.50	32.80	-1.30	-0.65

Guard railing or crash cushions will be installed at the corner of each structure as described in Table 3. Metal beam guardrail is present at the corner of each bridge, except for the northeast corner of Ohman Creek Bridge. Crash cushions will be installed instead of metal beam guardrail in areas that are located close to old growth redwood trees to avoid impacts to sensitive tree roots. Typical concrete pads for crash cushions are 20-30 feet long, 2-3 feet wide and ½ foot deep, shallower than metal beam guardrail posts.

Table 3. Proposed Bridge End Treatments

Location	Structure	Post Mile	End Type			
			Southwest (SW) corner	Northwest (NW) corner	Northeast (NE) corner	Southeast (SE) corner
1	Ohman Creek Bridge	0.88	Crash Cushion	Crash Cushion	Buried Post Anchor	Crash Cushion
2	Elk Creek Bridge	10.43	Crash Cushion	Crash Cushion	Crash Cushion	Crash Cushion
3	Bridge Creek Bridge	10.80	Guard Rail	Crash Cushion	Guard Rail	Buried Post Anchor
4	Bear Creek Bridge	43.02	Buried Post Anchor	Guard Rail	Crash Cushion	Guard Rail

Asphalt concrete taper widths and lengths will vary depending on the end treatment that is applied at each structure. Additional area to be paved for each structure is shown below in Table 4.

Table 4. New Pavement Tapers

Location	Structure	Post Mile	Taper Area (square feet)			
			SW corner	NW corner	NE corner	SE corner
1	Ohman Creek Bridge	0.88	304	23	136	3
2	Elk Creek Bridge	10.43	97	74	177	37
3	Bridge Creek Bridge	10.80	61	37	64	209
4	Bear Creek Bridge	43.02	350	330	8	18

Under the current project description, abutment widening is needed only at Ohman Creek Bridge. The abutment work is needed at Ohman Creek Bridge to match the new width of the bridge. The abutment extensions will be approximately four feet tall by 13.5 inches wide on each side and 12 to 18 inches deep. Rebar will be drilled and doweled into the existing abutment corner to provide attachment to the existing bridge. Equipment used to widen the abutments will be placed on the roadway and existing shoulder area. Handwork will involve foot traffic in areas off the shoulder and around the abutments.

As part of the proposed project the existing bridge approaches will be repaved and widened. Repaving work will include grinding the existing pavement of the lanes and existing shoulders, widen the shoulders with asphalt concrete and aggregate base to match the new bridge widths, and repaving for a smooth finished surface. Widening the shoulder will include placing aggregate base to a maximum depth of 1.15 feet under the pavement tapers.

A bridge deck treatment will also be included at Ohman Creek, Elk Creek, and Bridge Creek bridges. Bridge deck treatment work consists of removing the existing asphalt concrete, replacing unsound concrete, and placing polyester concrete.

Table 5. Bridge Deck Treatment

Location	Structure	Post Mile	Bridge Deck Treatment
1	Ohman Creek Bridge	0.88	Remove existing asphalt concrete (AC) (approximately 4 inches) and replace with 1 inch of polyester concrete.
2	Elk Creek Bridge	10.43	Remove existing AC (approximately 1.5 inches) and replace with 1 inch of polyester concrete.
3	Bridge Creek Bridge	10.80	Remove existing AC (approximately 1.5 inches) and replace with 1 inch of polyester concrete.
4	Bear Creek Bridge	43.02	None

All work for the proposed project will take place within the Caltrans right-of-way.

1.1.1. Construction Scenario

The following scenario is proposed to construct the project.

- Set up one lane traffic control
- Remove existing bridge railing, asphalt concrete and unsound concrete
- Reconstruct new overhang and widen abutments where necessary
- Place new bridge barriers
- Upgrade existing guardrail or replace with new crash cushions
- Switch traffic control to repeat work on the second side of each bridge
- Grind/replace asphalt and widen shoulder on bridge approaches
- Stripe

Exact sequencing may vary by the Contractor

Equipment used for removing the existing rail may include jackhammers or a bobcat with a small hoe-ram attachment which will be used for breaking up concrete, chainsaws for cutting away existing rails, a bobcat or backhoe for clearing concrete, and dump trucks for hauling away waste. All bridge work will be done from the top of the bridge. Falsework and forms for concrete pours and scaffolding for worker access will be assembled from the bridge and attached to it. No scaffolding or shoring will be placed below the OHWM of any waterbody.

Equipment used during construction may include basic carpentry tools such as skill saws and hand tools for placing forms for the new barriers, a small fork lift or bobcat for hauling material, a larger loader for placing and moving K-rail, and concrete trucks for importing and pouring concrete.

Equipment used for upgrading existing guardrail may include a truck with a drill for placing posts and hand tools for attaching railing to posts.

Temporary safety lighting may be placed in the work area in order to increase nighttime visibility for motorists. This project is expected to be constructed under one way traffic control. Temporary signal systems at Bridge Creek Bridge and Bear Creek Bridge will be installed and temporary stop sign control will be installed at Ohman Creek Bridge and Elk Creek Bridge. No nighttime work is anticipated.

1.1.2. Staging

It is anticipated that contractor will use existing closed roadbed and unpaved turnouts for staging areas.

1.1.3. Schedule

Construction is currently scheduled to take up to 205 working days. The number of construction seasons will depend on whether work will be conducted at more than one bridge at a time.

1.1.4. Standard Protection Measures

In compliance with several State and Federal laws, Caltrans typically implements standard measures during construction. These may be standard prescriptions for resources that may be present near the work area. They may be identified in Caltrans Standard Specifications, Standard Special Provisions, other manuals, or may otherwise be standard business practices. Typical measures may include water quality Best Management Practices (BMPs), pre-construction surveys, or standard avoidance distances for bird nests. Examples of standard measures that are expected to apply to this project include:

- Soil stabilization practices (vegetation, rolled erosion control blankets) will be implemented.
- Silt fences/fiber rolls will be placed to control sediment discharge from the project area during construction.
- Measures will be taken to prevent construction equipment effluents from contaminating soil or waters in the construction site, such as absorbent pads.

- Excavated spoils will be controlled to prevent sedimentation to watercourses.
- Weed-free straw mulch and fiber rolls will be applied to exposed soil areas for over-wintering.
- The contractor will be required to develop and implement site-specific best management practices and emergency spill controls.
- No concrete debris or contact water will be allowed to flow into waterways.
- No concrete will be poured within flowing water in the waterways.
- Water that has come into contact with setting concrete will be pumped into a tank truck and disposed of at an approved disposal site or settling basin.
- Concrete truck washouts will be located at upland staging areas a minimum of 150 feet away from watercourses.
- Trash receptacles with lids will be used.
- Environmentally Sensitive Areas (ESAs) will be designated on construction plans, and will be protected during construction. ESAs include other waters of the U. S./waters of the State and riparian vegetation areas within the ESL.
- A biologist will conduct training for all construction personnel before the start of construction. The training will include a description of sensitive biological resources present within and adjacent to the ESL, and general measures to protect the resource.
- Work windows will be followed as identified in programmatic and other agency agreements: Work will be limited to the period from June 15 to January 31. MBGR installation would be limited to the period from August 20 to January 31, with a daily work window beginning 2 hours post-sunrise and ending 2 hours pre-sunset from August 20 through September 15.
- Vegetation will be removed outside of the nesting season (February 1 and September 15) and will be kept trimmed and/or cleared prior to, as well as, during construction to discourage nesting; or surveys will be conducted prior to vegetation removal by a biologist to confirm absence of nesting birds.

1.1.5. Description of Alternatives

No Build Alternative

The no build alternative will perpetuate the existing railing.

1.1.6. Project Purpose and Need

The purpose of this project is to upgrade the bridge railing at Ohman Creek Bridge, Elk Creek Bridge, Bridge Creek Bridge, and Bear Creek Bridge on State Route

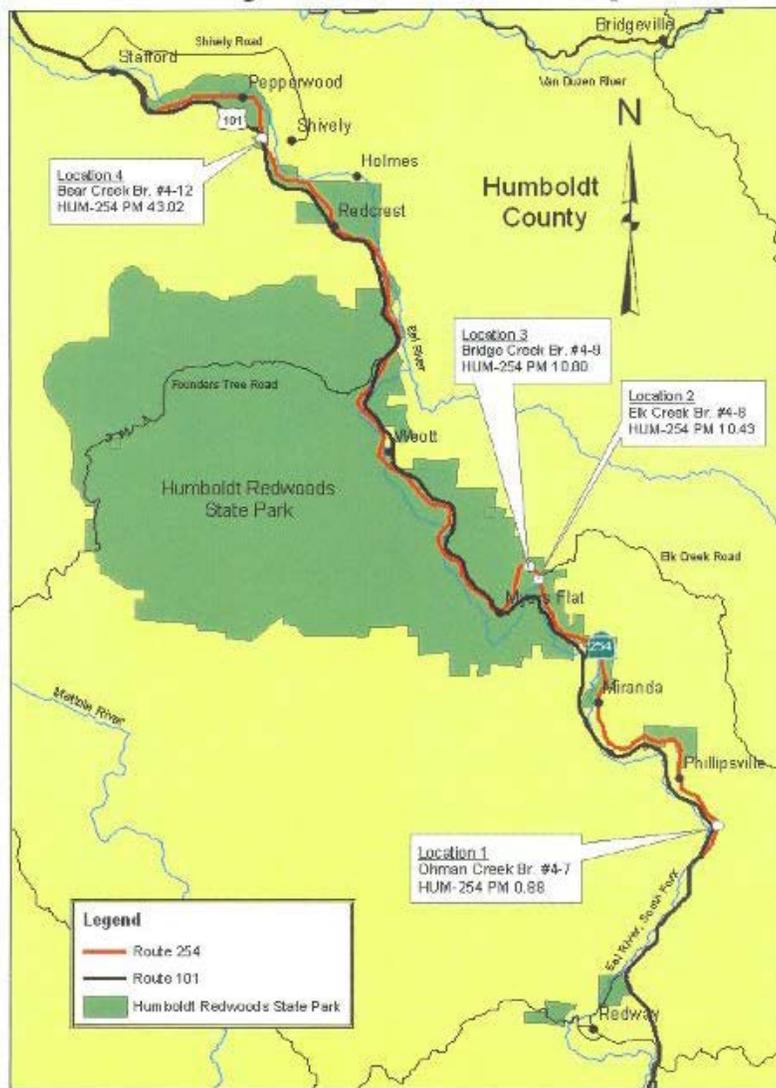
254. The proposed rail upgrade will have a see-through type bridge and bicycle railing.

This project is needed because these bridges were all built more than 70 years ago. Three of the existing bridges have timber railing that is deteriorating. The timber railing at Bridge Creek Bridge has deteriorated beyond the capabilities of routine maintenance.

1.1.7. Project Location

Location 1 can be found on the Miranda 7.5-minute U. S. Geological Survey (USGS) quadrangle, Township 3S, Range 4E, Section 19. Location 2 can be found on the Myers Flat 7.5-minute U. S. Geological Survey quadrangle, Township 2S, Range 3E, Section 21. Location 3 can be found on the Myers Flat 7.5-minute U. S. Geological Survey, Township 2S, Range 3E, Section 20. Location 4 can be found on the Red Crest 7.5-minute U. S. Geological Survey, Township 1N, Range 2E, Sections 29, 32. Figure 1 contains a vicinity map of the project locations. Appendix A contains quadrangle maps of the project locations.

Figure 1. Project Location Map



Chapter 2. Study Methods

2.1. Regulatory Requirements

The project proposes work in areas that fall under the jurisdiction of the North Coast Regional Water Quality Control Board (NCRWQCB) and the California Department of Fish and Wildlife (CDFW). Caltrans will obtain a Report of Waste Discharge (ROWD) from the North Coast Regional Water Quality Control Board and a Section 1602 Streambed Alteration Agreement from CDFW prior to the start of construction. Any additional avoidance or mitigation measures developed during the permitting process will be incorporated into the project.

2.2. Studies Required

A list of sensitive species and habitats potentially occurring in the project vicinity was developed from reviewing the California Natural Diversity Database (CNDDDB) and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants for the following nine quadrangles: Blocksburg, Bridgeville, Ettersburg, Fort Seward, Miranda, Myers Flat, Redcrest, Scotia, and Weott. For the botanical surveys, CNDDDB and the CNPS were queried for the following 17 quadrangles: Blocksburg, Briceland, Bridgeville, Bull Creek, Ettersburg, Fort Seward, Garberville, Harris, Hydesville, Larabee Valley, Miranda, Myers Flat, Owl Creek, Redcrest, Scotia, Weott, and Yager Junction. The U. S. Fish and Wildlife Service (USFWS) online IPaC system was queried for the project area. A list was requested from the National Marine Fisheries Service (NMFS) of listed fish that may occur in the streams in the project area. The Western Bat Working Group (WBWG) Regional Priority Matrix was also reviewed for information regarding sensitive bat species. Appendix B contains a list of sensitive species and habitats potentially occurring in the project vicinity, and the CNDDDB, CNPS, USFWS, and NMFS lists that helped inform it.

2.3. Personnel and Survey Dates

Table 6 summarizes the field surveys that have been conducted for the project.

Table 6: Surveys Conducted for the Project

Date	Personnel	Notes
March 2010	Al Kannely, Caltrans Biologist	General biological surveys
May 2010	Al Kannely, Caltrans Biologist	General biological surveys
May 5, 2010	ICF International	Focused botanical surveys, wetland and other waters of the U. S. surveys
July 14, 2010	ICF International	Focused botanical surveys, wetland and other waters of the U. S. surveys
April 13, 2011	ICF International	Focused botanical surveys
July 18, 2011	ICF International	Focused botanical surveys
November 2011	Al Kannely, Caltrans Biologist	General biological surveys
August 2012	Al Kannely, Caltrans Biologist	General biological surveys
October 27-28, 2014	Denise Walker-Brown, Caltrans Biologist; Lisa Embree, Caltrans Biologist; Ken Russo, Caltrans Biologist	Old growth redwood forest assessment
September 10, 2015	Sean Marquis, Caltrans Biologist	General biological surveys
November 19, 2015	Darin Sullivan, Caltrans Arborist; Sean Marquis, Caltrans Biologist	Updated old growth redwood forest assessment

2.3.1. Botanical and OHWM Delineation

ICF botanists conducted early and late season botanical surveys and identified the ordinary high water mark (OHWM) of the perennial creeks at all four project locations. ICF botanists followed the CDFW 2009 *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*. During botanical surveys, all plants were identified to the taxonomic level necessary to determine if they were special-status plants or were species with unusual or significant range extensions. Additional information regarding ICF surveyor qualifications can be found in the botanical survey memos in Appendix C.

The average width of each of the four creeks in the Environmental Study Limits (ESL) was determined by locating the OHWM, which was identified using the field

indicators provided in 33 Code of Federal Regulations (CFR) 328.3(e) and 329.11(a)(1) and in U.S. Army Corps of Engineers (USACE) Regulatory Guidance Letter No. 05-05, dated December 7, 2005.

2.3.2. Old Growth Redwood Assessment

Caltrans biologists assessed the potential impacts of the project on old growth redwood trees in October 2014. Potential effects on tree health were rated on a scale of 0-6 based on proximity of work to the tree, extent of root zone affected, and depth of work (Table 7).

Table 7: Effect of Root Zone Disturbance on Tree Health

Rating	Effect
0	Root zone disturbance would have no effect on tree health.
1	Effect of root zone disturbance is extremely minor and there would be no decline in foliage density or tree health.
2	Effect of root zone disturbance is very slight and there would be no decline in foliage density or tree health.
3	Effect of root zone disturbance is slight and there would be no decline in foliage density or tree health.
4	Effect of root zone disturbance may be a short-term visible reduction in foliage density that is still well within the adaptive capabilities of the tree.
5	Effect of root zone disturbance may be a reduction in root health sufficient to cause lasting visible dieback of wood in the uppermost crown; tree survival is not threatened.
6	Effect of root zone disturbance may be severe enough to threaten survival of the tree.

A new tree assessment was done in fall of 2015 in order to use updated tree information, an updated project description, and a certified arborist. Fieldwork was performed in October and November 2015 by Caltrans staff. Tree locations and diameter at breast height (dbh) were recorded, and plotted on project layout maps. Old-growth redwood trees for this project are defined as trees at least 30 inches in dbh. Trees whose root health zones (RHZs, 5 x dbh) intersected proposed ground-disturbing work elements (see Appendix D) were assessed for potential impact. Impact assessment was done by a Caltrans staff: an ISA-certified arborist with assistance from a biologist. Impact assessment followed the same 0 to 6 rating scale used in the previous assessment. Important considerations for the 2015 assessment included distance from excavation, extent of proposed work as depicted in the project cross section diagrams and project plans, and extent of work that would occur within

the structural root zone (SRZ, 3 x dbh). Tree evaluation also considered site conditions, such as topography, apparent water sources, and previous fill and excavations. Based on the information, evaluators assessed the likely impact of work on old-growth redwood tree health.

2.4. Agency Coordination and Professional Contacts

This section contains a summary of the coordination and consultation with various resource agencies conducted as part of this project.

2.4.1. U. S. Fish and Wildlife Service and NOAA's National Marine Fisheries Service

Technical assistance with USFWS and NOAA's National Marine Fisheries Service (NMFS) began in 2009, when the scope of the proposed project was much larger.

In 2010 USFWS staff provided mapping showing the known nesting territories of the northern spotted owl near two of the bridges (Location 2 and 3). Because all four project locations have suitable nesting habitat and nest sites can vary from year to year, the decision was made to assume that the northern spotted owl will be present at all four project locations, and to incorporate appropriate avoidance and minimization measures into the project.

2.4.2. California Department of Fish and Wildlife

Caltrans has coordinated with CDFW regarding the proposed project, beginning in 2009. Avoidance and minimization measures were incorporated into the project to address concerns by CDFW staff. In June 2014 Caltrans received concurrence from CDFW that the proposed project will not result in the take (as defined in the California Fish and Game Code) of species listed, or proposed for listing, under the California Endangered Species Act (CESA), as long as avoidance and minimization measures were included in the project. A copy of the CDFW concurrence is included in Appendix E.

2.4.3. California Department of Parks and Recreation

Caltrans obtained a scientific investigation permit from the North Coast Redwoods District of the California Department of Parks and Recreation (California State Parks) to conduct sensitive plant investigations for the proposed project.

Numerous field visits during project development involving California State Parks and Caltrans staff have occurred over the last few years. Informally, options for

staging, construction methods, and potential impacts to sensitive park resources were discussed.

2.5. Environmental Study Limits

The ESL encompasses the area reasonably needed to construct the project, provide for access and staging, and complete environmental studies. The ESL is roughly a rectangle extending a couple hundred feet beyond the bridges along the roadway and 50 feet perpendicular to the road. The ESL is shown on the mapping in Appendices A and B. The ESL is approximately 6.8 acres in area.

2.6. Limitations That May Influence Results

No problems or limitations such as property access or weather were encountered during field surveys that will affect the conclusions of this Natural Environment Study (NES).

Chapter 3. Results: Environmental Setting

3.1. Description of the Existing Biological and Physical Conditions

The proposed Avenue of the Giants - Four Bridges Project is located in Humboldt County, at four locations along State Route 254. Elk, Bridge, and Bear Creek Bridges are located within Humboldt Redwoods State Park. Ohman Creek Bridge is located outside of public park lands. The ESL contains a mix of natural habitats and developed areas (paved and unpaved pullouts, redwood grove signage, tourist stops). Appendix F contains photographs showing the general area and vegetation present at each of the four project locations.

3.1.1. Physical Conditions

3.1.1.1. TOPOGRAPHY

Topography within the ESL varies from relatively flat to sloping hills, with erosion cut drainages that feed into the Eel River. Ohman Creek Bridge is at an elevation of 250 feet, Elk Creek Bridge is at an elevation of 190 feet, Bridge Creek Bridge is at an elevation of 205 feet, and Bear Creek Bridge is at an elevation of 135 feet.

3.1.1.2. SOILS

The Natural Resources Conservation Service (NRCS) Web Soil Survey was reviewed to determine the soil types present within the ESL, listed in Table 8 below (USDA, NRCS 2016). Four different soil classifications were identified within the ESL. None of the soil types present within the ESL are included on the National Hydric Soils List (USDA, NRCS 2015).

Table 8: Soil Types Present within the ESL

Location	Structure	Post Mile	Soil Unit Name	Soil Unit Map
1	Ohman Creek Bridge	0.88	Canocreek-Cooterock-Sproulish complex	5508
2	Elk Creek Bridge	10.43	Sproulish-Canocreek-Redwholy complex	571
3	Bridge Creek Bridge	10.80	Sproulish-Canocreek-Redwholy complex	571
4	Bear Creek Bridge	43.02	Eelriver and Cottoneva soils, 0 to 2 percent slopes	179
4	Bear Creek Bridge	43.02	Grizzlycreek-Chaddcreek complex	181

Location	Structure	Post Mile	Soil Unit Name	Soil Unit Map
4	Bear Creek Bridge	43.02	Redwoodhouse-Yagercreek-Mailridge	513

3.1.1.3. DRAINAGES/HYDROLOGY

The ESL was surveyed for wetlands and other waters of the U. S., and waters of the State. Four perennial creeks, classified as other waters of the U. S. and waters of the State, are present with the ESL: Ohman Creek, Elk Creek, Bridge Creek, and Bear Creek. Ohman Creek, Elk Creek, and Bridge Creek flow to the South Fork of the Eel River, and Bear Creek flows to the Eel River. All four project locations are within the Eel River Hydrologic Unit. Specific hydrologic information on each location is provided below in Table 9. Mapping in Appendix A and Figure 1 show the four project locations in relation to the Eel River.

Table 9: Hydrologic Information

Location	Structure	Post Mile	USGS Hydrologic Unit Code (HUC)	USGS HUC Name	State Water Resources Control Board (SWRCB) Hydrologic Unit	SWRCB Hydrologic Area	SWRCB Hydrologic Sub-area
1	Ohman Creek Bridge	0.88	18010106	South Fork Eel	Eel River	South Fork Eel River	Weott
2	Elk Creek Bridge	10.43	18010106	South Fork Eel	Eel River	South Fork Eel River	Weott
3	Bridge Creek Bridge	10.80	18010106	South Fork Eel	Eel River	South Fork Eel River	Weott
4	Bear Creek Bridge	43.02	18010105	Lower Eel	Eel River	Lower Eel River	Scotia

All four perennial creeks are in fairly narrow drainages with incised channels. The composition of the channel beds at all locations is primarily cobble sized rock, with Bear Creek the steepest and Ohman Creek the flattest in elevation. Small pools are present at all locations but they generally dry up or flow subsurface during the driest part of a normal rainfall year. These types of drainages provide good habitat for amphibians and their larva as the natural fluctuation of water level prevents larger predatory fish from being present in the spring/summer.

The ESL is hydrologically complex as it encompasses a number of creeks very close to where they flow into the South Fork of the Eel River or the Eel River. These areas are prone to backing up when the South Fork of the Eel River or the Eel River floods in the winter. In the summer a hydrologic connection to the South Fork of the Eel River or the Eel River is likely maintained through subsurface flow even when surface water flow rates are insufficient to make an above ground connection.

3.1.1.4. NATIONAL WETLANDS INVENTORY

The USFWS National Wetlands Inventory (NWI) was reviewed for information regarding the four creeks associated with this project. Table 10 lists the NWI classification code for each of the four creeks.

Table 10. NWI Classification Code

Location	Creek	Post Mile	NWI Classification Code
1	Ohman Creek	0.88	R4SBC (riverine, intermittent, streambed, seasonally flooded)
2	Elk Creek	10.43	R4SBC (riverine, intermittent, streambed, seasonally flooded)
3	Bridge Creek	10.80	R4SBC (riverine, intermittent, streambed, seasonally flooded)
4	Bear Creek	43.02	R3UBH (riverine, upper perennial, unconsolidated bottom, permanently flooded)

3.1.1.5. CLIMATE

The climate in the project area is Mediterranean/cool summer (Csb), according to a modified Köppen Classification System (Critchfield 1983 in CDFW 2003).

3.1.2. Biological Conditions

3.1.2.1. WILDLIFE

Suitable habitat for wildlife species, including the Northern spotted owl and marbled murrelet, Pacific fisher, Townsend’s big-eared bat is present within the ESL. Habitat within the ESL and surrounding vicinity is primarily associated with old growth redwood forest and the Eel River. Vaux's swift, osprey, bald eagle, and additional bat species also have the potential to be found in or near the project area.

No bats were observed to use the bridge during field surveys. No useable expansion joints or other crevices that could provide bat day roosting habitat were observed on any of the bridges. The bridges themselves provide night roosting bat habitat.

During a September 10, 2015 survey guano was observed beneath Ohman Creek and Bridge Creek Bridges, indicating that these two bridges are used for night roosting. While evidence of night roosting was not observed on Elk Creek or Bear Creek Bridges, these bridges could be used for night roosting.

No birds were observed to use the bridge during field surveys. Abandoned mud nests likely made by swallows, and a comparably sized twig nest possibly constructed by a black headed flycatcher, were also observed.

No Pacific fishers, or evidence of them, or suitable cavities, were observed during field surveys.

Foothill yellow-legged frog eggs were observed in Ohman Creek between the bridge and the creek's confluence with the Eel River, outside of the project's ESL.

3.1.2.2. VEGETATION COMMUNITIES

The project is located within the Outer North Coast Ranges (NCoRo) California Floristic Province (CA-FP) (Jepson Flora Project 2016). Vegetation communities within the ESL were primarily classified based on plant community descriptions provided in *A Manual of California Vegetation* (Sawyer, Keeler-Wolf, and Evens 2009). Redwood forest, annual brome grasslands, California bay forest, and madrone forest are present within the ESL.

Common species found at one or more of the project locations are California bay, (*Umbellularia californica*), bigleaf maple (*Acer macrophyllum*), French broom (*Genista monspessulana*), poison oak (*Toxicodendron diversilobum*), and a variety of grasses in the *Bromus* genus. An inventory of all plants identified during surveys conducted for this project can be found in Appendix G.

Elements of all of the communities listed below are present at each of the project locations. Redwood forest is the most prevalent community at each location. Redwood trees directly influence the other vegetation types, primarily due to shading and the presence of redwood duff. Annual brome grasslands which consist primarily of ruderal species of grasses that typically occur at the roads' edge, are most influenced by the presence of redwood trees. Annual brome grasslands are more prominent near the highway, where seed dispersal is more likely to occur.

Sequoia sempervirens (Redwood forest) Alliance Coast redwood (*Sequoia sempervirens*) is dominant or co-dominant in the tree canopy, with white fir (*Abies*

grandis), bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), Pacific madrone (*Arbutus menziesii*), giant chinquapin (*Chrysolepis chrysophylla*), tanoak (*Notholithocarpus densiflorus*), Sitka spruce (*Picea sitchensis*), Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and California bay (*Umbellularia californica*). Shrubs are infrequent or common, herbaceous layer is absent or abundant in redwood forest. Redwood forest is found on raised stream terraces, benches, all slopes and aspects, and ridges. *Sequoia sempervirens* Alliance is designated by CDFW as a Natural Community of Concern, and has a global rank (G-rank) of 3 (vulnerable) and a state rank (S-rank) of 3 (vulnerable).

Annual brome grasslands (*Bromus (diandrus, hordeaceus)* -

***Brachypodium distachyon* semi-natural herbaceous stands)**

Ripgut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*), or false brome (*Brachypodium distachyon*) is dominant or co-dominant with non-natives in the herbaceous layer in annual brome grasslands. Emergent trees and shrubs may be present at low cover in annual brome grasslands. Annual brome grasslands are found in all topographic settings in foothills, waste places, rangelands, and openings in woodlands.

California bay forest (*Umbellularia californica* forest alliance)

California bay (*Umbellularia californica*) is the dominant or co-dominant in the tree or tall shrub canopy, with bigleaf maple (*Acer macrophyllum*), buckeye (*Aesculus californica*), white alder (*Alnus rhombifolia*), red alder (*A. rubra*), Pacific madrone (*Arbutus menziesii*), hazelnut (*Corylus cornuta*), Southern California black walnut (*Juglans californica*), tanoak (*Notholithocarpus densiflorus*), California foothill pine (*Pinus sabiniana*), California sycamore (*Platanus racemosa*), Douglas fir (*Pseudotsuga menziesii*), coast live oak (*Quercus agrifolia*), canyon oak (*Q. chrysolepis*), interior live oak (*Q. wislizeni*), and coast redwood (*Sequoia sempervirens*). Canopy of the California bay forest is intermittent to continuous. The shrub layer is open to abundant and the herbaceous layer is sparse to abundant in the California bay forest. California bay forest is found on alluvial benches, streamsides, valley bottoms, coastal bluffs, inland ridges, steep north-facing slopes, and rocky outcrops.

Madrone forest (*Arbutus menziesii* forest alliance)

Pacific madrone (*Arbutus menziesii*) is the dominant or co-dominant tree in the canopy, with bigleaf maple (*Acer macrophyllum*), tanoak (*Notholithocarpus densiflorus*), Douglas fir (*Pseudotsuga menziesii*), coast live oak (*Quercus agrifolia*),

canyon oak (*Q. chrysolepis*), black oak (*Q. kelloggii*), interior live oak (*Q. wislizeni*), and California bay (*Umbellularia californica*). The canopy of the madrone forest is continuous. The shrub layer of the madrone forest is sparse to intermittent and the herbaceous layer is sparse in the madrone forest. Madrone forest is found on stream terraces and upland slopes with productive soils or steep slopes with shallow, rocky, infertile soils.

Riparian vegetation

All four bridges cross over a perennial drainage. Water from these drainages may only run below the surface during dry years. The areas adjacent to these drainages are riparian, and contain many of the species found in California bay forest. Due to shading from old growth redwood trees, most of these areas are thinly vegetated, with the exception being areas located close to the highway that receive more sun. These areas, however, tend to be occasionally cleared for road and utility maintenance, which prevent mature riparian communities from developing.

No statistical dominance surveys were completed for the project, but where old growth redwoods occur in the project they are clearly dominant because of the shading they provide and the amount of leaf litter build up. Riparian vegetation at each location is fairly thin due to the shading. There is a low complexity of vegetation streamside.

3.1.2.3. INVASIVE PLANT SPECIES

Invasive/noxious plant species listed on the California Department of Food and Agriculture (CDFA) and the California Invasive Plant Council (Cal-IPC) noxious weed lists were observed within the ESL during plant surveys, and are described in Table 11. No species from Federal Noxious Weed Regulation 7 CFR 360 were observed within the ESL.

Table 11: Invasive/Noxious Plant Species Found within the ESL

Scientific Name	Common Name	Rating	
		CDFA ¹	Cal-IPC ²
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	-	Moderate
<i>Avena barbata</i>	Slender oat	-	Moderate
<i>Brassica nigra</i>	Black mustard	-	Moderate
<i>Brassica rapa</i>	Rapeseed mustard	-	Limited
<i>Briza maxima</i>	Rattlesnake grass	-	Limited
<i>Bromus diandrus</i>	Ripgut brome	-	Moderate
<i>Bromus hordeaceus</i>	Soft chess	-	Limited
<i>Bromus madritensis</i> ssp. <i>rubens</i>	Red brome	-	High

Scientific Name	Common Name	Rating	
		CDFA ¹	Cal-IPC ²
<i>Carduus pycnocephalus</i>	Italian thistle	C	Moderate
<i>Centaurea solstitialis</i>	Yellow star-thistle	C	High
<i>Cirsium vulgare</i>	Bull thistle	C	Moderate
<i>Cynodon dactylon</i>	Bermuda grass	-	Moderate
<i>Cynosurus echinatus</i>	Dogtail grass	-	Moderate
<i>Cytisus scoparius</i>	Scotch broom	-	High
<i>Dactylis glomerata</i>	Orchard grass	-	Limited
<i>Erodium cicutarium</i>	Redstem filaree	-	Limited
<i>Festuca arundinacea</i>	Tall fescue	-	Moderate
<i>Foeniculum vulgare</i>	Sweet fennel	-	High
<i>Genista monspessulana</i>	French broom	C	High
<i>Geranium dissectum</i>	Cut leaf geranium	-	Limited
<i>Hedera helix</i>	English ivy	-	High
<i>Holcus lanatus</i>	Velvet grass	-	Moderate
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley	-	Moderate
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	Foxtail barley	-	Moderate
<i>Hypericum perforatum</i>	Klamath weed	C	Moderate
<i>Hypochaeris glabra</i>	Smooth cat's ear	-	Limited
<i>Hypochaeris radicata</i>	Rough cat's ear	-	Moderate
<i>Leucanthemum vulgare</i>	Ox-eye daisy	-	Moderate
<i>Lolium multiflorum</i>	Italian ryegrass	-	Moderate
<i>Lythrum hyssopifolium</i>	Hyssop loosetrife	-	Limited
<i>Medicago polymorpha</i>	Medic	-	Limited
<i>Mentha pulegium</i>	Pennyroyal	-	Moderate
<i>Myosotis latifolia</i>	broadleaf forget me not	-	Limited
<i>Parentucella viscosa</i>	Yellow glandweed	-	Limited
<i>Phalaris aquatica</i>	Harding grass	-	Moderate
<i>Picris echioides</i>	Bristly oxtongue	-	Limited
<i>Plantago lanceolata</i>	English plantain	-	Limited
<i>Poa pratensis</i>	Kentucky bluegrass	-	Limited
<i>Polypogon monspeliensis</i>	Rabbitsfoot grass	-	Limited
<i>Rubus armeniacus</i> (=R. <i>discolor</i>)	Himalayan blackberry	-	High
<i>Rumex acetosella</i>	Sheep sorrel	-	Moderate
<i>Rumex crispus</i>	Curly dock	-	Limited
<i>Torilis arvensis</i>	Field hedge parsley	-	Moderate
<i>Trifolium hirtum</i>	Rose clover	-	Moderate
<i>Vinca major</i>	Periwinkle	-	Moderate
<i>Vulpia myuros</i> ssp. <i>myuros</i>	Rattail fescue	-	Moderate

¹CDFA:

List C: includes weed species that are so widespread that CDFA does not endorse state or county-funded eradication containment efforts except in nurseries or seed lots.
- = no rating.

²Cal-IPC:

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate: These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited: These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

3.2. Regional Species and Habitats of Concern

A list of sensitive species and habitats potentially occurring in the project vicinity was developed from reviewing the CNDDDB and the CNPS Inventory of Rare and Endangered Vascular Plants for the following nine quadrangles: Blocksburg, Bridgeville, Ettersburg, Fort Seward, Miranda, Myers Flat, Redcrest, Scotia, and Weott. For the botanical surveys, CNDDDB and the CNPS were queried for the following 17 quadrangles: Blocksburg, Briceland, Bridgeville, Bull Creek, Ettersburg, Fort Seward, Garberville, Harris, Hydesville, Larabee Valley, Miranda, Myers Flat, Owl Creek, Redcrest, Scotia, Weott, and Yager Junction. The USFWS online species list database was queried for the Miranda, Myers Flat, and Redcrest quadrangles. The USFWS list was updated with a USFWS Information for Planning and Conservation (IPaC) Trust Resource Report for work in the Environmental Study Limit. The WBWG Regional Priority Matrix was also reviewed for information regarding sensitive bat species. Appendix B contains a list of sensitive species and habitats potentially occurring in the project vicinity.

Chapter 4. Results: Biological Resources, Discussion of Impacts and Mitigation

This chapter describes the sensitive natural communities, special-status wildlife species, and special-status plant species that are likely to occur within the project limits. It also describes potential impacts to resources, and the measures that are being proposed to protect these resources.

4.1. Natural Communities of Special Concern

4.1.1. Other Waters of the U. S. and Waters of the State

Other Waters of the U. S.

Under Section 404 of the Clean Water Act, waters of the U. S. include the following: territorial seas, coastal and inland waters, lakes, rivers and streams that are navigable and their adjacent wetlands, tributaries to navigable waters and their adjacent wetlands, interstate waters and their tributaries including adjacent wetlands, and all other waters of the U. S. (intermittent streams and prairie potholes).

Waters of the State

According to the State Water Resources Control Board, waters of the State include any surface water or groundwater, including saline waters, within the boundaries of the state. The State Water Resources Control Board also regulates riparian areas, defined less by a vegetation community and more by being adjacent to a waters of the U. S (riparian vegetation is discussed in Section 4.1.2).

4.1.1.1. SURVEY RESULTS

Wetlands were not observed within the ESL. Other waters of the U. S./waters of the State are present within the project limits: Ohman, Elk, Bridge, and Bear Creeks. All four are perennial creeks with a connection to the Eel River, a traditionally navigable water (TNW) body, as defined by the USACE.

Other waters of the U. S. within the ESL were classified as riverine (perennial streams). A perennial stream has flowing water year-round during a typical year. The water table is located above the streambed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow. Waters of the State within the ESL were classified

as perennial creeks and associated riparian vegetation (riparian vegetation is discussed in Section 4.1.2).

A total of 0.59 acres of other waters of the U. S./waters of the State are present within the ESL. Appendix H contains a map showing the other waters of the U. S./waters of the State present within the ESL.

4.1.1.2. PROJECT IMPACTS

No activities in waters are needed to complete the project. Work on the bridges will, however, be conducted above other waters of the U. S./waters of the State. Work will involve removal and rebuilding of bridge materials (e.g., concrete, bridge rails). The work poses a minimal risk of material inadvertently falling into other waters, and of material being placed in inappropriate locations where they may move toward waters. Standard containment measures will be in place to ensure that materials do not fall from the bridge and enter a stream. Equipment refueling, fluid leakage, and equipment maintenance near a stream channel pose potential risks of contamination to aquatic habitat. However, Caltrans' standard contract specifications and standard BMPs will avoid chemical contamination during construction, and localized degradation of water quality from toxic chemicals is unlikely. In the unlikely event that materials escape containment measures, foot traffic to retrieve items dropped below the bridge may be needed. No other activities below the OHWM of these perennial creeks will occur. Construction of the proposed project will not result in permanent or temporary impacts to other waters of the U. S./waters of the State.

4.1.1.3. AVOIDANCE AND MINIMIZATION EFFORTS

No avoidance or minimization efforts are needed.

4.1.1.4. COMPENSATORY MITIGATION

None.

4.1.1.5. CUMULATIVE IMPACTS

None.

4.1.2. Riparian Vegetation

Riparian vegetation provides dense multi-storied habitat available to birds, amphibians, mammals, and reptiles. Riparian vegetation also provides migration, foraging, and breeding habitat for neotropical birds that breed during the spring and summer in North America. Riparian zones adjacent to waterways provide shade, sediment transport, nutrient or chemical regulation, stream bank stability, and input of

large woody debris or organic matter. It also provides shelter cover, and a source of food input for fish. Riparian zones are also subject to jurisdiction by DFW under Sections 1600-1616 of the State Fish and Game Code.

4.1.2.1. SURVEY RESULTS

Riparian vegetation is present adjacent to all four perennial creeks within the ESL.

4.1.2.2. PROJECT IMPACTS

Minor temporary impacts to riparian vegetation may result from the construction of the proposed project. These impacts may include trimming during installation of metal beam guardrail and crash cushions, abutment work, and installation of tarps or other materials to contain debris during bridge work. No tree removal is anticipated.

An area adjacent to the bridge rails will need to be clear of vegetation in order to install effective containment measures, which will be used to prevent material from falling to the streams. The area needed will likely be approximately five to ten feet from the edge of bridge. As of November 2015, riparian trees (alder and big-leaf maple) have canopy growing within five feet of edge of bridge at Ohman Creek Bridge, Bridge Creek Bridge, and Bear Creek Bridge. The trees will not be removed; rather, trimming of canopy will be needed to provide the clearance. Trimming will be minor trimming of canopy, and will not threaten the survival of riparian trees or zones. The trees are expected to continue growth.

Installation of crash cushion and guardrail will require that a small area immediately surrounding them are clear of vegetation. As of November 2015, a big-leaf maple shrub was growing within five feet of guardrail (proposed for change to crash cushion) at one corner at Bear Creek Bridge. If the shrub continues growing toward the guardrail, it may need to be trimmed for installation of the crash cushion. Even if trimmed, the shrub would maintain sufficient growth such that its survival and the functioning of the riparian zone would not be threatened.

Appendix I contains a map showing areas that may be temporarily disturbed during construction.

Upon completion of construction, two of the bridges will be slightly wider than existing, and two of the bridges will be slightly narrower than existing. The proposed project is not expected to modify the amount of shade at any of the four project locations. The proposed project lacks access roads or other work below bridges, and will complete railing barrier work from the existing bridge decks, which limit the

amount of riparian vegetation areas that would need to be trimmed. Standard measures, such as ESAs, are also included in the project and are designed to ensure that impacted areas are limited to those identified in project studies. No trees will be removed, only trimming of branches. Species expected to be trimmed are fast-growing and are expected to regrow naturally. Effects to riparian vegetation are small and temporary, and will not be substantial.

4.1.2.3. AVOIDANCE AND MINIMIZATION EFFORTS

No avoidance or minimization efforts are needed.

4.1.2.4. COMPENSATORY MITIGATION

None.

4.1.2.5. CUMULATIVE IMPACTS

None.

4.1.3. *Sequoia sempervirens* (Redwood Forest) Alliance

The project is located in and near Humboldt Redwoods State Park. Redwood groves at all four project locations include old-growth coast redwood trees. Old growth redwood forest is classified by CDFW as *Sequoia sempervirens* (Redwood Forest) Alliance (Sawyer et al. 2009) and is designated as a natural community of special concern. This natural community has State Rank of 3: Vulnerable—Vulnerable in the state due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation from the state (Sawyer et al. 2009). The Global Rank is G3: Vulnerable—At moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors. The old growth redwood forest is also a protected park resource.

Existing human-caused disturbance is observable at all four locations: existing paved road crosses through each grove. Additional human-caused disturbance is present at each location. At Ohman Creek Bridge, a restaurant and visitor attraction, with paved parking lot and buildings, cover much of the habitat southeast of the bridge. At Elk Creek Bridge, paved and unpaved parking areas, as well as hiking trails, are present. At Ohman Creek, Bridge Creek, and Bear Creek Bridges, French or Scotch broom, both of which are invasive/noxious according to Cal-IPC, occur in patches.

Coast redwood forest at all four locations exhibit at least some elements of high quality habitat. All four locations contain old-growth coast redwood trees. Three

locations are located in Humboldt Redwoods State Park. These groves, as well as surrounding forest, are protected State Park resources. All four locations are located near a major river (Eel River or South Fork Eel River), which may provide alluvium, but also may damage trees during flood events.

The coast redwood forest exhibits some elements of exemplary quality, but also some degradation. The coast redwood forest at all four locations is of relatively high quality.

A literature review of redwood tree characteristics was conducted as part of a tree impact assessment for a proposed project adjacent to coast redwood forest (Yniguez 2015). Pertinent sections of the literature review are presented here:

Root Disturbance and Adaptations of Coast Redwoods

One of the main considerations in evaluating the impacts of construction on redwood trees is the ability of the species to tolerate disturbance. Under contract to the Department, a registered consulting arborist, Dennis Yniguez of Tree Decisions, conducted a comprehensive review of the scientific literature on tree physiology and root impacts, and on redwood biology and ecology (Yniguez 2015). This information was used in the evaluation of potential effects from the Richardson Grove Operational Improvement Project on redwood root systems.

Roots are frequently injured or die from many agents throughout the life of a healthy tree, and new roots often form rapidly after injuries (Perry 1992). Root pruning stimulates roots to regenerate near the cut (Wilson 1970). When a tree's root, trunk, or branch tissue is disrupted by pruning cuts or other wounds, microorganisms begin to infect the site. The tree responds by forming chemical and physical "walls" (barriers) around the wound to slow or prevent the spread of disease or decay. This process is called compartmentalization (Shigo 1977, 1986). This was demonstrated in a study of the effects of severing roots of four species of deciduous hardwoods (Watson 2008). Different sizes of roots were cut at successive distances from each tree, starting at the trunk. Examining the roots five years later showed that the severed roots of all sizes had only minimal decay. The author concluded that, unlike in branches where leaving a stub can lead to more extensive decay, severing the roots did not cause substantial deterioration from root decay. The minimal decay after 5 years posed no threat to the long-term health and stability of these four species (Watson 2008).

Coast redwoods are surprisingly capable of compensating for disruptions to their root systems (Yniguez 2015). Among the characteristics reported in the literature that have enabled the coast redwood to exploit its habitat so successfully are:

- **An extraordinarily resilient root system;**

Stone and Vasey (1962) examined four old growth redwoods whose roots had been removed from the top two feet of soil. The crowns of the trees remained healthy and within four years, 90% of the feeder root system was replaced by a comparable one (Stone 1965). They comment, “What continues to surprise us is that so much of the root system can be removed without any noticeable reduction in vigor.” Sturgeon (1964) described the trees along roads in Humboldt County, some of which had portions of their bases removed for road development. He noted, “Judging from the absence of significant loss of vigor in trees bordering the highways, coast redwood is evidently not seriously affected by paving where it does not cover more than half the trees’ root zone.” Standish (1972) and McBride and Jacobs (1978) found no decline in tree growth in areas where the trees were subjected to soil compaction by visitors.

- **A strong and widespread root structure;**

Coast redwoods have strong and widespread lateral roots that disperse aboveground forces to the soil and resist uprooting (Coutts 1983; Ennos 1993; Fritz 1929; Mattheck 1994; Olson et al. 1990; Stokes and Mattheck 1996; U.S. Forest Service 1908). The roots of individual trees graft onto other redwood roots to provide stability and anchorage, “together creating therefore a matrix like steel reinforcing bars in concrete” (Becking 1979).

- **Buttress flares containing specialized swellings called lignotubers;**

Buttress flares are massive swellings at or below the ground level that can release shoots and regenerate new roots to increase vigor and stability in response to injury (Del Tredici 1998, 1999). They also store carbohydrates and mineral nutrients and help anchor trees growing on steep slopes (Del Tredici 1998, 1999).

- **Ability to tolerate heavy siltation from flooding;**

Fritz (1934) examined the roots of a 1200-year-old coast redwood that fell in Richardson Grove State Park. It adapted to periodic siltation that partially buried its base and raised the ground level more than 11 feet by creating new sets of roots that grew upward into the sediment and formed to fit each new soil level.

- **Ability to withstand low light conditions, fire, and damage from fire, as well as resist decay and attack by insects;**

The basal bark of a coast redwood trunk is thick and fire resistant, although periodic fires can kill the living tissue beneath the bark (Fritz 1931; Isenberg 1943). Coast redwoods have no important tree-killing insect or disease enemies (Fritz 1931) and are valued for their decay resistance.

- **Ability to obtain water from fog drip and through its needles;**

Fog, dew, and rain can supplement water that is obtained from roots (Limm et al. 2009; Simonin et al. 2009). In one study in northern California, Dawson (1996) reported that between 8% and 34% of the water used by the coast redwoods was obtained by fog dripping from the foliage into the soil.

- **Ability to move water and minerals in a zig-zag pattern up the tree, supplying the entire crown.**

Coast redwood tree roots lift water and dissolved minerals (sap) in zigzag patterns, which supplies water to all of the branches and leaves (Perry 1992). Because moisture is distributed completely over the upper crown, death or injury to individual roots of a coast redwood does not lead to corresponding one-sided trunk or branch death in the crown of the tree (Perry 1992). This water distribution pattern gives coast redwoods great adaptability to environmental changes (Rudinsky and Vité 1959).

4.1.3.1. SURVEY RESULTS

Surveyors recorded and measured 351 trees in the areas surrounding the four bridges. Of these trees, 46 were coast redwoods with at least 30 inch diameter at breast height (dbh) and a RHZ intersecting a proposed project element. Expected effect from project root zone disturbance to tree health ranged between 0 and 4. No trees received a rating higher than 4. (Table 12).

Table 12: Tree Impact Ratings

Rating	Number of Trees				
	Ohman Creek Bridge	Elk Creek Bridge	Bridge Creek Bridge	Bear Creek Bridge	Total
0	5	3	--	4	12
1	1	5	2	8	16
2	2	6	1	1	10
3	1	3	2	--	6
4	--	2	--	--	2
5	--	--	--	--	--
6	--	--	--	--	--
Total	9	19	5	13	46

Twelve trees were rated 0; they would not be affected (tree numbers 3, 5, 22, 49, 53, 1221, 1461, 1462, 1529, 2260, 993132, and 993133).

Sixteen trees were rated 1; they would experience extremely minor effects (tree numbers 6, 21, 29, 44, 48, 1238, 1311, 1463, 1581, 1582, 2118, 2135, 2261, 2263, 2395, and 993146).

Ten trees were rated 2; they would experience very slight effects, with no decline in foliage density or tree health (tree numbers 1, 9, 10, 35, 1222, 1466, 1551, 1562, 1579, and 2394).

Six trees were rated 3; they would experience slight effect, with no decline in foliage density or tree health (tree numbers 1246, 1310, 1578, 2230, 2231, and 993129).

Two trees were rated 4; they may experience a short-term visible reduction in foliage density that is still well within the adaptive capabilities of the tree (tree numbers 1245, and 1550).

4.1.3.2. PROJECT IMPACTS

The potential effects to old-growth redwood trees were assessed without assuming any avoidance or minimization measures. Typical concrete pads for crash cushions are ½ foot deep, shallower than metal beam guardrail posts. Crash cushions will be installed instead of metal beam guardrail in areas that are located close to old growth redwood trees, in order to avoid impacts to sensitive tree roots. Widening would require excavation to a maximum depth of 1.15 feet. Important project features are depicted on maps in Appendix D. Any adverse effects to old-growth redwood forest

would primarily result from limited cutting of redwood tree roots. Other sources of effects would be approximately 0.04 acre of added impervious surface, and possible minor limb-trimming. No trees would be removed, and effects to individual trees would be minor. Long-term health and survival of old-growth redwood trees would not be jeopardized.

While impervious surface would be added, any changes in grade would be minor and not sufficient to cause substantive changes in runoff patterns. The overall adverse effects to old-growth redwood forest as a result of the project would be minor and temporary.

Several components and functions of old-growth redwood forest may be viewed in additional detail:

Individual Trees

Health of individual old-growth redwood trees would experience only minor adverse effects. Two old-growth redwood trees would experience a short-term visible reduction in foliage density that is still well within the adaptive capabilities of the trees. All other trees would experience no decline in foliage density or tree health. No trees were considered to be impacted to the point of dieback of wood or of threat to survival.

Edge / Fragmentation

No trees would be removed. Old-growth redwood forest habitat is expected to remain substantively intact. A small area of ground surface would be altered, notably an area of approximately 0.04 acre that would receive new impervious surface. Such area is in a slight widening of existing roadway adjacent to the bridges. No new sources of habitat fragmentation will be introduced.

Canopy

At most, two trees are expected to experience a temporary reduction in foliage density. Woody dieback is not expected. The capacity of the redwood grove canopy to provide shading, habitat, and other ecological functions is not expected to experience any substantive impairment.

4.1.3.3. AVOIDANCE AND MINIMIZATION EFFORTS

The project has been downscoped, and impact assessments indicate that effects to redwood trees would be minimal. The following avoidance and minimization

measures were developed in conjunction with California State Parks previously, when the project was larger in scope, and will be applied to the project to further reduce any potential impacts. Some of these measures overlap with standard measures. They are included here because they were discussed and agreed with California State Parks.

1. Prior to the start of construction, a qualified biologist will conduct training for all construction personnel regarding sensitive biological resources present within and adjacent to the ESL (including old growth redwood trees). The training will include a description of the resource and the general measures that are being implemented to avoid and minimize impacts to the resource.
2. A qualified biologist will be on site during all ground-disturbing activities within the critical root zone (defined as three times the diameter of the tree at breast height) of old growth redwood trees to provide technical assistance with avoidance and minimization measures.
3. Old growth redwood trees adjacent to the construction zone will be designated as ESAs on construction plans, and will be protected during construction.
4. Staging of materials, equipment, and vehicles will be limited to the closed highway lanes. Shoulders and pullout areas along the highway will be used for staging only if needed, after all available paved staging has been used. If these areas do not provide enough room for staging and additional staging areas are needed, these areas will be mutually agreed upon by the California State Parks and Caltrans Environmental and Construction staff. No staging of materials, equipment, or vehicles will be allowed in old growth redwood tree areas.
5. No trees over 24 inches diameter at breast height (dbh) will be limbed without written approval from California State Parks and Caltrans Environmental staff. All pruning will be performed in accordance with the ISA Tree Pruning Guidelines and adhere to the most recent editions of the American National Standard for Tree Care Operations (ANSI Z133.1) and Pruning (A300).
6. Excavation for paving tapers within the critical root zone will be done by hand, to minimize physical injury to the tree roots.
7. No roots greater than 2 inches in diameter will be cut.
8. Roots less than 2 inches in diameter will be cut cleanly, with a sharp instrument, in order to promote healing.

9. Irrigation will be provided in the critical root zone of redwoods over 24 inches dbh in areas where excavation below the finished grade has occurred within 24 hours and once a week thereafter between the dates June 1 through September 30 during construction. This will be accomplished with the use of a water truck with a fan spray. Water equivalent to ½ inch in depth will be applied to the area defined as from the edge of pavement to 25 feet beyond the edge of pavement. Clean, non-surface water will be used for tree irrigation; recycled water will not be used.

4.1.3.4. COMPENSATORY MITIGATION

None.

4.1.3.5. CUMULATIVE IMPACTS

None.

4.2. Special Status Plant Species

A total of 13 special status plant species and two sensitive habitat types were identified as potentially occurring in the vicinity of this project. Early and late season floristic surveys were completed over a series of two years during which no special status plant species were encountered. Detailed information regarding the botanical surveys conducted for the proposed project and the results of those surveys can be found in the final Botanical Survey Memo in Appendix G. An inventory of all plants observed during surveys can be found in Appendix H.

4.3. Special Status Animal Species Occurrences

4.3.1. Anadromous Fish

Southern Oregon/Northern California Coho Salmon

The Southern Oregon/Northern California coho salmon (*Oncorhynchus kisutch*) is listed as a federal and state threatened species. The Southern Oregon/Northern California coho salmon Evolutionary Significant Unit (ESU) is found in California coastal watersheds, from north of Punta Gorda to the California-Oregon border.

California Coastal Chinook Salmon

The California Coastal Chinook salmon (*Oncorhynchus tshawytscha*) was listed as a federal threatened species on September 16, 1999 and reaffirmed on June 28, 2005. The California Coastal Chinook salmon ESU includes all naturally spawned populations of Chinook salmon from rivers and streams south of the Klamath River (exclusive) to the Russian River (inclusive). Seven artificial propagation programs

are considered part of the ESU: the Humboldt Fish Action Council (Freshwater Creek), Yager Creek, Redwood Creek, Hollow Tree, Van Arsdale Fish Station, Mattole Salmon Group, and Mad River Hatchery fall-run Chinook hatchery programs.

Northern California Steelhead DPS

The Northern California steelhead Distinct Population Segment (DPS) (*Oncorhynchus mykiss*) was listed as a federal threatened species on June 7, 2000 and reaffirmed on January 5, 2006. The Northern California steelhead is also listed as a state species of special concern. The Northern California steelhead DPS includes all naturally spawned populations below natural and manmade impassable barriers in California coastal river basins from Redwood Creek southward to, but not including, the Russian River, as well as two artificial propagation programs: the Yager Creek Hatchery and North Fork Gualala River Hatchery (Gualala River Steelhead Project) steelhead hatchery programs.

4.3.1.1. SURVEY RESULTS

The South Fork of the Eel River and the Eel River provides habitat for Southern Oregon/Northern California Coast coho salmon, Northern California steelhead, and California coastal chinook salmon ESUs. Within the ESL these species may be present within Ohman Creek, Elk Creek, Bridge Creek, and Bear Creek.

Essential Fish Habitat

Magnuson-Stevens Fishery Conservation and Management Act defines Essential Fish Habitat as "...those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." It has been interpreted to include shade and food sources, such as riparian vegetation. Essential Fish Habitat (EFH) for Chinook salmon and coho salmon is present at all four project locations, including streams, stream channels/substrate, and riparian trees and shrubs.

4.3.1.2. CRITICAL HABITAT

Critical habitat for the Southern Oregon/Northern California coho salmon was designated on May 5, 1999. Critical habitat is designated to include all river reaches accessible to listed coho salmon between Cape Blanco, Oregon, and Punta Gorda, California. Ohman Creek, Elk Creek, Bridge Creek, and Bear Creek are designated as critical habitat for the Southern Oregon/Northern California coho salmon.

Critical habitat for the California Coastal Chinook salmon was published on September 2, 2005, with an effective date of January 2, 2006. Elk Creek, Bridge

Creek, and Bear Creek are designated as critical habitat for the California Coastal Chinook salmon.

Critical habitat for the Northern California steelhead was published on September 2, 2005, with an effective date of January 2, 2006. Ohman Creek, Elk Creek, Bridge Creek, and Bear Creek are designated as critical habitat for the Northern California steelhead.

4.3.1.3. PROJECT IMPACTS

The proposed project has very minor potential to impact individual salmonid species through unintended spills, increased sedimentation, and alteration of pH. The implementation of Caltrans' standard contract specifications and standard BMPs (see Section 1.1.4) are expected to further reduce impacts to anadromous fish during construction of the proposed project. Work on the bridge will be conducted above salmonid-bearing streams. Work will involve removal of bridge materials (e.g., concrete, bridge rails). The work poses a potential risk of material falling into a stream. Standard containment measures will be in place to ensure that materials do not fall from the bridge and enter a stream. Equipment refueling, fluid leakage, and equipment maintenance near a stream channel pose potential risks of contamination to aquatic habitat. However, Caltrans' standard contract specifications and standard BMPs will avoid chemical contamination during construction, and localized degradation of water quality from toxic chemicals is unlikely. Standard BMPs and standard specifications include restricting equipment fueling to upland areas; requiring that equipment and hazardous materials be stored in upland areas at least 150 feet from surface water; and requiring all equipment be cleaned before moving onto the site and be maintained free of leaks.

Riparian vegetation will not be removed during construction. Minimal trimming of riparian vegetation may occur during installation of metal beam guardrail and crash cushions, abutment work (Location 1 only), and installation of containment measures around bridge rails and overhangs.

Standard containment measures will be in place to ensure that materials do not fall from the bridge and enter a stream. Nevertheless, Caltrans is proceeding conservatively, and exercising coverage under the Programmatic Biological Opinion issued by NMFS on October 13, 2013 for Caltrans' routine maintenance and repair activities in Districts 1, 2, and 4, and individual Corps permits for these activities (NMFS 2013). The proposed project falls under Category 2. The Programmatic Biological Opinion identifies measures to be implemented whenever certain species

may be present. These measures are included in standard measures, and include items such as work windows. Additional BMPs (ABMPs) are also included as appropriate. A copy of the Category 2 Reporting Form, along with a list of ABMPs applicable to the project, can be found in Appendix J. The proposed project may affect, but is not likely to adversely affect, the southern Oregon/Northern California coho salmon, Northern California steelhead, and California coastal Chinook salmon.

The project will include minimal trimming of riparian vegetation. The trimming is expected on fast-growing riparian trees and shrubs, such as alder and big-leaf maple. Resultant effect to habitat will be minor and temporary, and limited to minimal trimming. The construction of the proposed project will not result in an adverse effect to Essential Fish Habitat or an adverse modification to designated critical habitat.

4.3.1.4. AVOIDANCE AND MINIMIZATION EFFORTS

No avoidance or minimization efforts are needed.

4.3.1.5. COMPENSATORY MITIGATION

None.

4.3.1.6. CUMULATIVE IMPACTS

None.

4.3.2. Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) is a federal threatened species and a state candidate species. Northern spotted owls generally have large home ranges and use large tracts of land containing significant acreage of older forest to meet their biological needs. The attributes of superior northern spotted owl nesting and roosting habitat typically include a moderate to high canopy closure (60 to 80 percent); a multi-layered, multi-species canopy with large overstory trees; a high incidence of large trees with deformities (large cavities, broken tops, mistletoe infections, and debris accumulations); large accumulations of fallen trees and other debris; and sufficient open space below the canopy for flight. Northern spotted owl nesting season is considered to be February 1 through July 30 (USFWS 2011).

4.3.2.1. SURVEY RESULTS

Protocol surveys were not conducted for the northern spotted owl. Known locations from USFWS and CNDDDB were reviewed. The closest documented northern spotted owl observation centers are approximately 1.2 miles away from Location 1, 1.2 miles

from Location 2, 1.1 miles from Location 3, and 0.6 miles from Location 4. USFWS provided mapping in 2010 that showed known northern spotted owl nesting territories near Locations 2 and 3. Because all four project locations have suitable northern spotted owl nesting habitat and nest sites can vary from year to year, the decision was made to assume that the northern spotted owl could be present at all four project locations.

4.3.2.2. CRITICAL HABITAT

Revisions to the critical habitat for the northern spotted owl were published by USFWS on December 4, 2012, with an effective date of January 3, 2013. The proposed project is not located within areas designated as critical habitat for the northern spotted owl.

4.3.2.3. PROJECT IMPACTS

The proposed project will not remove northern spotted owl nesting or foraging habitat; therefore, there will be no direct impacts to the northern spotted owl or its habitat.

The USFWS report, *Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California* (July 26, 2006) (Report), was consulted for assistance in estimating potential effects to the northern spotted owl due to noise and visual disturbance during the construction of this project.

Per the Report, existing noise levels were estimated using noise levels estimated in the Report for similar settings. Construction noise levels were estimated using known noise levels generated from types of equipment expected to be used to construct the project. Methods described in the Report were used to compare estimated construction and ambient noise levels, and estimate effects from construction. According to values listed in that report, the existing ambient noise levels within the ESL range from 67 to 95 decibels (dB) (Table 13). This ambient sound level classifies as “high.” Equipment expected to be used during construction of the proposed project will generate noise at levels ranging from 80 to 95 dB (Table 14), and will be categorized as “very high.” Using the sound levels listed in the USFWS report, equipment expected to be used during construction of the proposed project will not raise noise levels above the level of ambient. The installation of MBGR (at 7 of the 16 bridge rail ends) is the only activity expected to exceed 90 dB.

Table 13: Estimated Existing Noise Levels on SR 254 within the Project Limits

Sound Source	Reported Decibel Value (measured at 50 feet)
Passenger car (50 mph)	67
RVs (small) (low end)	75
Passenger car/light trucks (65 mph) (low end)	76
Automobile	80 (measured at 25 feet)
Large truck (low end)	84
Passenger car/light trucks (65 mph) (high end)	85
RVs (small) (high end)	85
RVs (large) (low end)	85
Pickup truck	87 (measured at 8 feet)
Large truck (high end)	89
RVs (large) (high end)	95

Table 14: Estimated Noise Levels During Construction of the Proposed Project

Sound Source	Reported Decibel Value (measured at 50 feet)	Relative Sound Level
Generator (low end)	78	Moderate
Backhoe (low end)	80	High
Front-end loader (low end)	80	High
Concrete truck (low end)	81	High
Chainsaw, large	83	High
Backhoe (high end)	84	High
Dump truck	84	High
Flat bed truck	84	High
Generator (high end)	84	High
Concrete truck (high end)	85	High
Gradall (low end)	85	High
Chainsaws (high end)	86	High
Gradall (high end)	86	High
Front-end loader (high end)	87	High
Jackhammer	89	High
Concrete saw	90	High
Guardrail installation and pile driving (low end)	95	Very high
Back-up vehicle safety alarm	97-110 (measured at source) ¹	

¹excluded from analysis, per the guidance outlined in the *Programmatic Informal Consultation for the California Department of Transportation's Routine Maintenance and Repair Activities, and Small Projects Program, for Districts 1 and 2* (USFWS 2014).

Sound levels for all activities except guardrail installation (and excluding vehicle back-up safety alarm) are expected to be at or below ambient sound levels, and at or below 90dB. Guardrail installation is expected to exceed ambient sound levels and exceed 90dB. Per the Report, the harassment distance for such sound levels is 165 feet; that is, work within 165 feet of an active northern spotted owl nest could harass an individual.

Work within a 131 foot line of sight to an active northern spotted owl nest could cause visual disturbance to an individual.

The proposed project is covered under the Programmatic Informal Consultation for the California Department of Transportation's Routine Maintenance and Repair Activities, and Small Projects Program for Districts 1 and 2 issued by the Arcata USFWS office on April 9, 2014 (USFWS 2014). The Programmatic Informal Consultation identifies measures to be implemented whenever certain species may be present. These measures are included in standard measures, and include items such as work windows. Additional BMPs (ABMPs) are also included as appropriate. A copy of the Inventory and Reporting Form, along with a list of BMPs and ABMPs applicable to the project, can be found in Appendix K. The proposed project may affect, but is not likely to adversely affect, the northern spotted owl.

In June 2014 Caltrans received concurrence from CDFW that take (as defined in the California Fish and Game Code) of the northern spotted owl would be unlikely, as long as the project follows certain measures. The measures are standard measures, such as work windows, training, and covered trash receptacles; and the absence of items from the project description: the project does not propose night work or tree removal. A copy of the CDFW concurrence is included in Appendix E. Any effect on northern spotted owl will not be substantial.

4.3.2.4. AVOIDANCE AND MINIMIZATION EFFORTS

No avoidance or minimization efforts are needed.

4.3.2.5. COMPENSATORY MITIGATION

None.

4.3.2.6. CUMULATIVE IMPACTS

None.

4.3.3. Marbled Murrelet

The marbled murrelet (*Brachyramphus marmoratus*) is a federally threatened species and a state endangered species. The majority of marbled murrelets are found within or adjacent to the marine environment, although there have been detections of marbled murrelets on rivers and inland lakes. Marbled murrelets spend the majority of their lives on the ocean, and come inland to nest. Marbled murrelets typically nest in old-growth forest, and commonly occupy large stands (500 acres) of trees.

Marbled murrelet nesting season is considered to be March 24 through September 15.

4.3.3.1. SURVEY RESULTS

Protocol surveys were not conducted for the marbled murrelet. Known locations from USFWS and CNDDDB were reviewed. The closest known occurrences of the marbled murrelet are located approximately 3.8 miles west of Location 2 and 3, and 0.1 miles to the north of Location 4. Because all four project locations have suitable marbled murrelet nesting habitat and nest sites can vary from year to year, the decision was made to assume that the marbled murrelet will be present at all four project locations.

4.3.3.2. CRITICAL HABITAT

Critical habitat for the marbled murrelet was designated by the USFWS on May 24, 1996. The proposed project is located within designated critical habitat for the marbled murrelet.

4.3.3.3. PROJECT IMPACTS

The proposed project will not remove marbled murrelet nesting or foraging habitat; therefore, there will be no direct impacts to the marbled murrelet or its habitat.

The USFWS report, *Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California* (July 26, 2006) (Report), was consulted for assistance in estimating potential effects to the marbled murrelet due to noise and visual disturbance during the construction of this project.

Per the Report, existing noise levels were estimated using noise levels estimated in the Report for similar settings. Construction noise levels were estimated using known noise levels generated from types of equipment expected to be used to construct the project. Methods described in the Report were used to compare estimated construction and ambient noise levels, and estimate effects from construction. According to values listed in that report, the existing ambient noise levels within the

ESL range from 67 to 95 dB (Table 13 above). This ambient sound level classifies as “high.” Equipment expected to be used during construction of the proposed project will generate noise at levels ranging from 80 to 95 dB (Table 14 above), and will be categorized as “very high.” Using the sound levels listed in the USFWS report, equipment expected to be used during construction of the proposed project will not raise noise levels above the level of ambient. The installation of MBGR (at 7 of the 16 bridge rail ends) is the only activity expected to exceed 90 dB.

Sound levels for all activities except guardrail installation (and excluding vehicle back-up safety alarm) are expected to be at or below ambient sound levels, and at or below 90dB. Per the Report, the harassment distance for such sound levels is 165 feet. Guardrail installation is expected to exceed ambient sound levels and exceed 90dB. Per the Report, the harassment distance for such sound levels is 165 feet. That is, work within 165 feet of an active marbled murrelet nest could harass an individual.

Human activities within a 131 foot line of sight to an active marbled murrelet nest could cause visual disturbance to an individual. Work within 131 feet of an active nest could harass marbled murrelet.

The proposed project is covered under the Programmatic Informal Consultation for the California Department of Transportation’s Routine Maintenance and Repair Activities, and Small Projects Program for Districts 1 and 2 issued by the Arcata USFWS office on April 9, 2014 (USFWS 2014). The Programmatic Informal Consultation identifies measures to be implemented whenever certain species may be present. These measures are included in standard measures, and include items such as work windows. Additional BMPs (ABMPs) are also included as appropriate. A copy of the Inventory and Reporting Form, along with a list of BMPs and ABMPs applicable to the project, can be found in Appendix K. The proposed project may affect, but is not likely to adversely affect, the marbled murrelet.

In June 2014 Caltrans received concurrence from CDFW that take (as defined in the California Fish and Game Code) of the marbled murrelet would be unlikely, as long as the project follows certain measures. The measures are standard measures, such as work windows, training, and covered trash receptacles; and the absence of items from the project description: the project does not propose night work or tree removal. A copy of the CDFW concurrence is included in Appendix E. Any effect on marbled murrelet will not be substantial.

4.3.3.4. AVOIDANCE AND MINIMIZATION EFFORTS

No avoidance or minimization efforts are needed.

4.3.3.5. COMPENSATORY MITIGATION

None.

4.3.3.6. CUMULATIVE IMPACTS

None.

4.3.4. Sensitive Bat Species

Bats are commonly associated with open forests and woodlands where there is a water source nearby over which to feed. Suitable roosting and nesting areas include caves, mines, large tree hollows, buildings, and other human-made structures. Loss of riparian foraging areas and roosting habitat are the biggest contributors to declining bat populations in California. The following sensitive bat species may occur in the vicinity of this project:

- Townsend's big-eared bat (*Corynorhinus townsendii*)
- long-legged myotis bat (*Myotis volans*)
- Yuma myotis bat (*Myotis yumanensis*)

Townsend's big-eared bat

Townsend's big-eared bat is a state candidate species and is considered a red/high priority species by the WBWG. Townsend's big-eared bat is found throughout California, from low desert to mid-elevation montane habitats. This species is one of the bat species most dependent on mines and caves, but will also roost in buildings and basal hollows of large trees. This species will night roost in more open settings, including under bridges. In the spring and summer, females form maternity colonies in mines, caves, buildings or trees, while males roost individually. In winter, these bats hibernate in caves, abandoned mines and trees. They are extremely sensitive to disturbance at their roosting sites and have suffered severe population declines throughout much of the U. S. Suitable day roosting habitat for the Townsend's big-eared bat is not present within the ESL. Suitable night roosting habitat is present under the four bridges. The ESL may contain suitable foraging habitat.

Parturition (giving birth) occurs mid-summer, coinciding with periods of high prey availability, and can vary from year to year depending on the weather. Single pups are born in May and June with births peaking in late May. The young are weaned at six weeks, and begin to fly in 2.5-3 weeks after birth (Zeiner et al. 1990).

Long-legged myotis bat

The long-legged myotis bat is considered a red/high priority species by the WBWG. It has been found from the coast to high elevations in the Sierra Nevada and White Mountains in California. This species day roosts primarily in hollow trees, particularly large diameter snags or live trees with lightning scars. It also uses rock crevices, mines, and buildings. The long-legged myotis bat may use caves and mines for night roosts. Long-legged myotis bats generally hibernate in mines or caves. Long-legged myotis bats forage in open areas, often at canopy height. The ESL contains suitable roosting and foraging habitat for the long-legged myotis bat.

Yuma myotis bat

The Yuma myotis bat is considered a green/low priority species by the WBWG. The Yuma myotis is found throughout western North America, and is relatively abundant at lower elevations in California. Occasionally roosting in mines or caves, these bats are most often found roosting under artificial structures, such as bridges. Bachelors also sometimes roost in abandoned cliff swallow nests, but tree cavities were probably the original sites for most nursery roosts. These bats typically forage over water in forested areas. Yuma myotis are threatened by loss of riparian habitats and the decline in permanent water sources in the southwest. The ESL contains suitable roosting and foraging habitat for the Yuma myotis bat.

4.3.4.1. SURVEY RESULTS

No bats were observed at the bridge during field surveys. Buildings and large basal hollows, caves, and outbuildings are absent from the project locations, though there may be basal hollows in areas beyond the limits of the locations. No useable expansion joints or other crevices that could provide bat day roosting habitat were observed on any of the bridges. The bridges themselves provide night roosting bat habitat. During a September 10, 2015 survey guano was observed beneath Ohman Creek and Bridge Creek Bridges, indicating that these two bridges are used for night roosting. While evidence of night roosting was not observed on Elk Creek or Bear Creek Bridges, these bridges could be used for night roosting.

According to CDFW's California Wildlife Habitat Relationships program (CWHR) (California Department of Fish and Wildlife 2008) the bat species listed in Table 15 may be expected to occur in the vicinity of the proposed project.

Table 15: Bat Species that May Occur in the Project Vicinity, According to CWHR

Scientific Name	Common Name
<i>Antrozous pallidus</i>	Pallid bat
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat
<i>Eptesicus fuscus</i>	Big brown bat
<i>Lasiorycteris noctivagans</i>	Silver haired bat
<i>Lasiurus cinereus</i>	Hoary bat
<i>Myotis californicus</i>	California myotis
<i>Myotis evotis</i>	Long-eared myotis
<i>Myotis lucifugus</i>	Little brown bat
<i>Myotis thysanodes</i>	Fringed myotis
<i>Myotis volans</i>	Long-legged myotis
<i>Myotis yumanensis</i>	Yuma myotis
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat

4.3.4.2. CRITICAL HABITAT

Critical habitat for the Townsend's big-eared bat, long-legged myotis bat, and Yuma myotis bat has not been designated.

4.3.4.3. PROJECT IMPACTS

The proposed project will not result in any direct impacts to the Townsend's big-eared bat or the Townsend's big-eared bat habitat because no trees will be removed.

All four locations experience existing human use on the roadway. Two locations are in elevated human use areas, with a visitor attraction and restaurant at Ohman Creek Bridge, and trails at Elk Creek Bridge. Bridge Creek Bridge and Bear Creek Bridge experience highway traffic, but lack sign of substantial additional human disturbance. No outbuildings or caves are at any of the locations. The only potential suitable roosting areas at all four locations would be basal hollows.

While night roosts are present under at least two of the bridges, the night roosts would only be occupied at night, during hours when no work is anticipated. Bats are not expected to be present at the bridges during the time of day when work would occur. The parts of the bridge providing night roost habitat would not be removed.

No guidelines for construction-noise sensitivity of Townsend's big-eared bat is available. Caltrans, to proceed cautiously, is assuming that construction-related sound is a concern for Townsend's big-eared bat. Standard measures, such as work windows, and absence of items from the project description (e.g., the project

description does not propose night work), would limit work to times when the bats may be least sensitive.

In June 2014 Caltrans received concurrence from CDFW that take (as defined in the California Fish and Game Code) of the Townsend's big-eared bat would be unlikely, as long as the project follows certain measures. The measures are standard measures, such as work windows, training, and covered trash receptacles; and the absence of items from the project description: the project does not propose night work or tree removal. A copy of the CDFW concurrence is included in Appendix E. Any effect on Townsend's big-eared bat, long-legged myotis bat, and Yuma myotis bat will not be substantial.

4.3.4.4. AVOIDANCE AND MINIMIZATION EFFORTS

No avoidance or minimization efforts are needed.

4.3.4.5. COMPENSATORY MITIGATION

None.

4.3.4.6. CUMULATIVE IMPACTS

None.

4.3.5. Pacific Fisher

The Pacific fisher (*Pekania (Martes) pennanti (pacifica)*) DPS is a federal candidate species and a state candidate species. There are two populations of Pacific fisher in California, the northern California and southern Sierra Nevada populations. The Pacific fisher is found in conifer, mixed conifer, and hardwood tree habitats. Pacific fishers require large, old trees; snags; or downed logs containing small cavities for denning and resting.

4.3.5.1. SURVEY RESULTS

The Pacific fisher was not observed during surveys conducted for this project. According to CDFW's CWHR program (California Department of Fish and Wildlife 2008) the Pacific fisher may be expected to occur in the vicinity of the proposed project. There is reasonable potential for Pacific fisher to be found in the areas surrounding the four project locations. Due to road traffic and other human-generated noise, it is unlikely that Pacific fisher will be present in the immediate project area.

4.3.5.2. CRITICAL HABITAT

Critical habitat has not been designated for the Pacific fisher.

4.3.5.3. PROJECT IMPACTS

The proposed project will not result in any direct impacts to Pacific fisher or its habitat because no trees will be removed.

No guidelines for construction-noise sensitivity of Pacific fisher is available. Caltrans, to proceed cautiously, is assuming that construction-related sound is a concern for Pacific fisher. Standard measures, such as work windows, and absence of items from the project description (e.g., the project description does not propose night work), would limit work to times when Pacific fisher may be least sensitive.

In June 2014 Caltrans received concurrence from CDFW that take (as defined in the California Fish and Game Code) of the Pacific fisher would be unlikely, as long as the project follows certain measures. The measures are standard measures, such as work windows, training, and covered trash receptacles; and the absence of items from the project description: the project does not propose night work or tree removal. A copy of the CDFW concurrence is included in Appendix E. Any effect on Pacific fisher will not be substantial.

4.3.5.4. AVOIDANCE AND MINIMIZATION EFFORTS

No avoidance or minimization efforts are needed.

4.3.5.5. COMPENSATORY MITIGATION

None.

4.3.5.6. CUMULATIVE IMPACTS

None.

4.3.6. Migratory Birds

Federal and state laws protect migratory birds, their occupied nests, and their eggs from destruction. The applicable Federal law is the Migratory Bird Treaty Act (15 USC 703-711), 50 CFR Part 21, and 50 CFR Part 10. Protection under California law is found in the Fish and Game Code Sections 3503, 3513, and 3800.

Osprey

The osprey (*Pandion haliaetus*) is considered a Watch List (WL) species by CDFW. Osprey are associated with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitats. Osprey use large trees, snags, and dead-topped trees in open forest habitats for cover and nesting. Osprey require clear, open bodies of water for foraging. The South Fork of the Eel River and the Eel River, located outside of the project's ESL, contain potential habitat for osprey.

Vaux's swift

Vaux's swift (*Chaetura vauxi*) is considered a species of special concern by CDFW. Vaux's swift nests in coniferous or mixed forest habitats, typically nesting colonially in hollow trees. It forages in forest openings, especially above streams. The South Fork of the Eel River and the Eel River, located outside of the project's ESL, contain potential habitat for Vaux's swift.

Bald eagle

Bald eagle (*Haliaeetus leucocephalus*) is a federal delisted species and a state endangered species. The bald eagle has been designated a fully protected (FP) species by CDFW. Bald eagles typically nest in forested areas adjacent to large bodies of water. The South Fork of the Eel River and the Eel River, located outside of the project's ESL, contain potential habitat for bald eagle.

4.3.6.1. SURVEY RESULTS

Although no active nests were seen during surveys, abandoned mud nests and a comparably sized twig nest were observed. The nests were likely made by swallows and black headed flycatcher. No osprey, Vaux's swift, or bald eagle nests were observed. It is anticipated that some migratory birds may try to nest in vegetation or on structures within the ESL. There are documented occurrences of osprey, Vaux's swift, and bald eagle in the vicinity of the project, primarily near large waterbodies such as the South Fork of the Eel River and the Eel River.

4.3.6.2. PROJECT IMPACTS

Minor trimming is expected on riparian trees and possibly shrubs (Section 4.1.2.2), as well as the lower branches of redwood trees at the Ohman Creek Bridge location. No osprey, Vaux's swift, or bald eagle nests or habitat will be removed. The trimming will not constitute a substantial effect to migratory bird habitat. Individual nests and migratory birds are protected by the Migratory Bird Treaty Act and California Fish & Game Code. As standard practice, Caltrans protects nests and migratory birds through measures such as vegetation removal outside the nesting season, or nesting bird surveys prior to vegetation removal. The project is not expected to impact migratory birds or their active nests.

4.3.6.3. AVOIDANCE AND MINIMIZATION EFFORTS

No avoidance or minimization efforts are needed.

4.3.6.4. COMPENSATORY MITIGATION

None.

4.3.6.5. CUMULATIVE IMPACTS

None.

Chapter 5. Results: Permits and Technical Studies for Special Laws or Conditions

Construction of the proposed project will require:

- Section 1602 Streambed Alteration Agreement from CDFW
- Report of Waste Discharge (ROWD) from NCRWQCB
- Coverage under the Programmatic Biological Opinion issued by NMFS under Section 7 of the Federal Endangered Species Act
- Coverage under the Programmatic Informal Consultation issued by the Arcata USFWS office under Section 7 of the Federal Endangered Species Act

These permits/concurrences may contain restrictions or additional mitigation.

5.1. Federal Regulatory Requirements

5.1.1. Federal Endangered Species Act

Federal Endangered Species Act of 1973 (16 U. S. C. 1531-1543): The Federal Endangered Species Act (FESA) and subsequent amendments provide guidance for the conservation of endangered and threatened species and the ecosystems upon which they depend.

Section 7 of FESA requires Federal agencies, in consultation with, and with the assistance of the Secretary of the Interior or the Secretary of Commerce, as appropriate, to insure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. USFWS and NMFS share responsibilities for administering the Act. Regulations governing interagency cooperation under Section 7 are found at 50 CFR Part 402. The opinion issued at the conclusion of consultation will include a statement authorizing take that may occur incidental to an otherwise legal activity.

Construction of the proposed project is covered under the Programmatic Biological Opinion issued by NMFS, for potential impacts to the southern Oregon/Northern California coho salmon, Northern California steelhead, and California coastal Chinook salmon. A copy of the Inventory and Reporting Form, along with a list of BMPs and ABMPs applicable to the project, can be found in Appendix K.

Construction of the proposed project is covered under the Programmatic Informal Consultation issued by the Arcata USFWS office, for potential impacts to the northern spotted owl and marbled murrelet. A copy of the Inventory and Reporting Form, along with a list of BMPs and ABMPs applicable to the project, can be found in Appendix K.

5.1.2. Clean Water Act (33 U. S. C. 1251-1376)

The Clean Water Act (CWA) provides guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters.

- **Section 401** requires that an applicant for a Federal license or permit that allows activities resulting in a discharge to waters of the U. S. must obtain a state certification that the discharge complies with other provisions of CWA. The Regional Water Quality Control Boards administer the certification program in California.
- **Section 402** establishes a permitting system for the discharge of any pollutant (except dredge or fill material) into waters of the U. S.
- **Section 404** establishes a permit program administered by USACE regulating the discharge of dredged or fill material into waters of the U. S. (including wetlands). Implementing regulations by USACE are found at 33 CFR Parts 320-330. Guidelines for implementation are referred to as the Section 404 (b)(1) Guidelines and were developed by the EPA in conjunction with USACE (40 CFR Parts 230). The Guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that will have less adverse impacts.

All four bridge locations are within areas that span or are adjacent to areas within USACE jurisdiction under Clean Water Act Section 404. Work is proposed over and adjacent to but not below the OHWM of these perennial creeks. Under the current project scope, a Section 404 permit from the USACE will not be needed.

The State Water Resources Control Board also regulates work over a waters of the State where a threat of discharge exists. Work on the four bridges has the potential to discharge into a jurisdictional area. ROWD are often used to permit work that has a potential to cause a discharge to a Waters of the State, but is not anticipated to have impacts. The proposed project will require a ROWD from the North Coast Regional Water Quality Control Board.

5.1.3. Executive Order 13112 Prevention and Control of Invasive Species

In response to Executive Order 13112, the Federal Highway Administration (FHWA) requires an analysis of the risk for any federal funded action to cause or promote the introduction or spread of invasive species. Disturbed soils are the perfect medium for the establishment of noxious weeds. The clearing, grading, and soil moving operations associated with roadway construction provide an opportunity for noxious weeds to become established.

Invasive/noxious plant species listed on CDFA and Cal-IPC noxious weed lists were found within the ESL during plant surveys conducted for this project, and are described in Table 11.

The contract specifications for permanent erosion control will require the use of locally appropriate California native forb and grass species, or a seed mix of sterile forb and grass seeds, mulch, or similar weed-free erosion control measure.

5.1.4. Executive Order 13186 Migratory Bird Treaty Act

Executive Order 13186 is designed to assist federal agencies in their efforts to comply with the Federal Migratory Bird Treaty Act. Under the Federal Migratory Bird Treaty Act, take is defined as the action of or attempt to pursue, hunt, shoot, capture, collect, or kill (50 CFR 10.12) and includes “intentional” take (for example, take that is the purpose of the activity in question) and “unintentional” take (for example, take that results from, but is not the purpose of, the activity in question).

The avoidance and minimization measures incorporated into this project will avoid impacts to nesting birds protected by the Federal Migratory Bird Treaty Act.

5.2. State Regulations

5.2.1. California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code 2050 et seq) establishes the policy of the State to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that State agencies should not approve projects that will jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that will avoid jeopardy. There are no state agency consultation procedures under CESA. For projects that affect both a state and federal listed species, compliance with FESA will satisfy CESA if CDFW determines that the

federal incidental take authorization is "consistent" with CESA under California Fish and Game Code Section 2080.1. For projects that will result in the take of a state only listed species, Caltrans must apply for a take permit under section 2081(b).

In June 2014 Caltrans received concurrence from CDFW that the proposed project will not result in the take (as defined in the California Fish and Game Code) of species listed, or proposed for listing, under CESA, as long as avoidance and minimization measures were included in the project. A copy of the CDFW concurrence is included in Appendix E.

5.2.2. California Fish and Game Code Section 1602

California Fish and Game Code Section 1602 requires any person, state or local governmental agency, or public utility to notify CDFW before beginning any activity that will do one or more of the following: 1) substantially obstruct or divert the natural flow of a river, stream, or lake; 2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or 3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. California Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in California.

The bed, bank, slope, and adjacent riparian areas along each of the four creeks fall under the jurisdiction of CDFW. The proposed project will require a Section 1602 Streambed Alteration Agreement from CDFW.

5.2.3. California Fish and Game Code Sections 3503 and 3503.5

Under California Fish and Game Code Sections 3503 and 3503.5, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, or to take, possess, or destroy any birds of prey or their nest or eggs.

The avoidance and minimization measures incorporated into this project will avoid impacts to nesting birds protected under California Fish and Game Code.

5.2.4. California Native Plant Protection Act (California Fish and Game Code Sections 1900 to 1913)

The California Native Plant Protection Act (NPPA) requires all state agencies to use their authority to carry out programs to conserve endangered and rare native plants. Provisions of the NPPA prohibit the taking of listed plants from the wild. The NPPA also requires notification of CDFW at least 10 days in advance of any change in land

use. This notification allows CDFW to salvage listed plant species that will otherwise be destroyed.

A total of 13 special status plant species were identified as potentially occurring in the vicinity of this project. No special status plant species were observed during plant surveys conducted for this project.

5.2.5. Senate Bill 857

Senate Bill (SB) 857, enacted into law on January 1, 2006, requires Caltrans to complete an assessment of potential barriers to anadromous fish prior to commencing any project using state or federal transportation money. SB 857 details the requirements of assessment and remediation of barriers to fish passage at stream crossings along the California highway system. All projects on streams that currently or historically supported anadromous fish shall include a fish passage assessment according to NMFS and CDFW guidelines.

The four bridges associated with the proposed project do not act as barriers to fish passage, for any species.

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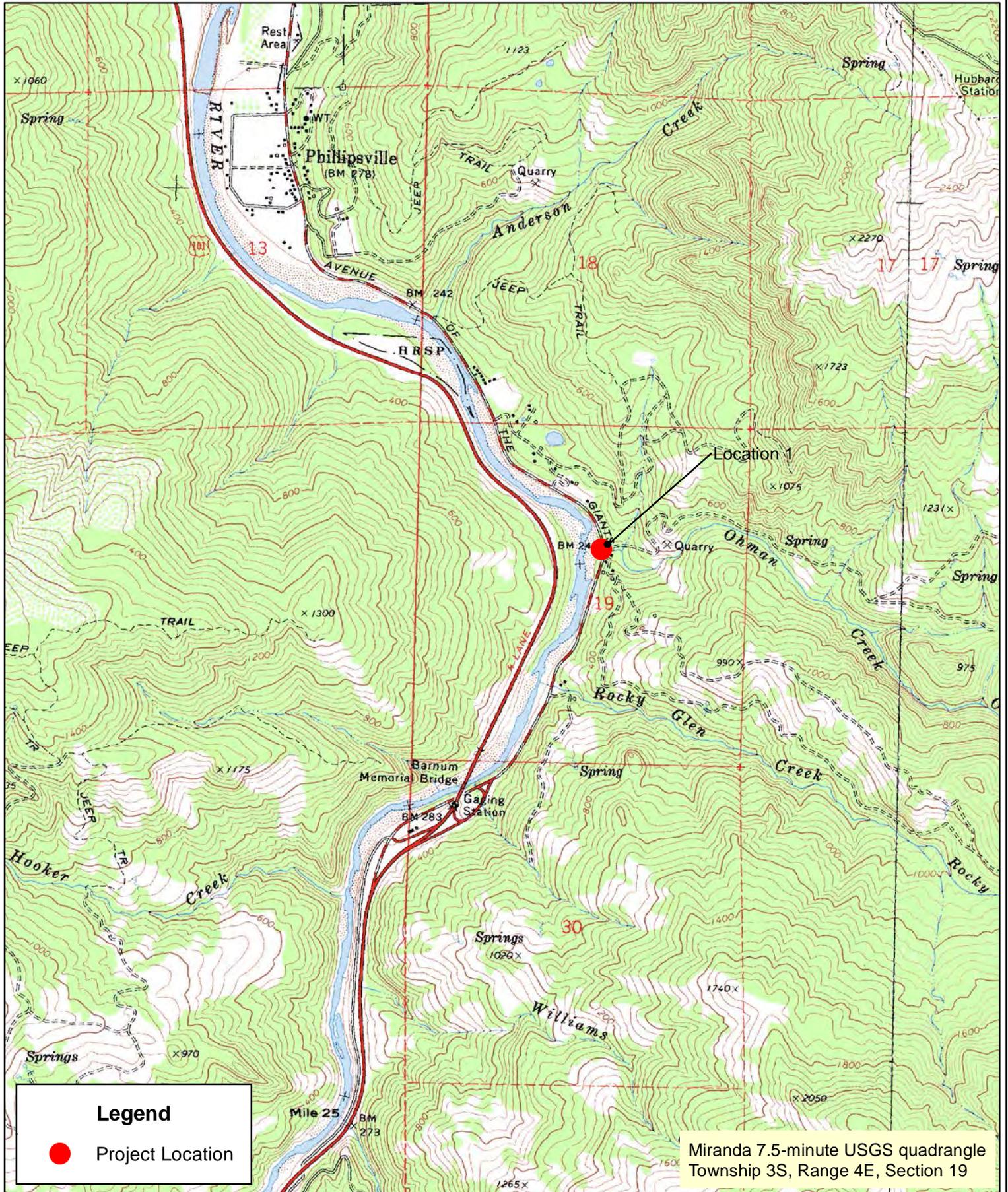
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Appendix A Quadrangle Maps of the Environmental Study Limits

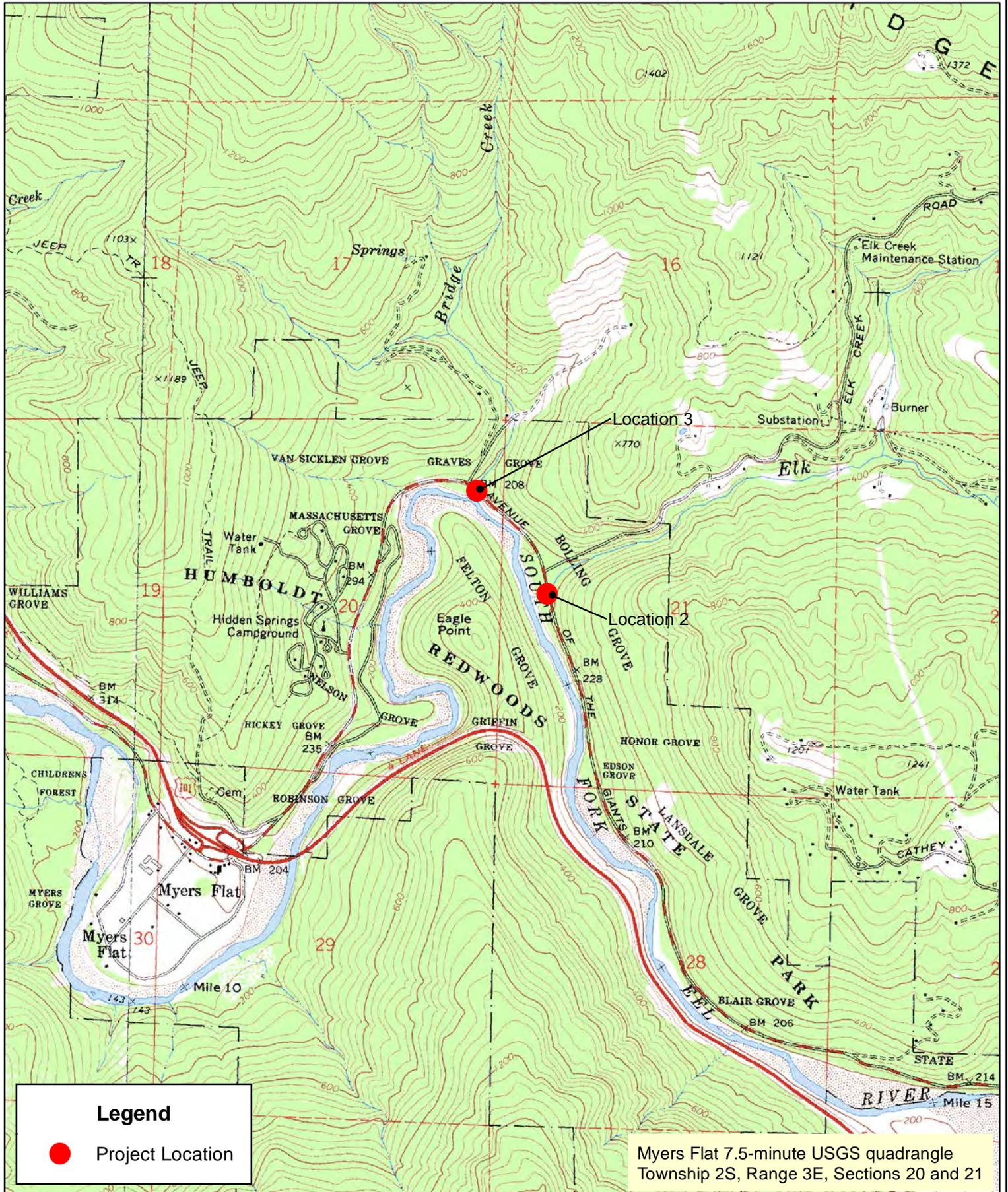
Quadrangle Map of the Project Locations



Location 1 - Ohman Creek Bridge, Post Mile 0.88
Avenue of the Giants - Four Bridges Project
State Route 254, Humboldt County
EA 01-436060, EFIS 010000186



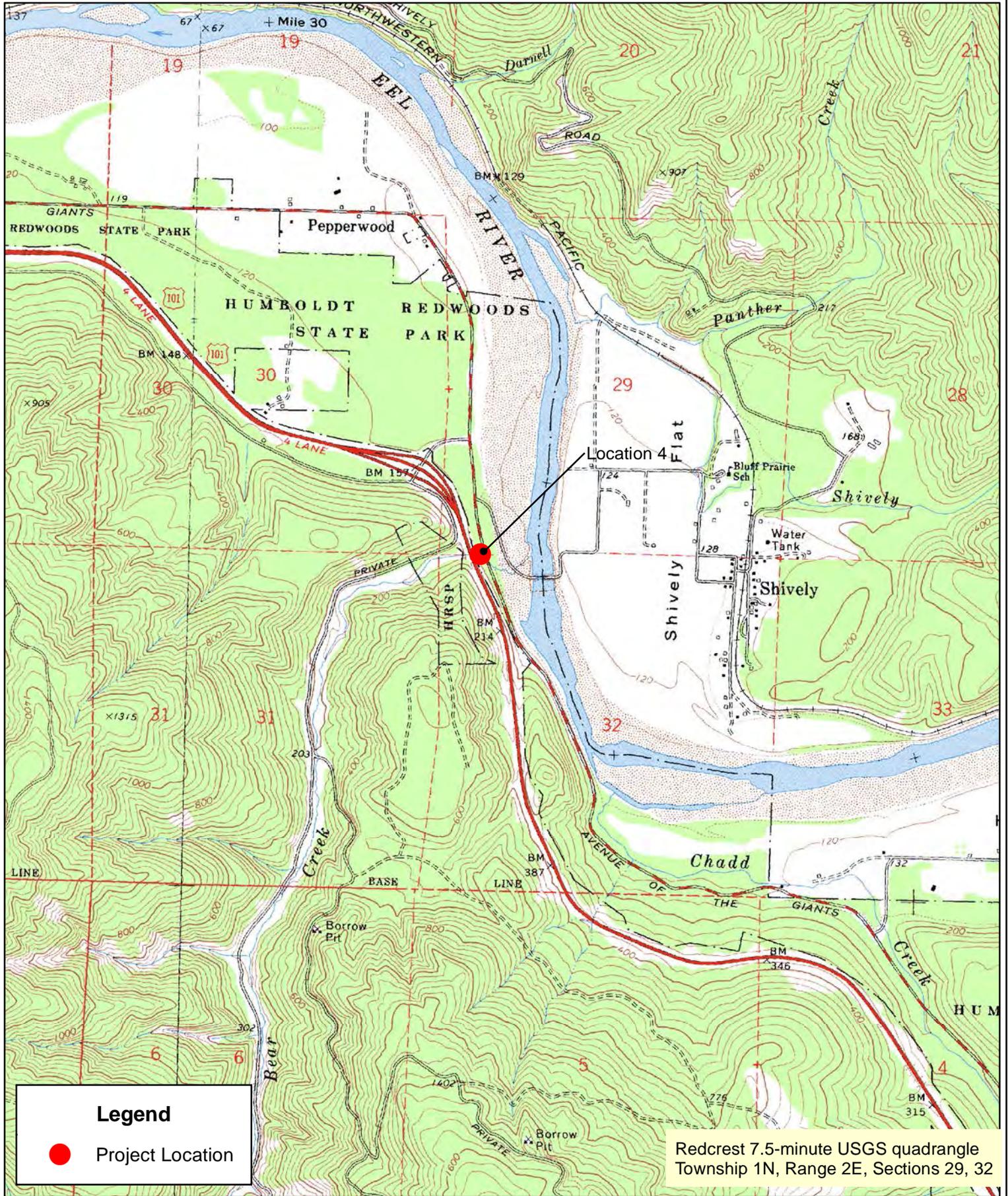
Quadrangle Map of the Project Locations



Location 2 - Elk Creek Bridge, Post Mile 10.43 and Location 3 - Bridge Creek Bridge, Post Mile 10.80
 Avenue of the Giants - Four Bridges Project
 State Route 254, Humboldt County
 EA 01-436060, EFIS 010000186



Quadrangle Map of the Project Locations



Location 4 - Bear Creek Bridge, Post Mile 43.02
Avenue of the Giants - Four Bridges Project
State Route 254, Humboldt County
EA 01-436060, EFIS 010000186



Appendix B Listed, Proposed Species, and Critical Habitat Potentially Occurring or Known to Occur in the Project Area

Scientific Name	Common Name	Status ¹	Habitat	Habitat Present/Absent	Rationale
		Federal/State			
AMPHIBIANS					
<i>Ascaphus truei</i>	Western tailed frog	None/SC	Cool, perennial, swiftly flowing streams in redwood, Douglas-fir, and yellow pine forests.	Present	Suitable habitat present within Environmental Study Limits (ESL); species not observed.
<i>Rana aurora</i>	Northern red-legged frog	None/SC	Usually found near ponds or other permanent water bodies with extensive vegetation.	Present	Suitable habitat present within ESL; species not observed.
<i>Rana boylei</i>	Foothill yellow-legged frog	None/SC	Creeks or rivers in woodlands or forests with rock and gravel substrate and low overhanging vegetation along the edge.	Present	Suitable habitat present within ESL; species not observed.
<i>Rhyacotriton variegatus</i>	Southern torrent salamander	None/SC	Cold, well-shaded, permanent streams and seepages, or within splash zone or on moss-covered rock within trickling water.	Present	Suitable habitat present within ESL; species not observed.
BIRDS					
<i>Accipiter cooperii</i>	Cooper's hawk	None/WL	Nests in a variety of habitat types, from riparian woodlands and foothill pine-oak woodlands through mixed conifer forests.	Present	Suitable habitat present within ESL; species not observed.
<i>Accipiter striatus</i>	Sharp-shinned hawk	None/WL	Dense canopy ponderosa pine or mixed-conifer forest and riparian habitats.	Present	Suitable habitat present within ESL; species not observed.

<i>Aquila chrysaetos</i>	Golden eagle	None/FP	Nests on cliffs and escarpments or in tall trees overlooking open spaces; forages in annual grasslands, chaparral, and oak woodlands.	Absent	Suitable habitat present within ESL; species not observed.
<i>Brachyramphus marmoratus</i>	Marbled murrelet	T/E	Mature, coastal coniferous forests for nesting; nearby coastal water for foraging; nests in conifer stands greater than 150 years old and may be found up to 35 miles inland; winters on subtidal and pelagic waters often well offshore.	Present	Suitable habitat present within ESL; species not observed.
<i>Coccyzus americanus occidentalis</i>	Western yellow-billed cuckoo	C/E	Wide, dense riparian forests with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley oak-riparian habitats where scrub jays are abundant.	Absent	Suitable habitat not present within ESL.
<i>Empidonax traillii brewsteri</i>	Willow flycatcher	None/E	Summers in wet or moist meadows and montane riparian habitats.	Absent	Suitable habitat not present within ESL.
<i>Falco peregrinus anatum</i>	American peregrine falcon	D/D, FP	Nests and roosts on protected ledges of high cliffs, usually adjacent to lakes or rivers supporting a large prey population.	Absent	Suitable habitat not present within ESL.
<i>Pandion haliaetus</i>	Osprey	None/WL	Nests in snags, trees, or utility poles near the ocean, large lakes, or rivers with abundant fish populations.	Present	Suitable habitat present within ESL; species not observed.

<i>Riparia riparia</i>	Bank swallow	None/T	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam.	Absent	Suitable habitat not present within ESL.
<i>Strix occidentalis caurina</i>	Northern spotted owl	T/SC	Dense old-growth or mature forests dominated by conifers with topped trees or oaks available for nesting crevices.	Absent	Suitable habitat not present within ESL.
FISH					
<i>Acipenser medirostris</i>	Green sturgeon	T/None	Prefers channel bottoms in river systems.	Present	Suitable habitat present within ESL.
<i>Oncorhynchus kisutch</i>	Southern Oregon/Northern California coho salmon	T/T	Requires beds of loose, silt free, coarse gravel for spawning. Also needs cover, cool water, and sufficient dissolved oxygen.	Present	Suitable habitat present within ESL.
<i>Oncorhynchus mykiss irideus</i>	Northern California steelhead	T/SC	Cool freshwater streams and rivers, require sand and gravel for spawning	Present	Suitable habitat present within ESL.
<i>Oncorhynchus tshawytscha</i>	California coastal Chinook salmon	T/None	Ocean and coastal streams	Present	Suitable habitat present within ESL.
INVERTEBRATES					
<i>Noyo interressa</i>	Ten Mile shoulderband	None/None	Terrestrial snail belonging to the Helminthoglyptidae family.		Suitable habitat present within ESL; species not observed.
MAMMALS					
<i>Arborimus pomo</i>	Sonoma tree vole	None/SC	Inhabits old-growth forests of Douglas-fir, redwood, or montane hardwood-conifer species.	Present	Suitable habitat not present within ESL.
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat	None/C (T)	Roosts in caves, tunnels, mines, and dark attics of abandoned buildings.		Suitable habitat present within ESL; species not observed.
<i>Martes caurina humboldtensis</i>	Humboldt marten	None/SC	Old growth forests.	Present	Suitable habitat present within ESL; species not observed.
<i>Pekania [=Martes] pennanti</i> DPS	Pacific fisher	C/C (T)	Northern coniferous and mixed forests.	Present	Suitable habitat present within ESL; species not observed.

<i>Myotis volans</i>	Long-legged myotis	None/None	Mountains throughout California, including ranges in the Mojave desert. Found above 4,000 feet in elevation.	Absent	Suitable habitat not present within ESL.
<i>Myotis yumanensis</i>	Yuma myotis	None/None	Found in a wide variety of habitats; optimal habitat is open forests and woodlands near water bodies.	Present	Suitable habitat present within ESL; species not observed.
REPTILES					
<i>Emys marmorata</i>	Western pond turtle	None/SC	Woodlands, grasslands, and open forests; occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with aquatic vegetation.	Present	Suitable habitat present within ESL.

Scientific Name	Common Name	Status ¹	Habitat	Blooming Period	Habitat Present/Absent	Rationale
		Federal/State/CNPS Rank				
PLANTS						
<i>Astragalus agnicidus</i>	Humboldt County milk-vetch	None/E/1B.1	Broadleafed upland forest, North Coast coniferous forest/openings, disturbed areas, sometimes roadsides.	April-September	Present	Suitable habitat present within ESL; species not observed.
<i>Carex arcta</i>	Northern clustered sedge	None/None/2B.2	Bogs and fens, North Coast coniferous forest (mesic).	June-September	Present	Suitable habitat present within ESL; species not observed.
<i>Coptis laciniata</i>	Oregon goldthread	None/None/2.2	Meadows and seeps, North Coast coniferous forest (streambanks)/mesic.	March-May	Present	Suitable habitat present within ESL; species not observed.

<i>Erythronium oregonum</i>	Giant fawn lily	None/None/2.2	Cismontane woodland, meadows and seeps/ sometimes serpentinite, rocky, openings.	March-June	Absent	Suitable habitat not present within ESL.
<i>Erythronium revolutum</i>	Coast fawn lily	None/None/2.2	Bogs and fens, broadleafed upland forest, North Coast coniferous forest/mesic, streambanks.	March-July	Present	Suitable habitat present within ESL; species not observed.
<i>Gilia capitata ssp. pacifica</i>	Pacific gilia	None/None/1B.2	Coastal bluff scrub, chaparral (openings), coastal prairie, valley and foothill grassland.	April-August	Absent	Suitable habitat not present within ESL.
<i>Kopsiopsis hookeri</i>	Small groundcone	None/None/2.3	North Coast coniferous forest.	April-August	Present	Suitable habitat present within ESL; species not observed.
<i>Lycopodium clavatum</i>	Running-pine	None/None/2.3	Lower montane coniferous forest (mesic), marshes and swamps, North Coast coniferous forest (mesic)/often edges, openings, roadsides.	June-August	Present	Suitable habitat present within ESL; species not observed.
<i>Meesia triquetra</i>	Three-ranked hump moss	None/None/4.2	Bogs and fens, meadows and seeps, subalpine coniferous forest, upper montane coniferous forest (mesic)/soil.	July	Absent	Suitable habitat not present within ESL.
<i>Montia howellii</i>	Howell's montia	None/None/2.2	Meadows and seeps, North Coast coniferous forest, vernal pools/vernally mesic.	March-May	Present	Suitable habitat present within ESL; species not observed.
<i>Packera bolanderi var. bolanderi</i>	Seacoast ragwort	None/None/2.2	Coastal scrub, North Coast coniferous forest.	May-July	Present	Suitable habitat present within ESL; species not observed.

<i>Piperia candida</i>	White-flowered rein orchid	None/None/1B.2	Broadleafed upland forest, lower montane coniferous forest, North Coast coniferous forest/sometimes serpentinite.	May-September	Present	Suitable habitat present within ESL; species not observed.
<i>Sidalcea malachroides</i>	Maple-leaved checkerbloom	None/None/4.2	Broadleafed upland forest, coastal prairie, coastal scrub, North Coast coniferous forest, riparian woodland/often in disturbed areas.	April-August	Present	Suitable habitat present within ESL; species not observed.
<i>Sidalcea malviflora ssp. patula</i>	Siskiyou checkerbloom	None/None/1B.2	Coastal bluff scrub, coastal prairie, North Coast coniferous forest/often on road cuts.	May-August	Present	Suitable habitat present within ESL; species not observed.
<i>Tiarella trifoliata var. trifoliata</i>	Trifoliolate laceflower	None/None/3.2	Lower montane coniferous forest, North Coast coniferous forest	June-August	Present	Suitable habitat present within ESL; species not observed.
<i>Tracyina rostrata</i>	Beaked tracyina	None/None/1B.2	Cismontane woodland, valley and foothill grassland.	May-June	Absent	Suitable habitat not present within ESL.
<i>Usnea longissima</i>	Long-beard lichen	None/None/None	Occurs in old-growth and late-successional conifer stands, hardwood stands, and riparian areas, particularly in coastal climates or on fog-swept mountains where humidity is high.	None	Present	Suitable habitat present within ESL; species not observed.
SENSITIVE HABITATS						
North Central Coast Summer Steelhead Stream		None/None/None			Present	Suitable habitat present within ESL.
Upland Douglas Fir Forest		None/None/None			Absent	Suitable habitat not present within ESL.

¹Status Explanations:

Federal Status (pursuant to the Federal Endangered Species Act of 1973, as amended)

E = endangered. Listed as being in danger of extinction.

T = threatened. Listed as likely to become endangered within the foreseeable future.

C = candidate. Candidate that may become a proposed species.

D = delisted.

- = no listing under the Federal Endangered Species Act.

State Status (pursuant to §1904 (Native Plant Protection Act of 1977) and §2050 et seq (California Endangered Species Act of 1984) of the California Fish and Game Code

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

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

C = candidate. Candidate for listing under the California Endangered Species Act.

R = rare. Listed as rare.

- = no listing.

State Status (other listings)

SC = species of special concern. Animals not listed under the Federal Endangered Species Act or the California Endangered Species Act but which are declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist.

WL = watch list species.

California Native Plant Society (CNPS)

California Rare Plant Rank 1B species. Plants rare, threatened, or endangered in California and elsewhere.

California Rare Plant Rank 2 species. Rare, threatened, or endangered in California, but more common elsewhere.

California Rare Plant Rank 3 species. More information is needed about the plant species.

California Rare Plant Rank 4 species. Plants of limited distribution.

.1 = seriously endangered in California.

.2 = fairly endangered in California.

.3 = Not very endangered in California

Appendix C Botanical Survey Memo



Memorandum

Date:	July 18, 2011
To:	Al Kannely, Environmental Planner/Natural Sciences Caltrans District 3/North Region P.O. Box 911 703 B Street Marysville, CA 95901
From:	Jessica Hughes & Cristian Singer, Botanists
Subject:	2011 Late-Season Botanical Surveys for the HUM 254 Bridge Upgrades Project

Introduction

Two ICF International botanists, Cristian Singer and Jessica Hughes, conducted late-season botanical surveys for the four bridges that compose the California Department of Transportation's (Caltrans') HUM 254 Bridge Upgrades Project on State Route 254 (SR 254), also known as the Avenue of the Giants, in Humboldt County, California. The study area consisted of the Environmental Study Limit (ESL) at each of the four bridges (Bear Creek, Bridge Creek, Elk Creek, and Ohman Creek) that were provided as shapefile data by Caltrans Environmental Planner Al Kannely on April 20, 2010. Bear Creek Bridge is located at postmile (PM) 43.02, Bridge Creek Bridge is located at PM 10.80, Elk Creek Bridge is located at PM 10.43, and Ohman Creek Bridge is located at PM 0.88. Previous botanical surveys of the study area were conducted on May 5 and July 14, 2010 and April 13 and 14, 2011.

The study area contained a mixture of natural habitats and developed areas (e.g., SR 254, paved and unpaved pullouts, redwood grove signage, tourist stops). Although redwood (*Sequoia sempervirens*) forest was the dominant habitat type, small swaths of annual grassland and areas of mixed evergreen forest composed of Pacific madrone (*Arbutus menziesii*), tan oak (*Lithocarpus densiflorus*), Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*), and California bay (*Umbellularia californica*) were also observed.

Methods

Background Investigation

The background investigation consisted of record searches of the 2011 California Natural Diversity Database (CNDDDB) and the California Native Plant Society's (CNPS's) 2011 online *Inventory of Rare & Endangered Plants* for the Miranda, Myers Flat, Redcrest, Weott, Fort Seward, Harris, Blocksburg, Ettersburg, Briceland, Garberville, Bridgeville, Owl Creek, Larabee Valley, Yager Junction, Scotia, Bull Creek, Hydesville, and Harris 7.5-minute U.S. Geological Survey quadrangles. The results of these searches were used to identify sensitive plants with the potential to occur in the study area.

Botanical Surveys

Mr. Kannely obtained a scientific investigation permit from the North Coast Redwoods District of the California Department of Parks and Recreation for Mr. Singer and Ms. Hughes to conduct sensitive plant investigations in Humboldt Redwoods State Park. Per the conditions of the permit, Ms. Hughes also spoke with Supervising Ranger John O'Rourke at Humboldt Redwoods State Park on June 10, 2011 to provide him with the approximate dates and locations of the late-season surveys in the park.

Mr. Singer and Ms. Hughes conducted the late-season botanical surveys of the study area on June 14 and 15, 2011. The surveyors followed the California Department of Fish and Game's (DFG's) 2009 *Protocols for surveying and evaluating impacts to special status native plant populations and natural communities*. Mr. Singer and Ms. Hughes have the minimum surveyor qualifications recommended in the DFG survey protocols, including experience conducting floristic field surveys; knowledge of plant taxonomy and plant community ecology; familiarity with the plants of the area, including rare, threatened, and endangered species; familiarity with the appropriate state and federal statutes related to plants and plant collecting; and experience with analyzing impacts of development on native plant species and communities. Mr. Singer has a bachelor's degree in environmental biology (botanical emphasis) and Ms. Hughes has a master's degree in botany and plant pathology. During the late-season botanical surveys, all plants were identified to the taxonomic level necessary to determine if they were sensitive plants or were species with unusual or significant range extensions.

Results

Background Investigation

The record searches of the CNDDDB and CNPS's *Inventory of Rare & Endangered Plants* identified 21 sensitive plants as having the potential to occur in the study area (see Attachment A).

Botanical Surveys

A list of plants observed within the ESL at each bridge and a combined list of all plants observed during the botanical surveys are included in Attachment B. No sensitive plants were observed in the study area during the late-season botanical surveys.

The timing of the early-season botanical surveys coincided with the reported blooming periods of 10 of the 21 sensitive plant species identified during the background investigation as having the potential to occur in the study area:

- leafy reed grass (*Calamagrostis foliosa*)
- northern clustered sedge (*Carex arcta*)
- streamside daisy (*Erigeron bioletti*)
- running-pine (*Lycopodium clavatum*)
- robust monardella (*Monardella villosa* ssp. *globosa*)
- seacoast ragwort (*Packera bolanderi* var. *bolanderi*)
- white-flowered rein orchid (*Piperia candida*)
- Siskiyou checkerbloom (*Sidalcea malviflora* ssp. *patula*)
- beaked tracyina (*Tracyina rostrata*)
- oval-leaved viburnum (*Viburnum ellipticum*)

Two of the eleven remaining sensitive species, three-ranked hump moss (*Meesia triquetra*) and long-beard lichen (*Usnea longissima*), do not flower. Nine of the eleven remaining sensitive species have reported blooming periods that coincided with the timing of the early-season botanical surveys in the study area conducted on May 5, 2010 and April 13 and 14, 2011.

Conclusions and Recommendations

No sensitive plants were identified in the study area during the 2010 or 2011 late-season botanical surveys. No additional botanical surveys are recommended because early-season botanical surveys were conducted on May 5, 2010 and April 13 and 14, 2011.

Attachment A
CNDDB and CNPS Records Search Results

California Department of Fish and Game

Natural Diversity Database

Sensitive Plants

Hydesville, Owl Creek, Yager Junction, Scotia, Redcrest, Bridgeville, Bull Creek Weott, Myers Flat, Blocksburg, Larabee Valley, Ettersburg, Miranda, Fort Seward, Briceland, Garberville, and Harris Quads

Scientific Name/Common Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1 Astragalus agnicidus Humboldt milk-vetch	PDFAB0F080		Endangered	G2	S2.1	1B.1
2 Calamagrostis foliosa leafy reed grass	PMPOA170C0		Rare	G3	S3.2	4.2
3 Carex arcta northern clustered sedge	PMCYP030X0			G5	S1S2	2.2
4 Coptis laciniata Oregon goldthread	PDRAN0A020			G4G5	S3	2.2
5 Erythronium oregonum giant fawn lily	PMLIL0U0C0			G5	S2.2	2.2
6 Erythronium revolutum coast fawn lily	PMLIL0U0F0			G4	S2S3	2.2
7 Gilia capitata ssp. pacifica Pacific gilia	PDPLM040B6			G5T3T4	S2.2?	1B.2
8 Kopsiopsis hookeri small groundcone	PDORO01010			G5	S1S2	2.3
9 Lycopodium clavatum running-pine	PPLYC01080			G5	S4.1	4.1
10 Meesia triquetra three-ranked hump moss	NBMUS4L020			G5	S4	4.2
11 Monardella villosa ssp. globosa robust monardella	PDLAM180P7			G5T2	S2.2	1B.2
12 Montia howellii Howell's montia	PDPOR05070			G3G4	S3	2.2
13 Packera bolanderi var. bolanderi seacoast ragwort	PDAST8H0H1			G4T4	S1.2	2.2
14 Piperia candida white-flowered rein orchid	PMORC1X050			G2	S2	1B.2
15 Sanicula tracyi Tracy's sanicle	PDAPI1Z0K0			G3	S3.2	4.2
16 Sidalcea malachroides maple-leaved checkerbloom	PDMAL110E0			G3G4	S3S4.2	4.2
17 Sidalcea malviflora ssp. patula Siskiyou checkerbloom	PDMAL110F9			G5T2	S2	1B.2
18 Tracyina rostrata beaked tracyina	PDAST9D010			G1G2	S1S2.2	1B.2
19 Usnea longissima long-beard lichen	NLLEC5P420			G4	S4.2	
20 Viburnum ellipticum oval-leaved viburnum	PDCPR07080			G5	S2.3	2.3

CNPS Inventory of Rare and Endangered Plants

Status: Plant Press Manager window with 15 items - Wed, Jun. 8, 2011, 13:31 b

- During each visit, we provide you with an empty "Plant Press" for collecting items of interest.
- Several report formats are available. Use the CSV and XML options to download raw data.

Reformat list as:

open	save	scientific	common	family	CNPS
	<input checked="" type="checkbox"/>	Astragalus agnicidus	Humboldt County milk-vetch	Fabaceae	List 1B.1
	<input checked="" type="checkbox"/>	Carex arcta	northern clustered sedge	Cyperaceae	List 2.2
	<input checked="" type="checkbox"/>	Coptis laciniata	Oregon goldthread	Ranunculaceae	List 2.2
	<input checked="" type="checkbox"/>	Erigeron biolettii	streamside daisy	Asteraceae	List 3
	<input checked="" type="checkbox"/>	Erythronium oregonum 	giant fawn lily	Liliaceae	List 2.2
	<input checked="" type="checkbox"/>	Erythronium revolutum 	coast fawn lily	Liliaceae	List 2.2
	<input checked="" type="checkbox"/>	Gilia capitata ssp. pacifica 	Pacific gilia	Polemoniaceae	List 1B.2
	<input checked="" type="checkbox"/>	Kopsiopsis hookeri	small groundcone	Orobanchaceae	List 2.3
	<input checked="" type="checkbox"/>	Monardella villosa ssp. globosa	robust monardella	Lamiaceae	List 1B.2
	<input checked="" type="checkbox"/>	Montia howellii	Howell's montia	Portulacaceae	List 2.2
	<input checked="" type="checkbox"/>	Packera bolanderi var. bolanderi	seacoast ragwort	Asteraceae	List 2.2
	<input checked="" type="checkbox"/>	Piperia candida	white-flowered rein orchid	Orchidaceae	List 1B.2
	<input checked="" type="checkbox"/>	Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	Malvaceae	List 1B.2
	<input checked="" type="checkbox"/>	Tracyina rostrata	beaked tracyina	Asteraceae	List 1B.2
	<input checked="" type="checkbox"/>	Viburnum ellipticum	oval-leaved viburnum	Adoxaceae	List 2.3

Attachment B
Lists of Plant Species Observed

Table B-1. Plant Species Observed During Botanical Surveys for the HUM 254 Bridge Upgrades—All Projects

<i>Scientific Name</i>	Common Name
Trees	
<i>Acer macrophyllum</i>	bigleaf maple
<i>Aesculus californica</i>	California buckeye
<i>Alnus rhombifolia</i>	white alder
<i>Alnus rubra</i>	red alder
<i>Arbutus menziesii</i>	Pacific madrone
<i>Fraxinus dipetala</i>	California ash
<i>Fraxinus latifolia</i>	Oregon ash
<i>Lithocarpus densiflorus</i> var. <i>densiflorus</i>	tan oak
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir
<i>Quercus chrysolepis</i>	canyon live oak
<i>Quercus garryana</i>	Oregon oak
<i>Quercus kelloggii</i>	black oak
<i>Salix hookeriana</i>	Hooker's willow
<i>Salix lasiolepis</i>	arroyo willow
<i>Sequoia sempervirens</i>	coast redwood
<i>Umbellularia californica</i>	California bay
Shrubs/Woody Vines	
<i>Arctostaphylos columbiana</i>	hairy manzanita
<i>Baccharis pilularis</i>	coyote brush
<i>Ceanothus integerrimus</i>	deer brush
<i>Ceanothus thyrsiflorus</i>	blueblossom
<i>Cornus nuttallii</i>	Pacific dogwood
<i>Cornus sericea</i>	creek dogwood
<i>Corylus cornuta</i> var. <i>californica</i>	California hazelnut
<i>Cytisus scoparius</i>	Scotch broom
<i>Genista monspessulana</i>	French broom
<i>Heteromeles arbutifolia</i>	toyon
<i>Lonicera hispidula</i> var. <i>vacillans</i>	hairy honeysuckle
<i>Mimulus aurantiacus</i>	bush monkeyflower
<i>Rosa californica</i>	California rose
<i>Rosa eglanteria</i>	sweetbriar
<i>Rubus discolor</i>	Himalayan blackberry
<i>Rubus parviflorus</i>	thimbleberry
<i>Rubus ursinus</i>	California blackberry
<i>Salix exigua</i>	sandbar willow
<i>Sambucus nigra</i> ssp. <i>caerulea</i>	blue elderberry
<i>Symphoricarpos albus</i>	common snowberry
<i>Symphoricarpos mollis</i>	creeping snowberry
<i>Toxicodendron diversilobum</i>	poison oak
<i>Vaccinium ovatum</i>	evergreen huckleberry

<i>Scientific Name</i>	Common Name
<i>Vitis californica</i>	California grape
Ferns and Relatives	
<i>Adiantum aleuticum</i>	five-finger fern
<i>Adiatum jordanii</i>	California maidenhair fern
<i>Equisetum telmateia</i> ssp. <i>braunii</i>	giant horsetail
<i>Pentagramma triangularis</i>	gold-back fern
<i>Polypodium calirhiza</i>	nested polypody
<i>Polypodium glycyrrhiza</i>	licorice fern
<i>Polystichum munitum</i>	sword fern
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern
<i>Woodwardia fimbriata</i>	giant chainfern
Grasses and Relatives	
<i>Agrostis exarata</i>	bentgrass
<i>Aira caryophyllea</i>	silver hair grass
<i>Aira praecox</i>	yellow hair grass
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Avena barbata</i>	slender wild oat
<i>Avena fatua</i>	wild oat
<i>Briza maxima</i>	quaking grass
<i>Briza minor</i>	little quaking grass
<i>Bromus carinatus</i>	California brome
<i>Bromus diandrus</i>	ripgut brome
<i>Bromus hordeaceus</i>	soft chess
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome
<i>Bromus orcuttianus</i>	Orcutt's brome
<i>Carex barbarae</i>	Santa Barbara sedge
<i>Carex gynodynama</i>	Olney's hairy sedge
<i>Carex hendersonii</i>	Henderson's sedge
<i>Carex multicaulis</i>	many-stemmed sedge
<i>Cynodon dactylon</i>	Bermuda grass
<i>Cynosurus echinatus</i>	hedgehog dog-tail grass
<i>Cyperus eragrostis</i>	tall flatsedge
<i>Dactylis glomerata</i>	orchard grass
<i>Deschampsia elongata</i>	slender hair grass
<i>Elymus glaucus</i>	blue wildrye
<i>Festuca arundinacea</i>	tall fescue
<i>Gastridium ventricosum</i>	nitgrass
<i>Glyceria borealis</i>	northern mannagrass
<i>Holcus lanatus</i>	velvet grass
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	foxtail barley
<i>Juncus articulatus</i>	jointed rush

<i>Scientific Name</i>	Common Name
<i>Juncus bufonius</i>	toad rush
<i>Juncus effusus</i>	common bog rush
<i>Juncus patens</i>	spreading rush
<i>Juncus xiphioides</i>	iris-leaved rush
<i>Lolium multiflorum</i>	Italian ryegrass
<i>Lolium perenne</i>	perennial ryegrass
<i>Luzula comosa</i>	wood rush
<i>Luzula parviflora</i>	small-flowered woodrush
<i>Melica hardfordii</i>	Hardford's melic
<i>Nassella pulchra</i>	purple needlegrass
<i>Paspalum dilatatum</i>	dallis grass
<i>Phalaris aquatica</i>	Harding grass
<i>Poa annua</i>	annual bluegrass
<i>Poa bulbosa</i>	bulbous bluegrass
<i>Poa pratensis</i> ssp. <i>pratensis</i>	Kentucky bluegrass
<i>Polypogon monspeliensis</i>	rabbitsfoot grass
<i>Typha angustifolia</i>	narrowleaf cattail
<i>Vulpia bromoides</i>	brome fescue
<i>Vulpia microstachys</i> var. <i>pauciflora</i>	Pacific fescue
<i>Vulpia myuros</i> var. <i>myuros</i>	rattail fescue
Herbaceous Flowering Plants	
<i>Achillea millefolium</i>	yarrow
<i>Adenocaulon bicolor</i>	trail plant
<i>Allium triquetrum</i>	white-flowered onion
<i>Anagallis arvensis</i>	scarlet pimpernel
<i>Anaphalis margaritacea</i>	pearly everlasting
<i>Aquilegia formosa</i>	western columbine
<i>Aralia californica</i>	elk's clover
<i>Artemisia douglasiana</i>	mugwort
<i>Asarum caudatum</i>	wild ginger
<i>Bellis perennis</i>	English daisy
<i>Bowlesia incana</i>	bowlesia
<i>Brassica nigra</i>	black mustard
<i>Brassica rapa</i>	field mustard
<i>Cakile maritima</i>	European sea rocket
<i>Calochortus amabilis</i>	golden fairy lanternbe-lily
<i>Calochortus tolmei</i>	Tolmei's star tulip
<i>Calypso bulbosa</i>	fairyslipper orchid
<i>Cardamine californica</i>	milkmaids
<i>Cardamine oligosperma</i>	bittercress
<i>Carduus pycnocephalus</i>	Italian thistle
<i>Centaurea solstitialis</i>	yellow star-thistle

<i>Scientific Name</i>	Common Name
<i>Centaureum venustum</i>	centaury
<i>Cerastium glomeratum</i>	mouse-ear chickweed
<i>Chamomilla suaveolens</i>	pineapple weed
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	soap plant
<i>Cichorium intybus</i>	chicory
<i>Cirsium occidentale</i>	western thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Claytonia parviflora</i> ssp. <i>parviflora</i>	narrow-leaved miner's lettuce
<i>Claytonia perfoliata</i>	miner's-lettuce
<i>Claytonia sibirica</i>	candy flower
<i>Collomia heterophylla</i>	variable-leaved collomia
<i>Crassula connata</i>	pygmy weed
<i>Daucus carota</i>	Queen Anne's lace
<i>Dichelostemma capitatum</i>	wild hyacinth
<i>Dichelostemma ida-maia</i>	firecracker flower
<i>Digitalis purpurea</i>	foxglove
<i>Disporum hookeri</i>	drops of gold
<i>Epilobium brachycarpum</i>	autumn willowherb
<i>Epilobium ciliatum</i>	fringed willowherb
<i>Erigeron philadelphicus</i>	Philadelphia fleabane
<i>Erodium botrys</i>	big heronbill
<i>Erodium cicutarium</i>	redstem filaree
<i>Erodium moschatum</i>	whitestem filaree
<i>Erysimum capitatum</i>	western wallflower
<i>Eschscholzia caespitosa</i>	tufted poppy
<i>Eschscholzia californica</i>	California poppy
<i>Filago californica</i>	filago
<i>Filago gallica</i>	narrowleaved filago
<i>Foeniculum vulgare</i>	fennel
<i>Fragaria vesca</i>	wood strawberry
<i>Galium aparine</i>	bedstraw
<i>Galium californicum</i> ssp. <i>californicum</i>	California bedstraw
<i>Galium parisiense</i>	wall bedstraw
<i>Geranium dissectum</i>	cutleaf geranium
<i>Geranium molle</i>	dovefoot geranium
<i>Geranium pusillum</i>	small geranium
<i>Geranium robertianum</i>	Robert's geranium
<i>Hedera helix</i>	English ivy
<i>Helenium puberulum</i>	sneezeweed
<i>Hieracium albiflorum</i>	white hawkweed
<i>Hirschfeldia incana</i>	hoary mustard
<i>Hydrophyllum tenuipes</i>	Pacific waterleaf

<i>Scientific Name</i>	<i>Common Name</i>
<i>Hypericum perforatum</i>	St. John's wort
<i>Hypochaeris glabra</i>	smooth cat's-ear
<i>Hypochaeris radicata</i>	hairy cat's-ear
<i>Iris douglasiana</i>	Douglas' iris
<i>Iris</i> sp.	iris
<i>Lactuca serriola</i>	prickly lettuce
<i>Lamium purpureum</i>	purple deadnettle
<i>Lapsana communis</i>	common nipplewort
<i>Lathyrus latifolius</i>	perennial pea
<i>Lathyrus sulphureus</i>	sulphur pea
<i>Lathyrus tingitanus</i>	Tangier pea
<i>Lemna</i> sp.	duckweed
<i>Leontodon taraxacoides</i>	hairy hawkbit
<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Lilium</i> sp. (leaves only)	lily
<i>Linum bienne</i>	flax
<i>Lotus corniculatus</i>	birdfoot trefoil
<i>Lotus micranthus</i>	small flowered lotus
<i>Lotus purshianus</i>	Spanish lotus
<i>Lupinus bicolor</i>	miniature lupine
<i>Lupinus latifolius</i> var. <i>latifolius</i>	broad leaved lupine
<i>Lupinus nanus</i>	sky lupine
<i>Lythrum hyssopifolium</i>	hyssop loosestrife
<i>Medicago polymorpha</i>	bur-clover
<i>Mentha arvensis</i>	field mint
<i>Mentha pulegium</i>	pennyroyal
<i>Mimulus guttatus</i>	seep monkeyflower
<i>Monardella villosa</i> ssp. <i>villosa</i>	coyote mint ¹
<i>Myosotis latifolia</i>	broadleaf forget me not
<i>Nemophila parviflora</i> var. <i>austinae</i>	small-flowered nemophila
<i>Osmorhiza chilensis</i>	mountain sweet-cicely
<i>Oxalis oregana</i>	redwood sorrel
<i>Parentucellia viscosa</i>	yellow parentucellia
<i>Pedicularis densiflora</i>	Indian warrior
<i>Petasites frigidus</i> var. <i>palmatus</i>	coltsfoot
<i>Picris echioides</i>	bristly ox-tongue
<i>Plantago coronopus</i>	buckhorn plantain
<i>Plantago lanceolata</i>	English plantain
<i>Polygonum arenastrum</i>	common knotweed
<i>Prosartes hookeri</i>	drops of gold
<i>Psilocarphus tenellus</i> var. <i>tenellus</i>	slender woolly heads
<i>Polygala californica</i>	California polygala

<i>Scientific Name</i>	Common Name
<i>Prunella vulgaris</i> ssp. <i>lanceolata</i>	self heal
<i>Ranunculus californicus</i>	California buttercup
<i>Ranunculus muricatus</i>	prickle-fruited buttercup
<i>Ranunculus parviflorus</i>	few-flowered buttercup
<i>Rumex acetosella</i>	sheep sorrel
<i>Rumex crispus</i>	curly dock
<i>Rumex pulcher</i>	fiddle dock
<i>Sanicula crassicaulis</i>	Pacific sanicle
<i>Satureja douglasii</i>	yerba buena
<i>Scoliopus bigelovii</i>	fetid adder's tongue
<i>Scrophularia californica</i>	California figwort
<i>Senecio vulgaris</i>	old man of spring
<i>Silene gallica</i>	common catchfly
<i>Sisyrinchium bellum</i>	blue-eyed grass
<i>Smilacina racemosa</i>	false Solomon's seal
<i>Sonchus oleraceus</i>	common sow thistle
<i>Spergularia rubra</i>	red sandspurry
<i>Stachys ajugoides</i> var. <i>rigida</i>	hedge nettle
<i>Stachys albens</i>	cobwebby hedge-nettle
<i>Stachys bullata</i>	hedge nettle
<i>Stellaria media</i>	chickweed
<i>Taraxacum officinale</i>	dandelion
<i>Tellima grandiflora</i>	fringe cups
<i>Torilis arvensis</i>	hedge parsley
<i>Trientalis latifolia</i>	western star flower
<i>Trifolium angustifolium</i>	narrowleaf crimson clover
<i>Trifolium breweri</i>	forest clover
<i>Trifolium campestre</i>	hop clover
<i>Trifolium dubium</i>	shamrock
<i>Trifolium glomeratum</i>	clustered clover
<i>Trifolium hirtum</i>	rose clover
<i>Trifolium microcephalum</i>	little head clover
<i>Trifolium obtusiflorum</i>	creek clover
<i>Trifolium oliganthum</i>	few-flowered clover
<i>Trifolium pratense</i>	red clover
<i>Trifolium repens</i>	white clover
<i>Trifolium subterraneum</i>	subterranean clover
<i>Trifolium variegatum</i>	variegated clover
<i>Trillium ovatum</i> ssp. <i>ovatum</i>	Pacific trillium
<i>Triteleia laxa</i>	Ithuriel's spear
<i>Vancouveria hexandra</i>	northern vancouveria
<i>Verbascum blattaria</i>	moth mullein

<i>Scientific Name</i>	Common Name
<i>Vicia americana</i>	American vetch
<i>Vicia benghalensis</i>	vetch
<i>Vicia hirsuta</i>	hairy vetch
<i>Vicia sativa</i>	spring vetch
<i>Vinca major</i>	periwinkle
<i>Viola glabella</i>	stream violet
<i>Whipplea modesta</i>	modesty

¹ The *Monardella villosa* in the study area lacks the height (i.e., >50 centimeters) and long outer bracts (i.e., 20–30 millimeters) that are key characters of the rare subspecies *M. villosa* ssp. *globosa*, a CNPS List 1B.2 species.

Table B-2. Plant Species Observed During Botanical Surveys for the HUM 254 Bridge Upgrades—Bear Creek Bridge Project

<i>Scientific Name</i>	Common Name
Trees	
<i>Acer macrophyllum</i>	bigleaf maple
<i>Alnus rhombifolia</i>	white alder
<i>Alnus rubra</i>	red alder
<i>Arbutus menziesii</i>	Pacific madrone
<i>Lithocarpus densiflorus</i> var. <i>densiflorus</i>	tan oak
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir
<i>Salix hookeriana</i>	Hooker's willow
<i>Salix lasiolepis</i>	arroyo willow
<i>Sequoia sempervirens</i>	coast redwood
<i>Umbellularia californica</i>	California bay
Shrubs	
<i>Baccharis pilularis</i>	coyote brush
<i>Ceanothus thyrsiflorus</i>	blueblossom
<i>Corylus cornuta</i> var. <i>californica</i>	California hazelnut
<i>Genista monspessulana</i>	French broom
<i>Heteromeles arbutifolia</i>	toyon
<i>Lonicera hispidula</i> var. <i>vacillans</i>	hairy honeysuckle
<i>Rosa eglanteria</i>	sweetbriar
<i>Rubus discolor</i>	Himalayan blackberry
<i>Rubus parviflorus</i>	thimbleberry
<i>Rubus ursinus</i>	California blackberry
<i>Symphoricarpos albus</i>	common snowberry
<i>Symphoricarpos mollis</i>	creeping snowberry
<i>Toxicodendron diversilobum</i>	poison oak
Ferns and Relatives	
<i>Adiantum aleuticum</i>	five-finger fern
<i>Equisetum telmateia</i> ssp. <i>braunii</i>	giant horsetail
<i>Polypodium glycyrrhiza</i>	licorice fern
<i>Pentagramma triangularis</i>	gold-back fern
<i>Polystichum munitum</i>	sword fern
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern
<i>Woodwardia fimbriata</i>	giant chainfern
Grasses and Relatives	
<i>Agrostis exarata</i> .	bentgrass
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Bromus carinatus</i>	California brome
<i>Bromus diandrus</i>	ripgut brome
<i>Bromus hordeaceus</i>	soft chess
<i>Bromus orcuttianus</i>	Orcutt's brome
<i>Briza maxima</i>	large quaking grass
<i>Briza minor</i>	little quaking grass

<i>Scientific Name</i>	Common Name
<i>Cynosurus echinatus</i>	hedgehog dog-tail grass
<i>Cyperus eragrostis</i>	tall flatsedge
<i>Dactylis glomerata</i>	orchard grass
<i>Elymus glaucus</i>	blue wildrye
<i>Festuca arundinacea</i>	tall fescue
<i>Holcus lanatus</i>	velvet grass
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	foxtail barley
<i>Juncus patens</i>	spreading rush
<i>Lolium multiflorum</i>	Italian ryegrass
<i>Lolium perenne</i>	perennial ryegrass
<i>Phalaris aquatica</i>	Harding grass
<i>Poa annua</i>	annual bluegrass
<i>Poa pratensis</i> ssp. <i>pratensis</i>	Kentucky bluegrass
<i>Vulpia microstachys</i> var. <i>pauciflora</i>	Pacific fescue
Herbaceous Flowering Plants	
<i>Achillea millefolium</i>	yarrow
<i>Adenocaulon bicolor</i>	trail plant
<i>Allium triquetrum</i>	white-flowered onion
<i>Anaphalis margaritacea</i>	pearly everlasting
<i>Artemisia douglasiana</i>	mugwort
<i>Asarum caudatum</i>	wild ginger
<i>Bellis perennis</i>	English daisy
<i>Cakile maritima</i>	European sea rocket
<i>Cardamine californica</i>	milkmaids
<i>Cardamine oligosperma</i>	bitter cress
<i>Carduus pycnocephalus</i>	Italian thistle
<i>Cerastium glomeratum</i>	mouse-ear chickweed
<i>Cichorium intybus</i>	chicory
<i>Cirsium occidentale</i>	western thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Claytonia parviflora</i> ssp. <i>parviflora</i>	narrow-leaved miner's lettuce
<i>Claytonia perfoliata</i>	miner's-lettuce
<i>Claytonia sibirica</i>	candy flower
<i>Daucus carota</i>	Queen Anne's lace
<i>Epilobium ciliatum</i>	fringed willowherb
<i>Erigeron philadelphicus</i>	Philadelphia fleabane
<i>Erysimum capitatum</i>	western wallflower
<i>Foeniculum vulgare</i>	fennel
<i>Fragaria vesca</i>	wood strawberry
<i>Galium aparine</i>	bedstraw
<i>Geranium dissectum</i>	cutleaf geranium
<i>Geranium molle</i>	dovefoot geranium

<i>Scientific Name</i>	Common Name
<i>Geranium robertianum</i>	Robert's geranium
<i>Hieracium albiflorum</i>	white hawkweed
<i>Hirschfeldia incana</i>	hoary mustard
<i>Hypericum perforatum</i>	St. John's wort
<i>Hypochaeris radicata</i>	hairy cat's-ear
<i>Iris douglasiana</i>	Douglas' iris
<i>Lapsana communis</i>	common nipplewort
<i>Lathyrus sulphureus</i>	sulphur pea
<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Lotus corniculatus</i>	birdfoot trefoil
<i>Lupinus latifolius</i> var. <i>latifolius</i>	broad leaved lupine
<i>Lupinus nanus</i>	sky lupine
<i>Lythrum hyssopifolium</i>	hyssop loosestrife
<i>Medicago polymorpha</i>	bur-clover
<i>Mentha arvensis</i>	field mint
<i>Mentha pulegium</i>	pennyroyal
<i>Myosotis latifolia</i>	broadleaf forget me not
<i>Nemophila parviflora</i> var. <i>austinae</i>	small-flowered nemophila
<i>Osmorhiza chilensis</i>	mountain sweet-cicely
<i>Oxalis oregana</i>	redwood sorrel
<i>Petasites frigidus</i> var. <i>palmatus</i>	coltsfoot
<i>Picris echioides</i>	bristly ox-tongue
<i>Plantago lanceolata</i>	English plantain
<i>Prunella vulgaris</i> ssp. <i>lanceolata</i>	self heal
<i>Ranunculus californicus</i>	California buttercup
<i>Ranunculus muricatus</i>	prickle-fruited buttercup
<i>Rumex acetosella</i>	sheep sorrel
<i>Rumex crispus</i>	curly dock
<i>Rumex pulcher</i>	fiddle dock
<i>Sanicula crassicaulis</i>	Pacific sanicle
<i>Satureja douglasii</i>	yerba buena
<i>Scrophularia californica</i>	California figwort
<i>Smilacina racemosa</i>	false Solomon's seal
<i>Sonchus oleraceus</i>	common sow thistle
<i>Stachys ajugoides</i> var. <i>rigida</i>	hedge nettle
<i>Stachys albens</i>	cobwebby hedge-nettle
<i>Stachys bullata</i>	hedge nettle
<i>Stellaria media</i>	chickweed
<i>Taraxacum officinale</i>	dandelion
<i>Tellima grandiflora</i>	fringe cups
<i>Torilis arvensis</i>	hedge parsley
<i>Trifolium campestre</i>	hop clover

<i>Scientific Name</i>	Common Name
<i>Trifolium pratense</i>	red clover
<i>Trifolium repens</i>	white clover
<i>Trillium ovatum</i> ssp. <i>ovatum</i>	Pacific trillium
<i>Vancouveria hexandra</i>	northern vancouveria
<i>Vicia americana</i>	American vetch
<i>Vicia sativa</i>	spring vetch
<i>Viola glabella</i>	stream violet
<i>Whipplea modesta</i>	modesty

Table B-3. Plant Species Observed During Botanical Surveys for the HUM 254 Bridge Upgrades—Bridge Creek Bridge Project

<i>Scientific Name</i>	Common Name
Trees	
<i>Acer macrophyllum</i>	bigleaf maple
<i>Aesculus californica</i>	California buckeye
<i>Alnus rubra</i>	red alder
<i>Arbutus menziesii</i>	Pacific madrone
<i>Lithocarpus densiflorus</i> var. <i>densiflorus</i>	tan oak
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir
<i>Quercus garryana</i>	Oregon oak
<i>Quercus kelloggii</i>	black oak
<i>Salix lasiolepis</i>	arroyo willow
<i>Sequoia sempervirens</i>	coast redwood
<i>Umbellularia californica</i>	California bay
Shrubs	
<i>Arctostaphylos columbiana</i>	hairy manzanita
<i>Baccharis pilularis</i>	coyote brush
<i>Ceanothus thyrsiflorus</i>	blueblossom
<i>Corylus cornuta</i> var. <i>californica</i>	California hazelnut
<i>Genista monspessulana</i>	French broom
<i>Heteromeles arbutifolia</i>	toyon
<i>Lonicera hispidula</i> var. <i>vacillans</i>	hairy honeysuckle
<i>Mimulus aurantiacus</i>	bush monkeyflower
<i>Rubus discolor</i>	Himalayan blackberry
<i>Rubus parviflorus</i>	thimbleberry
<i>Salix exigua</i>	sandbar willow
<i>Sambucus nigra</i> ssp. <i>caerulea</i>	blue elderberry
<i>Symphoricarpos albus</i>	common snowberry
<i>Toxicodendron diversilobum</i>	poison oak
<i>Vaccinium ovatum</i>	evergreen huckleberry
Ferns and Relatives	
<i>Adiantum aleuticum</i>	five-finger fern
<i>Equisetum telmateia</i> ssp. <i>braunii</i>	giant horsetail
<i>Polypodium calirhiza</i>	nested polypody
<i>Polypodium glycyrrhiza</i>	licorice fern
<i>Polystichum munitum</i>	sword fern
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern
Grasses and Relatives	
<i>Aira praecox</i>	yellow hair grass
<i>Agrostis exarata</i>	bentgrass
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Avena barbata</i>	slender wild oat
<i>Briza maxima</i>	quaking grass
<i>Briza minor</i>	little quaking grass

<i>Scientific Name</i>	Common Name
<i>Bromus carinatus</i>	California brome
<i>Bromus diandrus</i>	riggut brome
<i>Bromus hordeaceus</i>	soft chess
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome
<i>Bromus orcuttianus</i>	Orcutt's brome
<i>Carex gynodynamis</i>	Olney's hairy sedge
<i>Cynodon dactylon</i>	Bermuda grass
<i>Cynosurus echinatus</i>	hedgehog dog-tail grass
<i>Cyperus eragrostis</i>	tall flatsedge
<i>Dactylis glomerata</i>	orchard grass
<i>Elymus glaucus</i>	blue wildrye
<i>Festuca arundinacea</i>	tall fescue
<i>Gastridium ventricosum</i>	nitgrass
<i>Holcus lanatus</i>	velvet grass
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley
<i>Juncus articulatus</i>	jointed rush
<i>Juncus bufonius</i>	toad rush
<i>Juncus effusus</i>	common bog rush
<i>Juncus patens</i>	spreading rush
<i>Juncus xiphioides</i>	iris-leaved rush
<i>Lolium multiflorum</i>	Italian ryegrass
<i>Luzula comosa</i>	wood rush
<i>Nassella pulchra</i>	purple needlegrass
<i>Phalaris aquatica</i>	Harding grass
<i>Poa annua</i>	annual bluegrass
<i>Poa bulbosa</i>	bulbous blue grass
<i>Polypogon monspeliensis</i>	rabbitsfoot grass
<i>Typha angustifolia</i>	narrowleaf cattail
<i>Vulpia myuros</i> var. <i>myuros</i>	rattail fescue
Herbaceous Flowering Plants	
<i>Anagallis arvensis</i>	scarlet pimpernel
<i>Artemisia douglasiana</i>	mugwort
<i>Asarum caudatum</i>	wild ginger
<i>Brassica rapa</i>	field mustard
<i>Calochortus amabilis</i>	golden fairy lantern
<i>Cardamine californica</i>	milkmaids
<i>Cardamine oligosperma</i>	bittercress
<i>Carduus pycnocephalus</i>	Italian thistle
<i>Centaurea solstitialis</i>	yellow star-thistle
<i>Centaureum venustum</i>	centaury
<i>Cerastium glomeratum</i>	mouse-ear chickweed
<i>Cichorium intybus</i>	chicory

Scientific Name	Common Name
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	soap plant
<i>Daucus carota</i>	Queen Anne's lace
<i>Dichelostemma capitatum</i>	wild hyacinth
<i>Dichelostemma ida-maia</i>	firecracker flower
<i>Digitalis purpurea</i>	foxglove
<i>Eriophyllum lanatum</i> var. <i>achillaeoides</i>	woolly sunflower
<i>Erodium botrys</i>	big heronbill
<i>Filago californica</i>	filago
<i>Filago gallica</i>	narrowleaved filago
<i>Foeniculum vulgare</i>	fennel
<i>Fragaria vesca</i>	wood strawberry
<i>Galium aparine</i>	bedstraw
<i>Geranium dissectum</i>	cutleaf geranium
<i>Hirschfeldia incana</i>	hoary mustard
<i>Hypericum perforatum</i>	St. John's wort
<i>Hypochaeris glabra</i>	smooth cat's-ear
<i>Hypochaeris radicata</i>	rough cat's-ear
<i>Iris douglasiana</i>	Douglas' iris
<i>Lathyrus sulphureus</i>	sulphur pea
<i>Lathyrus tingitanus</i>	Tangier pea
<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Lilium</i> sp. (leaves only)	lily
<i>Linum bienne</i>	flax
<i>Lotus corniculatus</i>	birdfoot trefoil
<i>Lotus micranthus</i>	small flowered lotus
<i>Lotus purshianus</i>	Spanish lotus
<i>Lupinus nanus</i>	sky lupine
<i>Lythrum hyssopifolium</i>	hyssop loosestrife
<i>Medicago polymorpha</i>	bur-clover
<i>Mentha arvensis</i>	mint
<i>Monardella villosa</i> ssp. <i>villosa</i>	coyote mint ¹
<i>Nemophila parviflora</i> var. <i>austinae</i>	small-flowered nemophila
<i>Osmorhiza chilensis</i>	mountain sweet-cicely
<i>Oxalis oregana</i>	redwood sorrel
<i>Parentucellia viscosa</i>	yellow parentucellia
<i>Petasites frigidus</i> var. <i>palmatius</i>	coltsfoot
<i>Picris echioides</i>	bristly ox-tongue
<i>Plantago coronopus</i>	buckhorn plantain
<i>Plantago lanceolata</i>	English plantain
<i>Polygonum arenastrum</i>	common knotweed
<i>Prunella vulgaris</i> ssp. <i>lanceolata</i>	self heal
<i>Psilocarphus tenellus</i> var. <i>tenellus</i>	slender woolly marbles

<i>Scientific Name</i>	Common Name
<i>Ranunculus muricatus</i>	prickle-fruited buttercup
<i>Ranunculus parviflorus</i>	few-flowered buttercup
<i>Rumex crispus</i>	curly dock
<i>Rumex pulcher</i>	fiddle dock
<i>Sanicula crassicaulis</i>	Pacific sanicle
<i>Scoliopus bigelovii</i>	fetid adder's tongue
<i>Silene gallica</i>	common catchfly
<i>Smilacina racemosa</i>	false Solomon's seal
<i>Sonchus asper</i>	prickly sow thistle
<i>Spergularia rubra</i>	red sandspur
<i>Stachys ajugoides</i> var. <i>rigida</i>	hedge nettle
<i>Stellaria media</i>	chickweed
<i>Taraxacum officinale</i>	dandelion
<i>Torilis arvensis</i>	hedge parsley
<i>Trifolium angustifolium</i>	narrowleaf crimson clover
<i>Trifolium breweri</i>	forest clover
<i>Trifolium campestre</i>	hop clover
<i>Trifolium hirtum</i>	rose clover
<i>Trifolium oliganthum</i>	few-flowered clover
<i>Trifolium repens</i>	white clover
<i>Trifolium subterraneum</i>	subterranean clover
<i>Verbascum blattaria</i>	moth mullein
<i>Vicia americana</i>	American vetch
<i>Vicia benghalensis</i>	vetch
<i>Vicia hirsuta</i>	hairy vetch
<i>Vicia sativa</i>	spring vetch
<i>Vicia villosa</i>	winter vetch
<i>Vinca major</i>	periwinkle
<i>Whipplea modesta</i>	modesty

¹ Lacks the height (i.e., >50 centimeters and long outer bracts (i.e., 20–30 millimeters) that are key characters of the rare subspecies *M. villosa* ssp. *globosa*), a CNPS List 1B.2 species.

Table B-4. Plant Species Observed During Botanical Surveys for the HUM 254 Bridge Upgrades—Elk Creek Bridge Project

<i>Scientific Name</i>	Common Name
Trees	
<i>Acer macrophyllum</i>	bigleaf maple
<i>Alnus rubra</i>	red alder
<i>Arbutus menziesii</i>	Pacific madrone
<i>Fraxinus dipetala</i>	California ash
<i>Lithocarpus densiflorus</i> var. <i>densiflorus</i>	tan oak
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir
<i>Salix lasiolepis</i>	arroyo willow
<i>Sequoia sempervirens</i>	coast redwood
<i>Umbellularia californica</i>	California bay
Shrubs	
<i>Cornus nuttallii</i>	Pacific dogwood
<i>Corylus cornuta</i> var. <i>californica</i>	California hazelnut
<i>Genista monspessulana</i>	French broom
<i>Rosa californica</i>	California rose
<i>Rubus parviflorus</i>	thimbleberry
<i>Rubus ursinus</i>	California blackberry
<i>Symphoricarpos albus</i>	common snowberry
<i>Symphoricarpos mollis</i>	creeping snowberry
<i>Toxicodendron diversilobum</i>	poison oak
<i>Vaccinium ovatum</i>	evergreen huckleberry
Ferns and Relatives	
<i>Adiantum aleuticum</i>	five-finger fern
<i>Equisetum telmateia</i> ssp. <i>braunii</i>	giant horsetail
<i>Pentagramma triangularis</i>	gold-back fern
<i>Polypodium glycyrrhiza</i>	licorice fern
<i>Polystichum munitum</i>	sword fern
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern
<i>Woodwardia fimbriata</i>	giant chainfern
Grasses and Relatives	
<i>Aira caryophyllea</i>	silver hair grass
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Avena barbata</i>	slender wild oat
<i>Briza maxima</i>	large quaking grass
<i>Bromus diandrus</i>	ripgut brome
<i>Bromus orcuttianus</i>	Orcutt's brome
<i>Carex hendersonii</i>	Henderson's sedge
<i>Carex multicaulis</i>	many-stemmed sedge
<i>Cynosurus echinatus</i>	hedgehog dog-tail grass
<i>Deschampsia elongata</i>	slender hair grass
<i>Elymus glaucus</i>	blue wildrye
<i>Festuca arundinacea</i>	tall fescue

<i>Scientific Name</i>	Common Name
<i>Gastridium ventricosum</i>	nitgrass
<i>Juncus patens</i>	spreading rush
<i>Lolium multiflorum</i>	Italian ryegrass
<i>Luzula parviflora</i>	small-flowered woodrush
<i>Melica hardfordii</i>	Hardford's melic
<i>Poa annua</i>	annual bluegrass
Herbaceous Flowering Plants	
<i>Achillea millefolium</i>	yarrow
<i>Adenocaulon bicolor</i>	trail plant
<i>Aralia californica</i>	elk's clover
<i>Artemisia douglasiana</i>	mugwort
<i>Asarum caudatum</i>	wild ginger
<i>Bellis perennis</i>	English daisy
<i>Bowlesia incana</i>	bowlesia
<i>Brassica nigra</i>	black mustard
<i>Calypso bulbosa</i>	fairyslipper orchid
<i>Cardamine californica</i>	milkmaids
<i>Cerastium glomeratum</i>	mouse-ear chickweed
<i>Cichorium intybus</i>	chicory
<i>Claytonia parviflora</i> ssp. <i>parviflora</i>	narrow-leaved miner's lettuce
<i>Collomia heterophylla</i>	variable-leaved collomia
<i>Daucus carota</i>	Queen Anne's lace
<i>Disporum hookeri</i>	drops of gold
<i>Erigeron philadelphicus</i>	Philadelphia fleabane
<i>Filago gallica</i>	narrowleaved filago
<i>Foeniculum vulgare</i>	fennel
<i>Fragaria vesca</i>	wood strawberry
<i>Galium aparine</i>	bedstraw
<i>Galium californicum</i> ssp. <i>californicum</i>	California bedstraw
<i>Geranium molle</i>	dovefoot geranium
<i>Hieracium albiflorum</i>	white hawkweed
<i>Hydrophyllum tenuipes</i>	Pacific waterleaf
<i>Iris douglasiana</i>	Douglas' iris
<i>Lathyrus latifolius</i>	perennial pea
<i>Lathyrus sulphureus</i>	sulphur pea
<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Lotus purshianus</i>	Spanish lotus
<i>Lupinus bicolor</i>	miniature lupine
<i>Medicago polymorpha</i>	bur-clover
<i>Mimulus guttatus</i>	seep monkeyflower
<i>Osmorhiza chilensis</i>	mountain sweet-cicely
<i>Oxalis oregana</i>	redwood sorrel

<i>Scientific Name</i>	Common Name
<i>Petasites frigidus</i> var. <i>palmatus</i>	coltsfoot
<i>Plantago lanceolata</i>	English plantain
<i>Polygala californica</i>	California polygala
<i>Prunella vulgaris</i> ssp. <i>lanceolata</i>	self heal
<i>Ranunculus muricatus</i>	prickle-fruited buttercup
<i>Rumex crispus</i>	curly dock
<i>Rumex pulcher</i>	fiddle dock
<i>Sanicula crassicaulis</i>	Pacific sanicle
<i>Satureja douglasii</i>	yerba buena
<i>Scoliopus bigelovii</i>	fetid adder's tongue
<i>Scrophularia californica</i>	California figwort
<i>Smilacina racemosa</i>	false Solomon's seal
<i>Stachys ajugoides</i> var. <i>rigida</i>	hedge nettle
<i>Tellima grandiflora</i>	fringe cups
<i>Torilis arvensis</i>	hedge parsley
<i>Trientalis latifolia</i>	western star flower
<i>Trifolium dubium</i>	shamrock
<i>Trifolium glomeratum</i>	clustered clover
<i>Trifolium hirtum</i>	rose clover
<i>Trifolium microcephalum</i>	little head clover
<i>Trifolium repens</i>	white clover
<i>Trientalis latifolia</i>	western star flower
<i>Trillium ovatum</i> ssp. <i>ovatum</i>	Pacific trillium
<i>Vancouveria hexandra</i>	northern vancouveria
<i>Vicia sativa</i>	spring vetch
<i>Viola glabella</i>	stream violet
<i>Whipplea modesta</i>	modesty

Table B-5. Plant Species Observed During Botanical Surveys for the HUM 254 Bridge Upgrades—Ohman Creek Bridge Project

<i>Scientific Name</i>	Common Name
Trees	
<i>Acer macrophyllum</i>	bigleaf maple
<i>Aesculus californica</i>	California buckeye
<i>Alnus rubra</i>	red alder
<i>Arbutus menziesii</i>	Pacific madrone
<i>Fraxinus latifolia</i>	Oregon ash
<i>Lithocarpus densiflorus</i> var. <i>densiflorus</i>	tan oak
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir
<i>Quercus chrysolepis</i>	canyon live oak
<i>Quercus garryana</i>	Oregon oak
<i>Quercus kelloggii</i>	black oak
<i>Salix hookeriana</i>	Hooker's willow
<i>Salix lasiolepis</i>	arroyo willow
<i>Sequoia sempervirens</i>	coast redwood
<i>Umbellularia californica</i>	California bay
Shrubs/Woody Vines	
<i>Baccharis pilularis</i>	coyote brush
<i>Ceanothus integerrimus</i>	deer brush
<i>Cornus nuttallii</i>	Pacific dogwood
<i>Cornus sericea</i>	creek dogwood
<i>Corylus cornuta</i> var. <i>californica</i>	California hazelnut
<i>Cytisus scoparius</i>	Scotch broom
<i>Genista monspessulana</i>	French broom
<i>Heteromeles arbutifolia</i>	toyon
<i>Lonicera hispidula</i> var. <i>vacillans</i>	hairy honeysuckle
<i>Mimulus aurantiacus</i>	bush monkey flower
<i>Rosa californica</i>	California rose
<i>Rubus discolor</i>	Himalayan blackberry
<i>Rubus ursinus</i>	California blackberry
<i>Symphoricarpos albus</i>	common snowberry
<i>Toxicodendron diversilobum</i>	poison oak
<i>Vaccinium ovatum</i>	evergreen huckleberry
<i>Vitis californica</i>	California grape
Ferns and Relatives	
<i>Adiantum jordanii</i>	California maidenhair fern
<i>Equisetum telmateia</i> ssp. <i>braunii</i>	giant horsetail
<i>Pentagramma triangularis</i>	gold-back fern
<i>Polypodium calirhiza</i>	nested polypody
<i>Polystichum munitum</i>	sword fern
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern

<i>Scientific Name</i>	Common Name
Grasses and Relatives	
<i>Aira caryophylla</i>	silver hair grass
<i>Agrostis exarata</i>	bentgrass
<i>Avena barbata</i>	slender wild oat
<i>Avena fatua</i>	wild oat
<i>Briza maxima</i>	quaking grass
<i>Briza minor</i>	little quaking grass
<i>Bromus carinatus</i>	California brome
<i>Bromus diandrus</i>	rippgut brome
<i>Bromus hordeaceus</i>	soft chess
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome
<i>Carex barbarae</i>	Santa Barbara sedge
<i>Cynodon dactylon</i>	Bermuda grass
<i>Cynosurus echinatus</i>	hedgehog dog-tail grass
<i>Cyperus eragrostis</i>	tall flatsedge
<i>Dactylis glomerata</i>	orchard grass
<i>Elymus glaucus</i>	blue wildrye
<i>Festuca arundinacea</i>	tall fescue
<i>Glyceria borealis</i>	northern mannagrass
<i>Holcus lanatus</i>	velvet grass
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	foxtail barley
<i>Juncus bufonius</i>	toad rush
<i>Juncus patens</i>	spreading rush
<i>Lolium multiflorum</i>	Italian ryegrass
<i>Luzula comosa</i>	wood rush
<i>Paspalum dilatatum</i>	dallis grass
<i>Phalaris aquatica</i>	Harding grass
<i>Poa annua</i>	annual bluegrass
<i>Vulpia bromoides</i>	brome fescue
<i>Vulpia myuros</i> var. <i>myuros</i>	rattail fescue
Herbaceous Flowering Plants	
<i>Anagallis arvensis</i>	scarlet pimpernel
<i>Aquilegia formosa</i>	western columbine
<i>Artemisia douglasiana</i>	mugwort
<i>Bellis perennis</i>	English daisy
<i>Calochortus tolmei</i>	Tolmei's star tulip
<i>Carduus pycnocephalus</i>	Italian thistle
<i>Centaurium venustum</i>	centaury
<i>Cerastium glomeratum</i>	mouse-ear chickweed
<i>Chamomilla suaveolens</i>	pineapple weed
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	soap plant

<i>Scientific Name</i>	Common Name
<i>Cichorium intybus</i>	chicory
<i>Claytonia sibirica</i>	candy flower
<i>Crassula connata</i>	pygmy weed
<i>Daucus carota</i>	Queen Anne's lace
<i>Epilobium brachycarpum</i>	autumn willowherb
<i>Erodium botrys</i>	big heronbill
<i>Erodium cicutarium</i>	redstem filaree
<i>Erodium moschatum</i>	whitestem filaree
<i>Eschscholzia caespitosa</i>	tufted poppy
<i>Eschscholzia californica</i>	California poppy
<i>Foeniculum vulgare</i>	fennel
<i>Fragaria vesca</i>	wood strawberry
<i>Galium aparine</i>	bedstraw
<i>Galium parisiense</i>	wall bedstraw
<i>Geranium dissectum</i>	cutleaf geranium
<i>Geranium molle</i>	dovefoot geranium
<i>Geranium pusillum</i>	small geranium
<i>Geranium robertianum</i>	Robert's geranium
<i>Hedera helix</i>	English ivy
<i>Helenium puberulum</i>	sneezeweed
<i>Hirschfeldia incana</i>	hoary mustard
<i>Hypericum perforatum</i>	St. John's wort
<i>Hypochaeris glabra</i>	smooth cat's-ear
<i>Iris douglasiana</i>	Douglas' iris
<i>Lactuca serriola</i>	prickly lettuce
<i>Lamium purpureum</i>	purple deadnettle
<i>Lapsana communis</i>	common nipplewort
<i>Lathyrus latifolius</i>	perennial pea
<i>Lathyrus sulphureus</i>	sulphur pea
<i>Lathyrus tingitanus</i>	Tangier pea
<i>Lemna</i> sp.	duckweed
<i>Leontodon taraxacoides</i>	hairy hawkbit
<i>Linum bienne</i>	flax
<i>Lotus micranthus</i>	small flowered lotus
<i>Lupinus bicolor</i>	miniature lupine
<i>Lythrum hyssopifolium</i>	hyssop loosestrife
<i>Medicago polymorpha</i>	bur-clover
<i>Mentha pulegium</i>	pennyroyal
<i>Osmorhiza chilensis</i>	mountain sweet-cicely
<i>Parentucellia viscosa</i>	yellow parentucellia
<i>Pedicularis densiflora</i>	Indian warrior
<i>Petasites frigidus</i> var. <i>palmatus</i>	coltsfoot

<i>Scientific Name</i>	Common Name
<i>Picris echioides</i>	bristly ox-tongue
<i>Plantago lanceolata</i>	English plantain
<i>Polygala californica</i>	California polygala
<i>Prosartes hookeri</i>	drops of gold
<i>Prunella vulgaris</i> ssp. <i>lanceolata</i>	self heal
<i>Psilocarphus tenellus</i> var. <i>tenellus</i>	slender woolly heads
<i>Ranunculus californicus</i>	California buttercup
<i>Ranunculus hebecarpus</i>	delicate buttercup
<i>Rumex crispus</i>	curly dock
<i>Rumex pulcher</i>	fiddle dock
<i>Sanicula crassicaulis</i>	Pacific sanicle
<i>Scrophularia californica</i>	California figwort
<i>Senecio vulgaris</i>	old man of spring
<i>Silene gallica</i>	common catchfly
<i>Sisyrinchium bellum</i>	blue-eyed grass
<i>Smilacina racemosa</i>	false Solomon's seal
<i>Sonchus oleraceus</i>	common sow thistle
<i>Spergularia rubra</i>	red sandspurry
<i>Stachys ajugoides</i> var. <i>rigida</i>	hedge nettle
<i>Stellaria media</i>	chickweed
<i>Taraxacum officinale</i>	dandelion
<i>Tellima grandiflora</i>	fringe cups
<i>Torilis arvensis</i>	hedge parsley
<i>Trifolium breweri</i>	forest clover
<i>Trifolium dubium</i>	shamrock
<i>Trifolium hirtum</i>	rose clover
<i>Trifolium microcephalum</i>	little head clover
<i>Trifolium obtusiflorum</i>	creek clover
<i>Trifolium repens</i>	white clover
<i>Trifolium subterraneum</i>	subterranean clover
<i>Trifolium variegatum</i>	variegated clover
<i>Triteleia laxa</i>	Ithuriel's spear
<i>Vicia hirsuta</i>	hairy vetch
<i>Vicia sativa</i>	spring vetch
<i>Vinca major</i>	periwinkle
<i>Viola glabella</i>	stream violet
<i>Whipplea modesta</i>	modesty

Appendix D Tree Assessment

These data and assessment supersede the “Addendum to the July 2014 NES – Old Growth Redwood Trees,” dated November 24, 2014 and updated May 28, 2014.

Tree Assessment
Ohman Creek Bridge

Date: 19 November 2015		Personnel: Sean Marquis, Darin Sullivan	
Tree #	Comments	Rating	
993132	Below road elevation. Work is in ground that is unlikely to support roots. No work in SRZ.	0	
993133	Below road elevation. Work is in ground that is unlikely to support roots. No work in SRZ.	0	
1529	Work is in already-compacted, disturbed, paved area.	0	
993129	Slightly lower than road elevation. Crash cushion and structural section (max excavation depth of 0.85 ft), and utility pole and guy wire work in SRZ.	3	
1466	Work is in RHZ on opposite side of a larger tree. No work in SRZ.	2	
1	Structural section (max excavation depth of 0.85 ft) in SRZ. In a grove, expect interconnected roots.	2	
1461	Structural section (max excavation depth of 0.85 ft) in SRZ. In a grove, expect interconnected roots.	0	
1462	Structural section (max excavation depth of 0.85 ft) in SRZ. In a grove, expect interconnected roots.	0	
1463	Structural section (max excavation depth of 0.85 ft) in SRZ. In a grove, expect interconnected roots.	1	

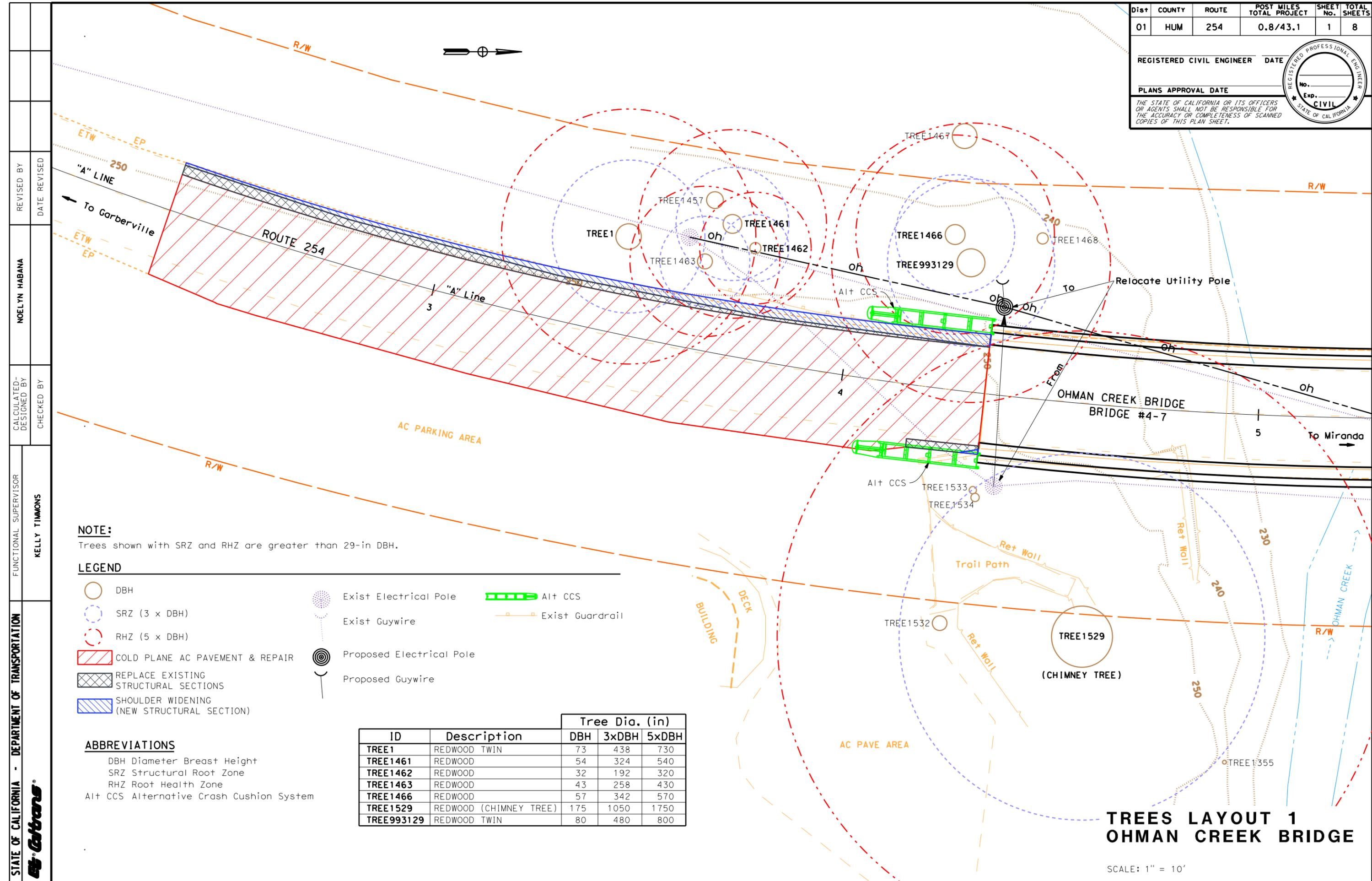
Rank	Total # trees in rank (w/o min)
0	5
1	1
2	2
3	1
4	0
5	0
6	0

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	HUM	254	0.8/43.1	1	8

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

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NOTE:

Trees shown with SRZ and RHZ are greater than 29-in DBH.

LEGEND

- DBH
- SRZ (3 x DBH)
- RHZ (5 x DBH)
- COLD PLANE AC PAVEMENT & REPAIR
- REPLACE EXISTING STRUCTURAL SECTIONS
- SHOULDER WIDENING (NEW STRUCTURAL SECTION)
- Exist Electrical Pole
- Exist Guywire
- Proposed Electrical Pole
- Proposed Guywire
- Alt CCS
- Exist Guardrail

ABBREVIATIONS

- DBH Diameter Breast Height
- SRZ Structural Root Zone
- RHZ Root Health Zone
- Alt CCS Alternative Crash Cushion System

ID	Description	Tree Dia. (in)		
		DBH	3xDBH	5xDBH
TREE1	REDWOOD TWIN	73	438	730
TREE1461	REDWOOD	54	324	540
TREE1462	REDWOOD	32	192	320
TREE1463	REDWOOD	43	258	430
TREE1466	REDWOOD	57	342	570
TREE1529	REDWOOD (CHIMNEY TREE)	175	1050	1750
TREE993129	REDWOOD TWIN	80	480	800

**TREES LAYOUT 1
OHMAN CREEK BRIDGE**

SCALE: 1" = 10'

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	HUM	254	0.8/43.1	2	8

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

FUNCTIONAL SUPERVISOR: KELLY TIMMONS

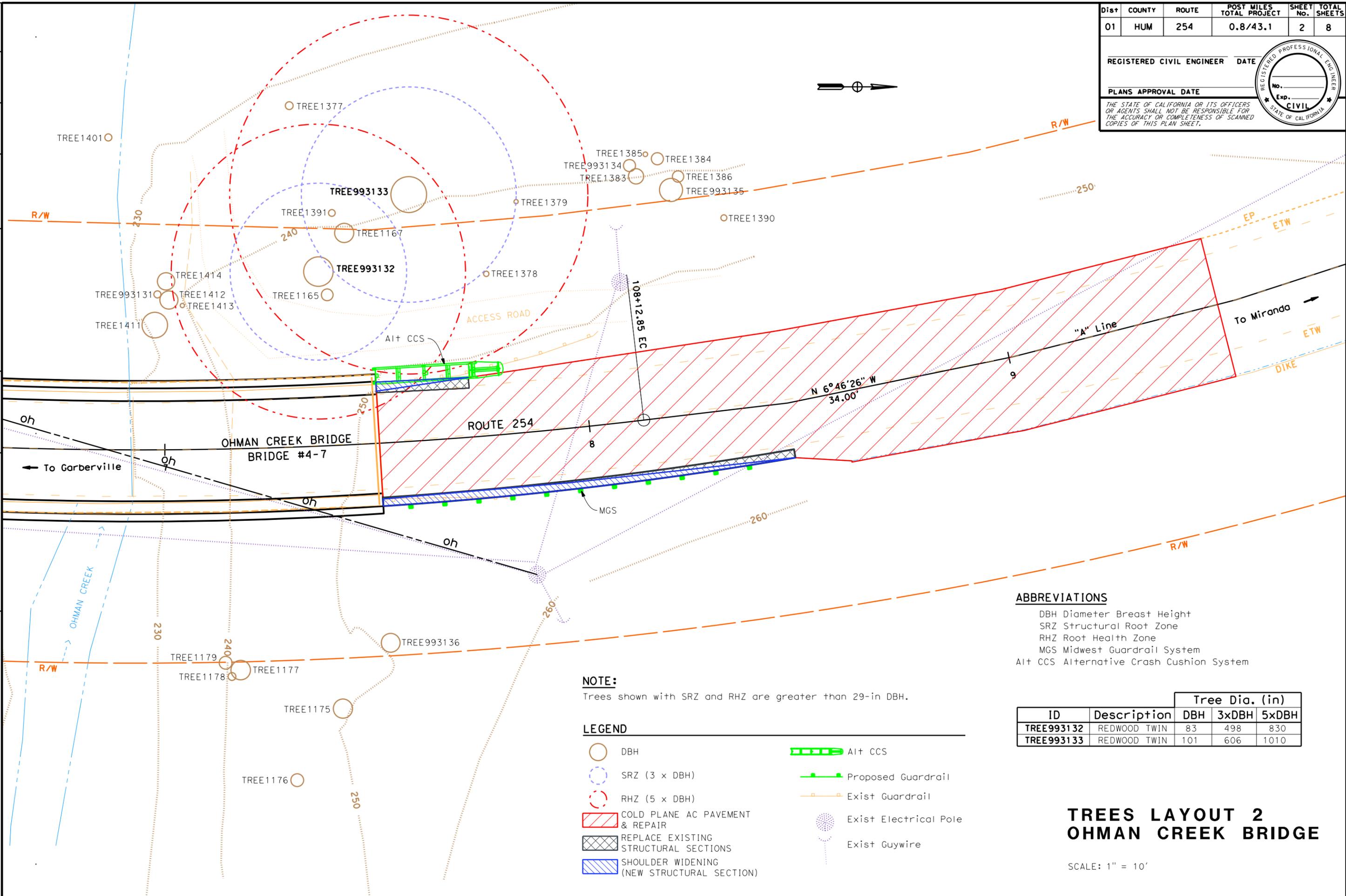
CHECKED BY: _____

DESIGNED BY: _____

NOELYN HABANA

REVISOR: _____

DATE: _____



ABBREVIATIONS

DBH Diameter Breast Height
 SRZ Structural Root Zone
 RHZ Root Health Zone
 MGS Midwest Guardrail System
 AI+ CCS Alternative Crash Cushion System

NOTE:
 Trees shown with SRZ and RHZ are greater than 29-in DBH.

- LEGEND**
- DBH
 - SRZ (3 x DBH)
 - RHZ (5 x DBH)
 - COLD PLANE AC PAVEMENT & REPAIR
 - REPLACE EXISTING STRUCTURAL SECTIONS
 - SHOULDER WIDENING (NEW STRUCTURAL SECTION)
 - AI+ CCS
 - Proposed Guardrail
 - Exist Guardrail
 - Exist Electrical Pole
 - Exist Guywire

ID	Description	Tree Dia. (in)		
		DBH	3xDBH	5xDBH
TREE993132	REDWOOD TWIN	83	498	830
TREE993133	REDWOOD TWIN	101	606	1010

**TREES LAYOUT 2
 OHMAN CREEK BRIDGE**

SCALE: 1" = 10'

LAST REVISION: DATE PLOTTED => \$DATE
 11-12-15 TIME PLOTTED => \$TIME

Tree Assessment
Elk Creek Bridge

Date: 19 November 2015		Personnel: Sean Marquis, Darin Sullivan	
Tree #	Comments	Rating	
1222	Work on crash cushion and structural section (max excavation depth of 0.85 ft) in SRZ. However, ditch appears previously to have been excavated between tree and work area, structural roots likely to have been cut.	2	
1221	No excavation proposed in RHZ (only grind and overlay existing roadway).	0	
1245	Crash cushion and structural section (max excavation depth of 0.85 ft) in SRZ, work close to tree.	4	
1310	Crash cushion and structural section (max excavation depth of 0.85 ft) in SRZ. Appears that tree was a twin tree, where twin that was closer to roadway fell in past. Excavation will be in fallen twin's root zone, such that any roots encountered are less likely to belong to standing twin.	3	
1311	Work in RHZ only, not expected to abstract water flow toward tree. No work in SRZ.	1	
1246	Structural section (max excavation depth of 0.85 ft) in outer limits of SRZ.	3	
1238	Work would affect only small amount of root area. No work in SRZ.	1	
1582	Small amount of crash cushion in SRZ.	1	
1578	Crash cushion and structural section (max excavation depth of 0.85 ft) in SRZ.	3	
1550	Structural section (max excavation depth of 0.85 ft) in SRZ. Tree close to roadway. Grove of supporting trees, expect interconnected roots.	4	
6	Small amount of excavation, only in edge of RHZ. No excavation in SRZ.	1	
5	No excavation proposed in RHZ or SRZ (only grind and overlay existing roadway).	0	
3	No excavation proposed in RHZ or SRZ (only grind and overlay existing roadway).	0	
1581	Excavation in small amount of RHZ. No excavation in SRZ.	1	
1579	SRZ and RHZ appear larger on map than realistic. Pullout and tree 1578 are between 1579 and road.	2	
1551	Crash cushion and structural section (max excavation depth of 0.85 ft) in edge of SRZ. Work in fill behind crib wall, don't expect structural roots, but work could affect supporting roots in fill.	2	
1562	Work is in RHZ on opposite side of a larger tree.	2	
9	Structural section (max excavation depth of 0.85 ft) in SRZ.	2	
10	Structural section (max excavation depth of 0.85 ft) in SRZ.	2	

Rank	Total # trees in rank (w/o min)
0	3
1	5
2	6
3	3
4	2
5	0
6	0

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	HUM	254	0.8/43.1	3	8

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED PROFESSIONAL ENGINEER
No. _____
Exp. _____
CIVIL
STATE OF CALIFORNIA

NOTE:

Trees shown with SRZ and RHZ are greater than 29-in DBH.

LEGEND

- DBH
- SRZ (3 x DBH)
- RHZ (5 x DBH)
- Alt CCS
- Exist Guardrail
- COLD PLANE AC PAVEMENT & REPAIR
- REPLACE EXISTING STRUCTURAL SECTIONS
- SHOULDER WIDENING (NEW STRUCTURAL SECTION)

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

NOELYN HABANA

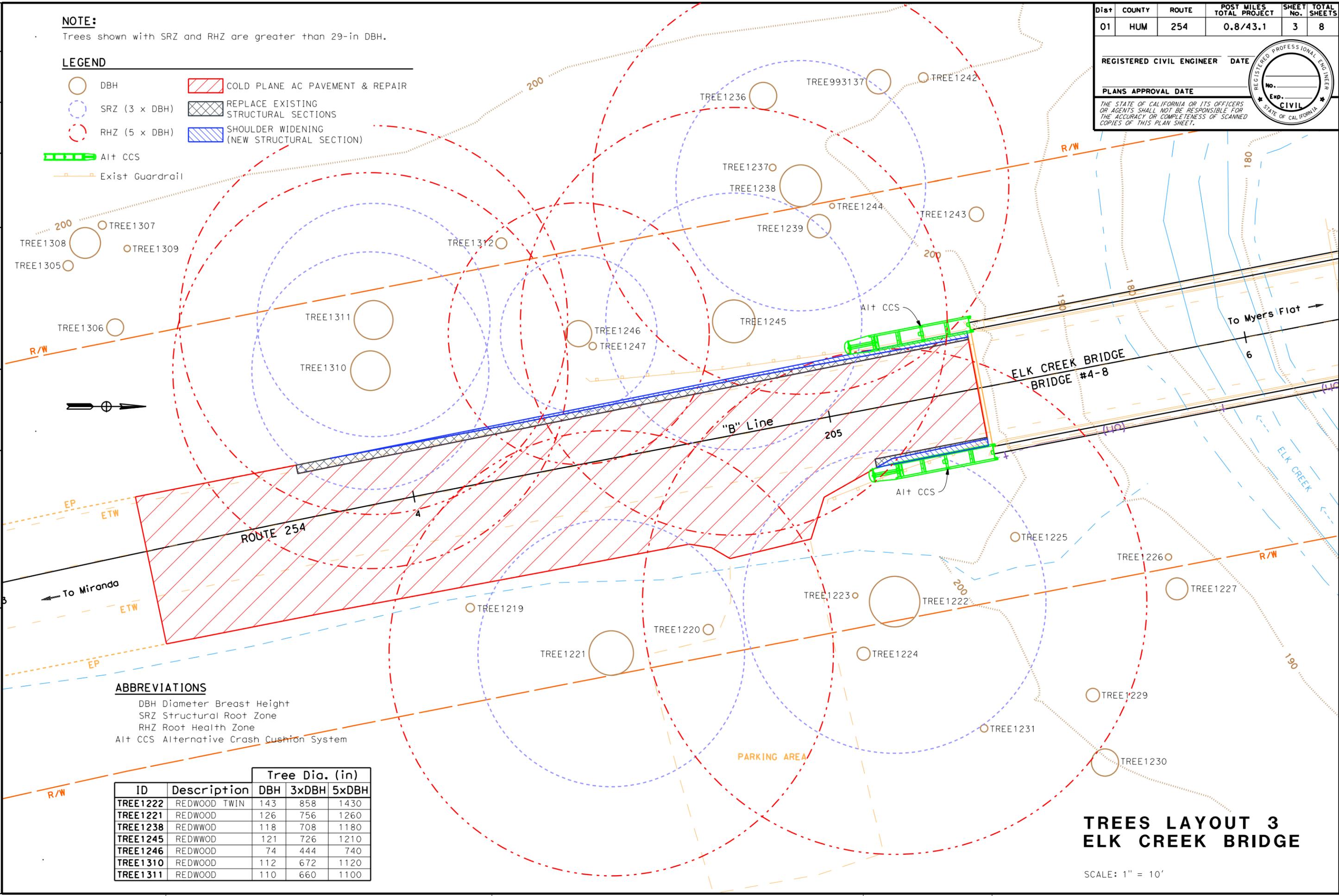
KELLY TIMMONS

REVISOR

FUNCTIONAL SUPERVISOR

DESIGNER

CHECKER



ABBREVIATIONS

- DBH Diameter Breast Height
- SRZ Structural Root Zone
- RHZ Root Health Zone
- Alt CCS Alternative Crash Cushion System

ID	Description	Tree Dia. (in)		
		DBH	3xDBH	5xDBH
TREE1222	REDWOOD TWIN	143	858	1430
TREE1221	REDWOOD	126	756	1260
TREE1238	REDWOOD	118	708	1180
TREE1245	REDWOOD	121	726	1210
TREE1246	REDWOOD	74	444	740
TREE1310	REDWOOD	112	672	1120
TREE1311	REDWOOD	110	660	1100

**TREES LAYOUT 3
ELK CREEK BRIDGE**

SCALE: 1" = 10'



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	HUM	254	0.8/43.1	4	8

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

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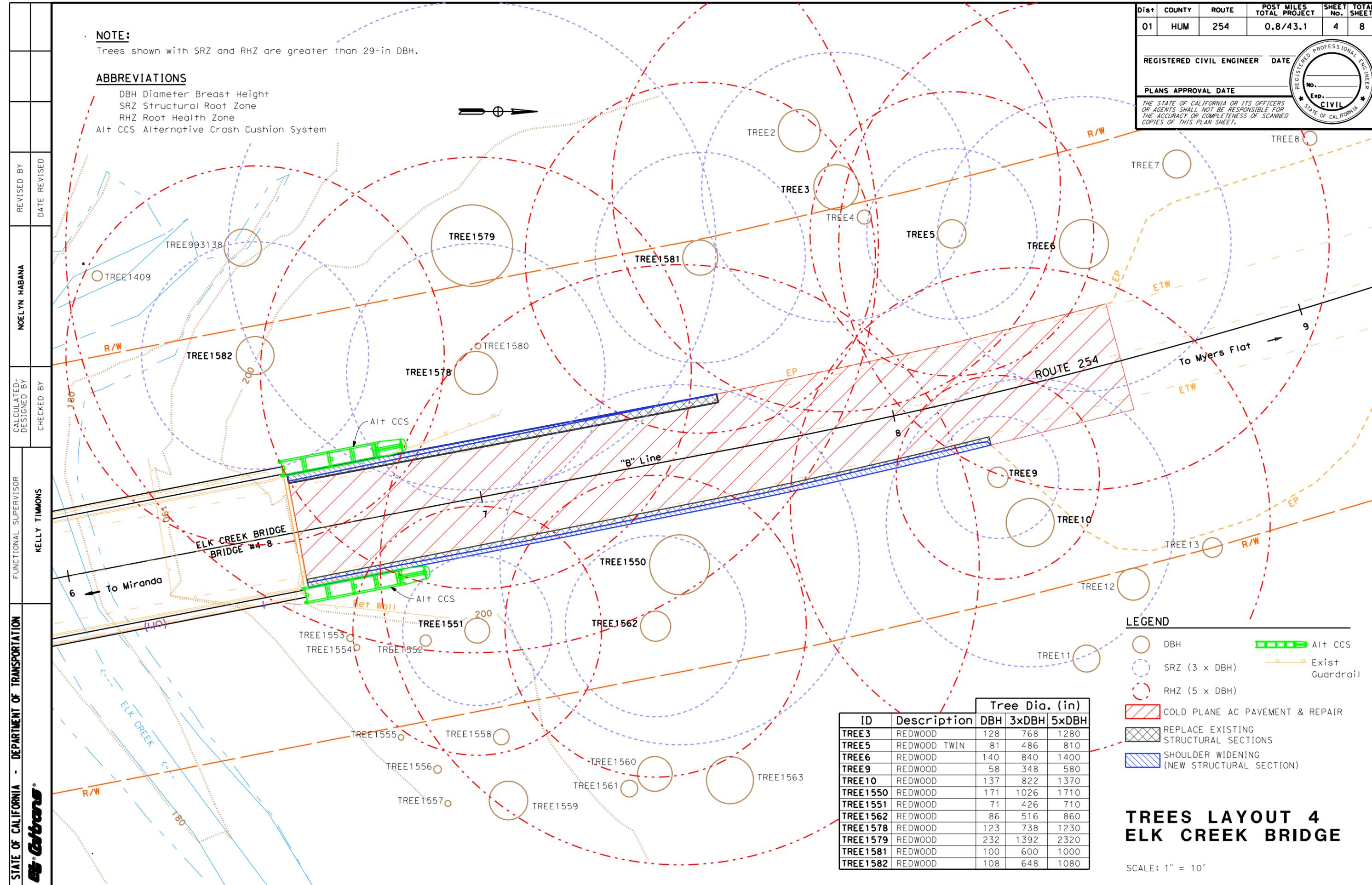
REGISTERED PROFESSIONAL ENGINEER
No. _____
Exp. _____
CIVIL
STATE OF CALIFORNIA

NOTE:

Trees shown with SRZ and RHZ are greater than 29-in DBH.

ABBREVIATIONS

- DBH Diameter Breast Height
- SRZ Structural Root Zone
- RHZ Root Health Zone
- Alt CCS Alternative Crash Cushion System



REVISOR: NOELYN HABANA
DESIGNER: KELLY TIMMONS
SUPERVISOR: [Blank]
FUNCTIONAL SUPERVISOR: [Blank]
CALCULATED/DESIGNED BY: [Blank]
CHECKED BY: [Blank]

LEGEND

- DBH
- SRZ (3 x DBH)
- RHZ (5 x DBH)
- COLD PLANE AC PAVEMENT & REPAIR
- REPLACE EXISTING STRUCTURAL SECTIONS
- SHOULDER WIDENING (NEW STRUCTURAL SECTION)
- Alt CCS
- Exist Guardrail

ID	Description	Tree Dia. (in)		
		DBH	3xDBH	5xDBH
TREE3	REDWOOD	128	768	1280
TREE5	REDWOOD TWIN	81	486	810
TREE6	REDWOOD	140	840	1400
TREE9	REDWOOD	58	348	580
TREE10	REDWOOD	137	822	1370
TREE1550	REDWOOD	171	1026	1710
TREE1551	REDWOOD	71	426	710
TREE1562	REDWOOD	86	516	860
TREE1578	REDWOOD	123	738	1230
TREE1579	REDWOOD	232	1392	2320
TREE1581	REDWOOD	100	600	1000
TREE1582	REDWOOD	108	648	1080

**TREES LAYOUT 4
ELK CREEK BRIDGE**

SCALE: 1" = 10'

LAST REVISION: DATE PLOTTED => \$DATE
10-13-15 TIME PLOTTED => \$TIME

Tree Assessment
Bridge Creek Bridge

Date: 19 November 2015		Personnel: Sean Marquis, Darin Sullivan	
Tree #	Comments	Rating	
2395	Tree has minimal foliage, needs few roots to support its existing foliage.	1	
2394	Minimal work in SRZ, direction expected to be oblique to tree, not expected to dissect many roots.	2	
993146	Lower elevation than work, work is in small amount of RHZ.	1	
2230	Trees young, vigorous, work transecting only part of SRZ.	3	
2231	Tree young, vigorous. Minimal work in SRZ.	3	

Rank	Total # trees in rank (w/o min)
0	0
1	2
2	1
3	2
4	0
5	0
6	0

NOTE:
Trees shown with SRZ and RHZ are greater than 29-in DBH.

ABBREVIATIONS
DBH Diameter Breast Height
SRZ Structural Root Zone
RHZ Root Health Zone
MGS Midwest Guardrail System

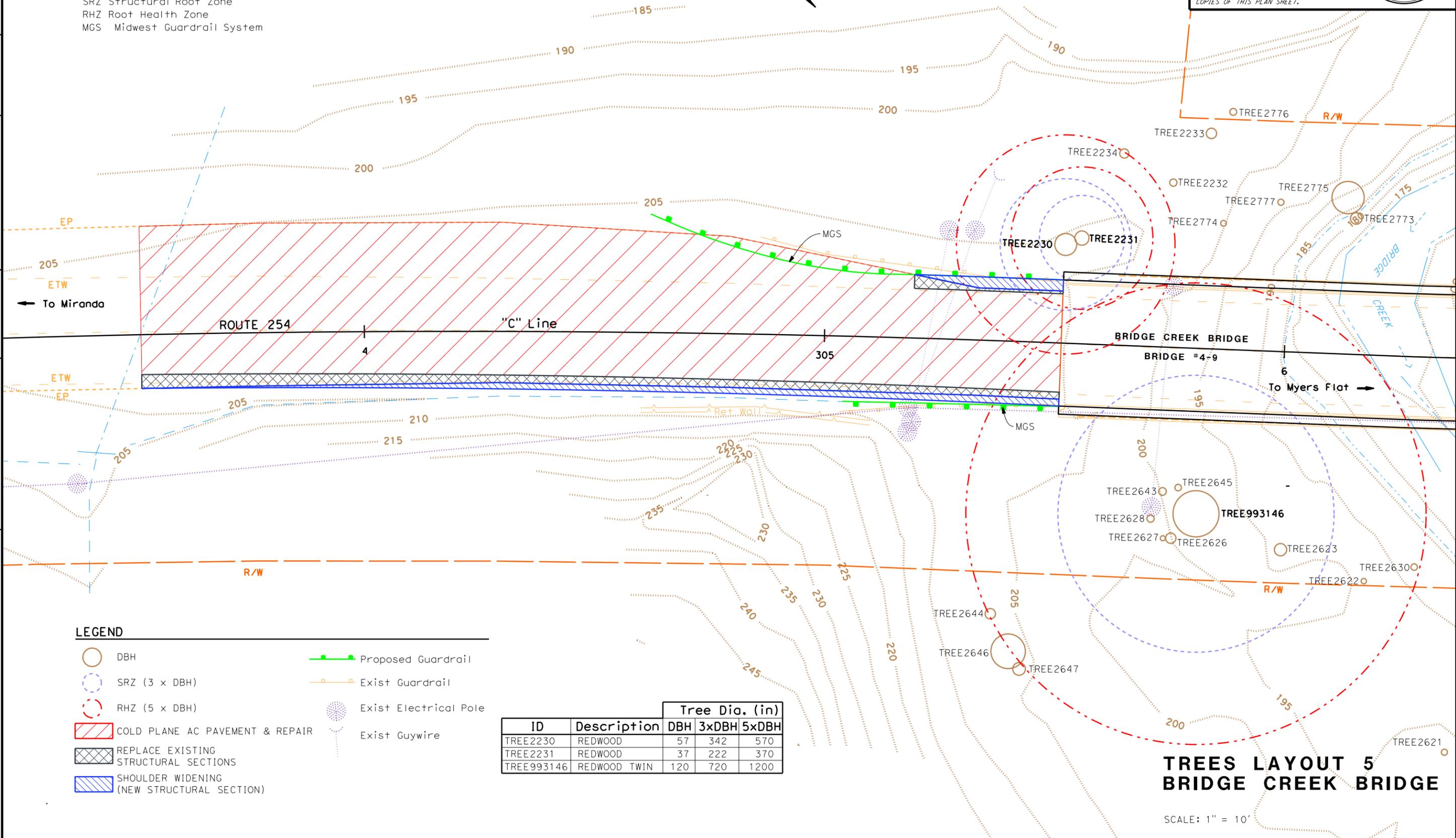
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

FUNCTIONAL SUPERVISOR
KELLY TIMMONS

CALCULATED-DESIGNED BY
CHECKED BY

NOELYN HABANA

REVISED BY
DATE REVISED



LEGEND

- DBH
- SRZ (3 x DBH)
- RHZ (5 x DBH)
- COLD PLANE AC PAVEMENT & REPAIR
- REPLACE EXISTING STRUCTURAL SECTIONS
- SHOULDER WIDENING (NEW STRUCTURAL SECTION)
- Proposed Guardrail / Exist Guardrail
- Exist Electrical Pole
- Exist Guywire

ID	Description	Tree Dia. (in)		
		DBH	3xDBH	5xDBH
TREE2230	REDWOOD	57	342	570
TREE2231	REDWOOD	37	222	370
TREE993146	REDWOOD TWIN	120	720	1200

**TREES LAYOUT 5
BRIDGE CREEK BRIDGE**

SCALE: 1" = 10'

NOTE:

Trees shown with SRZ and RHZ are greater than 29-in DBH.

ABBREVIATIONS

- DBH Diameter Breast Height
- SRZ Structural Root Zone
- RHZ Root Health Zone
- MGS Midwest Guardrail System
- Alt CCS Alternative Crash Cushion System

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	HUM	254	0.8/43.1	6	8

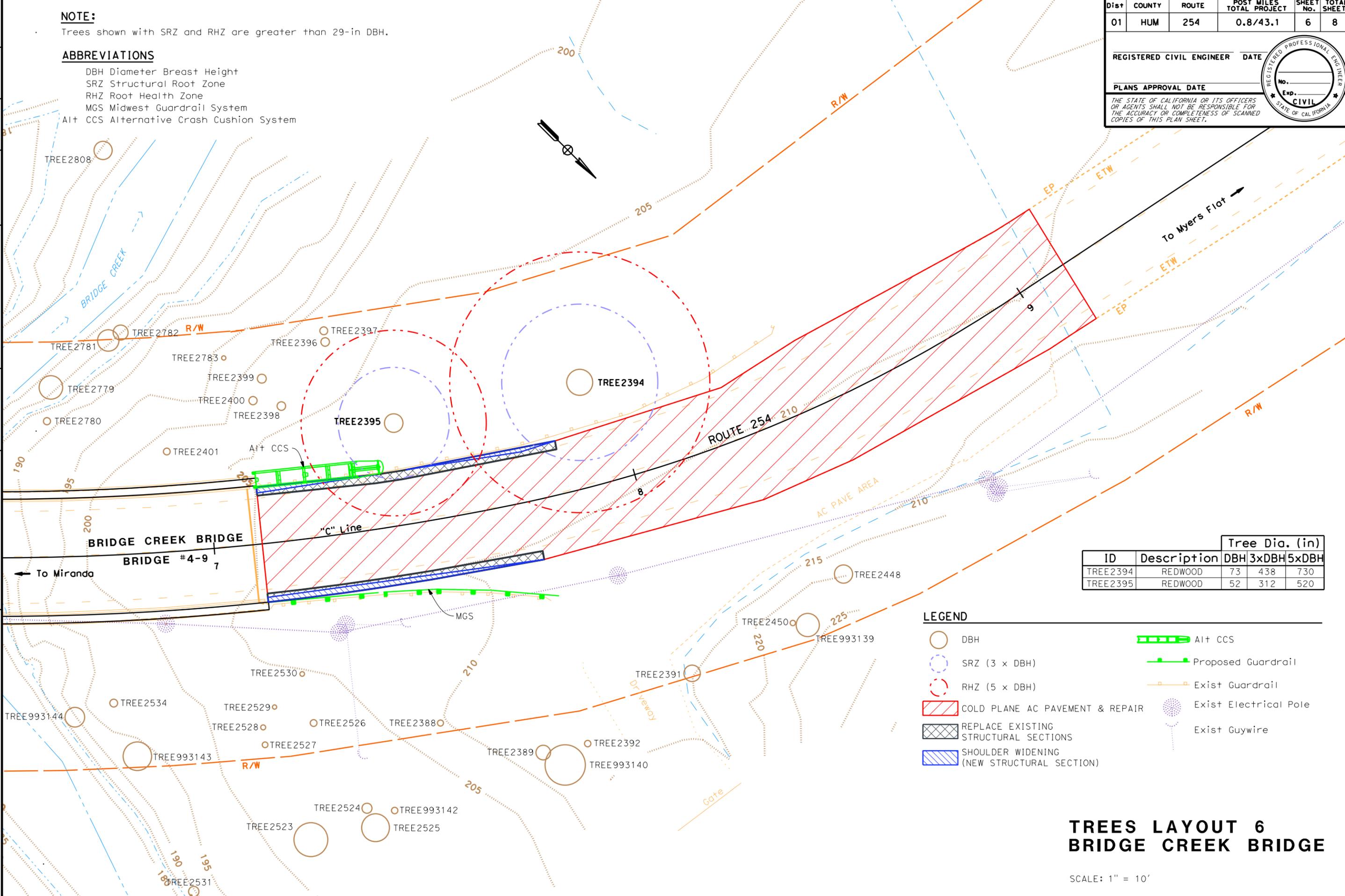
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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NOELYN HABANA
 REVISOR
 NOELYN HABANA
 CHECKER
 FUNCTIONAL SUPERVISOR
 DEPARTMENT OF TRANSPORTATION
 STATE OF CALIFORNIA



ID	Description	Tree Dia. (in)		
		DBH	3xDBH	5xDBH
TREE2394	REDWOOD	73	438	730
TREE2395	REDWOOD	52	312	520

LEGEND

- DBH
- SRZ (3 x DBH)
- RHZ (5 x DBH)
- COLD PLANE AC PAVEMENT & REPAIR
- REPLACE EXISTING STRUCTURAL SECTIONS
- SHOULDER WIDENING (NEW STRUCTURAL SECTION)
- Alt CCS
- Proposed Guardrail
- Exist Guardrail
- Exist Electrical Pole
- Exist Guywire

**TREES LAYOUT 6
BRIDGE CREEK BRIDGE**

SCALE: 1" = 10'

LAST REVISION DATE PLOTTED => \$DATE TIME PLOTTED => \$TIME

Tree Assessment
Bear Creek Bridge

Date: 19 November 2015		Personnel: Sean Marquis, Darin Sullivan	
Tree #	Comments	Rating	
2260	Tree is dead.	0	
2263	Work is in fill, in RHZ. Tree is downslope from roadway. No work in SRZ.	1	
35	Structural section (max excavation depth of 1.0 ft) in SRZ. Slope/bank downslope (toward roadway) from trunk was previously cut, such that structural roots likely have already been cut.	2	
44	Existing spike top. Slope/bank downslope (toward roadway) from trunk was previously cut, such that structural roots are likely have already been cut. No excavation in SRZ.	1	
29	Excavation is in a very small part of RHZ (opposite side of roadway). No excavation in SRZ.	1	
2261	Work is in small amount of RHZ (crash cushion in small amount of RHZ). Structural section excavation limited to existing structural section. No excavation in SRZ.	1	
22	No excavation proposed in RHZ (only grind and overlay existing roadway).	0	
21	Two tops, both spike tops. Work is in very small amount of RHZ, on opposite side of roadway. No excavation in SRZ.	1	
2118	Tree is young and vigorous. Work is in small amount of RHZ. No work in SRZ.	1	
48	Tree is in poor health, with dead top and minimal foliage. Guardrail posts proposed in RHZ. No excavation in SRZ.	1	
2135	Excavation is in RHZ, on opposite side of roadway. No excavation in SRZ.	1	
49	No excavation proposed in RHZ (only grind and overlay existing roadway).	0	
53	No excavation proposed in RHZ (only grind and overlay existing roadway).	0	

Rank	Total # trees in rank (w/o min)
0	4
1	8
2	1
3	0
4	0
5	0
6	0

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	HUM	254	0.8/43.1	8	8

REGISTERED CIVIL ENGINEER DATE _____

PLANS APPROVAL DATE _____

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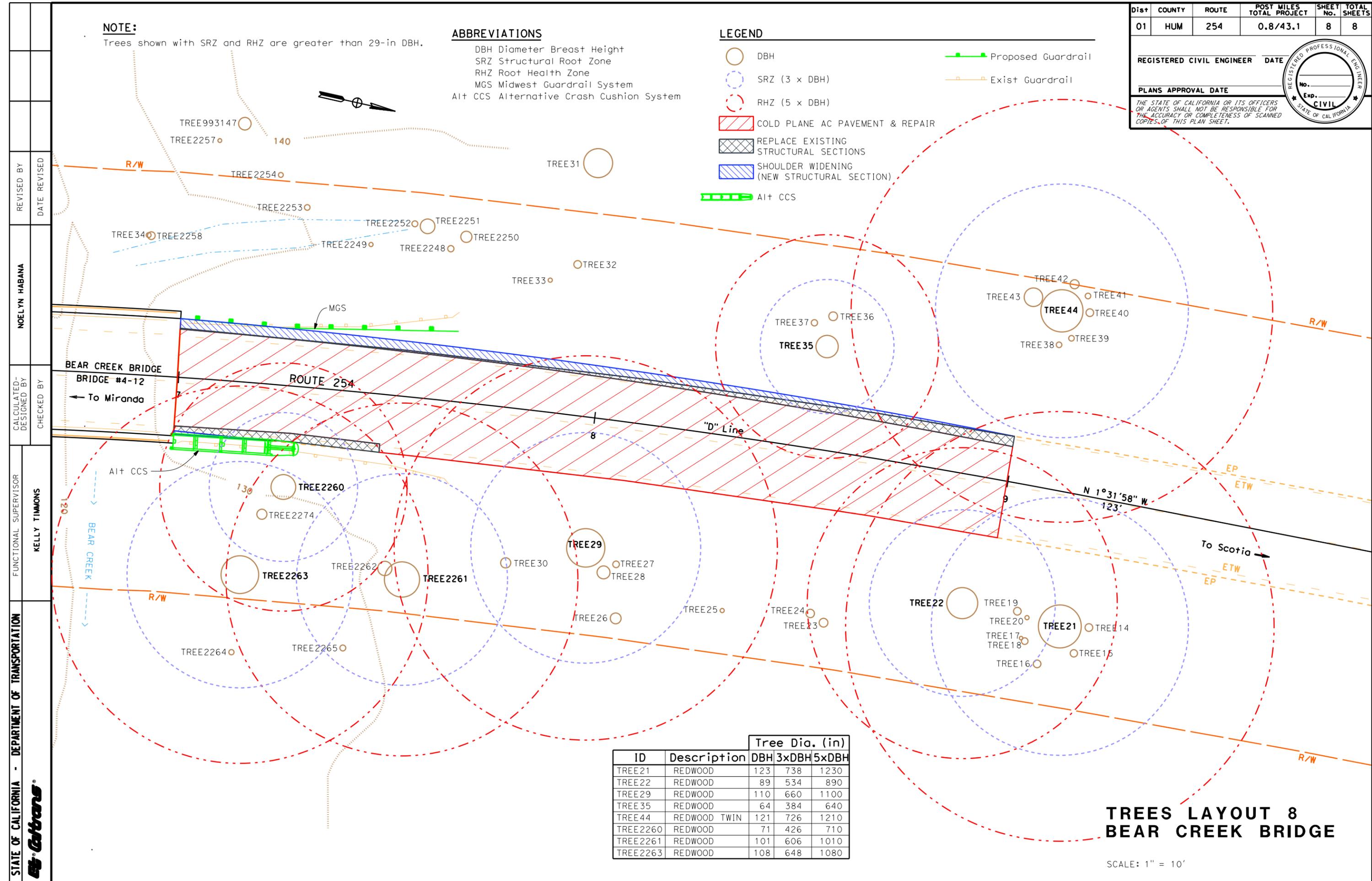


NOTE:
Trees shown with SRZ and RHZ are greater than 29-in DBH.

ABBREVIATIONS
 DBH Diameter Breast Height
 SRZ Structural Root Zone
 RHZ Root Health Zone
 MGS Midwest Guardrail System
 Alt CCS Alternative Crash Cushion System

LEGEND

-  DBH
-  SRZ (3 x DBH)
-  RHZ (5 x DBH)
-  COLD PLANE AC PAVEMENT & REPAIR
-  REPLACE EXISTING STRUCTURAL SECTIONS
-  SHOULDER WIDENING (NEW STRUCTURAL SECTION)
-  Alt CCS
-  Proposed Guardrail
-  Exist Guardrail



ID	Description	Tree Dia. (in)		
		DBH	3xDBH	5xDBH
TREE21	REDWOOD	123	738	1230
TREE22	REDWOOD	89	534	890
TREE29	REDWOOD	110	660	1100
TREE35	REDWOOD	64	384	640
TREE44	REDWOOD TWIN	121	726	1210
TREE2260	REDWOOD	71	426	710
TREE2261	REDWOOD	101	606	1010
TREE2263	REDWOOD	108	648	1080

**TREES LAYOUT 8
BEAR CREEK BRIDGE**

SCALE: 1" = 10'

NOELYN HABANA
 KELLY TIMMONS
 DEPARTMENT OF TRANSPORTATION

Appendix E CDFW Concurrence

From: [Dunn, JoAnn@Wildlife](mailto:Dunn_JoAnn@Wildlife)
To: Osmondson, Jennifer A@DOT
Cc: Pommerenck, Adele@DOT; Rosas, Sandra@DOT
Subject: RE: Caltrans Avenue of the Giants - Four Bridges Project [no take NSO & MAMU]
Date: Monday, June 16, 2014 7:30:33 PM

The California Department of Fish and Wildlife (CDFW) concurs that provided Caltrans follows the measures as proposed below for the Avenue of the Giant – Four Bridges Project, “take” (as defined in Fish and Game Code) of northern spotted owl (*Strix occidentalis caurina*) and marbled murrelet (*Brachyramphus marmoratus*) would be unlikely. This determination is based in part on the anticipated work windows of construction activities as described below.

JoAnn R. Dunn
Northern Region Coastal Caltrans Liaison
California Department of Fish and Wildlife
619 Second Street
Eureka, California 95501

Tel: 707-441-2076
Fax: 707-441-2021

From: Osmondson, Jennifer A@DOT
Sent: Thursday, May 15, 2014 2:45 PM
To: Dunn, JoAnn@Wildlife
Cc: Pommerenck, Adele@DOT; Rosas, Sandra@DOT
Subject: Caltrans Avenue of the Giants - Four Bridges Project

Good afternoon JoAnn – to prevent take of CESA-listed marbled murrelet and CESA candidate species northern spotted owl, Townsend’s big-eared bat, and Pacific fisher by the Avenue of the Giants/SR 254 – Four Bridges Project, Caltrans is proposing to incorporate the protective measures described in this email.

Proposed Project Schedule:

To prevent take of sensitive species, construction of the proposed project will occur between June 15 and January 31 of each construction season. Metal beam guardrail (MBGR) installation (at 7 of the 16 bridge rail ends) will occur between August 16 and January 31 of each construction season (with a daily work window beginning 2 hours post-sunrise and ending 2 hours pre-sunset from August 16 through September 15). MBGR installation is the only project activity expected to exceed 90 decibels (dB). Under this proposed project schedule two bridges would be completed per season, resulting in a two year project. Construction of the project would likely go into winter suspension beginning October 15 of each construction season (due to rain). A generator would be needed at Location 4 24 hours a day.

Beginning construction earlier in the season would allow the project to be shortened from four seasons to two seasons. This would reduce the amount of time that sensitive species would be subject to noise generated by the proposed project.

Table 1 of the U. S. Fish and Wildlife Service (USFWS) report, *Estimating the Effects of Auditory and*

Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California, was consulted for assistance in estimating potential effects due to noise disturbance to the northern spotted owl and marbled murrelet during construction of the proposed project. This information was also used to estimate potential effects to Townsend’s big-eared bat and Pacific fisher. According to values listed in the USFWS report, the existing ambient noise levels within the Environmental Study Limits (ESL) range from 67 to 95 dB (Table 1 below). This ambient sound level classifies as “high.” Equipment expected to be used during construction of the proposed project would generate noise at levels ranging from 80 to 95 dB (Table 2 below), and would be categorized as “very high.” Using the sound levels listed in the USFWS report, equipment expected to be used during construction of the proposed project would not raise noise levels above the level of ambient. The installation of MBGR (at 7 of the 16 bridge rail ends) is the only activity expected to exceed 90 dB.

Table 1: Estimated Existing Noise Levels on SR 254 within the Project Limits

Sound Source	Reported Decibel Value (measured at 50 feet)
Passenger car (50 mph)	67
RVs (small) (low end)	75
Passenger car/light trucks (65 mph) (low end)	76
Automobile	80 (measured at 25 feet)
Large truck (low end)	84
Passenger car/light trucks (65 mph) (high end)	85
RVs (small) (high end)	85
RVs (large) (low end)	85
Pickup truck	87 (measured at 8 feet)
Large truck (high end)	89
RVs (large) (high end)	95

Table 2: Estimated Noise Levels During Construction of the Proposed Project

Sound Source	Reported Decibel Value (measured at 50 feet)	Relative Sound Level
Generator (low end)	78	Moderate
Backhoe (low end)	80	High
Front-end loader (low end)	80	High
Concrete truck (low end)	81	High
Chainsaw, large	83	High
Backhoe (high end)	84	High
Dump truck	84	High
Flat bed truck	84	High
Generator (high end)	84	High
Concrete truck (high end)	85	High
Gradall (low end)	85	High
Chainsaws (high end)	86	High

Gradall (high end)	86	High
Front-end loader (high end)	87	High
Jackhammer	89	High
Concrete saw	90	High
Guardrail installation and pile driving (low end)	95	Very high
Back-up vehicle safety alarm	97-112 (measured at source)	

Using guidance from the USFWS report, the resulting estimated harassment distance would be 165 feet. Using the 165-foot distance as a buffer around the project's ESL, an estimated 49.5 acres would be subject to harassment from auditory disturbance. At Locations 1, 2, and 3 some of this buffer area includes the streambed of the South Fork of the Eel River, where these species are not expected to nest or roost.

The Programmatic Informal Consultation between USFWS, Caltrans, and the U. S. Army Corps of Engineers (April 9, 2014) was also used for guidance in determining protective measures for both marbled murrelet and northern spotted owl.

General Protective Measures:

1. To prevent take of sensitive species, construction of the proposed project will occur between June 15 and January 31 of each construction season. MBGR installation (at 7 of the 16 bridge rail ends) would occur between August 16 and January 31 of each construction season (with a daily work window beginning 2 hours post-sunrise and ending 2 hours pre-sunset from August 16 through September 15).
2. No potential nest/roost trees, for any sensitive species, will be removed.
3. Night work will not be conducted, except for the use of a generator to power a temporary traffic signal at Location 4.
4. Corvid-proof waste/trash receptacles will be used, with the lid secured at all times, to prevent food waste from attracting corvids to the construction area. No food or food waste will be left unattended or discarded onsite.
5. Prior to the start of construction, a qualified biologist will conduct training for all construction personnel regarding sensitive biological resources present within and adjacent to the ESL. The training will include a description of the resource and the general measures that are being implemented to avoid and minimize impacts to the resource.

With implementation of these measures, Caltrans has determined it is unlikely that construction of the proposed project would result in the take of marbled murrelet, northern spotted owl, Townsend's big-eared bat, or Pacific fisher. Please let me know if you concur. I look forward to speaking with you soon. Thank you again for your assistance with all of this.

Thank you,
Jennifer

Jennifer Osmondson | Biologist

California Department of Transportation
703 B Street, Marysville, CA 95901
Phone: (530) 740-4807

From: [Dunn, JoAnn@Wildlife](mailto:Dunn_JoAnn@Wildlife)
To: [Osmondson, Jennifer A@DOT](mailto:Osmondson_Jennifer_A@DOT)
Cc: [Pommerenck, Adele@DOT](mailto:Pommerenck_Adele@DOT); [Rosas, Sandra@DOT](mailto:Rosas_Sandra@DOT); [Leppig, Gordon@Wildlife](mailto:Leppig_Gordon@Wildlife)
Subject: RESPONSE: RE: Caltrans Avenue of the Giants - Four Bridges Project [COTO and fisher]
Date: Monday, June 16, 2014 7:49:00 PM

Hello Jennifer,

The California Department of Fish and Wildlife (CDFW) concurs that provided Caltrans follows the measures as proposed below for the Avenue of the Giant – Four Bridges Project, which includes deferring work at some locations on HUM 254 until August 16, “take” (as defined in Fish and Game Code) of Townsend’s big-eared bat (*Corynorhinus townsendii*) and fisher (*Martes pennanti*, West Coast Distinct Population Segment) would be unlikely. This determination is based in part on the anticipated work windows of construction activities as described below.

JoAnn R. Dunn
Northern Region Coastal Caltrans Liaison
California Department of Fish and Wildlife
619 Second Street
Eureka, California 95501

Tel: 707-441-2076

Fax: 707-441-2021

From: Osmondson, Jennifer A@DOT
Sent: Thursday, May 15, 2014 2:45 PM
To: Dunn, JoAnn@Wildlife
Cc: Pommerenck, Adele@DOT; Rosas, Sandra@DOT
Subject: Caltrans Avenue of the Giants - Four Bridges Project

Good afternoon JoAnn – to prevent take of CESA-listed marbled murrelet and CESA candidate species northern spotted owl, Townsend’s big-eared bat, and Pacific fisher by the Avenue of the Giants/SR 254 – Four Bridges Project, Caltrans is proposing to incorporate the protective measures described in this email.

Proposed Project Schedule:

To prevent take of sensitive species, construction of the proposed project will occur between June 15 and January 31 of each construction season. Metal beam guardrail (MBGR) installation (at 7 of the 16 bridge rail ends) will occur between August 16 and January 31 of each construction season (with a daily work window beginning 2 hours post-sunrise and ending 2 hours pre-sunset from August 16 through September 15). MBGR installation is the only project activity expected to exceed 90 decibels (dB). Under this proposed project schedule two bridges would be completed per season, resulting in a two year project. Construction of the project would likely go into winter suspension beginning October 15 of each construction season (due to rain). A generator would be needed at Location 4 24 hours a day.

Beginning construction earlier in the season would allow the project to be shortened from four

seasons to two seasons. This would reduce the amount of time that sensitive species would be subject to noise generated by the proposed project.

Table 1 of the U. S. Fish and Wildlife Service (USFWS) report, *Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California*, was consulted for assistance in estimating potential effects due to noise disturbance to the northern spotted owl and marbled murrelet during construction of the proposed project. This information was also used to estimate potential effects to Townsend’s big-eared bat and Pacific fisher. According to values listed in the USFWS report, the existing ambient noise levels within the Environmental Study Limits (ESL) range from 67 to 95 dB (Table 1 below). This ambient sound level classifies as “high.” Equipment expected to be used during construction of the proposed project would generate noise at levels ranging from 80 to 95 dB (Table 2 below), and would be categorized as “very high.” Using the sound levels listed in the USFWS report, equipment expected to be used during construction of the proposed project would not raise noise levels above the level of ambient. The installation of MBGR (at 7 of the 16 bridge rail ends) is the only activity expected to exceed 90 dB.

Table 1: Estimated Existing Noise Levels on SR 254 within the Project Limits

Sound Source	Reported Decibel Value (measured at 50 feet)
Passenger car (50 mph)	67
RVs (small) (low end)	75
Passenger car/light trucks (65 mph) (low end)	76
Automobile	80 (measured at 25 feet)
Large truck (low end)	84
Passenger car/light trucks (65 mph) (high end)	85
RVs (small) (high end)	85
RVs (large) (low end)	85
Pickup truck	87 (measured at 8 feet)
Large truck (high end)	89
RVs (large) (high end)	95

Table 2: Estimated Noise Levels During Construction of the Proposed Project

Sound Source	Reported Decibel Value (measured at 50 feet)	Relative Sound Level
Generator (low end)	78	Moderate
Backhoe (low end)	80	High
Front-end loader (low end)	80	High
Concrete truck (low end)	81	High
Chainsaw, large	83	High
Backhoe (high end)	84	High
Dump truck	84	High
Flat bed truck	84	High
Generator (high end)	84	High

Concrete truck (high end)	85	High
Gradall (low end)	85	High
Chainsaws (high end)	86	High
Gradall (high end)	86	High
Front-end loader (high end)	87	High
Jackhammer	89	High
Concrete saw	90	High
Guardrail installation and pile driving (low end)	95	Very high
Back-up vehicle safety alarm	97-112 (measured at source)	

Using guidance from the USFWS report, the resulting estimated harassment distance would be 165 feet. Using the 165-foot distance as a buffer around the project's ESL, an estimated 49.5 acres would be subject to harassment from auditory disturbance. At Locations 1, 2, and 3 some of this buffer area includes the streambed of the South Fork of the Eel River, where these species are not expected to nest or roost.

The Programmatic Informal Consultation between USFWS, Caltrans, and the U. S. Army Corps of Engineers (April 9, 2014) was also used for guidance in determining protective measures for both marbled murrelet and northern spotted owl.

General Protective Measures:

1. To prevent take of sensitive species, construction of the proposed project will occur between June 15 and January 31 of each construction season. MBGR installation (at 7 of the 16 bridge rail ends) would occur between August 16 and January 31 of each construction season (with a daily work window beginning 2 hours post-sunrise and ending 2 hours pre-sunset from August 16 through September 15).
2. No potential nest/roost trees, for any sensitive species, will be removed.
3. Night work will not be conducted, except for the use of a generator to power a temporary traffic signal at Location 4.
4. Corvid-proof waste/trash receptacles will be used, with the lid secured at all times, to prevent food waste from attracting corvids to the construction area. No food or food waste will be left unattended or discarded onsite.
5. Prior to the start of construction, a qualified biologist will conduct training for all construction personnel regarding sensitive biological resources present within and adjacent to the ESL. The training will include a description of the resource and the general measures that are being implemented to avoid and minimize impacts to the resource.

With implementation of these measures, Caltrans has determined it is unlikely that construction of the proposed project would result in the take of marbled murrelet, northern spotted owl, Townsend's big-eared bat, or Pacific fisher. Please let me know if you concur. I look forward to speaking with you soon. Thank you again for your assistance with all of this.

Thank you,
Jennifer

Jennifer Osmondson | Biologist
California Department of Transportation
703 B Street, Marysville, CA 95901
Phone: (530) 740-4807

Appendix F Photographs of the Environmental Study Limits



Photo 1 – Location 1: Ohman Creek Bridge (Br. No. 4-7), HUM-254, PM 0.88, facing north



Photo 2 – Location 2: Elk Creek Bridge (Br. No. 4-8), HUM-254, PM 10.43, facing north



Photo 3 – Location 3: Bridge Creek Bridge (Br. No. 4-9), HUM-254, PM 10.80, facing north

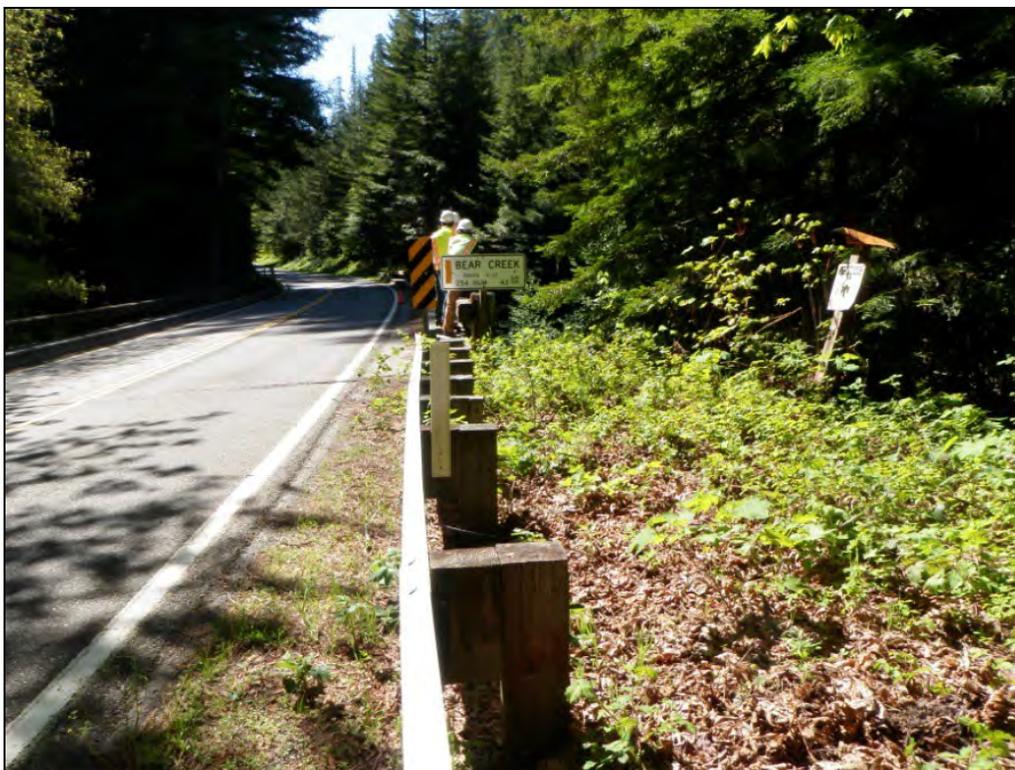


Photo 4 – Location 4: Bear Creek Bridge (Br. No. 4-12), HUM-254, PM 43.02, facing north

Appendix G Inventory of Plants Observed

Scientific Name	Common Name
<i>Acer macrophyllum</i>	bigleaf maple
<i>Achillea millefolium</i>	yarrow
<i>Adenocaulon bicolor</i>	trail plant
<i>Adiantum aleuticum</i>	five-finger fern
<i>Adiantum jordanii</i>	California maidenhair fern
<i>Aesculus californica</i>	California buckeye
<i>Agrostis exarata</i>	bentgrass
<i>Aira caryophyllea</i>	silver hair grass
<i>Aira praecox</i>	yellow hair grass
<i>Allium triquetrum</i>	white-flowered onion
<i>Alnus rhombifolia</i>	white alder
<i>Alnus rubra</i>	red alder
<i>Anagallis arvensis</i>	scarlet pimpernel
<i>Anaphalis margaritacea</i>	pearly everlasting
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Aquilegia formosa</i>	western columbine
<i>Aralia californica</i>	elk's clover
<i>Arbutus menziesii</i>	Pacific madrone
<i>Arctostaphylos columbiana</i>	hairy manzanita
<i>Artemisia douglasiana</i>	mugwort
<i>Asarum caudatum</i>	wild ginger
<i>Avena barbata</i>	slender wild oat
<i>Baccharis pilularis</i>	coyote brush
<i>Bellis perennis</i>	English daisy
<i>Bowlesia incana</i>	bowlesia
<i>Brassica nigra</i>	black mustard
<i>Brassica rapa</i>	field mustard
<i>Briza maxima</i>	quaking grass
<i>Briza minor</i>	little quaking grass
<i>Bromus carinatus</i>	California brome
<i>Bromus diandrus</i>	ripgut brome
<i>Bromus hordeaceus</i>	soft chess
<i>Bromus madritensis ssp. rubens</i>	red brome
<i>Bromus orcuttianus</i>	Orcutt's brome
<i>Calochortus amabilis</i>	golden fairy lanternbe-lily
<i>Calochortus tolmei</i>	Tolmei's star tulip
<i>Calypso bulbosa</i>	fairyslipper orchid
<i>Cardamine californica</i>	milkmaids
<i>Cardamine oligosperma</i>	bittercress
<i>Carduus pycnocephalus</i>	Italian thistle
<i>Carex barbarae</i>	Santa Barbara sedge

Scientific Name	Common Name
<i>Carex hendersonii</i>	Henderson's sedge
<i>Carex multicaulis</i>	many-stemmed sedge
<i>Ceanothus integerrimus</i>	deer brush
<i>Ceanothus thyrsiflorus</i>	blueblossom
<i>Centaurea solstitialis</i>	yellow star-thistle
<i>Centaureum venustum</i>	centaury
<i>Cerastium glomeratum</i>	mouse-ear chickweed
<i>Chamomilla suaveolens</i>	pineapple weed
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	soap plant
<i>Cichorium intybus</i>	chicory
<i>Cirsium occidentale</i>	western thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Claytonia parviflora</i> ssp. <i>parviflora</i>	narrow-leaved miner's lettuce
<i>Claytonia perfoliata</i>	miner's-lettuce
<i>Claytonia sibirica</i>	candy flower
<i>Collomia heterophylla</i>	variable-leaved collomia
<i>Cornus nuttallii</i>	Pacific dogwood
<i>Cornus sericea</i>	creek dogwood
<i>Corylus cornuta</i> var. <i>californica</i>	California hazelnut
<i>Crassula connata</i>	pygmy weed
<i>Cynodon dactylon</i>	Bermuda grass
<i>Cynosurus echinatus</i>	hedgehog dog-tail grass
<i>Cyperus eragrostis</i>	tall flatsedge
<i>Cytisus scoparius</i>	Scotch broom
<i>Dactylis glomerata</i>	orchard grass
<i>Daucus carota</i>	Queen Anne's lace
<i>Deschampsia elongata</i>	slender hair grass
<i>Dichelostemma capitatum</i>	wild hyacinth
<i>Disporum hookeri</i>	drops of gold
<i>Elymus glaucus</i>	blue wildrye
<i>Epilobium brachycarpum</i>	autumn willowherb
<i>Equisetum telmateia</i> ssp. <i>braunii</i>	giant horsetail
<i>Erigeron philadelphicus</i>	Philadelphia fleabane
<i>Erodium botrys</i>	big heronbill
<i>Erodium cicutarium</i>	redstem filaree
<i>Erodium moschatum</i>	whitestem filaree
<i>Erysimum capitatum</i>	western wallflower
<i>Eschscholzia caespitosa</i>	tufted poppy
<i>Eschscholzia californica</i>	California poppy
<i>Festuca arundinacea</i>	tall fescue
<i>Filago californica</i>	filago
<i>Filago gallica</i>	narrowleaved filago
<i>Foeniculum vulgare</i>	fennel

Scientific Name	Common Name
<i>Fragaria vesca</i>	wood strawberry
<i>Fraxinus dipetala</i>	California ash
<i>Fraxinus latifolia</i>	Oregon ash
<i>Galium aparine</i>	bedstraw
<i>Galium californicum</i> ssp. <i>californicum</i>	California bedstraw
<i>Galium parisiense</i>	wall bedstraw
<i>Gastridium ventricosum</i>	nitgrass
<i>Genista monspessulana</i>	French broom
<i>Geranium dissectum</i>	cutleaf geranium
<i>Geranium molle</i>	dovefoot geranium
<i>Geranium robertianum</i>	Robert's geranium
<i>Glyceria borealis</i>	northern mannagrass
<i>Hedera helix</i>	English ivy
<i>Helenium puberulum</i>	sneezeweed
<i>Heteromeles arbutifolia</i>	toyon
<i>Hieracium albiflorum</i>	white hawkweed
<i>Hirschfeldia incana</i>	hoary mustard
<i>Holcus lanatus</i>	velvet grass
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley
<i>Hordeum murinum</i> ssp. <i>leporinum</i>	foxtail barley
<i>Hydrophyllum tenuipes</i>	Pacific waterleaf
<i>Hypericum perforatum</i>	St. John's wort
<i>Hypochaeris glabra</i>	smooth cat's-ear
<i>Hypochaeris radicata</i>	hairy cat's-ear
<i>Iris douglasiana</i>	Douglas' iris
<i>Iris</i> sp.	iris
<i>Juncus articulatus</i>	jointed rush
<i>Juncus bufonius</i>	toad rush
<i>Juncus effusus</i>	common bog rush
<i>Juncus patens</i>	spreading rush
<i>Juncus xiphioides</i>	iris-leaved rush
<i>Lactuca serriola</i>	prickly lettuce
<i>Lamium purpureum</i>	purple deadnettle
<i>Lapsana communis</i>	common nipplewort
<i>Lathyrus latifolius</i>	perennial pea
<i>Lathyrus sulphureus</i>	sulphur pea
<i>Lathyrus tingitanus</i>	Tangier pea
<i>Lemna</i> sp.	duckweed
<i>Leontodon taraxacoides</i>	hairy hawkbit
<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Lilium</i> sp. (leaves only)	lily
<i>Linum bienne</i>	flax
<i>Lithocarpus densiflorus</i> var. <i>densiflorus</i>	tan oak
<i>Lolium multiflorum</i>	Italian ryegrass

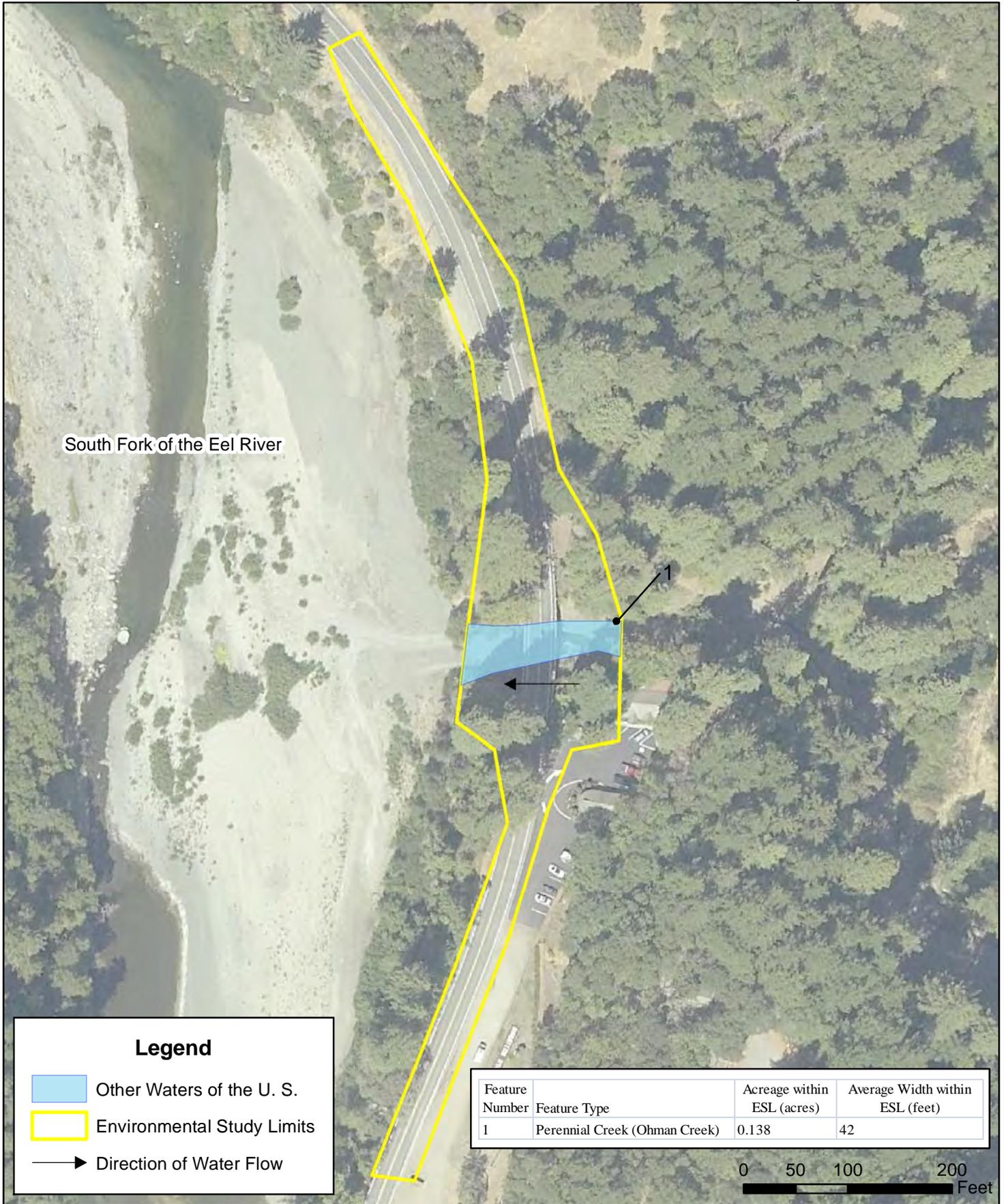
Scientific Name	Common Name
<i>Lonicera hispidula</i> var. <i>vacillans</i>	hairy honeysuckle
<i>Lotus corniculatus</i>	birdfoot trefoil
<i>Lotus micranthus</i>	small flowered lotus
<i>Lotus purshianus</i>	Spanish lotus
<i>Lupinus bicolor</i>	miniature lupine
<i>Lupinus latifolius</i> var. <i>latifolius</i>	broad leaved lupine
<i>Luzula comosa</i>	wood rush
<i>Luzula parviflora</i>	small-flowered woodrush
<i>Lythrum hyssopifolium</i>	hyssop loosestrife
<i>Medicago polymorpha</i>	bur-clover
<i>Melica hardfordii</i>	Hardford's melic
<i>Mentha arvensis</i>	field mint
<i>Mentha pulegium</i>	pennyroyal
<i>Mimulus aurantiacus</i>	bush monkeyflower
<i>Mimulus guttatus</i>	seep monkeyflower
<i>Monardella villosa</i> ssp. <i>villosa</i>	coyote mint ¹
<i>Myosotis latifolia</i>	broadleaf forget me not
<i>Nemophila parviflora</i> var. <i>austinae</i>	small-flowered nemophila
<i>Osmorhiza chilensis</i>	mountain sweet-cicely
<i>Oxalis oregana</i>	redwood sorrel
<i>Parentucellia viscosa</i>	yellow parentucellia
<i>Paspalum dilatatum</i>	dallis grass
<i>Pedicularis densiflora</i>	Indian warrior
<i>Pentagramma triangularis</i>	gold-back fern
<i>Petasites frigidus</i> var. <i>palmatus</i>	coltsfoot
<i>Phalaris aquatica</i>	Harding grass
<i>Picris echioides</i>	bristly ox-tongue
<i>Plantago coronopus</i>	buckhorn plantain
<i>Plantago lanceolata</i>	English plantain
<i>Poa annua</i>	annual bluegrass
<i>Poa bulbosa</i>	bulbous bluegrass
<i>Poa pratensis</i> ssp. <i>pratensis</i>	Kentucky bluegrass
<i>Polygala californica</i>	California polygala
<i>Polypodium calirrhiza</i>	nested polypody
<i>Polypodium glycyrrhiza</i>	licorice fern
<i>Polypogon monspeliensis</i>	rabbitsfoot grass
<i>Polystichum munitum</i>	sword fern
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood
<i>Prunella vulgaris</i>	self heal
<i>Pseudotsuga menziesii</i> var. <i>menziesii</i>	Douglas-fir
<i>Psilocarphus tenellus</i> var. <i>tenellus</i>	slender woolly heads
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	bracken fern
<i>Quercus chrysolepis</i>	canyon live oak

Scientific Name	Common Name
<i>Quercus garryana</i>	Oregon oak
<i>Quercus kelloggii</i>	black oak
<i>Ranunculus californicus</i>	California buttercup
<i>Ranunculus muricatus</i>	prickle-fruited buttercup
<i>Ranunculus parviflorus</i>	few-flowered buttercup
<i>Rosa californica</i>	California rose
<i>Rosa eglantheria</i>	sweetbriar
<i>Rubus armeniacus</i>	Himalayan blackberry
<i>Rubus parviflorus</i>	thimbleberry
<i>Rubus ursinus</i>	California blackberry
<i>Rumex acetosella</i>	sheep sorrel
<i>Rumex crispus</i>	curly dock
<i>Rumex pulcher</i>	fiddle dock
<i>Salix exigua</i>	sandbar willow
<i>Salix hookeriana</i>	Hooker's willow
<i>Salix lasiolepis</i>	arroyo willow
<i>Sambucus nigra ssp. caerulea</i>	blue elderberry
<i>Sanicula crassicaulis</i>	Pacific sanicle
<i>Satureja douglasii</i>	yerba buena
<i>Scoliopus bigelovii</i>	fetid adder's tongue
<i>Scrophularia californica</i>	California figwort
<i>Senecio vulgaris</i>	old man of spring
<i>Sequoia sempervirens</i>	coast redwood
<i>Smilacina racemosa</i>	false Solomon's seal
<i>Sonchus oleraceus</i>	common sow thistle
<i>Spergularia rubra</i>	red sandspurry
<i>Stachys ajugoides var. rigida</i>	hedge nettle
<i>Stachys albens</i>	cobwebby hedge-nettle
<i>Stachys bullata</i>	hedge nettle
<i>Stellaria media</i>	chickweed
<i>Symphoricarpos albus</i>	common snowberry
<i>Symphoricarpos mollis</i>	creeping snowberry
<i>Taraxacum officinale</i>	dandelion
<i>Tellima grandiflora</i>	fringe cups
<i>Torilis arvensis</i>	hedge parsley
<i>Toxicodendron diversilobum</i>	poison oak
<i>Trientalis latifolia</i>	western star flower
<i>Trifolium breweri</i>	forest clover
<i>Trifolium dubium</i>	shamrock
<i>Trifolium hirtum</i>	rose clover
<i>Trifolium microcephalum</i>	little head clover
<i>Trifolium obtusiflorum</i>	creek clover
<i>Trifolium oliganthum</i>	few-flowered clover
<i>Trifolium pratense</i>	red clover

Scientific Name	Common Name
<i>Trifolium repens</i>	white clover
<i>Trifolium subterraneum</i>	subterranean clover
<i>Trifolium variegatum</i>	variegated clover
<i>Trillium ovatum</i> ssp. <i>ovatum</i>	Pacific trillium
<i>Typha angustifolia</i>	narrowleaf cattail
<i>Umbellularia californica</i>	California bay
<i>Vaccinium ovatum</i>	evergreen huckleberry
<i>Vancouveria hexandra</i>	northern vancouveria
<i>Vicia americana</i>	American vetch
<i>Vicia benghalensis</i>	vetch
<i>Vicia hirsuta</i>	hairy vetch
<i>Vicia sativa</i>	spring vetch
<i>Vinca major</i>	periwinkle
<i>Viola glabella</i>	stream violet
<i>Vitis californica</i>	California grape
<i>Vulpia bromoides</i>	brome fescue
<i>Vulpia microstachys</i> var. <i>pauciflora</i>	Pacific fescue
<i>Vulpia myuros</i> var. <i>myuros</i>	rattail fescue
<i>Whipplea modesta</i>	modesty
<i>Woodwardia fimbriata</i>	giant chainfern

Appendix H Mapping of Other Waters of the U. S./Waters of the State

Other Waters of the U. S. Present within the Environmental Study Limits



Avenue of the Giants - Four Bridges Project

Created on April 1, 2014 by Caltrans Biologist Jennifer Osmondson

Date of Imagery: 2003 (Caltrans DHIPP Imagery)

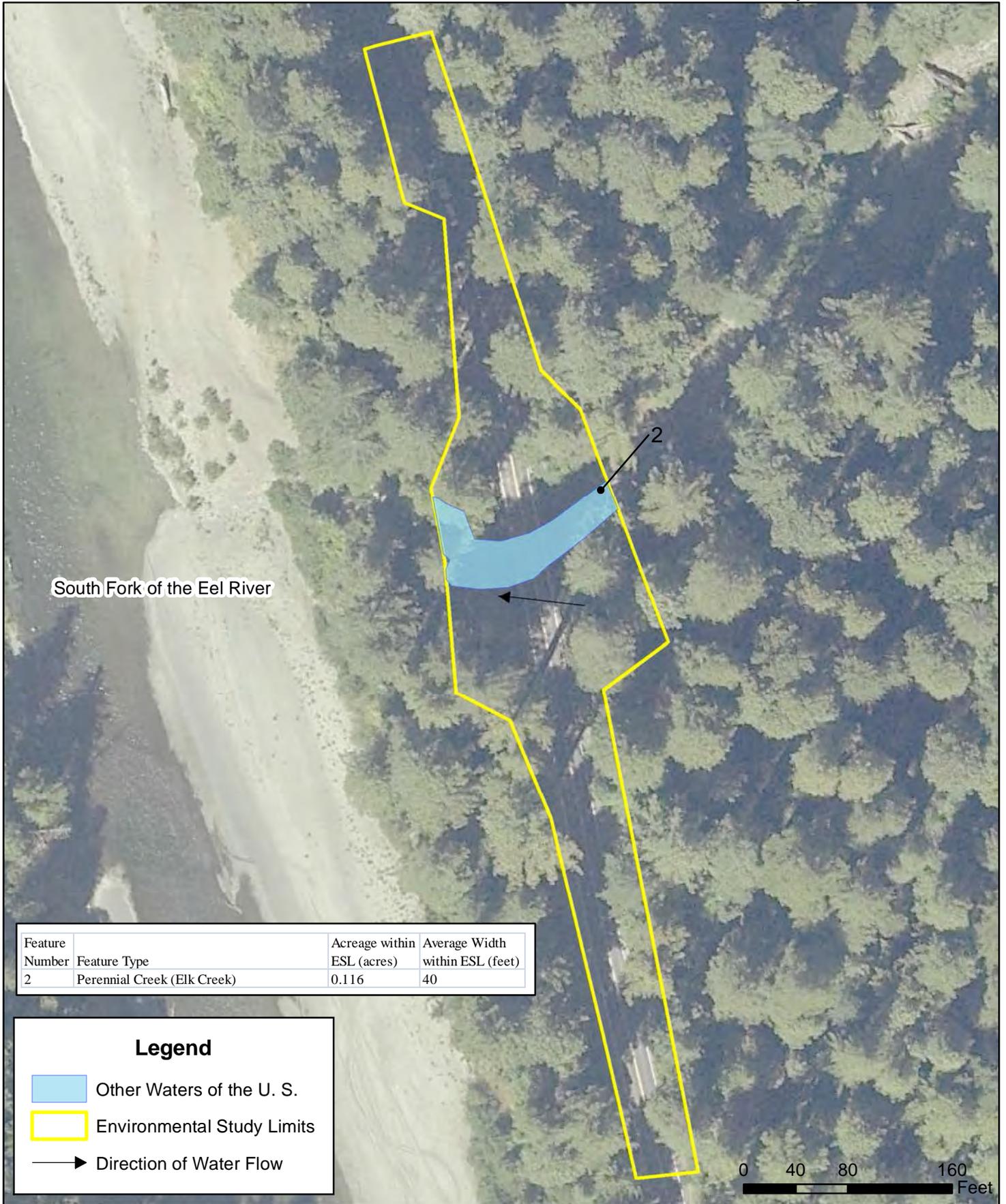
Reference Elevation Datum: NAD83

Scale: 1:1,500

Location 1 (Ohman Creek Bridge, Post Mile 0.88)



Other Waters of the U. S. Present within the Environmental Study Limits



Avenue of the Giants - Four Bridges Project
 Created on April 1, 2014 by Caltrans Biologist Jennifer Osmondson
 Date of Imagery: 2003 (Caltrans DHIPP Imagery)
 Reference Elevation Datum: NAD83
 Scale: 1:1,200
 Location 2 (Elk Creek Bridge, Post Mile 10.43)



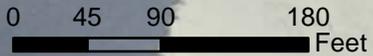
Other Waters of the U. S. Present within the Environmental Study Limits



Feature Number	Feature Type	Acreage within ESL (acres)	Average Width within ESL (feet)
3	Perennial Creek (Bridge Creek)	0.134	35

Legend

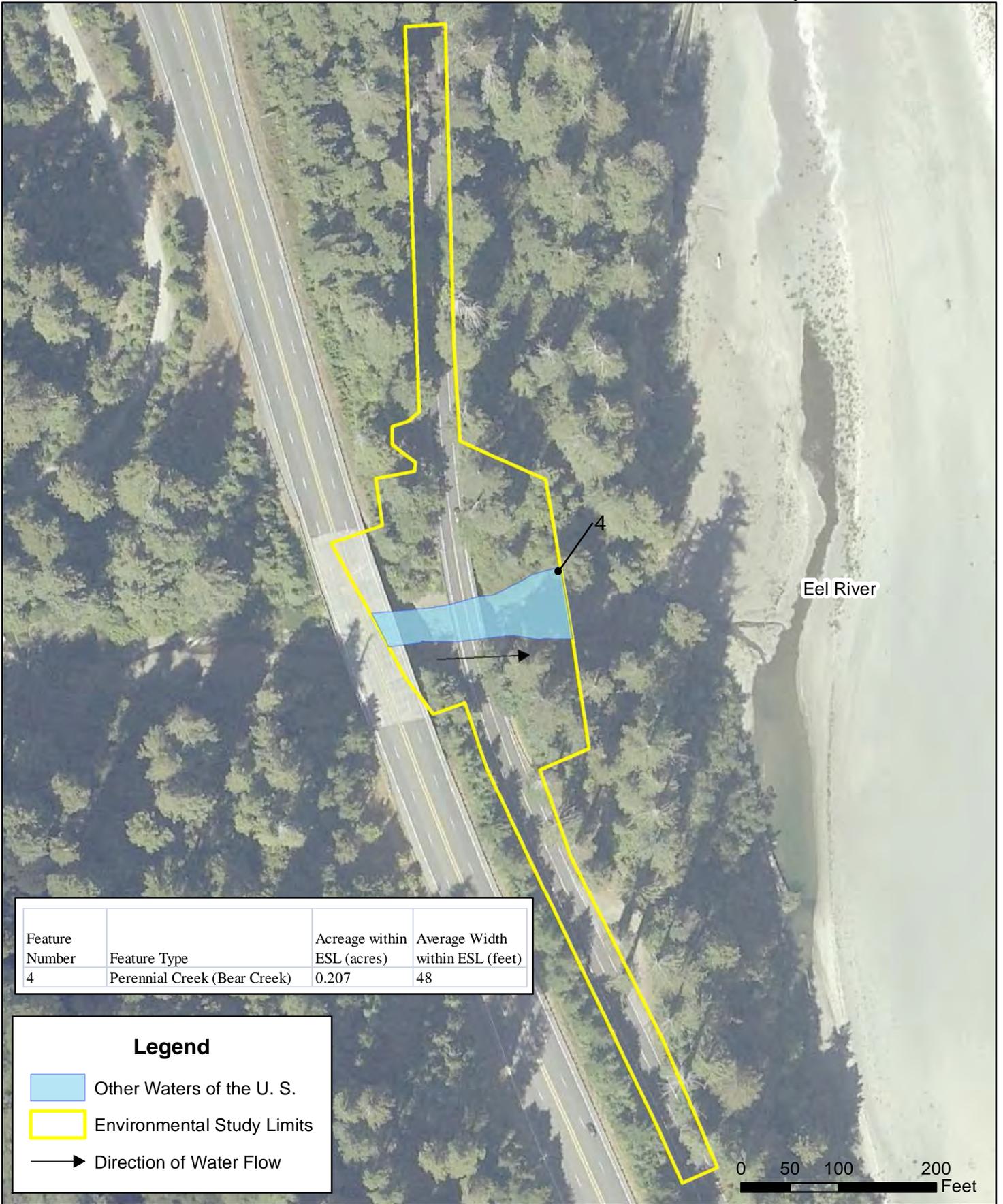
- Other Waters of the U. S.
- Environmental Study Limits
- Direction of Water Flow



Avenue of the Giants - Four Bridges Project
 Created on April 1, 2014 by Caltrans Biologist Jennifer Osmondson
 Date of Imagery: 2003 (Caltrans DHIPP Imagery)
 Reference Elevation Datum: NAD83
 Scale: 1:1,400
 Location 3 (Bridge Creek Bridge, Post Mile 10.80)



Other Waters of the U. S. Present within the Environmental Study Limits



Feature Number	Feature Type	Acreage within ESL (acres)	Average Width within ESL (feet)
4	Perennial Creek (Bear Creek)	0.207	48

Legend

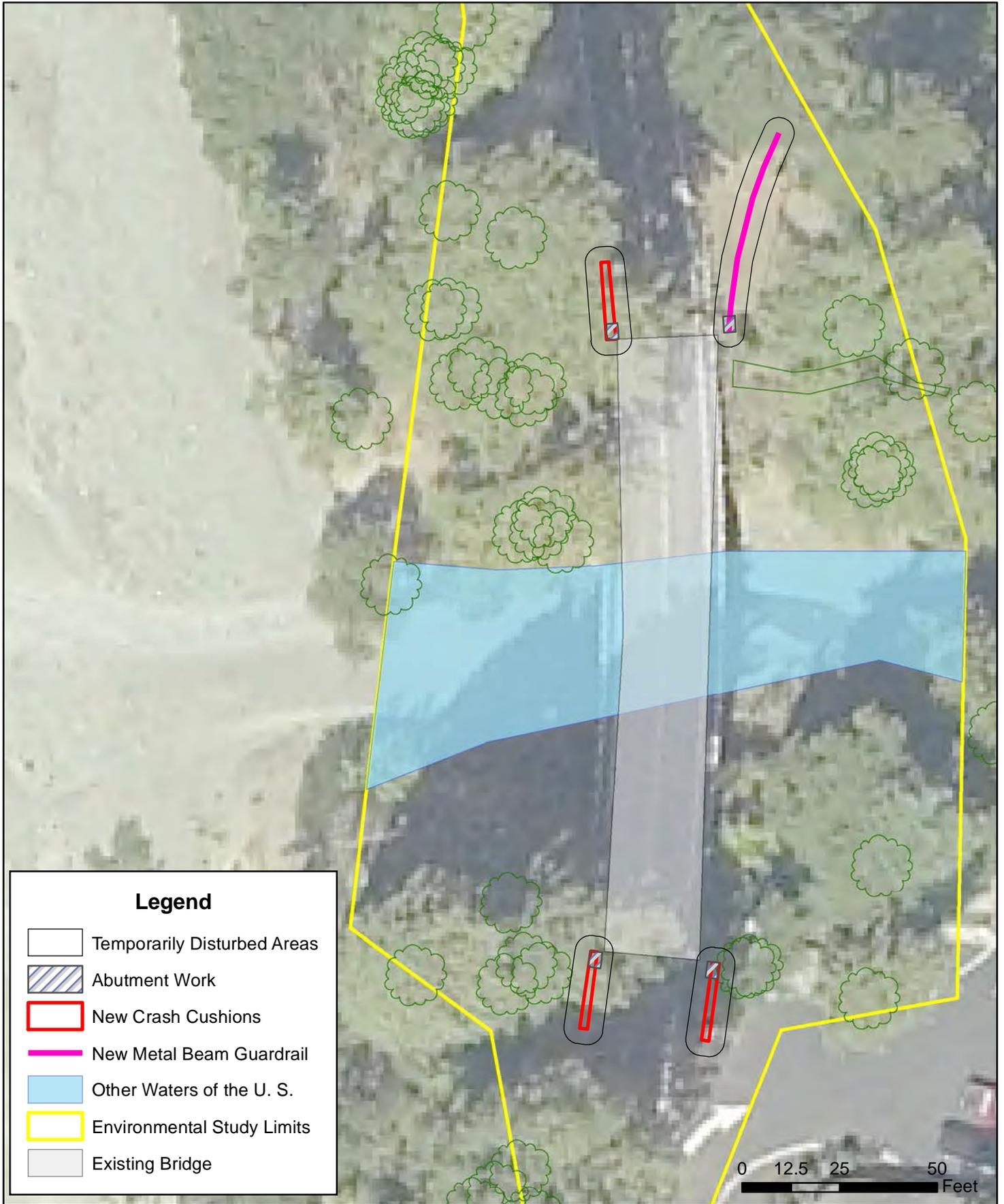
- Other Waters of the U. S.
- Environmental Study Limits
- Direction of Water Flow

Avenue of the Giants - Four Bridges Project
 Created on April 1, 2014 by Caltrans Biologist Jennifer Osmondson
 Date of Imagery: 2003 (Caltrans DHIPP Imagery)
 Reference Elevation Datum: NAD83
 Scale: 1:1,600
 Location 4 (Bear Creek Bridge, Post Mile 43.02)



Appendix I Areas Temporarily Disturbed During Construction

Temporarily Disturbed Areas



Avenue of the Giants - Four Bridges Project

Created on April 10, 2014 by Caltrans Biologist Jennifer Osmondson

Date of Imagery: 2003 (Caltrans DHIPP Imagery)

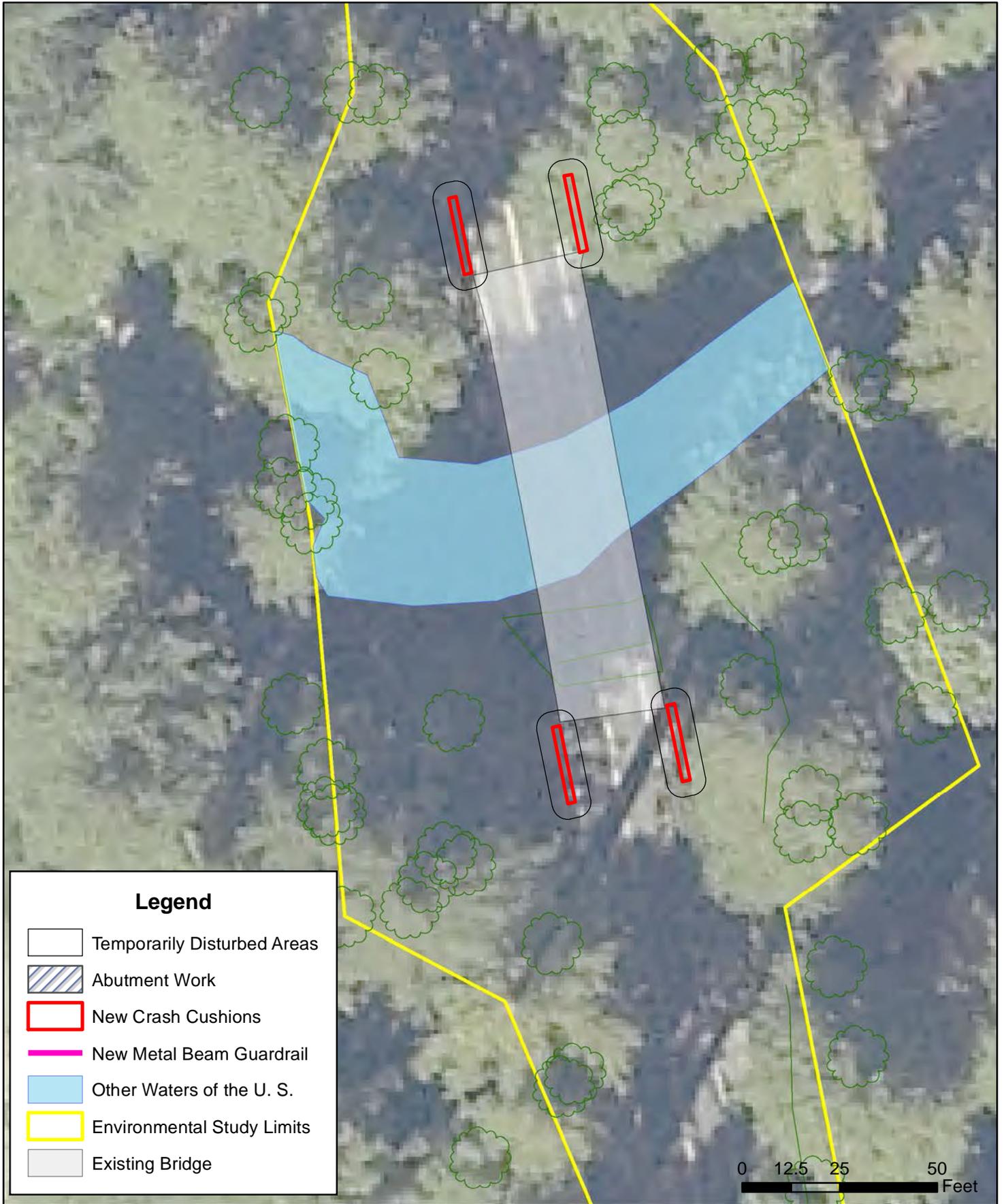
Reference Elevation Datum: NAD83

Scale: 1:400

Location 1 (Ohman Creek Bridge, Post Mile 0.88)



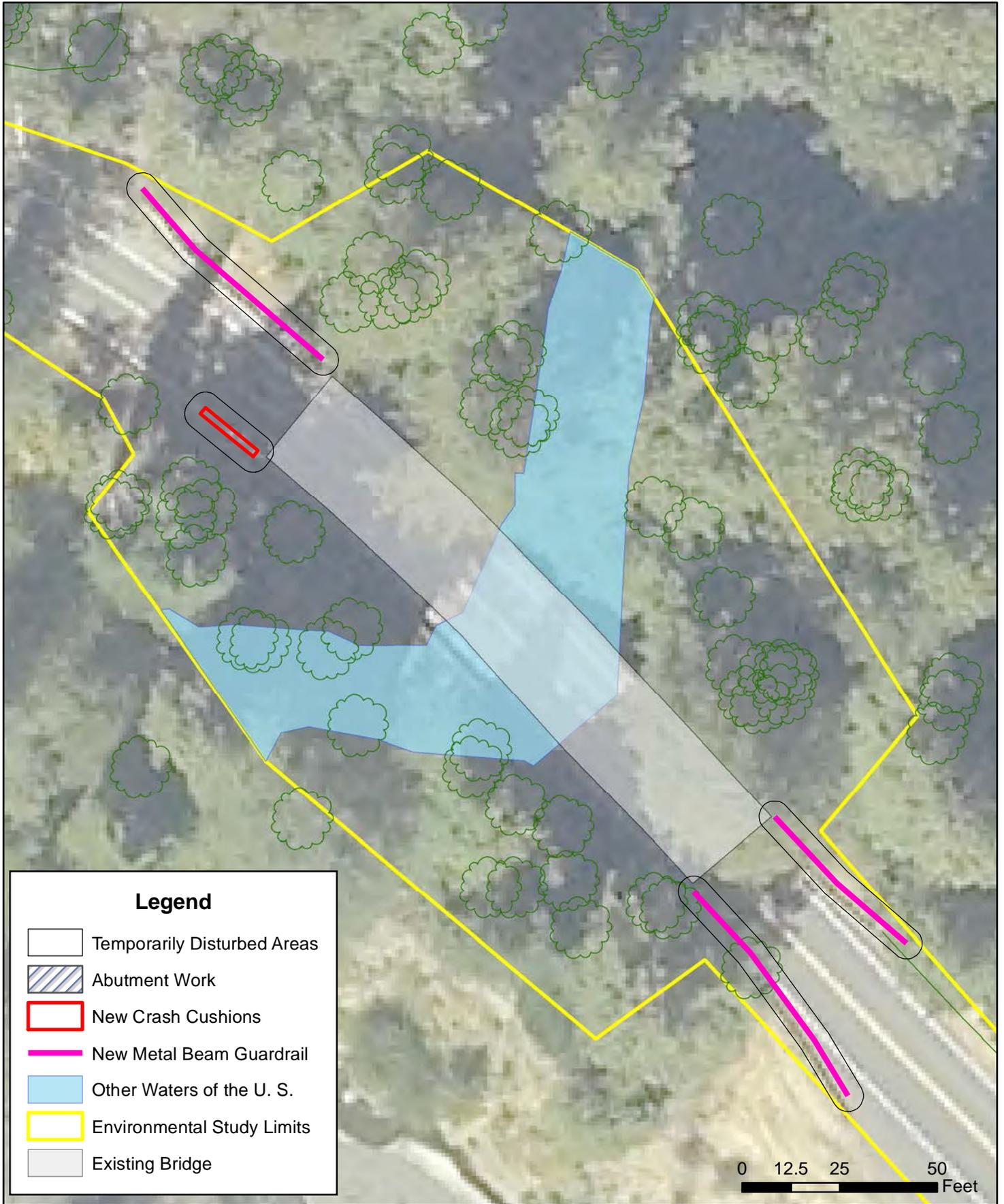
Temporarily Disturbed Areas



Avenue of the Giants - Four Bridges Project
Created on April 10, 2014 by Caltrans Biologist Jennifer Osmondson
Date of Imagery: 2003 (Caltrans DHIPP Imagery)
Reference Elevation Datum: NAD83
Scale: 1:400
Location 2 (Elk Creek Bridge, Post Mile 10.43)



Temporarily Disturbed Areas



Avenue of the Giants - Four Bridges Project

Created on April 10, 2014 by Caltrans Biologist Jennifer Osmondson

Date of Imagery: 2003 (Caltrans DHIPP Imagery)

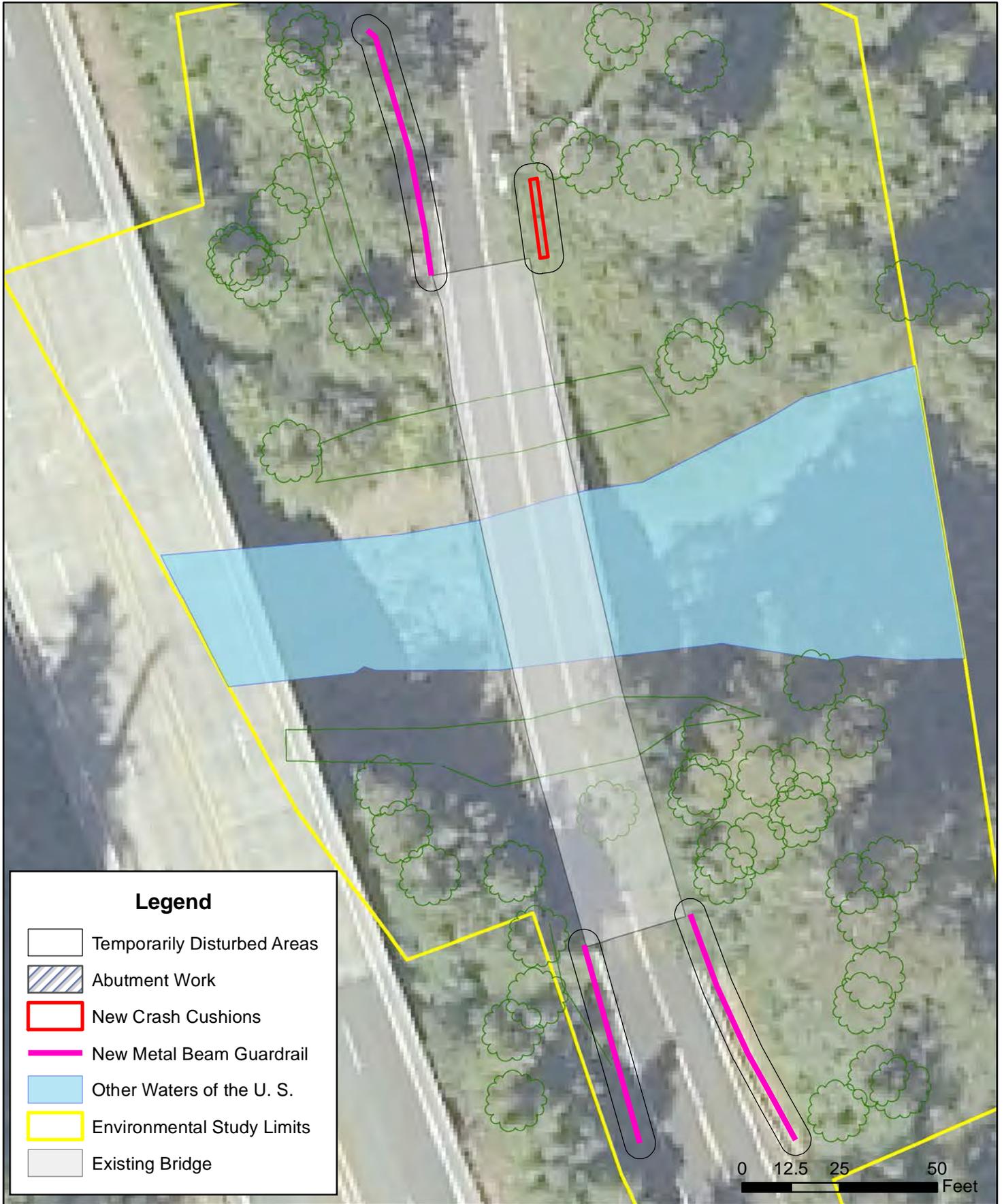
Reference Elevation Datum: NAD83

Scale: 1:400

Location 3 (Bridge Creek Bridge, Post Mile 10.80)



Temporarily Disturbed Areas



Legend

- Temporarily Disturbed Areas
- Abutment Work
- New Crash Cushions
- New Metal Beam Guardrail
- Other Waters of the U. S.
- Environmental Study Limits
- Existing Bridge

Avenue of the Giants - Four Bridges Project

Created on April 10, 2014 by Caltrans Biologist Jennifer Osmondson

Date of Imagery: 2003 (Caltrans DHIPP Imagery)

Reference Elevation Datum: NAD83

Scale: 1:400

Location 4 (Bear Creek Bridge, Post Mile 43.02)



Appendix J NMFS Programmatic Biological Opinion – Reporting Form

CATEGORY 2: POST-PROJECT REPORTING FORM

Project POC and contact information:

Name: Jennifer Osmondson Email: Jennifer_Osmondson@dot.ca.gov Phone: (530) 740-4807

Location (District, County, Route, Post Mile): District 1, Humboldt, 254, Post Miles 0.88, 10.43, 10.88, 43.02

Stream Name(s): Ohman Creek, Elk Creek, Bridge Creek (tributaries of the South Fork of the Eel River, Bridge Creek (tributary of the Eel River)

Watershed(s): South Fork Eel (18010106 HUC), Lower Eel (18010105 HUC)

Project type checklist:

Check project type and fill associated field(s) below (you can check more than 1)

Cleaning (removal of material below the OHWL with heavy equipment when all life stages of listed fish are absent)

Volume of material removed in cubic yards (*must be between 2 and 5 cubic yards*): _____

Vegetation and LWD Management (vegetation removal outside of the wetted channel within and 20 linear feet of a bridge or culvert with hand tools)

Area of vegetation removal within 150 linear feet of the OHWL in square feet (*must be below 5,000 square feet*): Minor trimming of vegetation may be necessary during construction of the proposed project.

Grading for Access Roads and Construction of Settling Basins and Storage Areas

(grading above the OHWL and outside of wetted channels and designated critical habitat)

Graded area within 150 linear feet of OHWL in square feet (*must be below 5,000 square feet*):

Installation of erosion control materials (placement of erosion control materials in designated critical habitat and outside of the wetted channels)

Type of materials installed (*RSP, sheet piles, or retaining walls may not be placed designated critical habitat*) _____

Drilling Geotechnical Test Holes (geotechnical drilling below the OHWL or within designated critical habitat)

Number of holes and specific location (*geotechnical drilling may not take place in wetted channels*) _____

Dewatering and Fish Relocation (dewatering and fish relocation outside

CATEGORY 2: POST-PROJECT REPORTING FORM

Page 2

anadromous fish waters or designated critical habitat)

List of fish species, approximate length, and approximate number handled (*listed fish may not be handled-anadromous fish may be handled if they are not listed **potentially an option in Klamath and Smith watersheds*) _____

X ***Rehabilitation, Retrofit, and Repair of Culverts and Bridges*** (rehabilitation, retrofit, or repair of culvert or bridge superstructures within anadromous waters or designated critical habitat)

List of structures rehabilitated, retrofitted, or repaired (*activities may not occur below the OHWL*): Bridge railings of Ohman Creek bridge, Elk Creek bridge, Bridge Creek bridge, and Bear Creek bridge will be replaced. Bridge abutments will be widened at Ohman Creek, in order to match the new width of the bridge.

Replacement of Culverts and Bridges (replacement of culverts and bridges in non-fish bearing streams).

Brief description of culvert or bridge replacement: _____

Attachment 1
Post-Construction Reporting Form

Additional Best Management Practices (ABMPs)	
1	ABMP-1.1: Equipment will be operated during the least sensitive diurnal, seasonal, and meteorological periods relative to the potential effects on listed species and habitat if feasible.
2	ABMP-1.2: Equipment will not operate in sensitive areas or habitats, such as wetlands and surface waters (Note: if equipment is necessary in waters or wetlands, see Project Action-14).
3	ABMP-1.3: Equipment will be inspected on a daily basis for leaks and completely cleaned of any external petroleum products, hydraulic fluid, coolants, and other deleterious materials prior to operating equipment.
4	ABMP-1.4: A Spill Prevention, Control, and Countermeasures (SPCC) Plan will be developed for each project that requires the operation of construction equipment and vehicles. The SPCC Plan will be kept on-site during construction and the appropriate materials and equipment will also be on-site during construction to ensure the SPCC Plan can be implemented. Personnel will be knowledgeable in the use and deployment of the materials and equipment so response to an accidental spill will be timely.
5	ABMP-2.1: Maintenance and construction activities will be avoided at night to the extent practicable.
6	ABMP-2.2: When night work cannot be avoided, disturbance of listed species will be avoided and minimized by restricting substantial use of temporary lighting to the least sensitive seasonal and meteorological windows.
7	ABMP-2.3: Lights on work areas will be shielded and focused to minimize lighting of listed-species habitat.
8	ABMP-3.1: Maintenance and fueling of construction equipment and vehicles will occur at least 15 meters from the Ordinary High Water Line (OHWL) or the edge of sensitive habitats (e.g., wetlands).
9	ABMP-5.1: Sediment and debris removed from the roadway will be disposed of off-site, at an approved location, where it cannot enter surface waters.
10	ABMP-6.1: Falsework will be installed to keep bridge debris and construction, maintenance, and repair materials from falling into streams during demolition, construction, and substantial maintenance and repair activities.
11	ABMP-10.1: Trees as identified in any special contract provisions or as directed by the Project Engineer will be preserved.
12	ABMP-10.4: Environmentally Sensitive Areas will be fenced to prevent encroachment of equipment and personnel into wetlands, riparian areas, stream channels and banks, and other sensitive habitats.
13	ABMP-10.5: Vegetation will be mowed to a height greater than 4 inches.
14	ABMP-10.6: Soil compaction will be minimized by using equipment that can reach over sensitive areas and that minimizes the pressure exerted on the ground.
15	ABMP-10.7: Where soil compaction is unintended, compacted soils will be loosened after heavy construction activities are complete.
16	ABMP-10.8: Where vegetation removal is temporary to support construction activities, native species will be re-established that are specific to the project location and that comprise a diverse community of woody and herbaceous plants.
17	ABMP-11.1: Storage areas will disturb less than 2.5 acres of vegetated or currently

Attachment 1
Post-Construction Reporting Form

	Additional Best Management Practices (ABMPs)
	undisturbed area.
18	ABMP-11.2: Storage areas will not disturb wetlands or other special status plant communities.
19	ABMP-11.3: For permanent storage areas that have been filled to capacity with sediment and debris, the final configuration will conform to natural contours (elevations, profile, and gradient) of surrounding terrain and native plant species will be established that are specific to the project location and comprise a diverse community of woody and herbaceous plants.
20	ABMP-11.4: Construction staging and storage areas will be located a minimum of 150 feet from the OHWL and other sensitive habitats (<i>e.g.</i> , wetlands).
21	ABMP-13.1: Temporary access and detours will be located a minimum of 50 feet from the OHWL and other sensitive habitats (<i>i.e.</i> wetlands).
22	ABMP-29.1: The proposed guidance document (described in Caltrans [2010] Programmatic BA) will be followed to ensure compliance with Project permits and authorization, including implementation of the BMPs.
23	ABMP-29.2: Before construction activities begin, the project environmental coordinator or biologist will discuss the implementation of the required BMPs with the maintenance crew or construction resident engineer and contractor, and identify and document environmentally sensitive areas and potential occurrence of listed species.
24	ABMP-29.3: Before construction activities begin, the project environmental coordinator or biologist will conduct a worker awareness training session for all construction personnel that describes the listed species and their habitat requirements, the specific measures being taken to protect individuals of listed species in the project area, and the boundaries within which project activities will be restricted.
25	ABMP-29.4: Caltrans will designate a biological monitor to monitor on-site compliance with all Project BMPs and any unanticipated effects on listed species.
26	ABMP-29.5: Non-compliance with BMPs and unanticipated effects on listed species will be reported to the resident engineer or maintenance supervisor immediately.
27	ABMP-29.6: When non-compliance is reported, the resident engineer or maintenance supervisor will implement corrective actions immediately to meet all BMPs; where unanticipated effects on listed species cannot be immediately resolved, the resident engineer or maintenance supervisor will stop work that is causing the unanticipated effect until the unanticipated effects are resolved.

Appendix K USFWS Programmatic Informal Consultation – Reporting Form

Inventory and Reporting Form:
Report on Project Activities to be Covered by the Arcata FWO Programmatic LOC
(AFWO-12B0001-12I0001)

Project Name: Avenue of the Giants – Four Bridges Project

EA or Federal Aid Number:
01-43060

Local Assistance Project? No

Project Lead and Contact Information:

Name: Jennifer Osmondson,
Project Biologist

Email:
Jennifer_Osmondson@dot.ca.gov

Phone: (530) 740-4807

Federal Action Agency:

- Caltrans
 US Army Corps of Engineers

Project Location (District, County, Route, Begin Post Mile and End Post Mile):

01-HUM-254-PM 0.88/43.02

Watershed: 18010106 (South Fork Eel HUC),
18010105 (Lower Eel HUC)

Stream name: Location 1 - Ohman Creek,
Location 2 - Elk Creek, Location 3 - Bridge Creek,
Location 4 - Bear Creek

Topo Location: Location 1 - Miranda 7.5-minute U. S. Geological Survey (USGS) quadrangle, Township 3S, Range 4E, Section 19. Location 2- Myers Flat 7.5-minute U. S. Geological Survey quadrangle, Township 2S, Range 3E, Section 21. Location 3 - Myers Flat 7.5-minute U. S. Geological Survey, Township 2S, Range 3E, Section 20. Location 4 - Red Crest 7.5-minute U. S. Geological Survey, Township 1N, Range 2E, Sections 29, 32.

Lat/long Location: Location 1 – 40.19, 123.77;
Location 2 – 40.28, 123.85; Location 3 – 40.28,
123.86; Location 4 – 40.43, 123.98

Brief Project Description:

The California Department of Transportation is proposing a project to upgrade the bridge railings at four locations on State Route 254 in Humboldt County: Ohman Creek (Bridge No. 4-7, Post Mile (PM) 0.88), Elk Creek (Bridge No. 4-8, PM 10.43), Bridge Creek (Bridge No. 4-9, PM 10.80), and Bear Creek (Bridge No. 4-12, PM 43.02). The proposed project will include upgrading bridge railing, upgrading guard railing (including crash cushions,) and repaving the existing roadway approximately 200 feet on each side of the bridges.

NES Attached? Yes

Date NES Signed: 7/10/2014

STEVE Fields Updated: Yes

Date: 7/10/2014

Proposed Activity Type Seeking Coverage by the PLOC (check all that apply):

Construction Season Pre- and Post-Project Noise Levels

The existing ambient noise levels within the Environmental Study Limits (ESL) for the proposed project range from 67 to 95 decibels (dB). Equipment expected to be used during construction of the proposed project will generate noise at levels ranging from 80 to 95 dB. The completed project will not increase noise levels above their current level.

Best Management Practices (BMPs) to be Incorporated into the Proposed Project

Concrete Finishing (NS-14)

Description

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Proper procedures minimize the impact that concrete finishing methods may have on runoff.

Appropriate Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

Limitations

Specific permit requirements may be included in the contract documents for certain concrete finishing operations.

Implementation

- Follow containment requirements stated in the project special provisions, if any.
- Collect and properly dispose of water and solid waste from high-pressure water blasting operations.
- Collect water from blasting operations and transport or dispose of water in a non-erodible manner. Refer to BMPs SS-9, "Earth Dikes/Drainage Swales & Lined Ditches," SS-10, "Outlet Protection/Velocity Dissipation Devices," and SS-11, "Slope Drains."
- Direct water from blasting operations away from inlets and watercourses to collection areas for removal (e.g., dewatering) as approved in advance by the RE and in accordance with applicable permits.
- Protect inlets during sandblasting operations. Refer to BMP SC-10, "Storm Drain Inlet Protection."
- Refer to BMP WM-8, "Concrete Waste Management"
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to BMP WM-6, "Hazardous Waste Management"

Maintenance and Inspection

- Follow inspection procedure as required in the project special provisions.
- At a minimum, inspect containment structures, if any, for damage or voids prior to use each day and prior to the onset of rain.
- At the end of each work shift, remove and contain the liquid and solid wastes from containment structures, if any, and from the general work area.
- Discharges to waterways will be reported to RE immediately upon discovery. A written discharge notification must follow within 7 days or as required by special provisions.

Concrete Waste Management (WM-8)

Description

Concrete waste management procedures and practices are designed to minimize or eliminate the discharge of concrete waste materials to storm drain systems or watercourses.

Appropriate Applications

Concrete waste management practices are typically implemented on construction projects where concrete is used as a construction material or where concrete dust and debris result from demolition activities.

Implementation

- Portland cement concrete and asphalt concrete waste will not be allowed to enter storm water drainages or watercourses.
- Portland cement concrete waste will be collected and properly disposed of or placed in a temporary concrete washout facility as shown conceptually in Figure 4-14 of the *Guidelines*.
- Asphalt concrete waste will be collected and properly disposed of.
- A sign will be installed adjacent to each temporary concrete washout facility to inform concrete equipment operators to utilize the proper facilities.
- Below-grade concrete washout facilities are typical. Above-grade facilities are used if excavation is not practical.
- A foreman and/or construction supervisor will monitor on-site concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.

Maintenance

A foreman and/or construction supervisor will monitor on-site concrete waste storage and disposal procedures.

Material Delivery and Storage (WM-1)

Description

Material delivery and storage procedures and practices are designed for the proper handling and storage of materials in a manner that minimizes or eliminates the discharge of these materials to storm water drainage systems or watercourses.

Appropriate Applications

These procedures are typically implemented at all construction sites with delivery and storage of pesticides, fertilizers, detergents, plaster, petroleum products, asphalt and concrete components, hazardous chemicals, concrete compounds or other materials that may be detrimental if released to the environment.

Implementation

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 will be stored in approved containers and drums and will not be overfilled. Containers and drums will be placed in temporary containment facilities for storage.
 1. A temporary containment facility will provide for a spill containment volume able to contain precipitation from a 24-hour, 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
 2. A temporary containment facility will be impervious to the materials stored there for a minimum contact time of 72 hours.
 3. A temporary containment facility will be maintained free of accumulated rainwater and spills. In the event of soil spills or leaks, accumulated rainwater and spills will be collected and placed into drums. These liquids will be handled as a hazardous waste unless testing determines to be non-hazardous. Non-hazardous liquids will be sent to an approved disposal site.
 4. Sufficient separation will be provided between stored containers to allow for spill cleanup and emergency response access.
 5. Incompatible materials, such as chlorine and ammonia, will not be stored in the same temporary containment facility.
 6. Throughout the rainy season, each temporary containment facility will be covered during nonworking days and prior to rain events.
 7. Materials will be stored in their original containers and the original product labels will be maintained in place in a legible condition. Damaged or otherwise illegible labels will be replaced immediately.
- Bagged and boxed materials will be stored on pallets and will not be allowed to accumulate on the ground.
- To provide protection from wind and rain, throughout the rainy season, bagged and boxed materials will be covered during nonworking days and prior to rain events.

- Storage areas will be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners will be repaired or replaced as needed to maintain proper function.

Maintenance

- Check to ensure that designated storage areas are kept clean and well organized.
- Repair and/or replace perimeter controls, containment structures, and covers as needed to keep them functioning properly.

Paving Operations Procedures (NS-3)

Description

Paving operations procedures are designed to minimize pollution of storm water runoff during paving operations.

Appropriate Applications

These procedures are typically implemented where paving, surfacing, resurfacing, or sawcutting may pollute storm water runoff or discharge to storm drain systems or watercourses.

Implementation

- Substances used to coat asphalt transport trucks and asphalt spreading equipment will not contain soap and will be nonfoaming and nontoxic.
- Drainage inlet structures and manholes will be covered when seal coat, tack coat, slurry seal or fog seal is applied to adjacent surfaces. Seal coat, tack coat, slurry seal, or fog seal will not be applied if rainfall or thunderstorms are predicted to occur during the application or curing period.
- Protect drainage inlet structures and maintenance holes during paving operations, including when seal coat, tack coat, slurry seal or fog seal is applied to adjacent surfaces.
- Seal coat, tack coat, slurry seal or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.
- When using asphalt release agents (e.g., citrus, soy-based or diesel) for cleaning and coating of equipment and tools, all products and by-products will be captured and reused, recycled, or disposed in accordance with the requirements of the Hazardous Waste Management BMP.
- Scrape residual material out of equipment using dry methods.
- Clean pavers over absorbent pads, drip pans, plastic sheeting or other materials to collect the asphalt release agents. Dispose removed material in accordance with the Hazardous Waste Management BMP.

- Pick up and reuse, recycle, or dispose of cured material in accordance with the Solid Waste Management BMP.
- Prevent water used to clean emulsion kettles from discharging into drain inlets or watercourses. Diesel oil used in kettle cleaning will be contained and reused, recycled, or disposed of in accordance with the Hazardous Waste Management BMP.

Maintenance

- Maintain machinery regularly to minimize leaks and drips.
- Ensure that employees and subcontractors are implementing appropriate measures during paving operations.

Preservation of Existing Vegetation (SS-2)

Description

Preservation of existing vegetation is the identification and protection of desirable vegetation that provides erosion and sediment control benefits.

Appropriate Applications

- Preserve existing vegetation at areas on a site where no construction activity is planned or where it will occur at a later date.
- As described in Section 4.3.2, on a year-round basis temporary fencing will be provided prior to the commencement of clearing and grubbing operations or other soil-disturbing activities in areas where no construction activity is planned or will occur at a later date.

Implementation

The following general steps will be taken to preserve existing vegetation:

- Mark areas to be preserved with orange polypropylene temporary fencing.
- Minimize disturbed areas by locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling.
- Construction materials and equipment storage and parking areas will be located where they will not cause root compaction.
- Keep equipment away from trees to prevent trunk damage and root damage.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Disturbed vegetation outside the active area will be replaced using the appropriate soil stabilization measures.

Maintenance

Ensure that the limits of disturbance are clearly marked. Irrigation or maintenance of existing vegetation will conform to the requirements in the landscaping plans.

Scheduling and Planning (SS-1)

Description

This BMP involves a schedule for every project that considers sequencing of construction activities with the installation of erosion and sediment control measures. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff and vehicle tracking and to perform the construction activities and control practices in accordance with the planned schedule.

Appropriate Applications

Construction sequencing will typically be scheduled to minimize land disturbance for all projects during the winter season.

Implementation

- Consider scheduling work items such as clearing and grubbing, grading and excavation to minimize the active construction area during the rainy season.
- Minimize soil-disturbing activities during the rainy season.
- Consider scheduling when establishing permanent vegetation (appropriate planting time for specified vegetation).

Maintenance

- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- When changes are warranted, amend the sequence scheduling in advance to maintain sediment control.

Vehicle and Equipment Fueling (NS-9)

Description

Vehicle and equipment fueling procedures and practices are designed to minimize or eliminate the discharge of fuel spills and leaks into storm drain systems or watercourses.

Appropriate Applications

These procedures are typically applied on all construction sites where vehicle and equipment fueling takes place.

Implementation

- Drip pans will be used during vehicle and equipment fueling unless the fueling is performed over an impermeable surface in a dedicated fueling area. Dedicated fueling areas will be protected from storm water run-on and runoff and will be located at least 15m from downstream drainage facilities or watercourses.
- Nozzles used in vehicle and equipment fueling will be equipped with an automatic shutoff to control drips.

- Fueling operations will not be left unattended.
- Absorbent spill cleanup materials will be available in fueling and maintenance areas and will be disposed properly after use.
- Vehicles and equipment leaks will be inspected and cleaned up on each day of use. Leaks will be repaired immediately or problem vehicles or equipment will be removed from the project site.

Maintenance

- Keep an ample supply of spill cleanup material on-site.
- Immediately clean up spills and properly dispose of contaminated soil and cleanup material.

Vehicle and Equipment Maintenance (NS-10)

Description

Vehicle and equipment maintenance procedures and practices are designed to minimize or eliminate the discharge of pollutants to storm drain systems or watercourses from vehicle and equipment maintenance procedures.

Appropriate Applications

These procedures are typically applied on all construction projects where an on-site yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Implementation

- Drip pans will be used during vehicle and equipment maintenance work that involves fluids unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area. Dedicated maintenance areas will be protected from storm water run-on and runoff and will be located at least 15m from downstream drainage facilities or watercourses.
- Drip pans will be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.
- Vehicles and equipment leaks will be inspected on each day of use. Leaks will be repaired immediately or problem vehicles or equipment will be removed from the project site.

Maintenance

- Maintain waste fluid containers in leak-proof condition.
- Check equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

Additional BMPS to be Incorporated into the Proposed Project

ABMP-1.1: When practicable, operate equipment during the least sensitive diurnal, seasonal, and meteorological periods relative to the potential effects on listed species and habitat.

ABMP-2.1: When practicable, avoid maintenance and construction activities at night when construction windows allow.

ABMP-2.2: When night work cannot be avoided, avoid and minimize disturbance of listed species by restricting substantial use of temporary lighting to the least sensitive seasonal and meteorological windows (Table 1-5) allowing for crew safety.

ABMP-2.3: Lights on work areas will be shielded and focused to minimize lighting of listed- species habitat to the extent practicable to ensure safety of workers.

ABMP-6.1: Consistent with state agency approvals, install collection devices or use other methods to keep bridge debris and construction and maintenance materials from falling into streams during demolition, construction, and substantial maintenance activities.

ABMP-10.1: Preserve trees as identified in the plans or any special contract provisions or as directed by the Resident Engineer.

ABMP-10.4: Environmentally Sensitive Areas will be fenced where appropriate, or otherwise physically protected to prevent encroachment of equipment and personnel into wetlands, riparian areas, stream channels and banks, and other sensitive habitats to the maximum extent practicable.

ABMP-10.6: Minimize soil compaction by using equipment that can reach over sensitive areas and minimizes the pressure exerted on the soil where practical.

Select equipment that reduces the amount of pressure exerted on the ground surface, and therefore, reduces erosion potential and/or use overhead or aerial access for transporting equipment across drainage channels. Use equipment that exerts ground pressures of less than 5 or 6 pounds per square inch (PSI), where possible. Low ground pressure equipment includes: wide or high flotation tires (860 to 1850 mm [34 to 72 in] wide); dual tires; bogie axle systems; tracked machines; lightweight equipment; and, central tire inflation systems. (Construction Site BMP Manual, March 1, 2003.)

ABMP-11.1: Temporary storage areas will disturb less than 10,000 square meters (2.5 acres) of naturally vegetated area.

ABMP-11.2: Temporary storage areas will not disturb wetlands or other special status plant areas.

ABMP-14.2: Use existing roadways and stream crossings for temporary access roads whenever safe and impacts to listed species are avoided or minimized to an acceptable level as determined by the project biologist.

ABMP-14.3: Minimize the number of access and egress points and total area affected by vehicle operation. Locate disturbed areas to reduce damage to existing native aquatic vegetation, substantial large woody debris, and spawning gravel.

ABMP-14.4: To the extent practicable, clean culverts and bridge abutments and piers and place RSP and other bank protection by working from the top of the bank or bridge if possible.

ABMP-14.5: Limit the duration and extent of in-water activities to the maximum extent practicable.

ABMP-14.8: Restore modified or disturbed portions of streams, banks, and riparian areas as nearly as possible to their natural contours.

ABMP-28.1: If individuals of listed species may be present and subject to potential injury or mortality from construction activities, a qualified biologist will conduct a preconstruction survey.

ABMP-28.2: Minimum qualifications for the qualified biologist will include a 4-year college degree in biology and any necessary permits.

ABMP-29.1: Follow the guidance document, developed in cooperation with NOAA Fisheries, USFWS, Corps, and FHWA, to ensure compliance with Program permits and authorization, including implementation of the environmental commitments.

ABMP-29.2: Before construction activities begin, the Project Environmental Coordinator or Biologist will discuss the implementation of the required Environmental Commitments with the Maintenance crew or Construction Resident Engineer and Contractor, as well as notification and other procedural requirements, and identify and document Environmentally Sensitive Areas and potential occurrence of listed species.

ABMP-29.3: Before construction activities begin, the Project Environmental Coordinator or Biologist will conduct a worker awareness training session for all construction and maintenance personnel that describes the listed species and their habitat requirements, the specific measures being taken to protect individuals of listed species in the project area, and the boundaries within which project activities will be restricted.

ABMP-29.4: Caltrans will designate or approve a biological monitor to monitor on-site compliance with all Program Environmental Commitments and any unanticipated effects on listed species.

ABMP-29.5: Non-compliance with environmental commitments and unanticipated effects on listed species will be reported to the Resident Engineer or Maintenance Supervisor

immediately.

ABMP-29.6: When non-compliance is reported, the Resident Engineer or Maintenance Supervisor will implement corrective actions as soon as feasible to meet all Environmental Commitments. Where unanticipated effects on listed species cannot be immediately resolved, the Resident Engineer or Maintenance Supervisor will stop work that is causing the unanticipated effect.

ABMP-29.7: If unanticipated effects on listed species violate the terms and conditions in the BO or other confirmed take authorization, NOAA Fisheries, USFWS, and DFG will be notified as soon as is reasonably possible. Modifications to project activities may be developed to prevent continued unanticipated effects.

- Routine Maintenance Activities including Resurfacing, Installation of Guard Rails, Shoulder Widening, and Striping
- Cleaning Activities
- Slide and Slipout Abatement and Repair
- Drainage System Maintenance, Repair, and Replacement
- Bridge Repair, Maintenance, and New Construction
- Vegetation Management
- Grading and Establishment of Staging and Storage Areas
- Geotechnical Drilling
- Grading of Existing Permanent and Establishment of New Temporary Access Roads and Traffic Detours
- Construction of Settling Basins
- Installation of Rock Slope Protection/Erosion Control Materials
- Emergency Repair

Species Seeking Coverage by the PLOC for Activities Identified Above:

California Red-legged Frog, Marbled Murrelet, Northern Spotted Owl, Western Snowy Plover, Tidewater Goby, Pt. Arena Mountain Beaver

Species	All Species Criteria Met? (Y/N)	Critical Habitat Present? (Y/N)	BMPs Implemented*	ABMPs Implemented*
Northern spotted owl	yes	no	NS-14, WM-8, WM-1, NS-3, SS-2, SS-1, NS-9, NS-10	Please see attached list of ABMPs
Marbled murrelet	yes	yes	NS-14, WM-8, WM-1, NS-3, SS-2, SS-1, NS-9, NS-10	Please see attached list of ABMPs

*(List all that apply and use Programmatic Biological Assessment numbering system; for MAMU and NSO must identify construction season and pre- and post- project noise levels) [Click here for Caltrans 2010 Routine Maintenance Programmatic Biological Assessment to look up BMP numbering](#)

Species and Associated Project Activities that Will Result in a Separate Section 7 Consultation and NOT Seeking coverage by the PLOC (from species list above):

Species	Project Activity Type	Date of Separate BA Submittal?
Click here to enter text.		

MAMU or NSO Affected Critical Habitat (acres*): N/A

*Need to report this to AFWO, Gregg Schmidt

	Effect (acres)		Habitat (acres)	
	Permanent	Temporary	Nesting	Foraging
MAMU				
NSO				

Notification Process:

- Email to HQ Senior Biologist and North Region Senior Biologist
Date: 7/10/2014 Names: Keith Pelfrey, North Region Senior Resource Biologist
- Copy of this form saved to project file
Date: 7/10/2014
- Copy of this form emailed to Arcata FWO
Date: Click here to enter a date.
- Copy of this form emailed to USACE San Francisco Office (Only required if USACE is Federal Lead)
Date: Click here to enter a date.

Contacts:

North Region Senior Resource Biologist: Keith Pelfrey, (530) 225-2085
HQ Sr. End Species Specialist: James Henke, (916) 653-6121
HQ Sr. End Species Specialist: Amy Golden, (916) 653-8566
Office of Biological Studies, Chief: Melinda Molnar, (916) 651-8166
Arcata FWO Biologist: Gregg Schmidt: (707) 825-5103

Instructions:

- If 404 Permit is required, send a copy of this form to the San Francisco USACE Office
- Submit a copy of this form with the NES to the North Region Senior Biologist for review