DEPARTMENT OF TRANSPORTATION
DISTRICT 1, P.O. BOX 3700
EUREKA, CA 95502-3700
PHONE (707) 445-6416
FAX (707) 441-5775
TTY 711

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EXHIBIT NO. 4B
APPLICATION NO.
1-11-039
CALIFORNIA DEPARTMENT OF TRANSPORTATION
REVEGETATION PLAN ADDENDUM (1 of 20)

November 10, 2011

File: DN-101-PM 4.04/4.42
Klamath River Bridge
Hinge Replacement
01-47690

RECEIVED
NOV 10 2011
CALIFORNIA
COASTAL COMMISSION

Melanie Faust, Coastal Analyst
California Coastal Commission
710 E Street, Suite 200
Eureka, CA 95501

Dear Ms. Faust:

Per the Coastal Commission's request, the California Department of Transportation (Caltrans) is providing additional project description information (re: temporary vegetation effects) for the Klamath River Bridge Hinge Replacement Project.

As part of the project, during construction three 84 feet by 110 feet areas (see enclosed Figure 1) will be temporarily affected. As described in the CDP application packet submitted to your office on October 6, 2011, the areas are located within the bank of the Klamath River and are comprised of a total of 0.501 acre of coastal zone wetland and 0.04 acre of U.S. Army Corps of Engineers "Other Waters" (see Table 1 below, Coastal Zone Wetland Effects below). Even though the ground at each hinge work area is relatively flat, minimal grading (up to 20 cubic yards of material moved at each location) may be required. There will be no stockpiling, no importing and no exporting of material within the work areas. After construction, each location would be re-contoured and replanted.

Table 1. Coastal Zone Wetland Effects

Work Areas	Coastal Zone Wetland Types (acres)				Total Acres
	Forested	Herbaceous	Scrub-Shrub	"Other Waters"	
Hinge 2 Work Area	0.069	-	0.143	-	0.212
Hinge 8 Work Area	-	0.008	0.069	0.040	0.117
Hinge 11 Work Area	-	-	0.212	-	0.212
Total Acres	0.069	0.008	0.424	0.040	0.541

As requested, to-scale maps are attached (see Exhibit A-1 and A-2) and vegetation descriptions are included. Please note (with the exception of the recent maintenance trimming at the Hinge 2 Work Area) that this information is also available in the Natural Environmental Study (NES) and Delineation of Coastal Zone Wetlands Report that were submitted with the CDP application.

The following describes the temporary vegetation effects at each hinge work area and at the staging areas.

Hinge 2 Work Area

The Hinge 2 Work Area (see Exhibit A-1 and Figures 2 - 5) is located on the south side of the river, approximately 225 feet from the river's edge. Pure stands of shining willow groves (*Salix lucida* ssp. *lasiandra)* occur at the edges of the Hinge 2 Work Area, with trees reaching 30-40 feet in height. This is a tree-dominated vegetation type characterized by shining willow with a dominant understory of stinging nettle (*Urtica dioica* ssp. *holosericea*, reaching heights of 7 feet). Directly under the bridge deck, shining willow drops out and an understory of stinging nettle dominates. Throughout the area, other riparian understory species such as California blackberry (*Rubus ursinus*), thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), black twinberry (*Lonicera involucrata* var. *ledebourii*), red elderberry (*Sambucus racemosa* var. *racemosa*), coast man-root (*Marah oreganus*) (all reaching heights of 6 feet), and common scouring rush (*Equisetum hyemale* ssp. *affine;* 2-4 feet in height) occur. Within this native riparian vegetation type there are scattered and minor tree components of Oregon ash (*Fraxinus latifolia*) and cascara (*Rhamnus purshiana*). Invasive species, especially Himalayan blackberry (*Rubus armeniacus*) and English ivy (*Hedera helix*), also occur in the area.

As shown in Table 1 (see previous page), the temporary effects associated with this work area are the clearing of 0.069 acre of riparian forest (shining willow groves alliance) and 0.143 acre of scrub-shrub (shining willow groves alliance, where stinging nettle dominates). Vegetation to be removed will be cleared and grubbed, and will be lifted to the bridge and disposed of outside the project limits as approved by Caltrans, to minimize the potential for contamination by non-native species.

The following migratory bird species were observed using this area during the breeding season: Allen's hummingbird (*Selasphorus sasin*), Anna's hummingbird (*Calypte anna*), Pacific-slope flycatcher (*Empidonax difficilis*), Hutton's vireo (*Vireo huttoni*), Steller's jay (*Cyanocitta stelleri*), chestnut-backed chickadee (*Poecile rufescens*), Pacific wren (*Troglodytes pacificus*), wrentit (*Chamaea fasciata*), Swainson's thrush (*Catharus ustulatus*), American robin (*Turdus migratorius*), Wilson's warbler (*Cardellina pusilla*) and song sparrow (*Melospiza melodia*). One nest, of an Allen's hummingbird, was found, in blackberry brambles outside of the project area.

Protocol surveys were conducted for the federal candidate Western yellow-billed cuckoo and State endangered little willow flycatcher. The surveys didn't identify either of these species, and verified there is no appropriate habitat. Based on CNDDB records and technical assistance with USFWS, northern spotted owls or marbled murrelet are not likely to use this area. Pacific fisher and Humboldt marten may pass through the area. No suitable habitat exists in the project area for any of these species (per technical assistance

with USFWS). Bats may forage above the riparian vegetation. Black bears (*Ursus amercanus*) rest and likely forage here. Lastly, a Pacific sideband (*Monadenia fidelis*) was observed in the hinge work area in October 2011.

Maintenance Trimming Within Hinge 2 Work Area

On August 22, 2011, the Caltrans tree crew conducted vegetation trimming under and adjacent (on the west side) to the Klamath River Bridge. Trimming is part of routine maintenance and is necessary to allow for bridge inspections and for the preservation of the bridge structure (contact with vegetation speeds bridge degradation). The tree crew attends mandatory trainings, which include training to identify bird nests. Caltrans protocol requires the tree crew to contact Caltrans environmental staff if a nest is observed within a tree to be trimmed. According to the chief of the tree crew, no nests were observed within the trimmed vegetation area.

The trimming activity overlapped with the project limits of the Hinge 2 Work Area (see Figure 6). As a result, three (two 5-inch and one 6-inch dbh) of the five trees identified in the Hinge Replacement Project's IS/ND as needing removal were cut, and several shining willow clusters (2-to 8-trunked, 1 to 4-inch dbh each trunk) were cut. As described under *Hinge 2 Work Area* on the previous page, besides the cut willows, the area trimmed was dominated by an understory of stinging nettle, and included other riparian understory species. All trimmed vegetation was left on site.

The length of time necessary for the affected trees to return to the pre-project condition is estimated at 5 to 7 years, based on counts of tree rings of cut trees. Woody trunks of cut trees were sprouting within a few weeks of cutting (see Figure 7).

Hinge 8 Work Area

The Hinge 8 Work Area (see Exhibit A-2 and Figures 8 & 9) is located on the north side of the river, approximately 60 feet from the river's edge. Sandbar willow thickets (*Salix exigua*) Alliance is the primary native vegetation type here. It is a shrub-dominated vegetation type characterized by sandbar willows (up to 7 feet in height), with little or no riparian understory species. Under the bridge deck, a major portion of the work area is comprised of coastal brambles Alliance vegetation type, with thimbleberry, salmonberry, and California blackberry reaching 5-6 feet in height. This is a shrub-dominated vegetation type where thimbleberry dominates, and is associated with other riparian vegetation components of black twinberry, coast man-root and common scouring rush. Within the work area, there are scattered and minor tree components of black cottonwood (*Populus trichocarpa*) saplings, Oregon ash and cascara.

Additionally, non-native, invasive herbaceous species occur throughout this area and include thistles (*Centaurea solstitialis* and *Cirsium* sp.), foxglove (*Digitalis purpurea)*, poison hemlock (*Conium maculatum*), English ivy, Klamath weed (*Hypericum perforatum*),

Italian ryegrass (*Lolium multiflorum*), weedy pampas grass (*Cortaderia jubata*), French broom (*Genista monspessulana*), bouncing bet (*Saponaria officianalis*), and pennyroyal (*Mentha pulegium*). Especially widespread is Himalayan blackberry.

As shown in Table 1 (see page 1 of this letter), the temporary effects associated with this work area are the clearing of 0.008 acre of herbaceous (ruderal vegetation, Himalayan blackberry brambles and coastal brambles), 0.069 acre of scrub-shrub (sandbar willow thickets interspersed with sapling black cottonwood), and work in 0.040 acre of U.S. Army Corps of Engineers "Other Waters" (seasonally wetted channel of the Klamath River). Vegetation to be removed will be cleared and grubbed, and will be lifted to the bridge and disposed of outside the project limits as approved by Caltrans, to minimize the potential for contamination by non-native species. The length of time necessary for the affected shrubs to return to the pre-project condition is estimated at 2-3 years.

As described under *Hinge 2 Work Area*, protocol surveys were conducted for migratory birds and measures were taken to address other animal species. For more information, please see description under *Hinge 2 Work Area.*

Hinge 11 Work Area

The Hinge 11 Work Area (see Exhibit A-2 and Figures 10 & 11) is located on the north side of the river, approximately 500 feet from the river's edge. Sitka willow thickets (*Salix sitchensis*) Provisional Alliance is the main vegetation type here. This alliance has elements of Hooker's willow (*Salix hookeriana*) and shining willow. This is a tree-dominated vegetation type, characterized by willows reaching heights of 5-20 feet, with often a sparse component of riparian understory species. Within the work area, there are scattered and minor tree components of black cottonwood saplings, Oregon ash and cascara.

Additionally, as in the Hinge 8 work area, non-native, invasive herbaceous species occur throughout this area and include thistles, foxglove, poison hemlock, English ivy, Klamath weed, Italian ryegrass, weedy pampas grass, French broom, bouncing bet, and pennyroyal. Especially widespread is Himalayan blackberry and fennel (*Foeniculum vulgare*), which is extensive and deeply rooted.

As shown in Table 1 (see page 1 of this letter), the temporary effects associated with this work area are the clearing of 0.212 acre of riparian scrub-shrub (Sitka willow thickets Alliance). Vegetation to be removed will be cleared and grubbed, and will be lifted to the bridge and disposed of outside the project limits as approved by Caltrans, to minimize the potential for contamination by non-native species. The length of time necessary for the affected trees to return to the pre-project condition is estimated at 3-4 years.

As described under *Hinge 2 Work Area*, protocol surveys were conducted for migratory birds and measures were taken to address other animal species. For more information, please see description under *Hinge 2 Work Area.*

Staging Areas 1, 2 and 8

Staging Areas 1, 2 and 8 (see Exhibit A-1 and Figure 12) are existing maintenance turnouts, located in upland areas adjacent to the highway. The areas consist of compacted dirt and gravel.

Wetland Functions and Values

According to the Functions and Values Assessment (based on the Wetland Evaluation Technique developed by USACE, Adamus et al. 1987) in the wetland delineation report, all three hinge work areas have a "low" function and value, with the exception of a small area within the Hinge 2 Work Area, which has a "low to moderate" function and value. Given this, plus the fact that there would be no permanent effects, Caltrans believes that onsite revegetation/restoration and invasive species removal would successfully offset the temporary wetland effects associated with the project.

If you have any questions, please contact Steve Croteau at 441-5615.

Thank you,

Dana York, Senior Environmental Planner
North Region Environmental Branch E2

Enclosures:

1) Table 1. See first page of this letter
2) Table 2. Bird Species Observed at Hinge Work Areas 8 and 11
3) Exhibit A-1. Coastal Delineation Map for Hinge 2 and Staging Areas 1 & 2
4) Exhibit A-2. Coastal Delineation Map for Hinges 8 & 11
5) Figure 1. Dimensions of Hinge Work Areas
6) Figure 2. Hinge 2 Work Area: View From Deck Looking North (East Side of Deck)
7) Figure 3. Hinge 2 Work Area: View From Deck Looking South (West Side of Deck)
8) Figure 4. Hinge 2 Work Area: Vegetation Trimming Area (Facing North From Pier 2)
9) Figure 5. Hinge 2 Work Area: Vegetation Trimming Area (Facing North From Pier 2)
10) Figure 6. Hinge 2 Work Area: Vegetation Trimming Within Hinge 2 Work Area
11) Figure 7. Hinge 2 Work Area: Sprouting Willows Within Hinge 2 Work Area
12) Figure 8. Hinge 8 Work Area: View From Deck Looking North (East Side of Deck)
13) Figure 9. Hinge 8 Work Area: View From Deck Looking North (West Side of Deck)
14) Figure 10. Hinge 11 Work Area: View From Deck Looking North (East Side of Deck)
15) Figure 11. Hinge 11 Work Area: View From Deck Looking South (West Side of Deck)
16) Figure 12. Staging Area 8

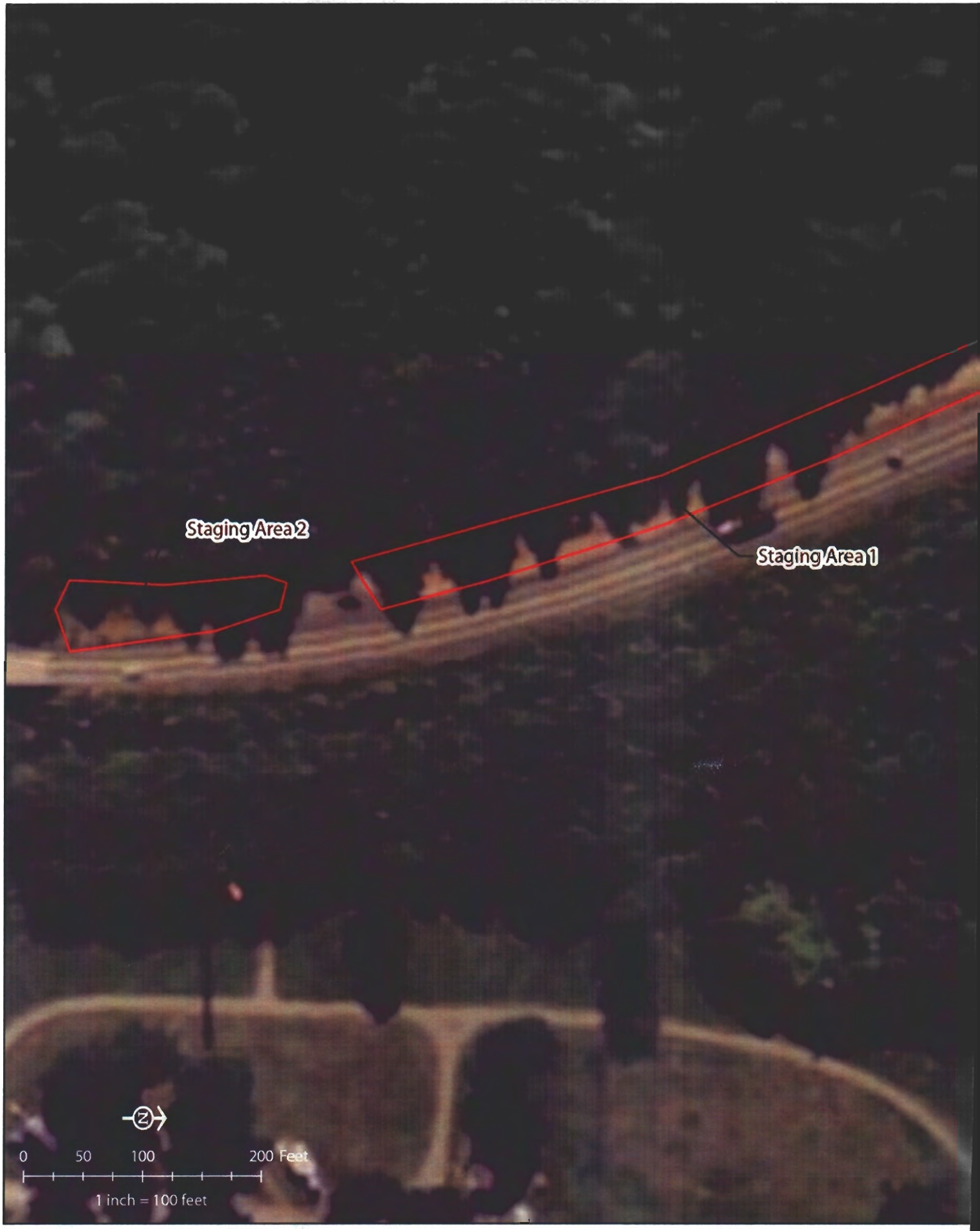
cc: Steve Croteau
SC/ks

Table 2. Bird species observed at Hinge Work Areas 8 and 11, Klamath River Bridge Project during field visits and surveys, 2009 and 2010. Effort to document all species was made in June, July and August. Otherwise, these are incidental observations.

	2009					2010			
Species Name	March	June	July	August	October	March	June	July	August
Common Merganser - *Mergus merganser*									X
California Quail - *Callipepla californica*		X		X		X	X	X	X
Turkey Vulture - *Cathartes aura*		X		X			X	X	X
Osprey - *Pandion haliaetus*	X	X		X		X	X	X	X
White-tailed Kite - *Elanus leucurus*			X						
Bald Eagle - *Haliaeetus leucocephalus*	X	X							
Red-shouldered Hawk - *Buteo lineatus*		X	X				X		
Peregrine Falcon - *Falco peregrinus*					X				
Semipalmated Plover - *Charadrius semipalmatus*									X
Spotted Sandpiper - *Actitis macularius*								X	X
Greater Yellowlegs - *Tringa melanoleuca*				X					
Western Gull - *Larus occidentalis*				X			X	X	X
Band-tailed Pigeon - *Patagioenas fasciata*		X						X	X
Mourning Dove - *Zenaida macroura*		X						X	
Vaux's Swift - *Chaetura vauxi*							X	X	X
Anna's Hummingbird - *Calypte anna*	X	X		X					
Rufous Hummingbird - *Selasphorus rufus*				X		X			
Allen's Hummingbird - *Selasphorus sasin*		X					X		
Rufous/Allen's Hummingbird - *Selasphorus rufus/sasin*	X	X						X	X
Belted Kingfisher - *Megaceryle alcyon*				X			X	X	X
Downy Woodpecker - *Picoides pubescens*							X	X	
Northern Flicker - *Colaptes auratus*							X		
Western Wood-Pewee - *Contopus sordidulus*		X					X	X	X
Pacific-slope Flycatcher - *Empidonax difficilis*		X		X			X	X	
Black Phoebe - *Sayornis nigricans*								X	
Hutton's Vireo - *Vireo huttoni*							X	X	X
Warbling Vireo - *Vireo gilvus*			X				X	X	
Steller's Jay - *Cyanocitta stelleri*		X					X	X	X
American Crow - *Corvus brachyrhynchos*		X					X	X	X
Common Raven - *Corvus corax*		X		X			X	X	X
Northern Rough-winged Swallow - *Stelgidopteryx serripennis*		X					X		
Tree Swallow - *Tachycineta bicolor*		X					X		
Violet-green Swallow - *Tachycineta thalassina*	X	X				X		X	X
Barn Swallow - *Hirundo rustica*		X					X	X	X

Table 2. Bird species observed at Hinge Work Areas 8 and 11, Klamath River Bridge Project during field visits and surveys, 2009 and 2010. Effort to document all species was made in June, July and August. Otherwise, these are incidental observations.

	2009					2010			
Species Name	March	June	July	August	October	March	June	July	August
Cliff Swallow - *Petrochelidon pyrrhonota*		X		X		X	X	X	X
Black-capped Chickadee - *Poecile atricapillus*	X	X					X	X	
Chestnut-backed Chickadee - *Poecile rufescens*		X		X		X	X	X	X
Bushtit - *Psaltriparus minimus*								X	X
Bewick's Wren - *Thryomanes bewickii*		X				X	X	X	
House Wren - *Troglodytes aedon*		X							
Winter Wren - *Troglodytes troglodytes*		X		X		X	X		X
Swainson's Thrush - *Catharus ustulatus*		X					X		X
American Robin - *Turdus migratorius*	X	X		X			X	X	X
Varied Thrush - *Ixoreus naevius*								X	
Wrentit - *Chamaea fasciata*		X		X		X	X	X	X
European Starling - *Sturnus vulgaris*		X					X	X	
Cedar Waxwing - *Bombycilla cedrorum*		X		X			X	X	X
Orange-crowned Warbler - *Vermivora celata*		X				X	X	X	
Yellow Warbler - *Dendroica petechia*		X		X			X	X	
Common Yellowthroat - *Geothlypis trichas*							X	X	
Wilson's Warbler - *Cardellina pusilla*		X		X		X	X	X	X
Yellow-breasted Chat - *Icteria virens*		X					X	X	
Spotted Towhee - *Pipilo maculatus*				X					X
Song Sparrow - *Melospiza melodia*	X	X		X		X	X	X	X
White-crowned Sparrow - *Zonotrichia leucophrys*	X	X					X	X	X
Western Tanager - *Piranga ludoviciana*		X		X					
Black-headed Grosbeak - *Pheucticus melanocephalus*		X		X			X	X	
Brewer's Blackbird - *Euphagus cyanocephalus*		X					X	X	X
Brown-headed Cowbird - *Molothrus ater*		X					X	X	
Purple Finch - *Carpodacus purpureus*								X	
Lesser Goldfinch - *Spinus psaltria*								X	
American Goldfinch - *Spinus tristis*		X		X			X	X	X


Staging Area 2
Staging Area 1
0
50
100
200 Feet
1 inch = 100 feet

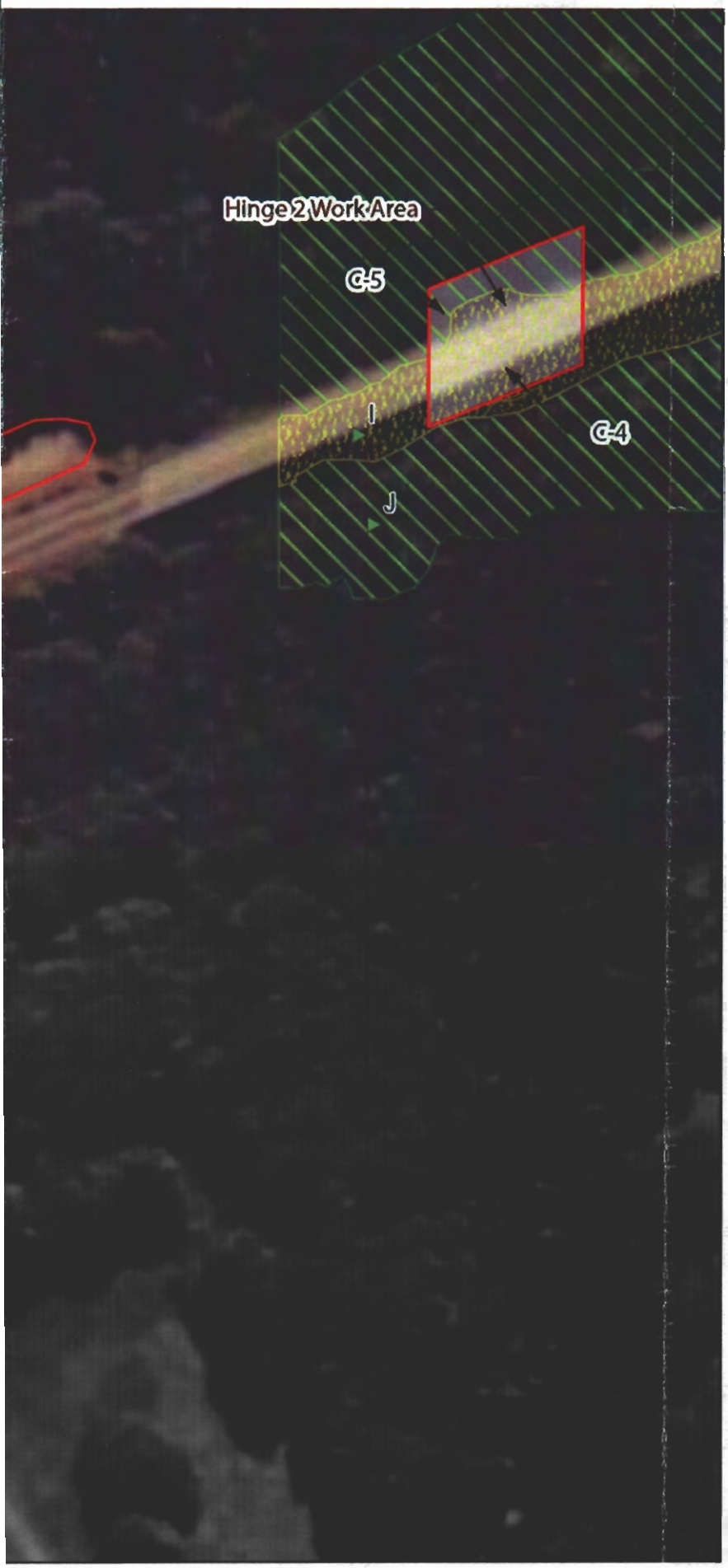


Exhibit A – I
Delineation of California Coastal Zone Wetlands

Klamath Hinge Replacement Project
01-DN 101 – PM 4.04
EA 01-476901
May 2011

USACE OTHER WATERS

NO USACE WATERS THIS SHEET

USACE WETLANDS

NO USACE WETLANDS THIS SHEET

COASTAL ZONE WETLANDS		AREA HECTARES	ACRES
FORESTED			
	C-5	0.028	0.069
	Total This Sheet	0.028	0.069
SCRUB-SHRUB			
	C-4	0.058	0.143
	Total This Sheet	0.058	0.143

PROJECT TOTALS	AREA HECTARES	ACRES
OTHER WATERS	0.016	0.040
FORESTED	0.028	0.069
HERBACEOUS	0.003	0.008
SCRUB-SHRUB	0.171	0.424

PROJECT TOTALS	AREA HECTARES	ACRES
OTHER WATERS	0.016	0.040
FORESTED	0.028	0.069
HERBACEOUS	0.003	0.008
SCRUB-SHRUB	0.171	0.424

Legend

Wetland Delineation Area (1.423 Acres)

A Data Point

Ordinary High Water Mark (OHWM)

NOTES:
1. BASEMAP SOURCE: CALTRANS & ICF
2. AERIAL SOURCE: NAIP 2005

DELINEATED BY: M. WIDDOWSON, J BUTTERWORTH	MAR 2010
DRAWN BY: M EWALT	MAY 2011

REV. DATE	DESCRIPTION	BY	APP'D

PREPARED FOR:
CALTRANS DISTRICT 1
UNIT# 171
DIVISION OF
ENVIROMENTAL, E1
1656 UNION STREET
EUREKA, CA 95501

CONTACT:
CAROL WILSON
(707) 441-3983P
(707)441-5775F

SHEET: 1 OF 2


Klamath River
C-3
TNW-1
F
G
H
E
D
OHWM
C-2
Hinge 8 Work Area
C
B
Hinge 11 Work Area
0
50
100
200 Feet
1 inch = 100 feet

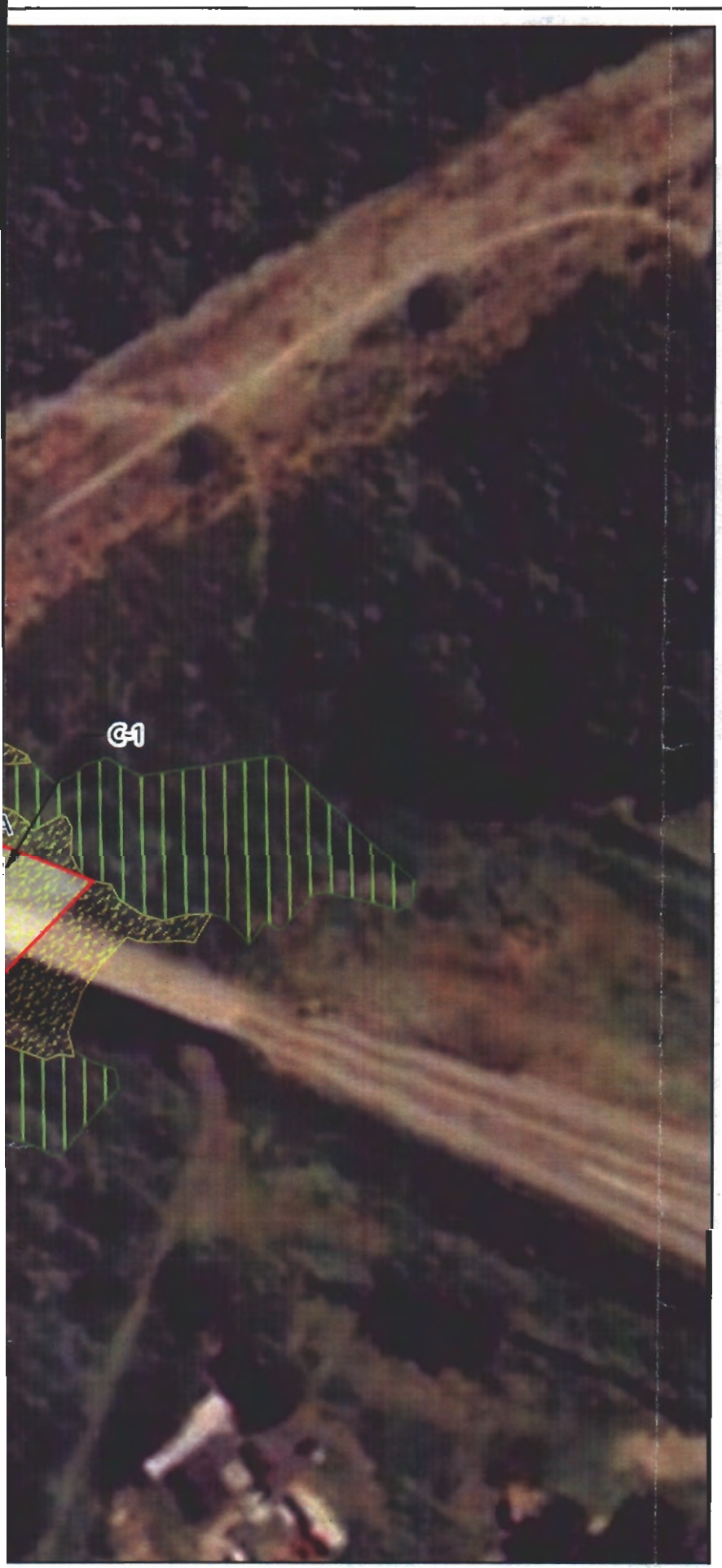


Exhibit A-2
Delineation of California Coastal Zone Wetlands

Klamath Hinge Replacement Project
01-DN 101 – PM 4.04
EA 01-476901
May 2011

USACE OTHER WATERS		AREA HECTARES	ACRES
TRADITIONAL NAVIGABLE WATER			
TNW-1		0.016	0.040

USACE WETLANDS

NO USACE WETLANDS THIS SHEET

COASTAL ZONE WETLANDS		AREA HECTARES	ACRES
SCRUB-SHRUB			
C-1		0.086	0.212
C-2		0.192	0.069
	Total This Sheet	0.278	0.281
HERBACEOUS			
C-3		0.003	0.008
	Total This Sheet	0.003	0.008

PROJECT TOTALS	AREA HECTARES	ACRES
OTHER WATERS	0.016	0.040
FORESTED	0.028	0.069
HERBACEOUS	0.003	0.008
SCRUB-SHRUB	0.171	0.424

Legend

- Wetland Delineation Area (1.423 Acres)
- Data Point
- Ordinary High Water Mark (OHWM)

NOTES:
1. BASEMAP SOURCE: CALTRANS & ICF
2. AERIAL SOURCE: NAIP 2005

DELINEATED BY: M. WIDDOWSON, J BUTTERWORTH	MAR 2010
DRAWN BY: M EWALT	MAY 2011

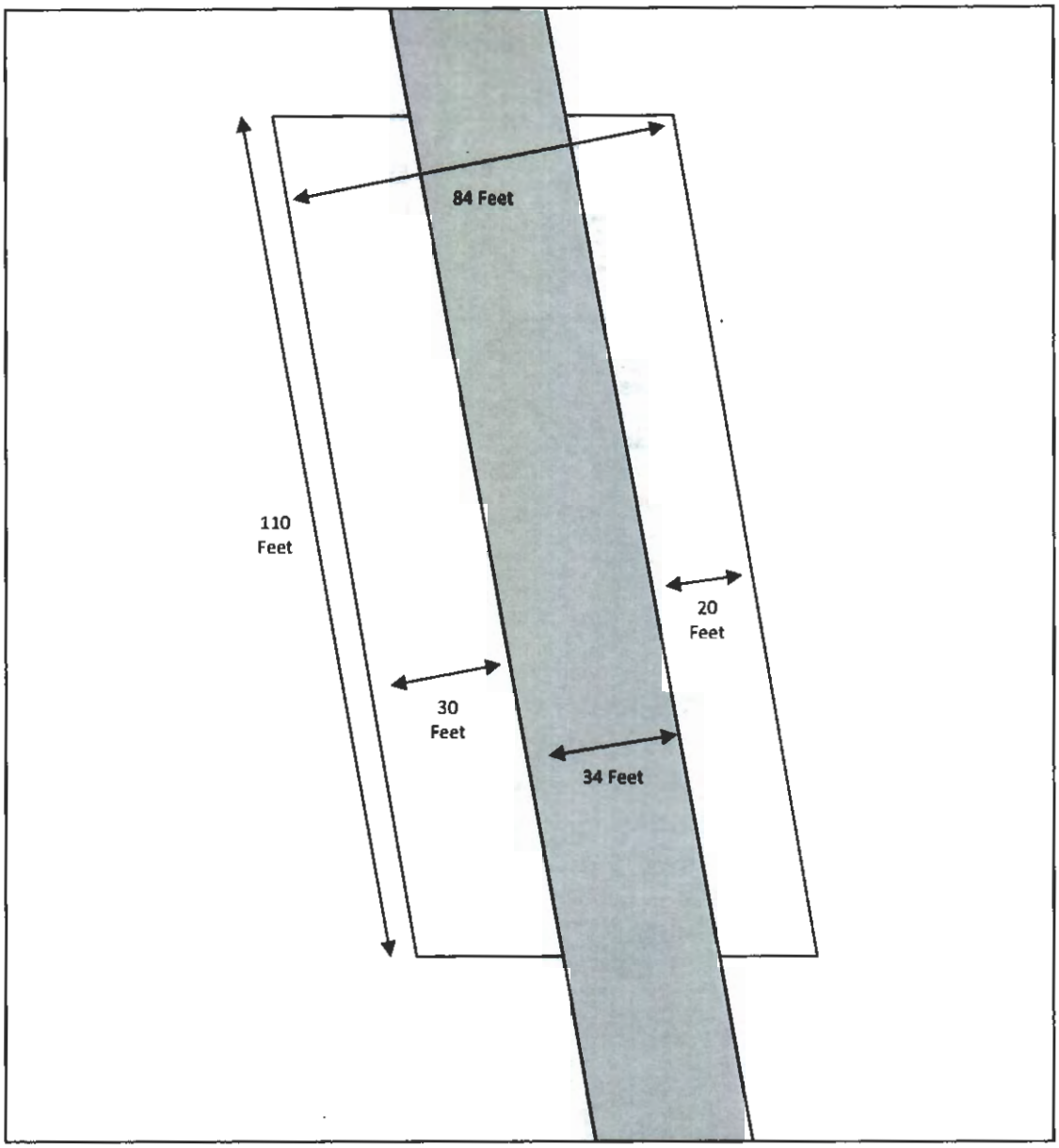
REV. DATE	DESCRIPTION	BY	APP'D

PREPARED FOR:
CALTRANS DISTRICT 1
UNIT# 171
DIVISION OF
ENVIROMENTAL, E1
1656 UNION STREET
EUREKA, CA 95501

CONTACT:
CAROL WILSON
(707) 441-3983P
(707)441-5775F

SHEET: 2 OF 2

Figure 1. Klamath River Bridge Hinge Replacement Project
Dimensions of Hinge Work Areas



The hinge work areas are 84 feet wide and 110 feet long.

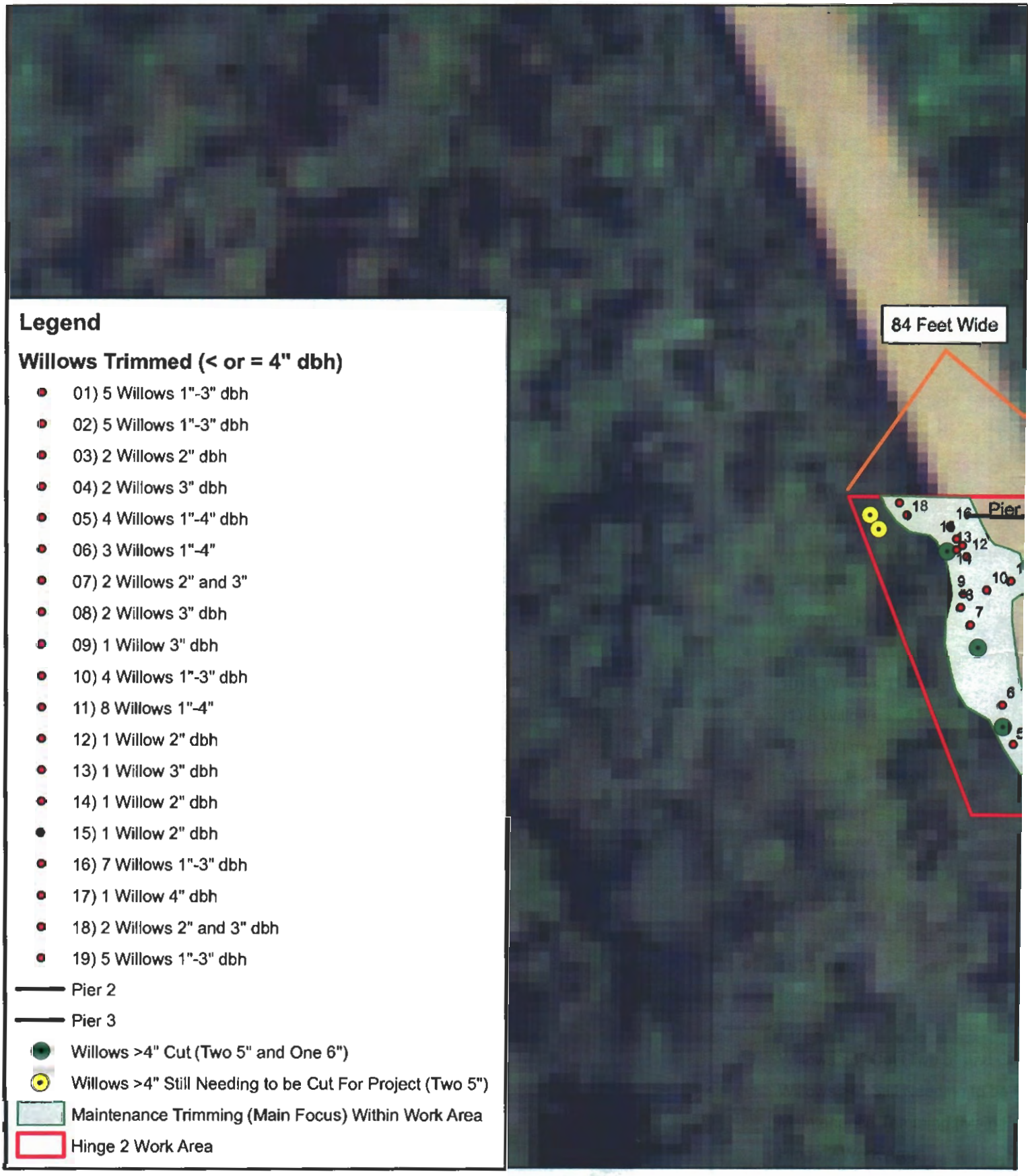
Figure 2. Hinge 2 Work Area: View From Deck Looking North (East Side of Bridge)

Figure 3. Hinge 2 Work Area: View From Deck Looking South (West Side of Bridge)

Figure 4. Hinge 2 Work Area: Vegetation Trimming Area (Facing North From Pier 2)

Figure 5. Hinge 2 Work Area: Vegetation Trimming Area (Facing North From Pier 2)

Figure 6. Maintenance Vegetation Tr



.mming Within Hinge 2 Work Area

Figure 7. Hinge 2 Work Area: Sprouting Willows (Photo Taken on 11/4/2012)

Figure 8. Hinge 8 Work Area: View From Deck Looking North (East Side of Bridge)

Figure 9. Hinge 8 Work Area: View From Deck Looking North (West Side of Bridge)

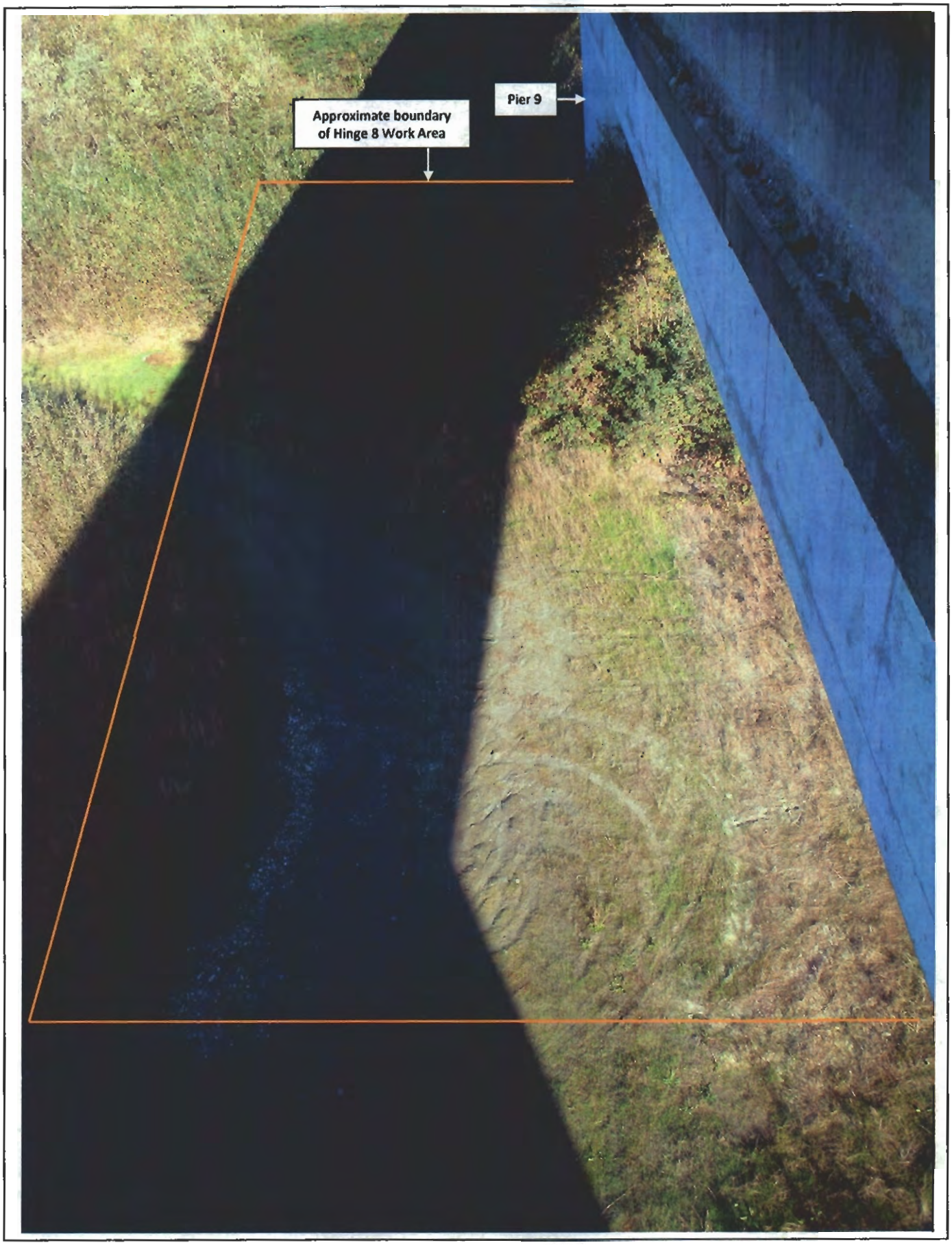


Figure 10. Hinge 11 Work Area: View From Deck Looking North (East Side of Bridge)

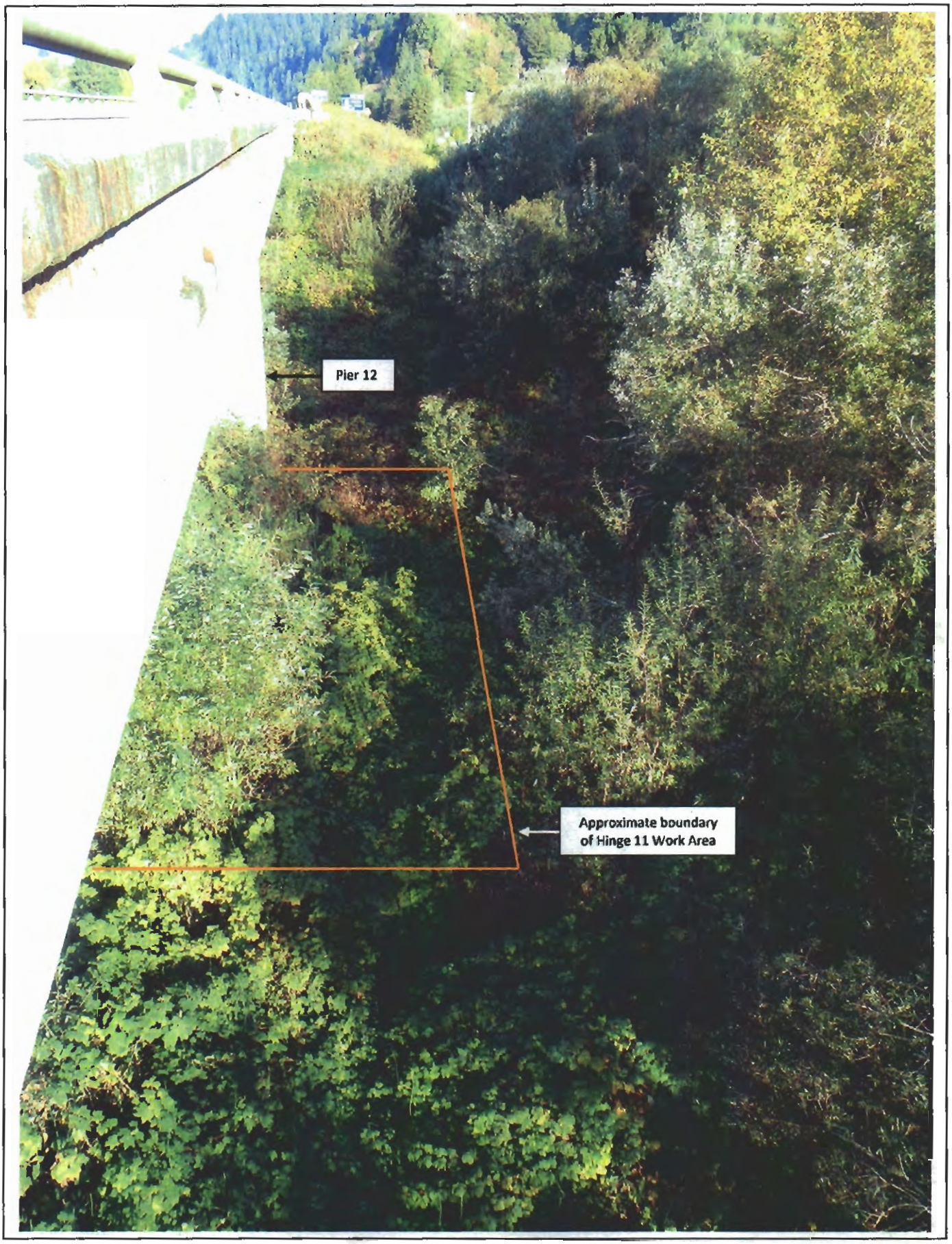
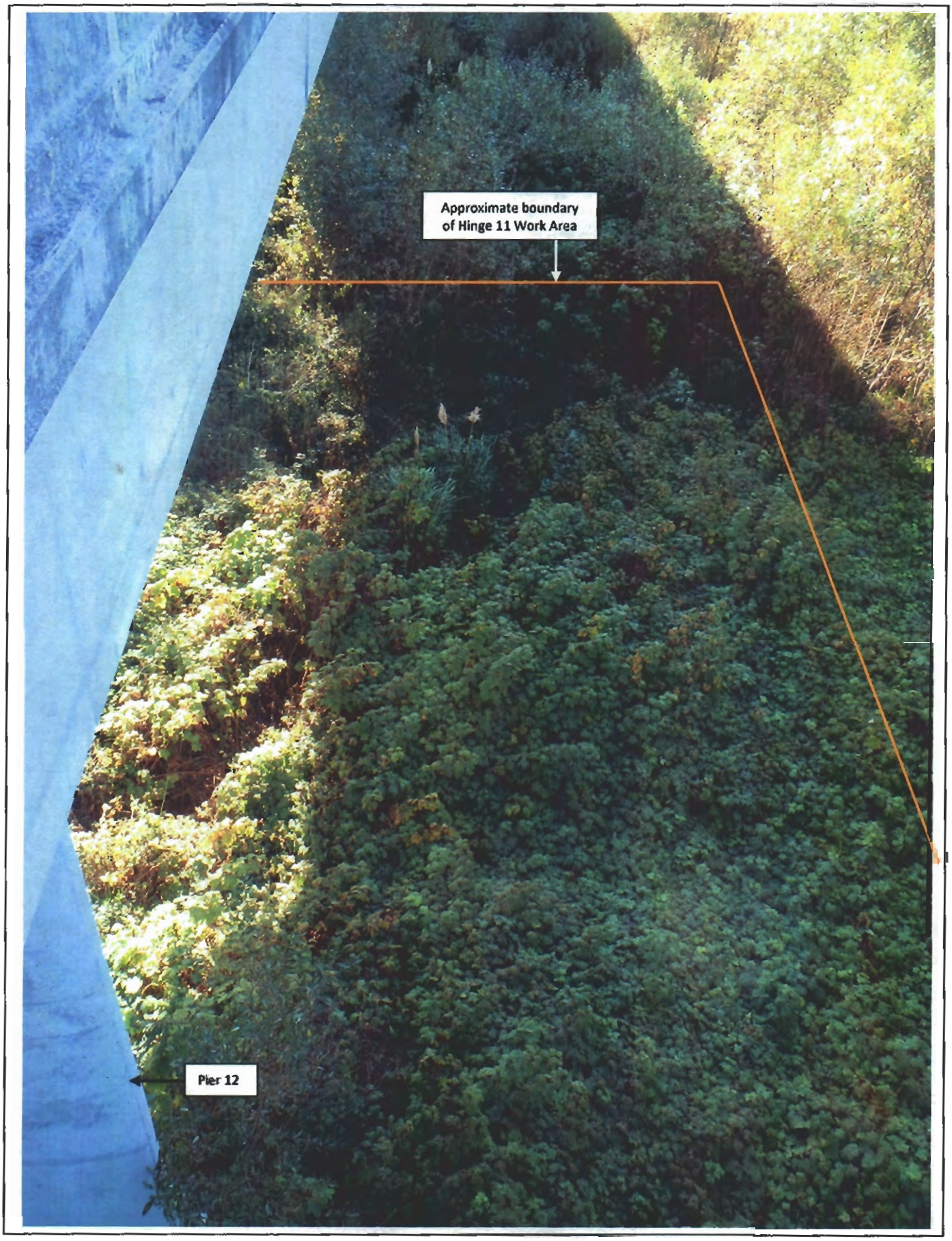


Figure 11. Hinge 11 Work Area: View From Deck Looking South (West Side of Bridge)



Bird and Bat Exclusion and Protection Plan for the Klamath River Bridge Hinge Replacement Project December 2011

Del Norte County
United States 101, Post Mile 4.04/4.42
01-47690

Table of Contents

Summary

The California Department of Transportation (Caltrans) plans to protect birds and bats in the vicinity of the Klamath River Bridge during the replacement of three hinges. Specifically, cliff swallows and bats will be excluded from portions of the bridge to protect them from disturbance, and from impacts that may occur due to elevated noise and vibration during work. Exclusion will be done with devices that will prevent nesting by cliff swallows and roosting by bats, without morbidity or mortality to birds and bats. Exclusion devices will be installed on the bridge hinges and box girders between November 15 and February 28, when bats and birds are not expected to be present, prior to the season of construction. Caltrans estimates that an appropriate distance to exclude swallows from work is 100 feet to the north and 100 feet to the south of each hinge, and an appropriate method to exclude bats from work is to prevent them from entering the box girders adjacent to the hinges to be replaced. Adequate swallow and bat habitat will be available on the bridge during construction. All exclusionary measures will be removed when swallow- and bat-disturbing activities are completed at each location, before the next breeding season. After completion of work, swallow nesting habitat will remain the same, and bat habitat will likely be improved, compared to the bridge habitat before hinge replacement.

Project Description

Caltrans is proposing to replace hinges at spans 2, 8 and 11 on the Klamath River Bridge. The project is located on United States 101 in Del Norte County from Post Mile 4.04 to 4.42. The hinges are in the early stages of failure with structural concrete cracks reported at all three hinges. Work would include the demolition and reconstruction of the three hinges, installation and removal of temporary supports and temporary foundations, and the temporary relocation of utilities. Approximately 25 feet of bridge, bridge deck, and bridge rail would be reconstructed at each hinge location. In addition, a methacrylate seal and traffic striping would be placed on the bridge deck, and a 12 inch by 12 inch by 1 inch concrete section of bridge would be repaired.

Since this project is near the Klamath River, work will take place between mid-May and mid-October during the low flow season, due to water quality concerns.

Chapter 1 BIRDS

1.1 Known Bird Presence and Use

1.1.1 Bird Species Present

Many bird species use the habitat surrounding the bridge (see Appendix 1) for foraging, roosting and nesting. However, during numerous avian surveys and other visits (totaling at least 25 visits, conducted throughout all the months over three years) to the bridge site, only two species, cliff swallows (*Petrochelidon pyrrhonota*) and European starlings (*Sturnus vulgaris*), have been observed using the bridge structure itself. Based on the site visits and lack of suitable habitat, it is unlikely other bird species inhabit the bridge.

European starlings are non-native, and considered invasive species that compete with native bird species (USDA, 2011). They are not protected under the Federal Migratory Bird Treaty Act, and in California, they may be taken at any time of the year and in any number (Section 472, Title 14, of the CCR). Starlings nest in scupper holes in both the soffit and the tops of piers. No measures will be taken to protect them.

Because vegetation in which native birds may nest will be removed outside of the breeding season, no impacts are expected for any bird species other than the two species nesting on the bridge. Thus, this plan focuses on the project's effects on cliff swallows.

1.1.2 Conservation Status, Pertinent Characteristics and Nesting Habits of Cliff Swallows on the Bridge

Cliff swallows do not have special State or Federal status, but are protected under the Federal Migratory Bird Treaty Act. They build nests by attaching mud pellets to vertical and overhanging surfaces. Breeding habitat has been enhanced by widespread construction of bridges, culverts, and buildings which provide alternative nesting sites (Brown and Brown 1995). Cliff swallows are colonial nesters, choosing a colony site first, and then establishing ownership of nesting space. The time it takes to build a nest varies, principally in response to weather. Nest construction can range from 3-27 days, but usually takes 1 to 2 weeks. Egg-laying usually begins before the nest is completely finished, with one egg laid each day until the clutch of three to four eggs is completed. Laying within a colony is highly synchronous, though the date of egg laying has also been found to vary within some colonies (Brown and Brown, 1995; USDA, 2011; UC-IPM, 2011).

Swallows nest along much of the length of the Klamath River Bridge, on both the east and west sides, as well as at the tops of the piers, and appear to prefer locations over the river. Nest locations and numbers vary from year to year, but the bridge usually supports several hundred nests annually. Cliff swallows have been documented as early as March 23 in the project area, though they were not yet building nests. Nest building has been reported beginning as early as April in the region (Hunter et al., 2005). A few swallows were documented tending nests at the bridge as late as August 10.

1.2 Potential for Disturbance to Cliff Swallows

There is little evidence of any appreciable harm caused by humans to cliff swallows. These birds are "extremely tolerant of disturbance by humans and rarely abandon nests," unless their access is blocked (e.g., by construction) or their nests get wet and fall (Brown and Brown, 1995).

1.2.1 Effects of Construction Noise and Vibration on Swallows and Bats Nesting or Roosting on the Bridge

A thorough literature review and investigation provided few studies on the effects of highway and construction noise or vibration on birds and bats, and most is inconclusive (Caltrans, 2009; Dooling and Popper, 2007; FHWA, 2006). Furthermore, in most studies, the overall level of the noise is measured in units of dBA sound pressure level, the frequency range of human hearing. This does not likely provide an accurate estimate of the noise level in the frequency region where birds (or bats) hear and communicate, which extends beyond human range (Caltrans, 2009; Dooling and Popper, 2007). Instead, it provides only a crude estimate, most likely an overestimate, of masking effects of noise on vocal communication in these animals. Popper and Dooling (2007) concluded that the overall level in dBA is a very conservative estimate of the effects of highway noise on communication in birds.

Despite the limitations in available research, studies have shown that birds and other animals exhibit a threshold shift in hearing sensitivity in response to sounds that are sufficiently long and/or intense, and these shifts are often not permanent. There is evidence that some species can adapt to moderate increases of background noise (Caltrans, 2009).

Little is known about the effect of high level impulse sounds, such as from construction equipment, on avian hearing. However, some studies show that birds can tolerate continuous (e.g. up to 72 hours) exposure to noises up to 110 dBA without experiencing permanent hearing damage or permanent threshold shift (Caltrans, 2009; Dooling and Popper, 2007). In contrast to traffic noise, noise from construction equipment acts like a point source and will typically drop

off at a rate of 6 dB per doubling of distance, although there is also likely to be an added component of additional attenuation that varies with the environment (Caltrans, 2009).

The most specific guidance available for assessing potential effects of construction noise on birds is the Arcata Fish and Wildlife Service Office of the U.S. Fish and Wildlife Service (USFWS)-issued *Guidance for estimating the effects of auditory and visual disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California* (USFWS, 2006). While this is useful in assessing effects to Northern Spotted Owl (NSO) and Marbled Murrelet (MAMU), it may not be as relevant in assessing impacts to swallows or bats. Still, because it is some of the best science available, it was used as guidance here.

One limitation of the USFWS guidance is that it is based on limited data from one species. The variations in noise effects and degrees of adaptation between species make it difficult to set tolerance levels (Caltrans, 2009). There are significant species differences in the ability to hear in noisy environments. These differences suggest that one model is not likely to fit all species under all conditions. Moreover, how a bird integrates acoustic (i.e., noise) and visual stimuli in different contexts (e.g., breeding season or brooding) will have a profound effect on whether harassment occurs. For example, very low level sounds bearing some resemblance to the sounds of a natural predator are likely to be far more important to the bird than other sounds with no history of signaling danger. Such experiential factors will undoubtedly vary significantly by species (Dooling and Popper, 2007).

Given the lack of empirical data on this point, Dooling and Popper (2007) recommend using subjective human experience with the noise in question as an Interim Guideline for estimating acceptable noise levels for avoiding stress and physiological effects. Noise types and levels that appear to increase stress and adverse physiological reactions in humans may also have similar consequences in birds.

Thus, the *Memorandum on the Klamath Bridge Hinge Repair Underwater Analysis* (Caltrans, 2011), which includes an analysis of vibration and airborne noise effects (in human terms) was used in conjunction with the USFWS (2006) Guidance in developing protective measures for birds and bats, and in determining an appropriate distance at which to exclude them from the source of construction noise and vibration.

1.2.2 Estimating Distance at which to Exclude Swallows and Bats

Equipment that may be used during construction includes: excavators, dozers, scrapers, cranes, boom trucks, hoe rams, jackhammers, backhoes, concrete mixers, concrete pumps (truck or

trailer mounted) flatbed trucks and dump trucks, generators, air compressors, saws, pumps, and storage containers. Of these, the loudest noise-producing equipment are shown in Table1.

Table 1. Equipment producing noise levels over 80 dBA at the Klamath River Bridge Hinge Replacement Project.

Equipment	Acoustical Use Factor (%)	dBA, estimated or measured at 50 ft from the source
Back-up alarm	5	90
Hoe ram	10	80-90
Jackhammer	20	85-89

The acoustic use factor is the percentage of time each piece of construction equipment is assumed to be operating at full power (i.e., its loudest condition) during construction. None of the equipment will produce continuous noise.

Using the USFWS guidance for NSO and MAMU (2006), the ambient sound level at the bridge is estimated to range from moderate (71-80 dBA) to high (81-90 dBA), due to traffic noise on the bridge. Thus, for most project activities, which would produce noise levels of 80 dBA or less (moderate action-generated sound-level), the estimated distance out to which harassment would occur to NSO and MAMU would be zero feet. For the project activities using the loudest equipment, with dBA of 81-90 dBA (high action-generated sound-level), the estimated distance out to which harassment would occur would be 165 feet. By extrapolation, this is the estimated harassment distance for swallows and bats. Referencing the Caltrans (2011) memo on noise and vibration effects at the Klamath River Bridge, the airborne noise from the hoe ram will drop to an average 74 dBA and a maximum of 84 dBA at 100 feet from the source.

Referencing the Caltrans (2011) memo on noise and vibration and effects at the Klamath River Bridge, the strongest vibrations will be produced by hoe rams. Measured 25 feet from the source, a hoe ram produces a peak particle velocity (PPV; the commonly accepted descriptor of the vibration amplitude) of 0.089. Hoe rams typically emit single-impact (transient), or low-rate repeated impact vibration. Thus, the vibration produced by these would be more than barely perceptible (threshold of 0.035 PPV) but much less than distinctly perceptible (threshold of 0.24 PPV) to humans -and, by extension, to swallows and bats, 25 feet away.

Thus, Caltrans estimates that an appropriate distance to exclude swallows from work is 100 feet to the north and 100 feet to the south of each hinge. This distance of 100 feet from the point source of noise and vibration (i.e. at each hinge) is based on the goal of keeping swallows a safe distance from disturbance while leaving adequate nesting habitat available. A further distance

out from each hinge could be excluded, but this would encroach considerably on the quantity of nesting space (see *Impacts and Effects on Birds-Roosting Sites Available During Construction*, p. 11). Furthermore, there is no substantial evidence to support a greater distance, and cliff swallows are documented as extremely tolerant of disturbance by humans.

1.3 Swallow Exclusion

1.3.1 Types, Methods, and Scope of Work for Swallow Exclusion

GUIDELINES/PARAMETERS

1. Between November 1 and February 28, exclusion will be installed; take preventative measures to eliminate the re-occupancy of the existing bridge structure by migratory bird species that will attempt to nest on the structure.

2. Exclusion will be done with devices that will prevent roosting and nesting without morbidity or mortality to birds and bats. Exclusion must be designed so it does not trap or entangle birds or bats.

3. Methodology will entail draping and tightly securing all edges of 100% exclusionary filter fabric along the sides of the bridge and top of the piers. Extreme care must be taken to ensure that no gaps or folds occur within the fabric coverage. The fabric must remain taut and not sag or develop holes. If it does, it must be promptly repaired

4. Only those hinges that will be worked on within the year will have exclusion installed, so that available swallow nesting sites are not unnecessarily restricted - e.g. Hinge 2 will be excluded one year and hinges 8 and 11 the other year (unless all three hinges will be repaired in one year).

5. A qualified biologist will inspect the bridge for birds and bats prior to installation of the exclusion. They will also inspect the bridge weekly to daily, depending on the presence and activity of swallows for the duration of the construction activity until post-bird nesting-use is documented, or September 30, whichever comes first. Site visits will entail inspection of any exclusionary measures to ensure that there are no flaws that would allow bird/bat access or bird/bat entanglement, and to make sure that bird nesting is not occurring within the exclusion zones.

6. A qualified biologist will study the construction-related effects (e.g., noise, vibration) on swallows and nests outside of the exclusion zone. Adjustments to the length of

exclusion will be made the following season (if the project takes more than one season), in accordance with these findings.

7. Swallows are strongly attracted to old nests or to the remnants of deteriorated nests, but it is unlikely that Caltrans will be allowed to wash off nests, especially at Hinge 8, which is close to the river, due to water quality concerns.

8. If swallows have eggs or young in the nest (i.e., due to unexpected early nesting), exclusion may not be used until the Resident Engineer (RE) has consulted with the project biologist on how to proceed.

SPECIFICS

Exclusion will be done with devices that will prevent roosting and nesting by birds, particularly cliff swallows, without morbidity or mortality to bats and birds. Exclusion must be designed so it does not trap or entangle bats or birds.

Swallows do not nest on the underside of the bridge deck (soffit) – they use the sections of the bridge where horizontal surfaces creates 90° angles with the vertical surfaces; i.e. at the tops of the piers where they meet the underside of the bridge, and at the angle formed along the entire length of the bridge, where the overhang meets the side of the bridge deck.

Exclusion will consist of non-woven RSP filter fabric. Filter fabric will be durable in the potentially windy conditions, and will not pose the threat of entangling bats as netting might. Filter fabric was used successfully on a recent bridge exclusion project on Highway 169. Exclusion will be installed 100 feet out from the center of each hinge, along the length of the bridge (200 feet total length for each hinge); thus, there will be 600 feet of exclusion along the length of one side of the bridge, totaling 1,200 feet of exclusion for the entire bridge (see diagrams in Appendix 2). The tops of three piers will also be excluded. These will include: at Hinge 2, the top of Pier 3, at Hinge 8, the top of Pier 9, and at Hinge 11, the top of Pier 12. Each pier has a circumference of 62 feet; thus, an additional 186 feet of swallow nesting area will be excluded.

Along the length of the bridge, the fabric will be attached from the side of the overhang to the side of the bridge deck (see Appendix 2). To attach the fabric, a concrete nail gun (22-charge gun) will be used to drive nails through plywood strips (which will hold the fabric down) into the concrete, making certain the fabric extends out from both edges of the plywood strips so that the fabric is securely tightened.

At the tops of the piers, the fabric can be secured using the plywood strips and nail gun method to attach the top of the exclusion to the soffit. At the bottom edge of the exclusion, the fabric will be secured to the sides of the pier. The most likely method would be to allow a 6-8 foot length of the fabric to hang down, and cinch it down tight with cable, allowing several feet of fabric to extend well below the cinching point.

All exclusionary measures will be removed when swallow-disturbing activities are completed at each location, before the next breeding season.

1.4 Additional Avoidance and Minimization Measures to Protect Birds

In order to avoid and minimize the potential effects on migratory birds, the following measures will be taken:

- Vegetation will be removed outside of the bird breeding season (between September 1 and February 28). Surveys will be performed for hummingbird nesting activity by a qualified biologist prior to any vegetation trimming that occurs in January through February, since hummingbirds could be nesting in the area at this time.
- If vegetation has not been cleared outside of the breeding season (if cleared between March 1-August 31), and construction is to begin after March 1, the following guidelines will be observed:
    - Surveys will be conducted (no earlier than two weeks prior to construction) by a qualified biologist to identify if birds are nesting within the project limits.
    - If bird nests are found during pre-construction surveys:
        - The areas will be marked as environmentally sensitive and nests will be monitored by a qualified biologist for disturbance during construction; and
        - Buffer areas will be delineated around areas with active nests, and bird-disturbing construction activities within the buffer area will not occur.

- During construction activities, when evidence of migratory birds, or their occupied nests, is discovered that may be adversely affected, the Contractor shall immediately stop work within 25 feet of the occupied nests and notify the Resident Engineer (RE). Work shall not resume until the RE has consulted with the project biologist on how to proceed, and provides written notification to the Contractor that work may begin in this location.

- All disturbed areas will be revegetated and restored to pre-construction conditions. Replanting will occur with native plant material indigenous to the area.

1.5 Impacts and Effects on Birds

Direct impacts to birds themselves are unlikely, due to the mobility of birds. Impacts to active nests will not occur since vegetation removal will occur outside of the nesting season, and exclusion will prevent swallows from nesting in areas where their nests, eggs or chicks could be disturbed or harmed. The project will result in some temporary impacts from the removal of nesting vegetation, which will be replanted.

1.5.1 Swallow Nesting Sites Available During Construction

NOTE: The following is described in terms of one side (either east or west) of the bridge; swallow nesting areas occur on both sides of the bridge, and thus all the areas described below are doubled.

Refer to Figure 1. The bridge is 2,038 feet long from abutment to abutment. Of this, approximately 250 feet on each end of the bridge, starting at the abutments, show no evidence of swallow nesting in the past several years (no nest scars or stains whatsoever), probably due to the height of vegetation in relation to the bridge (ground elevation is higher at the abutments) and possibly disturbance from people under the bridge. This means that approximately 500 feet of the bridge is not normally used by swallows. Thus, about 1,538 feet on each side (east and west) of the bridge is used by swallows for nesting, and is considered "potential nesting habitat". Evidence of more heavy and recent nesting (i.e., "favored nesting habitat") spans from Pier 4 on the south bank of the Klamath River to Pier 11 on the north bank (1225 feet). Within this span, nesting is especially concentrated over the river, between piers 4 and 8; this appears to be a "prime" nesting habitat, spanning 700 feet on each side of the bridge.

Caltrans proposes to exclude swallows at a distance of 100 feet from the source of noise and vibration (i.e., 100 feet out from both sides of the hinge, for a total of 200 feet exclusion at each hinge). This would result in 600 feet excluded, leaving 938 feet (61%) of potential nesting habitat unexcluded, on each side (east and west) of the bridge. All (700 feet) of the "prime" nesting habitat would remain available, as well as 63% (385 feet) of the remaining favored nesting habitat, and 48% (125 feet) of the less suitable nesting habitat. When added together (east and west side of bridge), 1,400 feet of "prime," 770 feet of favored, and 250 feet of less suitable habitat will be available during construction; this assumes all three hinges will be

replaced during the same season. More nesting habitat will be available if construction is split into two seasons, because exclusion will be installed only near those hinges to be worked on each year.

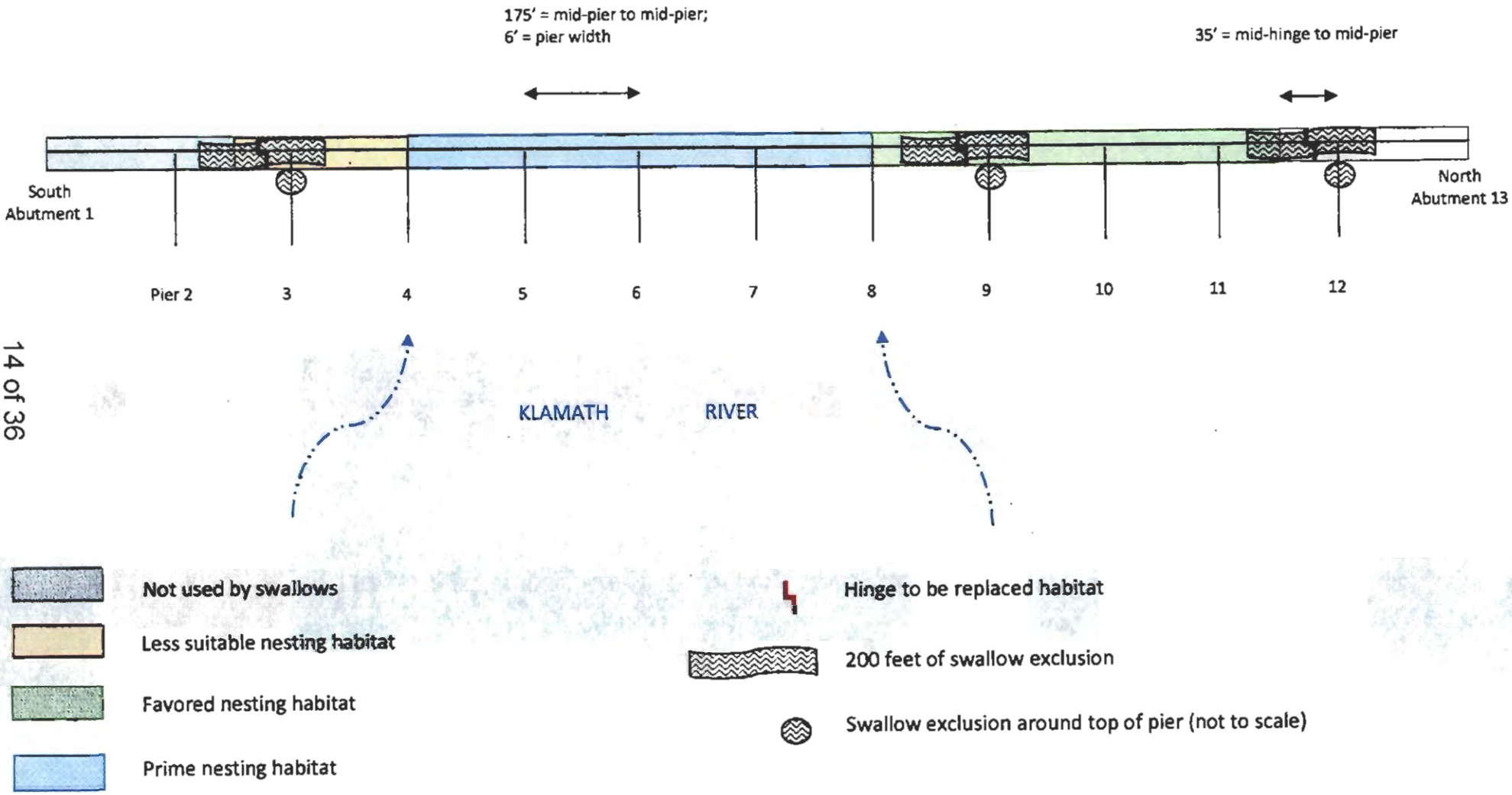


Figure 1. Swallow habitat and proposed exclusion on the Klamath River Bridge.

1.5.2 Bird Habitat Post-Construction

The quantity and condition of habitat available for cliff swallow nesting on the bridge will remain the same as prior to the hinge replacement project.

1.6 Plan Implementation

Caltrans and the Contractor will incorporate all protective measures described above, and those additional ones recommended and required by the permits and approvals by the U.S. Fish and Wildlife Service, the California Department of Fish and Game, the Yurok Tribe, the California Coastal Commission and the U.S. Army Corps of Engineers.

The determining factor of who installs the exclusion protection measures depends on when the necessary project permits (including any *prior to issuance of permit* conditions) are received. If clearances are received, allowing enough time for Caltrans maintenance staff to mobilize and install the measures, then maintenance staff will conduct the work. If clearances are not received with enough time remaining for Caltrans maintenance staff to conduct the work, then the project contractor will install the exclusion/protection measures.

1.7 Follow Up and Monitoring

Swallows will be monitored by a qualified biologist. Surveys will be conducted prior to the installation of exclusion and throughout the period when exclusion is in place, including during construction. Reports will be made via email or phone to the permitting agencies on a monthly basis. A written post-construction report will be submitted within 4 months of the end of construction. The report will include swallow use of the bridge and nesting habitat, effectiveness of exclusion devices, construction/demolition activities occurring, and any mortality or disturbance behavior observed.

Additional breeding season surveys will be conducted in the year following the hinge replacement, and a second annual report will be submitted, documenting swallow nesting use of the bridge.

Chapter 2 BATS

2.1 Known and Presumed Bat Presence and Use

At least 5 to 6 individuals, and potentially several more bats, use the bridge hinges as day roosts. Possibly up to a few hundred (though the number is unknown) bats use the interior of the box girders as day roosts, and may also use the box girders as maternity colony roosts (see the attached *Bat Surveys at the Klamath River Bridge, 2009-2011*). It is undetermined whether bats use the bridge for night roosting, but this seems likely, given the bridge's proximity to foraging habitat (riparian corridor) and the documented presence (via analysis of audio recordings) of several bat species foraging during the evening at the bridge. Night roosting normally occurs on the exterior of bridges, where bats take brief respites during foraging bouts (Caltrans, 2010a).

Bats occupy some of the bridge hinges at least during the summer (June-August) into late September. It is highly likely they use the bridge in spring (i.e., beginning in late February to March), as evidenced by large amounts of guano in the interior of the bridge (possible maternal colonies).

Some bats may use the bridge as a winter roost (Caltrans, 2010a); however, this remains to be verified by winter surveys. It is unlikely the bridge is used for hibernation, as temperatures are not cold enough in this area. The attached Bat Surveys Report provides details about survey effort and findings.

2.1.1 Bat Species Present

The project area is within the range of Yuma myotis (*Myotis yumanensis*), silver-haired bat (*Lasionycteris noctivagans*), fringed myotis (*Myotis thysanodes*) (CNDDB, August 2011) and little brown bat (*Myotis lucifugus*) (J. Szewczak, pers. comm., September 15, 2010).

Bat recording equipment and software (Szewczak, 2011) analysis were used during the first half of September 2011 to identify species present (Table 2). Five species were positively identified as present in the vicinity of the bridge:

1. Yuma myotis
2. California myotis (*Myotis californicus*)
3. little brown myotis
4. hoary bat (*Lasiurus cinereus*)
5. silver-haired bat

Table 2. Special Status of Bat Species found in the vicinity of the Klamath Bridge. The Department of Fish and Game considers the ranked taxa on this list to be those of greatest conservation need. Two species had no special status ranking. (Source: *CDFG Biogeographic Data Branch California Natural Diversity Database - Special Animals, January 2011*).

Scientific name	Common Name	Rank		ESA	CESA	Other Status
		Global	Subnational			
Myotis yumanensis	Yuma myotis	G5 S4?	S4?	None	None	BLM:S IUCN:LC WBWG:LM
Myotis californicus	California myotis	N/A	N/A	N/A	N/A	N/A
Myotis lucifugus	Little brown myotis *(San Bernardino Mts population)*	G5	S2S3	None	None	IUCN:LC WBWG:M
Lasiurus cinereus	Hoary bat	G5	S4?	None	None	IUCN:LC WBWG:M
Lasionycteris noctivagans	Silver haired bat	G5	S3S4	None	None	IUCN:LC WBWG:M
Antrozous pallidus	Pallid bat	G5	S3	None	None	BLM:S DFG:SSC IUCN:LC USFS:S WBWG:H
Eptesicus fuscus	Big brown bat	N/A	N/A	N/A	N/A	N/A

Rank: Global - G5 - Secure Global Conservation Status

Rank: Subnational - S2S3 - Imperiled/Vulnerable; S3 - Vulnerable;

S3S4 - Vulnerable/Apparently Secure; S4? - Apparently Secure (Variant Rank)

BLM: S - Bureau of Land Management sensitive species

DFG: SSC: California Species of Special Concern.

IUCN - The World Conservation Union; LC = Least Concern

USFS: USDA Forest Service sensitive species

WBWG: The Western Bat Working Group - H = High, M = Medium, LM = Low-Medium – priority

A sixth species, pallid bat (*Antrozous pallidus*), was identified as most likely being present. A seventh species, big brown bat (*Eptesicus fuscus*), was identified as possibly being present. See the attached report, *Bat Surveys at the Klamath River Bridge, 2009-2011*, for details.

Some of these species have special conservation status, as listed in Table 2.

2.2 Roosting Habits and Habitats of Bat Species Present

It is not known definitively all potential species of, and the full extent of how and when, bats use the Klamath River Bridge. Thus, this exclusion plan relies on the best available science to predict the likely type of bat use of the bridge – i.e., as maternal, day, night or migratory staging roosts, or over-winter hibernacula. This information was incorporated in planning the exclusion techniques that will be used. Natural history parameters and ecological requirements vary considerably among species, making it important that individual species occurring at a project site be correctly identified, and that species assemblage be adequately characterized (Johnston et al., 2004). Below is species-specific information relevant to potential use of the Klamath Bridge, based on species accounts (Bat Conservation International, 2011; Western Bat Working Group, 2005).

Yuma myotis – Frequently roosts in bridges. Females give birth from mid-spring to mid-summer. There are gaps in knowledge about winter range, and winter roost requirements, and it is unknown if they hibernate or overwinter in northwestern California. Bachelor males also sometimes roost in abandoned cliff swallow nests.

Little brown myotis - Summer maternity colony sites include human-occupied structures, sometimes bridges. Fidelity to physically stable day and night roost sites is strong, and individuals return for many years. Hibernation sites (typically caves and abandoned mines) and seasonality are poorly known in the west. Lack of knowledge of hibernation sites (and the degree of population aggregation at these sites) is a key point of vulnerability for this species. This species is especially associated with humans, often forming nursery colonies containing hundreds, sometimes thousands of individuals in buildings, attics, and other man-made structures.

Pallid bat – Day and night roosts frequently include bridges. Pallid bats roost in rock crevices, buildings, and bridges in *arid* regions. Although year-to-year and night-to-night roost reuse is common, they may switch day roosts on a daily (1-13 d) and seasonal basis. Parturition occurs from late April to July, and weaning in August; populations at higher latitudes and in cooler climates give birth later in the season. Winter habits are poorly known, but this species

apparently does not migrate long distances between summer and winter sites. In coastal California, males and females overwinter in a primary roost but occasionally use alternate roosts throughout the winter. Overwintering roosts have relatively cool, stable temperatures and are located in protected structures beneath the forest canopy or on the ground, out of direct sunlight. Few records of seasonal movements, locations of hibernacula and winter roosts, and mating behavior exist.

Big brown bat - This species is well known for its propensity to roost in anthropomorphic structures, including bridges. Bridges are commonly used as night roosts by males and pre-parturition and post-lactating females. Females give birth in early summer, after a gestation of about 60 days. The young are volant in 3-4 weeks. This species hibernates for most of the winter in the northern portion of its range. It appears to be a relatively sedentary species and is not known to migrate large distances. Information is generally lacking on seasonal movements and hibernation sites.

California myotis – Is infrequently reported as roosting in bridges. It forms small maternity colonies in cliff crevices, buildings, and bridges. Like many species, California myotis switch roosts on a regular basis, sometimes within a few feet, sometimes up to a mile apart.

Hoary bat – Is not reported as roosting in bridges; large groups migrate in autumn. Humans rarely get the chance to see these magnificent bats; they are not attracted to houses or other human structures, and they stay well hidden in foliage throughout the day. They typically roost 10-15 feet up in trees along forest borders.

Silver-haired bat - Maternity roosts appear to be almost exclusively in trees. Some records exist for roosts in other structures, but these appear to be largely anomalies. Radio-tracking has shown that these bats travel considerable distances from roost sites to foraging areas. Seasonal records suggest considerable north-south migration, with animals moving to warmer, more southern climates in the winter. The few overwintering individuals that have been found in Oregon and Washington were juveniles from the previous summer. They form maternity colonies almost exclusively in tree cavities or small hollows. Even though they are highly dependent upon old growth forest areas for roosts, silver-haired bats feed predominantly in disturbed areas, sometimes at tree-top level, but often in small clearings and along roadways or water courses.

It is highly unlikely that any bat species hibernate on the Klamath River Bridge, due to the temperate climate of the region; it is not cold enough to trigger hibernation. It is possible that bats use the bridge for over-winter roosting, during which they remain active and forage.

However, more surveys are needed to corroborate this. Table 3 summarizes the potential bat use of the bridge, based on local surveys and best available science.

Table 3. Potential Bat Roost Use and Probable Season of Use of the Klamath River Bridge, DN-101

	Type of Roost					
Bat Species	Day	Night	Maternity	Migratory	Winter	Hibernation
Yuma myotis	Mar-Oct	Mar-Oct	mid-Mar - Aug	?	?	?
California myotis	Infrequent	Infrequent	mid-Mar - Aug	Infrequent	?	unlikely
Little brown myotis	Mar-Oct	Mar-Oct	mid-Mar - Aug	?	?	unlikely
Hoary bat	N	N	N	N	N	unlikely
Silver haired bat	N	N	N	N	N	unlikely
Pallid bat	Mar-Oct	Mar-Oct	May - early Sep	?	Y	unlikely
Big brown bat	Mar-Oct	Mar-Oct	Apr - Aug	?	?	unlikely

2.2.1 Additional Surveys

Surveys will continue to more precisely determine bat use of the bridge and the time of year (if any) bats are not present in the bridge, when exclusion devices would best be installed. Pre-exclusion surveys will be conducted.

2.2.2 Assumptions

Based on what has been observed at the bridge, and what is known of typical bat behavior and roosting requirements, the most conservative approach to protect bats includes assuming:

1. Bats are present in all hinges and box girders, at least for part of each year. Furthermore, since different species may use a site at different times of the year and even within one season, and bat roosts can change location from year to year (Caltrans, 2010a), it is prudent to make such an assumption.

2. All three hinges to be replaced may be used as day roosting areas for a small number (< 100) of bats, at any time of year. The hinges likely do not serve as maternal roosts.

3. Bridges (especially concrete ones, which hold heat better) often serve as significant night roosts. Those most commonly used for night roosts are open cavity sites. Though the Klamath River Bridge has no open cavity sites, it is made of concrete. Thus, bats may use some exterior bridge surfaces for temporary night roosting, from which they would be free to escape if disturbed by the hinge repair work.

4. Box girders abutting the hinges are occupied by bats during spring (as soon as early March) through summer, and are gone by early October. Box girders may be used as

maternal roosts, and extra precautions are necessary in installing exclusion devices here.

5. Bats may roost over-winter on the bridge, but more surveys are necessary to document this. Non-hibernating bats may use areas, such as the Klamath River Bridge, that have prolonged periods of non-freezing temperatures during winter (Caltrans, 2010a).

6. There may be a low number of bats present that are undetected during surveys.

2.3 Potential for Disturbance to Bats

The same background information and analyses for swallows were used in estimating the effects of construction vibration and noise on bats and at what distance to exclude them from the noise source. Please refer to pp 5-6 under *BIRDS - Effects of Construction Noise and Vibration on Swallows and Bats Nesting or Roosting on the Bridge* and *Estimating Distance at which to Exclude Swallows and Bats*. One additional reference on bats documented that bats roosting in bridges are subjected to traffic noise, and are very tolerant of noise and vibration from above, though not from below (Caltrans, 2010a).

Caltrans determined that an appropriate method to exclude bats from work is to prevent them from entering the box girders adjacent to the hinges to be replaced. This will result in keeping bats 140 feet from the point source of noise and vibration in the longer box girder adjacent to the hinge. In the shorter box girder, bats will be kept a minimum distance of 35 feet from the point source, but will be free to move an additional 175 feet away (Figure 2).

This is based on the goal of keeping bats a safe distance from disturbance while leaving adequate roosting habitat available. Unlike nesting swallows, bats with young are not attached to a particular spot, though they cannot move long distances with the young. Thus, if bats are rearing pups in the box girder on the other side of the pier from the hinge, they will be able to move their young away (by crawling or flying, depending on the stage of their young) from the source of disturbance (up to a distance of 175 feet, the length of the girder).

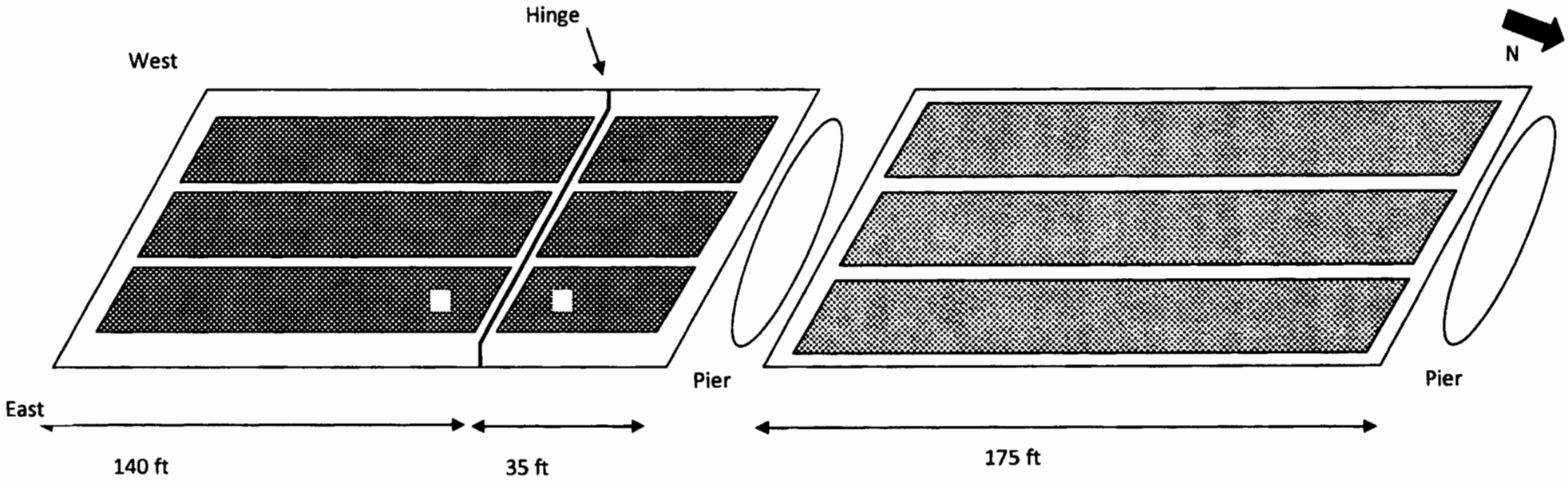


Figure 2. Distance bat exclusion will keep bats away from the point source of high level noise and vibration work at each hinge on the Klamath River Bridge.

2.4 Installation of Bat Exclusion

It would be optimal to perform the hinge repair when bats are not present. However, it will not be possible to perform the work entirely outside of the season when bats are anticipated to occupy the bridge, as the work is scheduled to occur from mid-May through October during the low flow season of the Klamath River, due to water quality concerns. Thus, exclusion devices will be installed prior to the arrival of bats, if at all possible. Surveys will be conducted no more than 15 days prior to and throughout the installation in order to fully assess bat presence, and installation methods will be adjusted accordingly to ensure bats are not trapped or injured. A qualified and experienced biologist will conduct the bat surveys. This biologist must possess a degree in biological or natural science from an accredited college or university and have a minimum of 1-year experience in performing bat surveys, and/or certified bat training.

2.4.1 Timing of Bat Exclusion

Exclusion devices will be installed on the bridge hinges and box girders between November 15 and February 28, when bats are not expected to be present, and prior to the season of construction. It is not recommended to seal a structure at all during April-August as this will trap flightless young inside (Bat Conservation and Management, BCM, 2011).

If it proves infeasible to exclude when no bats are present (e.g., bats are found to use the bridge year-round or for extensive periods), the following additional precautions will be taken:

1) At the hinges and any box girders used solely as non-maternal roosts, install exclusion devices after bat emergence at dusk, with devices that will allow bats still inside to exit but not re-enter the bridge. Installation of bat exclusion will begin approximately one hour after sunset, to allow for all bats to exit the bridge, and be completed within 3 hours after sunset, since bats may return in the early evening to roost after foraging bouts. Most bats start to leave a building about 15 minutes after sunset; however, some species of bats leave their roosts later than others (BCM, 2011).

2) At box girders and any hinges that serve as maternity roosts no exclusion will be installed during the pup season, estimated to occur between late April and late August. It is imperative that exclusion be installed prior to or after these dates. Pups are non-volant, unable to fly and leave the roost, during this period.

3) It is planned for all three hinges to be repaired within the same year. However, if this plan changes, only those hinges that will be worked on within the year will have exclusion installed, so that available bat roosting sites are not unnecessarily restricted - e.g. Hinge 2 will be excluded one year and hinges 8 and 11 the other year.

4) Installation of exclusions should be carefully monitored or avoided during periods when night temperatures fall below 50° F (10° C), because bats may remain inactive and not leave their roost sites (BCI 2011). If bats are hibernating (which is unlikely) in the bridge during the winter, exclusions should be postponed until spring when bats emerge to feed.

5) Inspections will be conducted prior to the installation of exclusionary measures and thereafter on a weekly basis, at a minimum, to ensure bats are not present.

2.4.2 Types, Methods, and Scope of Work for Bat Exclusion

Excluding bats from a roost is a process that allows them to exit unharmed, but not re-enter (BCI 1999). Surveys for bat presence will be conducted prior to exclusion installation. All obvious accesses will be sealed except one or two of the principal openings. One-way exclusionary devices will be installed on the openings into the box girders, to allow any bats remaining inside the bridge to escape from, but not return to, the bridge interior.

Exclusion devices will be installed on the bridge hinges and box girders between November 15 and February 28, when bats are not expected to be present, and prior to the season of construction. It may be possible to do exclusion in March and early April, if necessary, depending upon whether bats are present or not. It is possible bats will be present year-round. It is not recommended to seal a structure at all during mid-April-August, as this could trap flightless young inside.

2.4.3 Restrictions

-- Exclusion will be done with devices that will prevent roosting without morbidity or mortality to bats. Exclusion will be designed so it does not trap or entangle bats. Bird netting (Johnston et al., 2004) or other materials that could injure or kill bats will not be used as exclusion devices.

--Bat exclusion will be overseen by a qualified biologist.

-- Installation of exclusions should be carefully monitored or avoided during periods when night temperatures fall below 50° F (10° C), because bats may remain inactive and not leave their

roost sites. If bats are hibernating (which is unlikely) in the bridge during the winter, exclusions should be postponed until spring when bats emerge to feed.

-- According to Bat Conservation International (1999), caulking, flashing, screening or heavy-duty mesh can be used to bat-proof most openings on the outside. Expanding foam, caulking or similar products that take time to cure should **not** be used to seal cracks *where bats are active and could come into contact with it* (i.e., inside the box girders) because they can become entangled in that material as it dries. Such material can be used (i.e. on the outside of box girders and at the hinges) where it can be protected from contact with bats while it dries. These materials should be quick drying, preferably water-based, and produce no toxic off-gasses.

2.4.4 Order of Work and Methods

1) **Surveys**: at least 2 (more may be necessary) will be conducted prior to exclusion, by a qualified and experienced bat specialist/biologist.

    a) Bat surveys will be conducted prior to the exclusion (no more than 15 days prior to and throughout the installation in order to fully assess bat presence, and installation methods will be adjusted accordingly to ensure bats are not trapped or injured).

2) **Exclusion**: Once it is confirmed that no bats are present in the roost areas (inside box girders, inside the hinge joints, or any other possible roosting areas on which work is to be performed), exclusion should begin. *If bats are present, extra precautions and more time will need to be taken. If a maternity colony is present, exclusion may not take place until pups are volant and have left the roost.*

    a) **Box Girders;** (6 per hinge); Primary exit points are identified and marked on **all the box girders adjacent to the hinges to be worked on that year.** These include any type of openings such as scupper holes, drainage holes and inspection openings. All other escape routes greater than 0.25 inches (0.6 centimeter) are sealed. The preferred method is to use 1/8" wire mesh to bend and shape to fit the opening to be excluded. Other methods could include the use of caulking or flashing.

    The large access openings will have one-way exclusionary devices or valves installed. The preferred method is to install PVC pipe with or without an attached plastic sleeve (see attached BCI publication on Bat Exclusion for the details of installation). The pipe should be 10" long with a 2" diameter, and installed so that the tube or

pipe extends no more than ¼" into the opening. The access hole would first be covered with plywood board (or a sandwich of plywood boards) and bolted, or otherwise attached to the soffit, with a hole cut out to accommodate the PVC pipe/tube. The plywood will be attached in such a way (i.e. sealant applied to the edges) that no crevices or cracks remain for bats to access.

b) **Hinges** (3 total hinges, but only one or two may be excluded per year): Access to unused portions of these long crevices can be minimized by filling them with suitable material, such as wood, backer rod, steel wool, tubular foam pipe installation, heavy-duty mesh, expanding foam or caulk. Care should be taken to avoid sealing bats into the roost. If bats are determined to be present, the installation of bat exclusion will begin approximately one hour after sunset, to allow for all bats to exit the bridge, and be completed within 3 hours after sunset, since bats may return in the early evening to roost after foraging bouts. No exclusion will be performed at the hinges until all bats have evacuated the hinge. The preferred method will be to use a quick drying, water-based caulk or expanding foam, but caution should be used and the foam/caulk protected from contact with bats while it dries (i.e. with plywood or other covering). Bats displaced during exclusions may try to return to the roost for a short time following the procedure (BCI, 1999). Additionally, a type of sealant will be used that produces no toxic off-gasses.

   It is likely not possible to install one-way exclusionary devices at the hinges, due to their linear and shallow, crevice-like configuration.

3) **Other Work**: Remove existing coverings (metal squares) from the soffit inspection openings on those box girders adjacent to hinges not being replaced, to compensate for loss of habitat during hinge repair.

4) **Follow up Surveys and Inspections:** Inspections will be conducted on a weekly basis, at a minimum, to ensure bats are not present in the excluded parts of the structure, or entrapped in the exclusion devices.

5) **Exclusion Removal:** All exclusionary measures must be removed when bat-disturbing or entrapping activities are completed at each location. The exclusion should not be left up over-winter and allowed to deteriorate in the weather, and must be removed before bats return in the spring.

2.5 Additional Avoidance and Minimization Measures to Protect Bats

1. When evidence of bats within the work area or excluded areas is discovered, or if it is determined that bats may be adversely affected by construction activities, or when bats are injured or killed as a result of construction activities, the Contractor shall immediately stop work within 25 feet of the occupied roosts, injured or dead bats, and notify the Resident Engineer. Work will not resume until the Resident Engineer has consulted with the bat biologist and provides written notification that work may begin in this location.

If bats are found to roost in sections of the bridge *where no work is to be performed*, measures will be employed to minimize disturbance to them. These include;

2. Designating the areas under the roost within visual sight of the bats as an Environmentally Sensitive Area.

3. Minimizing clearing and grubbing, when possible.

4. Combustion equipment, such as generators, pumps, and vehicles would not be parked or operated under or adjacent to the structures unless necessary to perform the work.

5. If night work is needed, lighting should only focus on the portion of the bridge actively under construction. Presence of personnel directly under bat colonies would be minimized, especially during bat exit and entrance times of dusk and dawn.

6. When evidence of bats is discovered, or if it is determined that bats may be adversely affected by construction activities, or when bats are injured or killed as a result of construction activities, the Contractor shall immediately stop work within 25 feet of the occupied roosts, injured or dead bats and notify the Resident Engineer. Work shall not resume until the Resident Engineer has consulted with the bat biologist and provides written notification that work may begin in this location.

2.6 Impacts and Effects on Bats

2.6.1 Roosting Sites Available During Construction

Since only one to three hinges will be worked on at a time, the other bridge hinges (4 total on the bridge) and bridge structures will be available for roosting during the work. The existing

large soffit openings (used for human access) to those box girders not adjacent to hinges being repaired will be uncovered at the time exclusion is installed elsewhere. This will provide easily accessible, alternate roosting habitat and help compensate for loss of habitat during hinge repair. There is evidence (based on the presence of guano) that some of these box girders have been used by bats, but not to the same extent as the one box girder where the soffit opening has been uncovered for 2-3 years. It appears that this box girder was used much more heavily by bats (much thicker layer of guano), and it may likely be because the very large access opening was uncovered. The other box girders have metal plates bolted to cover the access holes, and bats are only able to access the box girders through much smaller openings.

Additionally, there are several potential alternate roosting sites and existing habitat (i.e., foliage, large standing snags, and rock crevices) in the vicinity of the bridge. The installation of smaller, temporary bat houses (typically attached to structures or free-standing), would most likely not be effective, as they do not maintain a steady temperature conducive to bat roosting, and often bats do not use them (Caltrans, 2002). Given the amount of bridge available for roosting, it is probable bats would choose the bridge over new bat housing.

2.6.2 Bat Habitat Post-Construction

The repaired bridge will provide as much, and likely more, roosting area and potentially better habitat value than it currently provides for bats. To help accomplish this, slight modifications will be made as part of the work.

Hinges to be replaced will be approximately the same dimensions and will provide similar roosting structure as the existing hinges. At each finished hinge, the newly installed joint foam (expanded polystyrene) will be trimmed at the exterior edge to leave a 6-inch depth for bats to access for roosting. Previously, the foam was installed flush with the exterior of the hinge joint, and only provided bat roosting habitat if it weathered away. The plans will identify the removal of foam within the hinges (to a 6 inch depth from edge of bridge, from soffit to deck--on both the east and west side) at all three hinges.

Opening to the box girders will be left as they were (or more accessible to bats than) before construction. Specifically, the one box girder (at Hinge 8) where the large soffit opening has remained uncovered for 2-3 years will remain so, since bats are accustomed to frequenting this girder. Within this box girder, there is evidence of high bat use, which is probably due to ease-of-access. As an additional habitat-enhancing measure, another box girder (at Hinge 2) with evidence of moderate bat use (indicating favorable habitat), will have its soffit opening uncovered to allow easier access in the future for bats. The plans will specify at Hinge 2 to leave the cover off of the inspection access point, long span (south side of hinge) at the easternmost

box/cell, and at Hinge 8 to leave the cover off of the inspection access point, short span (north side of hinge) at the easternmost box/cell. In addition, the new hinge seats will be 2 feet, as compared to the existing 6-inch hinge seats, resulting in 1.5 feet of additional bat habitat.

2.7 Plan Implementation

Caltrans and the Contractor will incorporate all protective measures described above, and those additional ones recommended and required by the permits and approvals by the U.S. Fish and Wildlife Service, the California Department of Fish and Game, the Yurok Tribe, the California Coastal Commission and the U.S. Army Corps of Engineers.

The determining factor of who installs the exclusion protection measures depends on when the necessary project permits (including any *prior to issuance of permit* conditions) are received. If clearances are received, allowing enough time for Caltrans maintenance staff to mobilize and install the measures, then maintenance staff will conduct the work. If clearances are not received with enough time remaining for Caltrans maintenance staff to conduct the work, then the project contractor will install the exclusion/protection measures.

2.8 Follow Up and Monitoring

Bats will be monitored by a qualified biologist with training and experience in bat surveys, identification, biology, behavior, and roosting habitat requirements. Surveys will be conducted prior to the installation of exclusion and throughout the period when exclusion is in place, including during construction. Reports will be made via email or phone to the permitting agencies on a monthly basis. A written post-construction report will be submitted within 4 months of the end of construction. The report will include seasonal and diurnal bat use of the bridge and roosting habitat, effectiveness of exclusion devices, construction/demolition activities occurring, and any mortality or disturbance behavior observed.

Additional seasonal surveys will be conducted for bats in the year following the hinge replacement, and a second annual report will be submitted, documenting bat use and location in the bridge.

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Appendix 1.

Bird species observed at Hinge Work Areas 8 and 11, Klamath River Bridge Project during field visits and surveys, 2009 and 2010. Effort to document all species was made in June, July and August. Otherwise, these are incidental observations.

	2009					2010			
Species Name	March	June	July	August	October	March	June	July	August
Common Merganser - *Mergus merganser*									X
California Quail - *Callipepla californica*		X		X		X	X	X	X
Turkey Vulture - *Cathartes aura*		X		X			X	X	X
Osprey - *Pandion haliaetus*	X	X		X		X	X	X	X
White-tailed Kite - *Elanus leucurus*			X						
Bald Eagle - *Haliaeetus leucocephalus*	X	X							
Red-shouldered Hawk - *Buteo lineatus*		X	X				X		
Peregrine Falcon - *Falco peregrinus*					X				
Semipalmated Plover - *Charadrius semipalmatus*									X
Spotted Sandpiper - *Actitis macularius*								X	X
Greater Yellowlegs - *Tringa melanoleuca*				X					
Western Gull - *Larus occidentalis*				X			X	X	X
Band-tailed Pigeon - *Patagioenas fasciata*		X						X	X
Mourning Dove - *Zenaida macroura*		X						X	
Vaux's Swift - *Chaetura vauxi*							X	X	X
Anna's Hummingbird - *Calypte anna*	X	X		X					
Rufous Hummingbird - *Selasphorus rufus*				X		X			
Allen's Hummingbird - *Selasphorus sasin*		X					X		
Rufous/Allen's Hummingbird - *Selasphorus rufus/sasin*	X	X						X	X
Belted Kingfisher - *Megaceryle alcyon*				X			X	X	X
Downy Woodpecker - *Picoides pubescens*							X	X	
Northern Flicker - *Colaptes auratus*							X		
Western Wood-Pewee - *Contopus sordidulus*		X					X	X	X
Pacific-slope Flycatcher - *Empidonax difficilis*		X		X			X	X	
Black Phoebe - *Sayornis nigricans*								X	
Hutton's Vireo - *Vireo huttoni*							X	X	X
Warbling Vireo - *Vireo gilvus*			X				X	X	

Appendix 1. (continued)

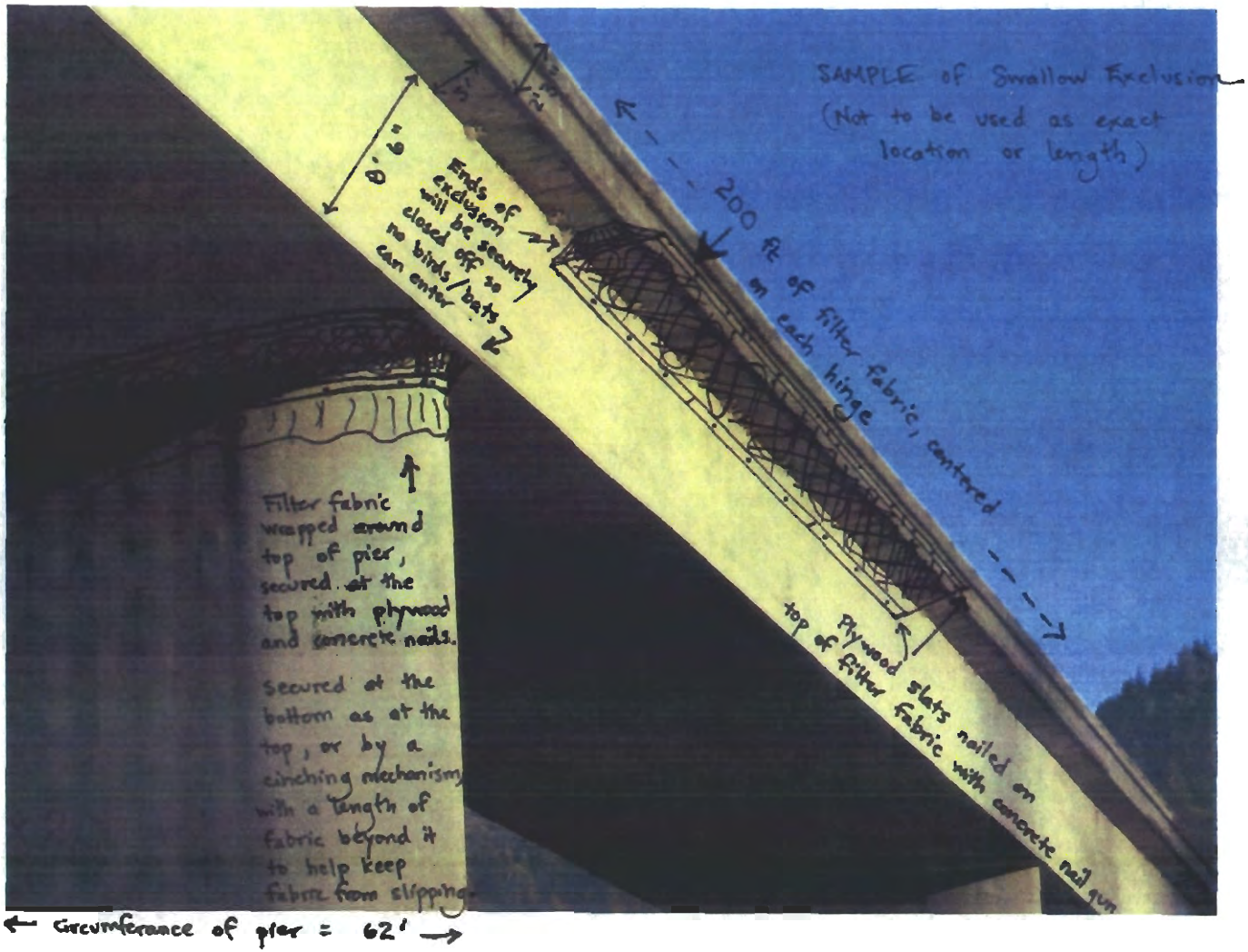
Species Name	2009 March	2009 June	2009 July	2009 August	2009 October	2010 March	2010 June	2010 July	2010 August
Steller's Jay - *Cyanocitta stelleri*		X					X	X	X
American Crow - *Corvus brachyrhynchos*		X					X	X	X
Common Raven - *Corvus corax*		X		X			X	X	X
Northern Rough-winged Swallow - *Stelgidopteryx serripennis*		X					X		
Tree Swallow - *Tachycineta bicolor*		X					X		
Violet-green Swallow - *Tachycineta thalassina*	X	X				X		X	X
Barn Swallow - *Hirundo rustica*		X					X	X	X
Cliff Swallow - *Petrochelidon pyrrhonota*		X		X		X	X	X	X
Black-capped Chickadee - *Poecile atricapillus*	X	X					X	X	
Chestnut-backed Chickadee - *Poecile rufescens*		X		X		X	X	X	X
Bushtit - *Psaltriparus minimus*								X	X
Bewick's Wren - *Thryomanes bewickii*		X				X	X	X	
House Wren - *Troglodytes aedon*		X							
Winter Wren - *Troglodytes troglodytes*		X		X		X	X		X
Swainson's Thrush - *Catharus ustulatus*		X					X		X
American Robin - *Turdus migratorius*	X	X		X			X	X	X
Varied Thrush - *Ixoreus naevius*								X	
Wrentit - *Chamaea fasciata*		X		X		X	X	X	X
European Starling - *Sturnus vulgaris*		X					X	X	
Cedar Waxwing - *Bombycilla cedrorum*		X		X			X	X	X
Orange-crowned Warbler - *Vermivora celata*		X				X	X	X	
Yellow Warbler - *Dendroica petechia*		X		X			X	X	
Common Yellowthroat - *Geothlypis trichas*							X	X	
Wilson's Warbler - *Cardellina pusilla*		X		X		X	X	X	X
Yellow-breasted Chat - *Icteria virens*		X					X	X	

Appendix 1. (continued)

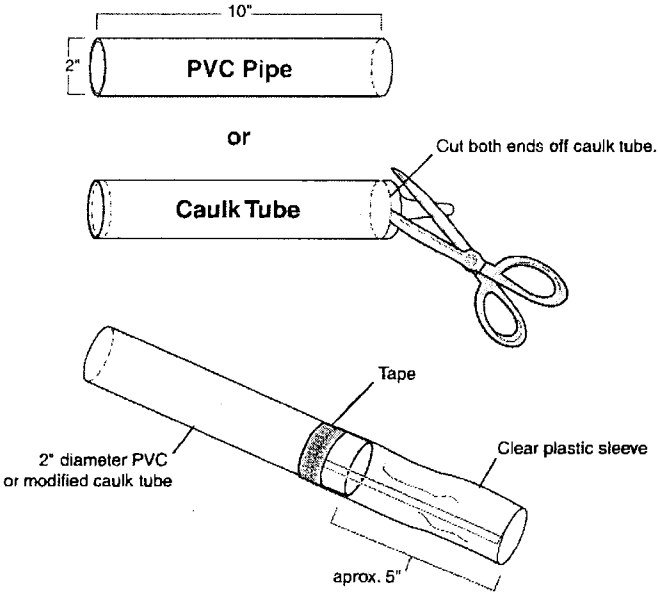
Species Name	2009 March	June	July	August	October	2010 March	June	July	August
Spotted Towhee - *Pipilo maculatus*				X					X
Song Sparrow - *Melospiza melodia*	X	X		X		X	X	X	X
White-crowned Sparrow - *Zonotrichia leucophrys*	X	X					X	X	X
Western Tanager - *Piranga ludoviciana*		X		X					
Black-headed Grosbeak - *Pheucticus melanocephalus*		X		X			X	X	
Brewer's Blackbird - *Euphagus cyanocephalus*		X					X	X	X
Brown-headed Cowbird - *Molothrus ater*		X					X	X	
Purple Finch - *Carpodacus purpureus*								X	
Lesser Goldfinch - *Spinus psaltria*								X	
American Goldfinch - *Spinus tristis*		X		X			X	X	X

Appendix 2.

Method of Swallow Exclusion at the Klamath River Bridge.



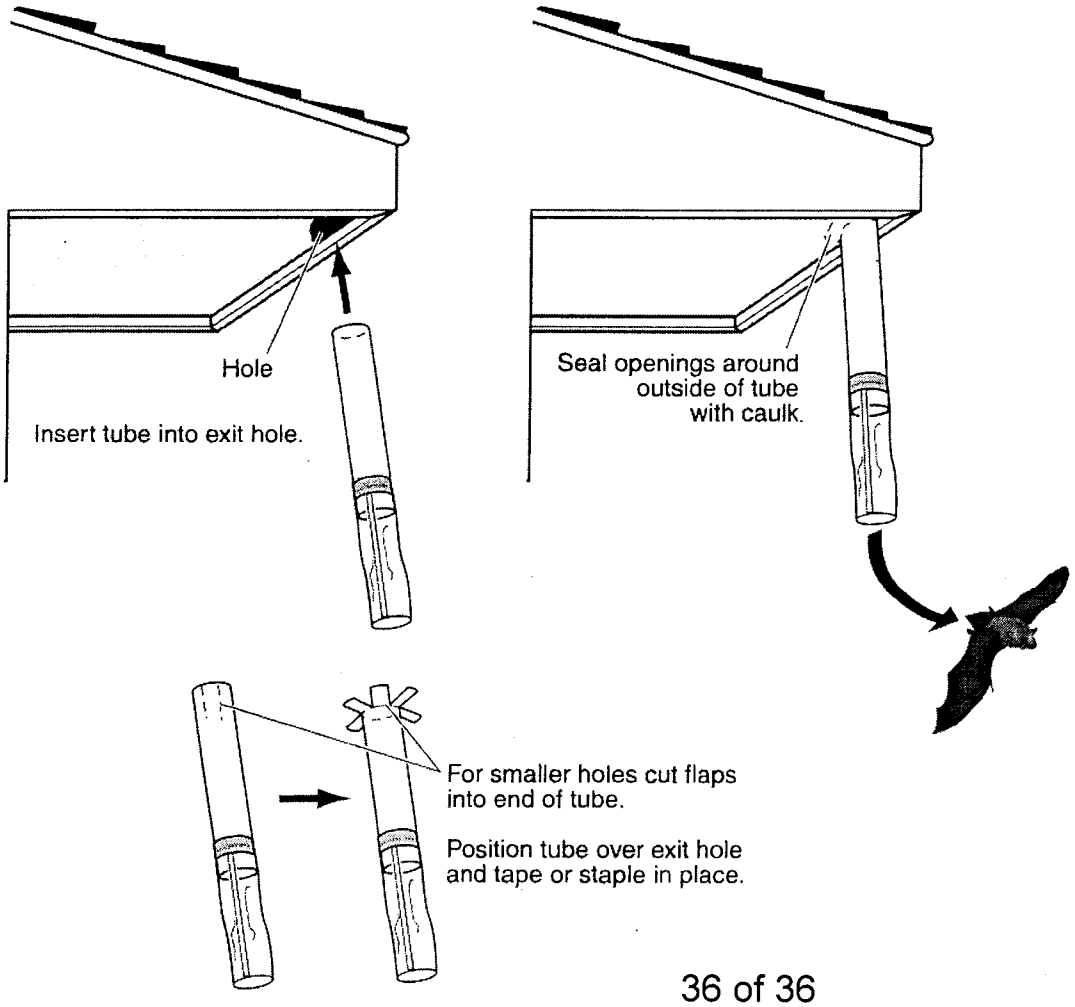
Excluding bats with tubes



In most cases, tubes make the best bat-exclusion devices. These include openings on buildings with rough exterior walls, such as brick or stone houses and log cabins. Tubes also work best for holes at corners where walls meet and on horizontal surfaces such as soffits.

Exclusion tubes should have a diameter of two inches (five centimeters) and be about 10 inches (25.4 centimeters) in length. Exclusion devices can be purchased commercially or made from PVC pipe or flexible plastic tubing. Bats are unable to cling to the smooth surface of these tubes, so the tube should project no more than one-quarter inch (six millimeters) into the opening. This will ensure exiting bats can easily enter the tube. Laura Finn of Fly By Night Inc., says empty caulking tubes also work well after caps at both ends have been cut away. Caulking tubes must be thoroughly cleaned before they can be used for exclusions because dried caulk forms a rough surface that could allow bats to reenter. These flexible, plastic tubes let you squeeze one end so it fits into a crevice. Or you can cut one end into flaps that fit over an opening and can be caulked, stapled, nailed or screwed into place (*see diagram*).

Once the tube has been secured over the hole, a piece of lightweight, clear plastic can be taped around the tube's outside end (*see diagram*) to further reduce the likelihood of bats reentering, though this is usually not necessary.



Plastic sleeves collapse on themselves, preventing bats from reentering once they have crawled out through the tube. After the tube has been secured into or over an opening used by bats, any spaces between the outer rim of the tube and the building must be sealed shut. Also be sure to seal any other openings in the building that bats could use. Leave the tube in place for a minimum of five to seven days to ensure all bats have left. After the bats have been excluded, the tube should be removed and the opening permanently sealed.

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: Steve Croteau
Associate Environmental Planner
North Region Office of Environmental Services

Date: September 20, 2011

File: 01-DN-101, 01000003531
PM R4.0

From: Todd Lark
Project Engineer

Subject: Erosion Control, Grading, Drainage and Water Pollution Control Plan.

PROJECT DESCRIPTION

The Klamath River Bridge was built in 1965, more than 40 years ago. The bridge is 2,038 feet long and consists of 12 spans and 4 hinges. The original hinge seats are only 6 inches wide. Over time, the hinge seats have started to exhibit signs of fatigue due to the large loads they carry. Bridge inspection reports have noted cracking at all four hinges as far back as 2001.

In the winter of 2006, the hinge at span 5 experienced significant rapid settlement, requiring replacement of that hinge under emergency contract. Due to the urgency of the emergency repair, the bridge was restricted to one-way reversible traffic and temporary night closures of the entire bridge during the hinge replacement work.

This project proposes to replace the remaining cracked and aging hinges at PM R4.09 (Hinge 2), R4.29 (Hinge 8), & R4.39 (Hinge 11) to extend the service life of the bridge, to prevent damage to the remainder of the structure and to conform to current hinge design and construction practices. Hinge replacement includes application of methacrylate to the new deck surface after construction in order to seal and extend the life of the bridge.

The project is scheduled to be constructed between May 15, 2012 and October 15, 2014. All construction activities will occur during the dry season, May 15 to October 15. Since construction of each joint is expected to require up to 8 weeks, Hinge 8 and Hinge 11 will be constructed concurrently in order to finish within one season. Construction access will be from the bridge deck in order to minimize environmental and community impacts. Mitigation for the project for temporary impacts will be described in a separate re-vegetation/mitigation document. An estimated maximum of 20 temporary night time bridge closures are planned with the project.

Erosion Control

The project will be constructed with the necessary erosion and water quality control practices to minimize the potential for degradation of water quality through the use of construction Best Management Practices (BMPs) identified in Caltrans' Water Quality Handbook, Construction Site BMPs Manual. Caltrans' approved temporary construction BMPs applicable to this project include measures for sediment control, soil stabilization, tracking control, wind erosion control, non-stormwater site management, and waste management and materials pollution control. See the Water Pollution Control Plan section of this memo for more detail.

Drainage

No drainage work is proposed. The topography of the floodplain below the hinge repair areas is relatively flat. Soils are comprised of highly permeable sands and gravel, with various vegetation such as Himalaya berries and willows. The entire surface of the bridge deck slopes to the east, with deck drains (scuppers) through the bridge rail on the east side and spaced approximately every 30 feet.

Grading

Temporary grading of approximately 1,600 square feet will be required to provide a work area at each of the at three locations (Hinge 2, Hinge 8 and Hinge 11) see attached Storm Water, Erosion and Water Pollution Control Plan Drawings. There will be approximately 20 cubic yards of material at each hinge replacement work area that will be temporarily graded flat to provide a temporary foundation for the temporary bridge supports. Environmentally Sensistive Area (ESA) fencing will limit and enclose the work area. Sediment control measures such as fiber rolls will be placed adjacent to the ESA fencing at the downgradient limits of the hinge work areas, as needed, to prevent sediment transport by storm water.

Materials and equipment will be lowered from the bridge deck to the hinge work areas to eliminate the need for access roads, mininizing soil disturbance. Upon completion of the project, the three graded areas will be and restored to as close to preconstruction contours as is feasible and re-vegetated (described separately). We need to estimate how many cubic yards of material will be graded at each hinge—it's a requirement in the CDP application.

Water Pollution Control Plan

Caltrans requires that a Water Pollution Control Program (WPCP) be prepared for project construction sites with less than one acre of disturbed soil area. The WPCP identifies erosion control, sediment control and construction site management practices that will be implemented during the project. Caltrans' approved construction BMPs applicable to this project include:

Soil Stabilization Practices

Soil stabilization consists of source control measures that are designed to prevent soil particles from detaching and becoming suspended in storm water runoff. Soil stabilization BMPs protects the soil surface by covering and/or binding the soil particles.

SS-1 Scheduling
Disturbance of the Hinge Work Areas and construction of the hinges will only occur during the dry season. Disturbance of the three staging areas, shown on the Water Pollution Control Drawings (see attached), will be conducted during the dry season. Concrete work will be scheduled during periods forecast with no precipitation.

SS-2 Preservation of Existing Vegetation
Clearing and grubbing will be limited to the Hinge Work Areas, shown on the attached Water Pollution Control Drawings. Surrounding areas of existing vegetation will be protected by ESA fencing.

SS-6 Temporary Erosion Control
Straw mulch with stabilizing emulsion may be used to protect disturbed soil in the Hinge Work Areas should precipitation occur during construction.

SS-7 Temporary Cover
Geotextiles, plastic sheeting, or mats may be used to protect disturbed soil in the Hinge Work Areas should precipitation occur during construction.

Sediment Control Practices
Sediment controls are designed to intercept runoff and capture suspended soil particles through a settlement or filtration process.

SC-4 Temporary Check Dams
Checkdams are used to slow the velocity of run-off and settle suspended particles from concentrated flow paths. If concentrated flows occur, checkdams will be installed along the earthen berm bounding the westerly side of the two staging areas located immediately south of the bridge (see attached plan). Temporary fiber rolls will be installed along the west side of the staging area (vehicle and equipment maintenance area) and along the bridge deck sidewalk curb between the work opening and adjacent scuppers.

SC-5 Temporary Fiber Rolls
Temporary fiber rolls will be installed down gradient of disturbed soil areas on the river bar and adjacent to the northerly staging area. Fiber rolls placed on the bridge deck up gradient of the openings will be weighted using gravel bags spaced every 4 feet, instead of standard entrenchment.

SC-6 Temporary Gravel Bag Berm
A gravel bag berm will be installed upgradient of bridge deck openings during construction of the east half of the deck to reduce the amount of stormwater from entering the opening and reaching the floodplain.

SC-10 Temporary Drain Inlet Protection
Scuppers will be sealed shut adjacent to the hinge repair locations during methacrylate sealing, concrete finishing, and curing compound application operations. Scuppers will be protected by installation of a filtering media during all other construction operations.

Tracking Control

SC-7 Street Sweeping
Street sweeping activities will occur when noticeable tracking of material occurs on paved surfaces within the construction limits. A sweeper will be on-site at all times during construction and will sweep within 1 hour whenever sediment or debris is observed during activities that require sweeping, such as when vehicles are entering or leaving the staging areas.

Wind Erosion Control

WE-1 Wind Erosion Contol
Wind erosion of stockpiles will be prevented by the use of temporary covers or the application of water. Dust will be controlled in staging areas by the use of rock stabilization or the application of water. Water application activities will be performed in a manner that prevents surface run-off of water from the Hinge Work Areas or from the Caltrans Right-of-Way.

Non-stormwater Site Management

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the Caltrans Permit or authorized under a separate National Pollution Discharge Elimation System (NPDES) permit, shall be prohibited. The selection of non-stormwater BMPs is based on whether construction activities with a potential for non-stormwater discharges will be conducted. Storage of equipment and materials on the river bar will be expected to include small skid steer grader/dozer, compactor, generator/welder, saws, air compressor, wood or concrete crane mats, and steel pipe materials to be used to temporarily support the bridge. Pile driving is not planned for construction.

NS-1 Water Control and Conservation
Water conservation practices will be implemented on the project site. All watering equipment will be kept in good working order and any leakages from equipment will be repaired promptly.

NS-3 Paving, Sealing, Sawcutting, and Grinding Operations
Sawcutting will be required prior to demolition. All sawcutting waste will be collected by vacuum during sawcutting operations and properly disposed. A receipt of sawcutting waste will be provided to the Resident Engineer (RE). Methacrylate sealant will be applied to the new concrete deck surface. All drain inlets (scuppers) will be sealed shut prior to the beginning of sawcutting and sealing operations.

NS-6 Illegal Connection/ Illegal Discharge Detection Reporting
The Contractor will report any instances of illegal discharge to the RE immediately upon discovery.

NS-9 Vehicle and Equipment Fueling
All fueling will be performed over impermeable surfaces. Drip pans and/or absorbent pads will be used for all fueling operations. All vehicles used for fueling equipment or vehicles will carry spill kits. Fuel containers that are not in immediate use will be stored in an approved secondary containment location.

NS-10 Vehicle and Equipment Maintenance
Vehicle and equipment maintenance will only be performed in the staging areas located immediately to the north and south of the bridge. Maintenance areas will be impermeable, bermed and protected from receiving stormwater. Drip pans and/or absorbent pads will be used for all maintenance activities. Spill kits will be available at all maintenance areas. All receipts for disposed oils, fluids, lubricants, and spill cleanup materials will be provided to the RE.

NS-12 Conccrete Curing
Water used for concrete curing will be applied and controlled in a manner to prevent its release to the floodplain. Concrete curing compound, if selected for use, will be applied in a manner to prevent overspray or mobilization by the wind.

NS-13 Material and Equipment Used Over Water
Drip pans will be placed under all vehicles and equipment on the bridge or on the ground in the Hinge Work Areas if idle for more than one hour. An adequate supply of spill cleanup materials will be available both on the bridge deck and on the ground in the Hinge Work Areas. Leaking equipment will be repaired immediately or removed.

NS-14 Concrete Finishing
If sand blasting operations are required, the Contractor will provide containment BMPs to prevent a discharge to Waters of the State/US.

NS-15 Structure Demolition/Removal Over or Adjacent to Water
Platforms and/or covers, approved by the RE, will be used to contain and collect demolition debris. Debris catching devices will be emptied daily and collected debris will be removed and stored away from the water course.

Waste Management and Materials Pollution Control

Waste Management and Materials pollution control which prevent pollution by limiting or reducing potential pollutants at their source before they come into contact with storm water may be implemented under the following BMPs:

WM-1, WM-2 Material Delivery, Storage, and Use
The Contractor will ensure proper material delivery, handling, storage, and use. The Contractor and subcontractor employees will be trained on proper practices prior to working on-site. Liquids will be stored in approved containers and shall be stored in secondary containment areas when not in immediate use. Damaged labels or containers will be replaced immediately.

WM-3 Stockpile Management

Soil generated from grading activities in the Hinge Work Areas may be stockpiled on-site a minimum of 100 feet from concentrated flow conveyances. Stockpiles that have been inactive for more than 14 days will be protected by a plastic cover and a sediment control perimeter barrier. Active stockpiles will be protected with a cover and a linear sediment barrier prior to a forecast precipitation event.

WM-4 Spill Prevention and Control

Material or waste storage areas will be kept clean, well organized, and equipped with enough cleanup supplies for the material being stored. Minor, semi-significant, and significant or hazardous spills will be reported to the Water Pollution Control (WPC) manager, who will immediately notify the RE. For any spill resulting in a discharge to Waters of the State/US, immediate notification upon discovery will be made to Ken Fetcho, Water Division Assistant Director, Yurok Tribe Environmental Program, at (707) 954-1532. For all significant or hazardous spills, immediate notification to the Humboldt County Sheriff's Office of Emergency Services at (707) 268-2500, the California Highway Patrol Arcata Office at (707) 268-2000 or 911, and the California Coastal Commission at (707) 445-7833, will be made in addition to those agencies identified in the contract Special Provisions.

WM-5 Solid Waste Management

Wood, for constructing the bridge forms and supports, will be cut on the bridge deck. Sawdust and debris will be removed at the end of each day, reducing the potential for construction debris to be transported into the Klamath River. BMPs will be used to collect and contain welding waste. Public litter in the project site area will be picked up and removed at least once per week. A sufficient quantity and size of water-tight dumpsters will be provided to contain all solid waste generated by work or public.

WM-6 Hazardous Waste Management

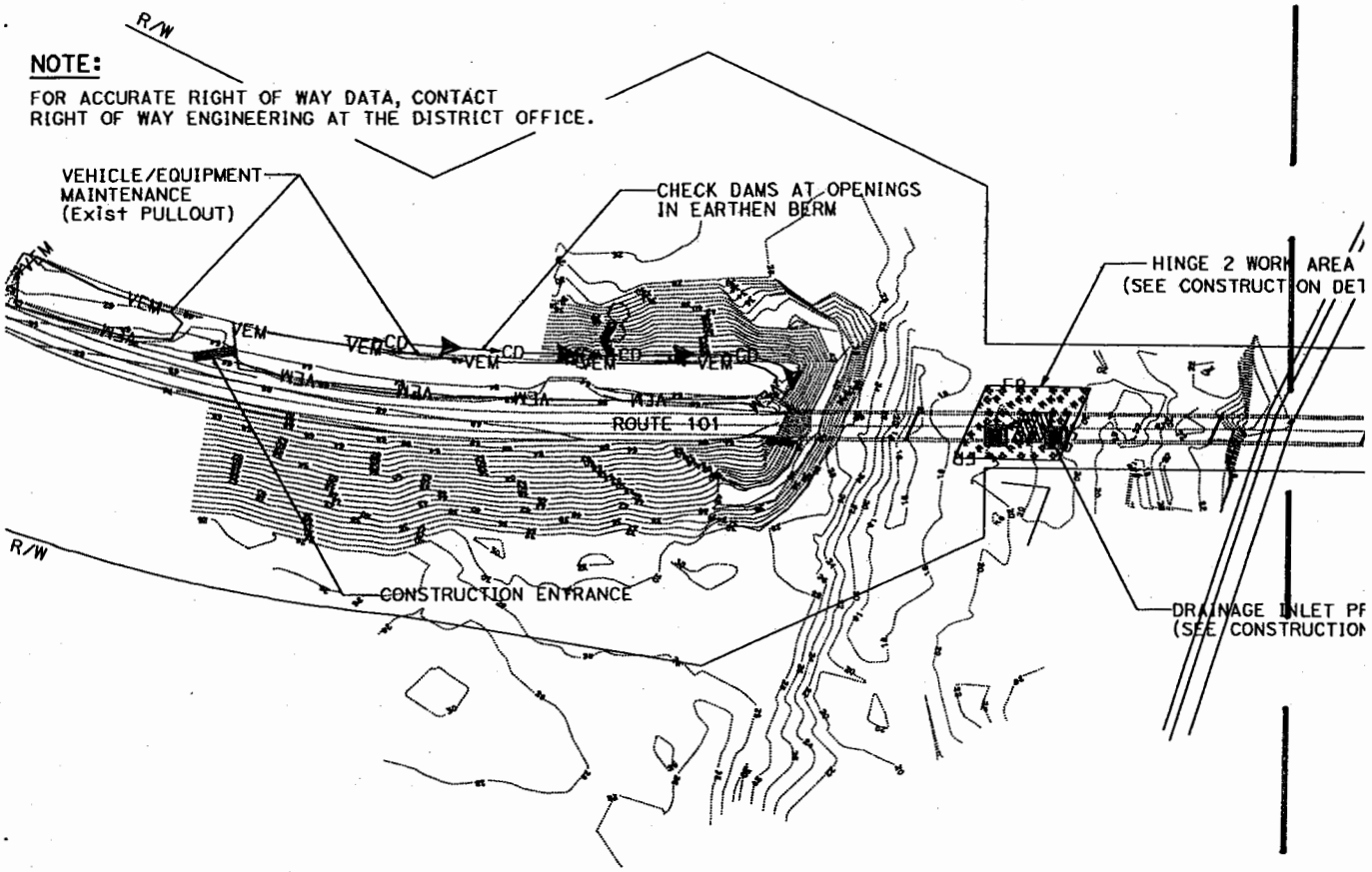
Any hazardous waste discovered or generated on the project site will be properly collected, stored, transported, and disposed. Materials with hydrocarbon contamination such as oily rags and gravel with oil/grease/lubricant/hydraulic fluid will be stored in an undamaged, steel, properly labeled waste container, and located within an approved secondary containment facility. Waste from equipment leaks and drips will be treated as hazardous until tested by an Environmental Laboratory Accreditation Program (ELAP) certified lab and shown to be non-hazardous. Manifests and disposal receipts will be provided to the RE verifying proper storage durations, transportation methods, and disposal locations.

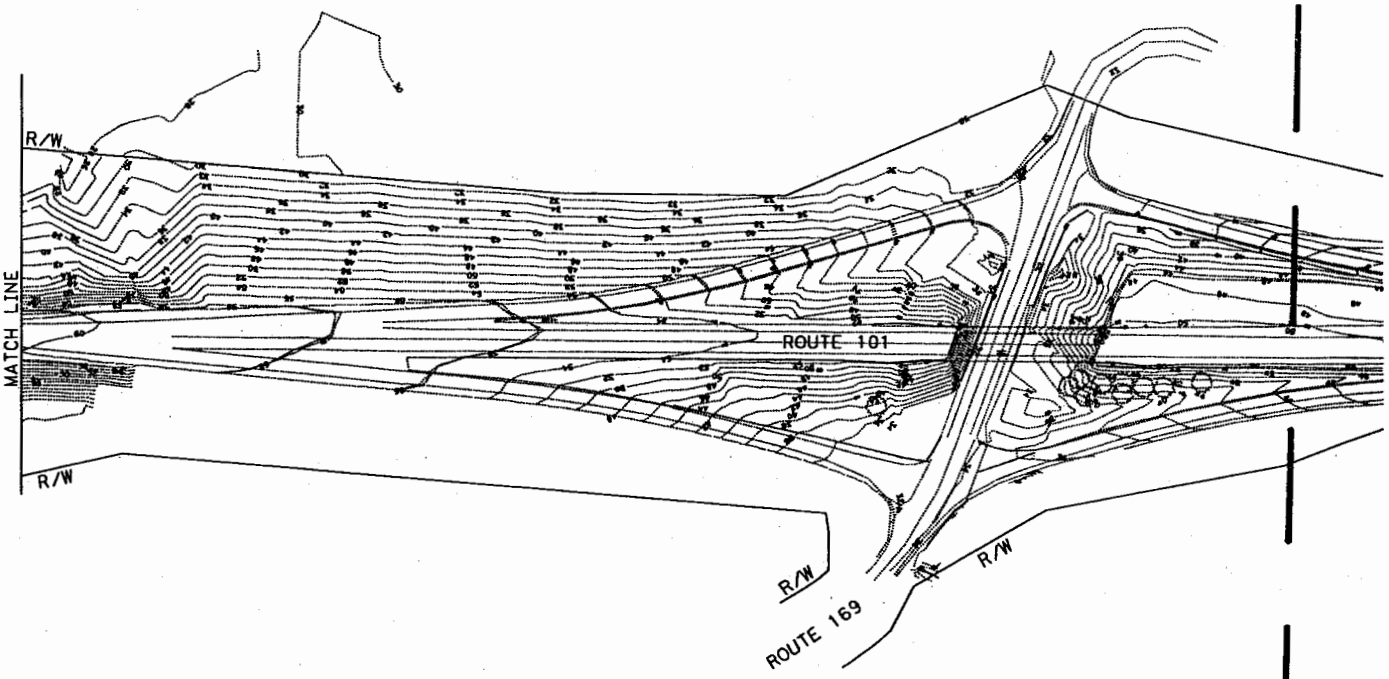
WM-8 Concrete Waste Management

A temporary concrete washout will be located in either the staging area north of the bridge or the staging area south of the bridge, or both. All water that has been in contact with wet concrete or cement will either be evaporated on-site or tested and properly disposed. All concrete washout waste will be disposed at an authorized facility and the receipt provided to the RE.

WM-9 Sanitary/Septic Waste Management

Portable toilets will be located at the staging area and near the Hinge Work Areas. Toilets will be on level ground, away from traffic, staked down if high wind warnings are forecast, and located a minimum of 50 feet from storm drains receiving waters and flow lines.





		REVISED BY	DATE REVISED
TODD LARK	CHECKER		
CALCULATED-DESIGNED BY	CHECKED BY		
FUNCTIONAL SUPERVISOR	L.R. ASHLEY		

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

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01	DN	101	R4.0/R4.4		

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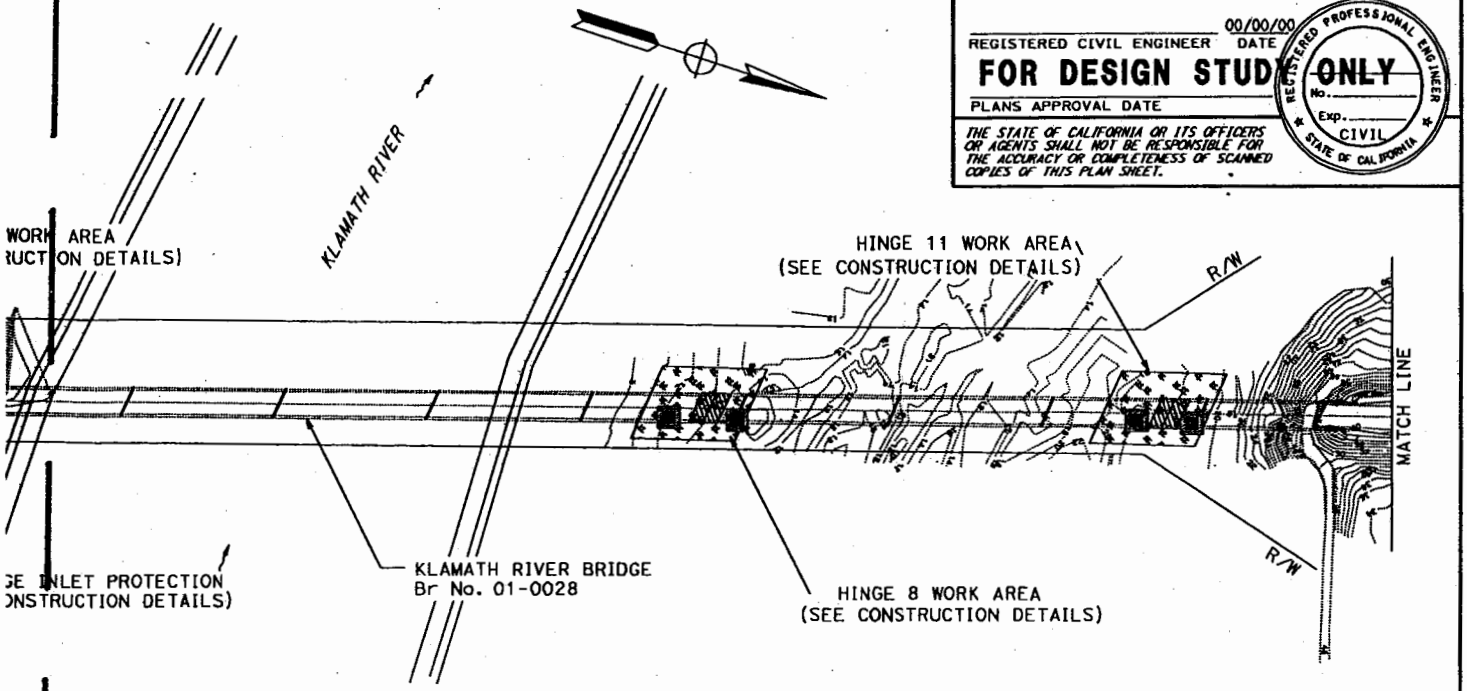
REGISTERED CIVIL ENGINEER DATE

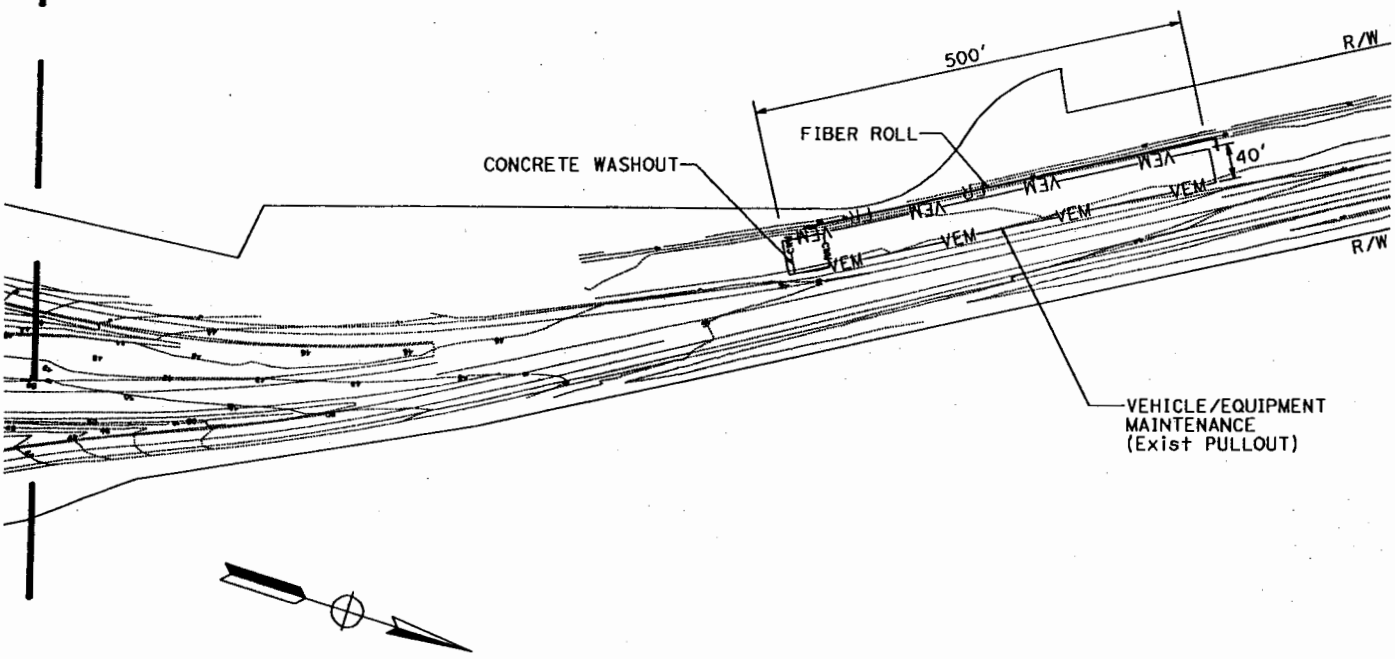
FOR DESIGN STUDY ONLY

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





(STORM WATER, EROSION AND WATER POLLUTION CONTROL PLAN)

LAYOUT

SCALE: 1"=100'

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LAST REVISION 08-18-11
DATE PLOTTED => 23-AUG-2011
TIME PLOTTED => 08:43

ARY WATER POLLUTION CONTROL WORK ONLY

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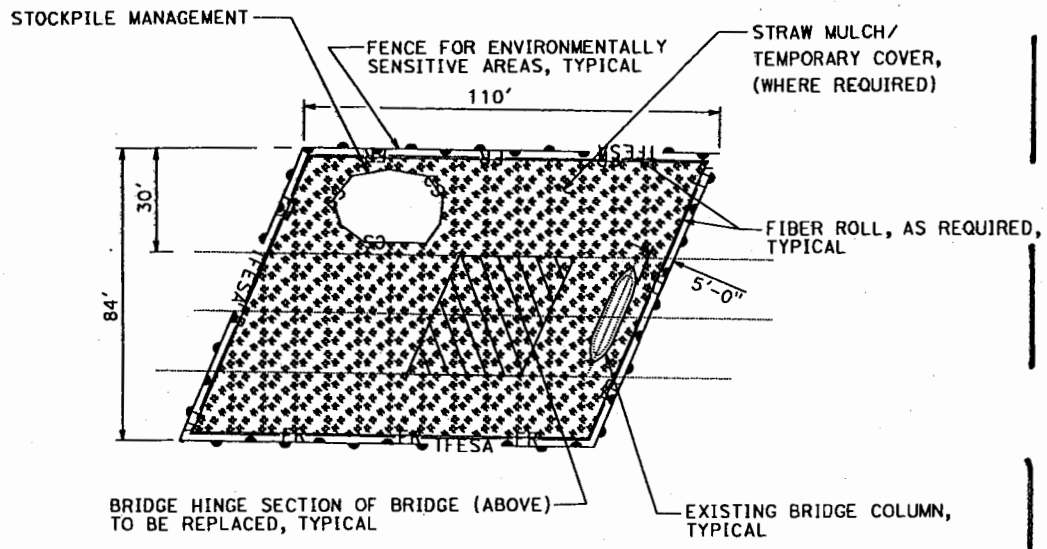
OJECT NUMBER & PHASE 01000003531

NOTE:

FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



TEMPORARY EROSION CONTROL PLAN
DETAIL
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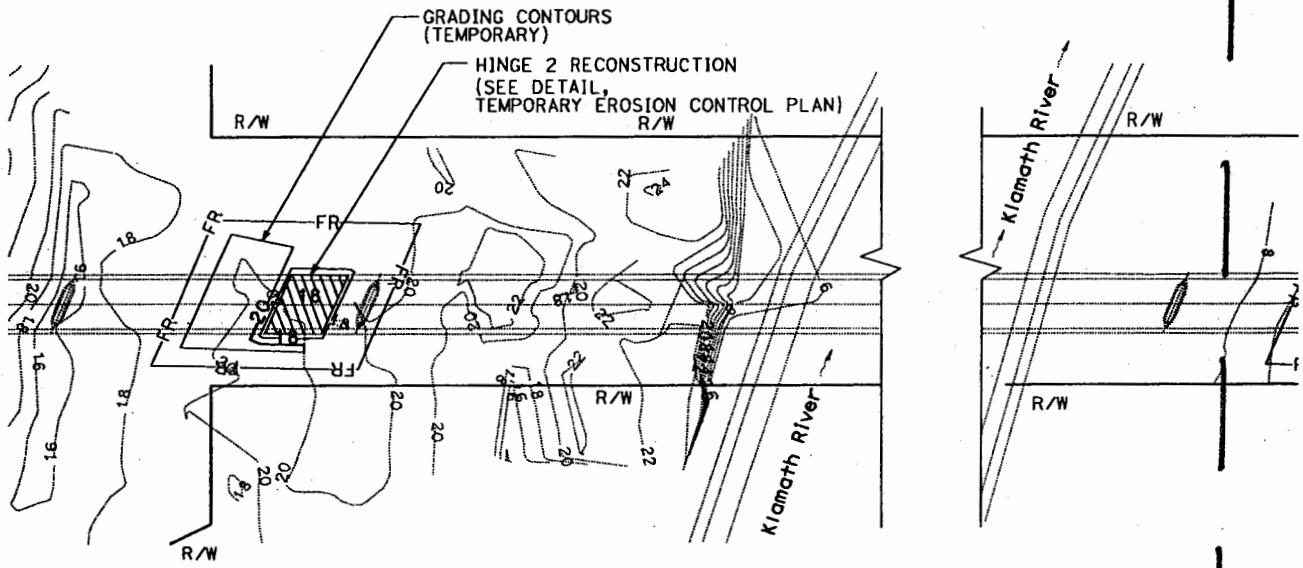

TEMPORARY GRADING PLAN HINGE 2
SCALE: 1" = 50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION | DESIGN | FUNCTIONAL SUPERVISOR: L.R. ASHLEY | CALCULATED-DESIGNED BY: TODD LARK | CHECKED BY: CHECKER | REVISED BY | DATE REVISED

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REGISTERED CIVIL ENGINEER — 00/00/00 DATE

FOR DESIGN STUDY ONLY

PLANS APPROVAL DATE

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

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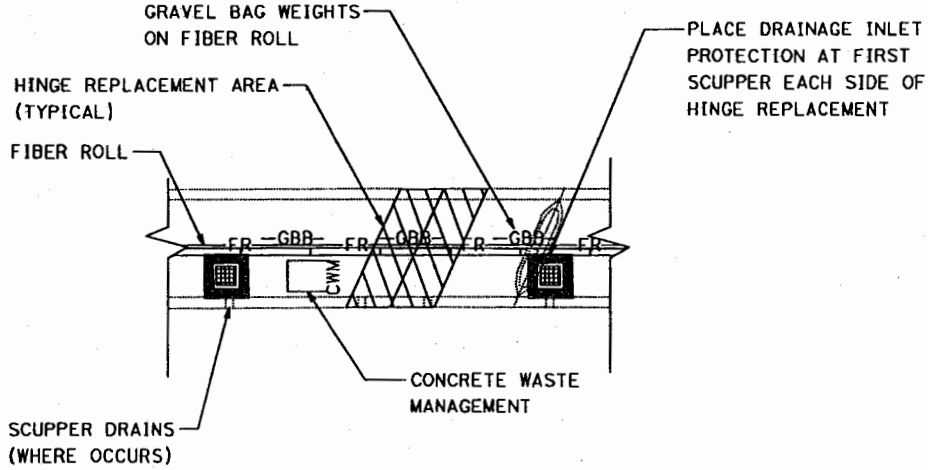

DECK SEDIMENT CONTROL PLAN DETAIL

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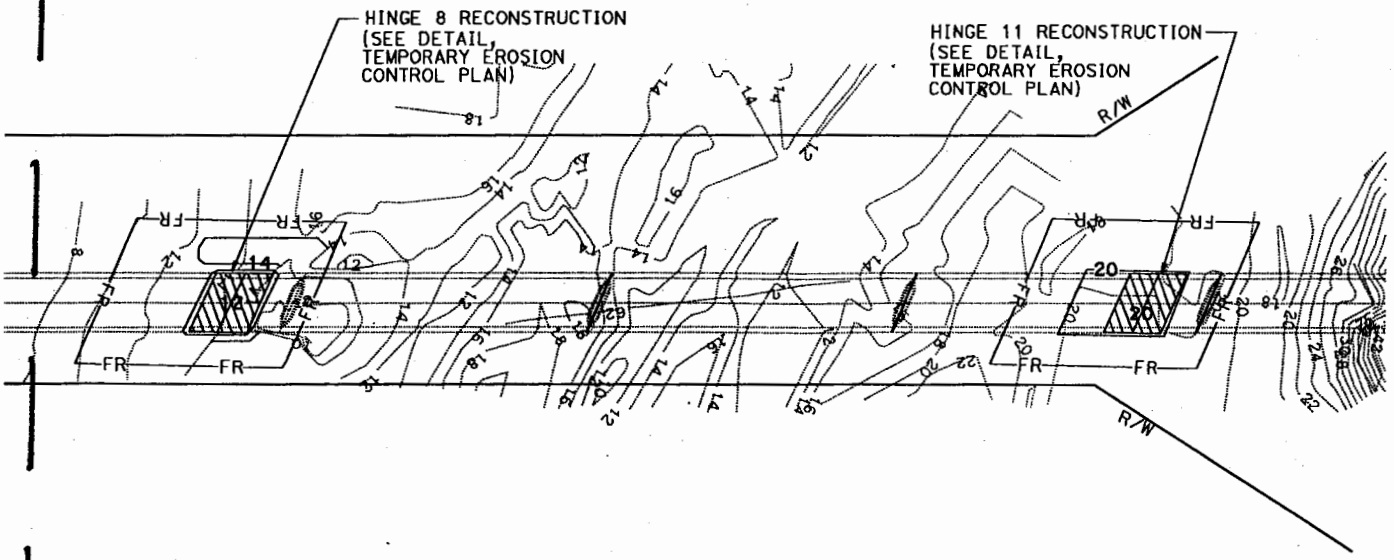

TEMPORARY GRADING PLAN HINGES 8 & 11

SCALE: 1" = 50'

(STORM WATER, EROSION AND WATER POLLUTION CONTROL PLAN)

CONSTRUCTION DETAILS C-1

SCALE AS NOTED

0 1 2 3

LAST REVISION 08-18-11 | DATE PLOTTED => 23-AUG-2011 | TIME PLOTTED => 08:43

ECT NUMBER & PHASE 01000003531

DEPARTMENT OF TRANSPORTATION
DISTRICT 1, P.O. BOX 3700
EUREKA, CA 95502-3700
PHONE (707) 445-6440
FAX (707) 441-5775
TTY 711

Flex your power!
Be energy efficient!

December 14, 2011

File: Klamath River Bridge
Long-Term Vegetation
Maintenance Activities

Melanie Faust, Coastal Analyst
California Coastal Commission
710 E Street, Suite 200
Eureka, CA 95501

Dear Ms. Faust:

As identified in the Revegetation, Mitigation and Monitoring Plan submitted to your office on November 29, 2011, to offset the temporary effects associated with the Klamath River Bridge Hinge Replacement Project, the California Department of Transportation (Caltrans) proposes to revegetate Hinge Work Areas 2, 8, and 11, and to restore 0.790 acre of coastal wetland located between Hinge Work Areas 8 and 11 (see attached map). The Coastal Commission requested confirmation that maintenance trimming (clear-cut to the ground) would not occur within the revegetated and restored areas. As identified in the revegetation plan, the proposed plant palette includes shrubs that only grow up to 20 feet tall. Given this, trimming/cutting should not be necessary. In the event that shrubs or trees encroach upon the bridge, Caltrans would not clear-cut the vegetation, rather Caltrans would strategically trim individual trees and/or shrubs to the necessary distance required for bridge maintenance. The distances maintained will be 10 feet from the edge of the bridge deck and at least 20 feet below bridge soffit.

If you have any questions, please contact me at 445-6393.

Thank you,

M J Suchanek

Mark Suchanek, Deputy Director
Caltrans, District 1

cc: Kevin Church
Steve Croteau

Klamath River Bridge Hinge Replacement Project: Restoration Areas

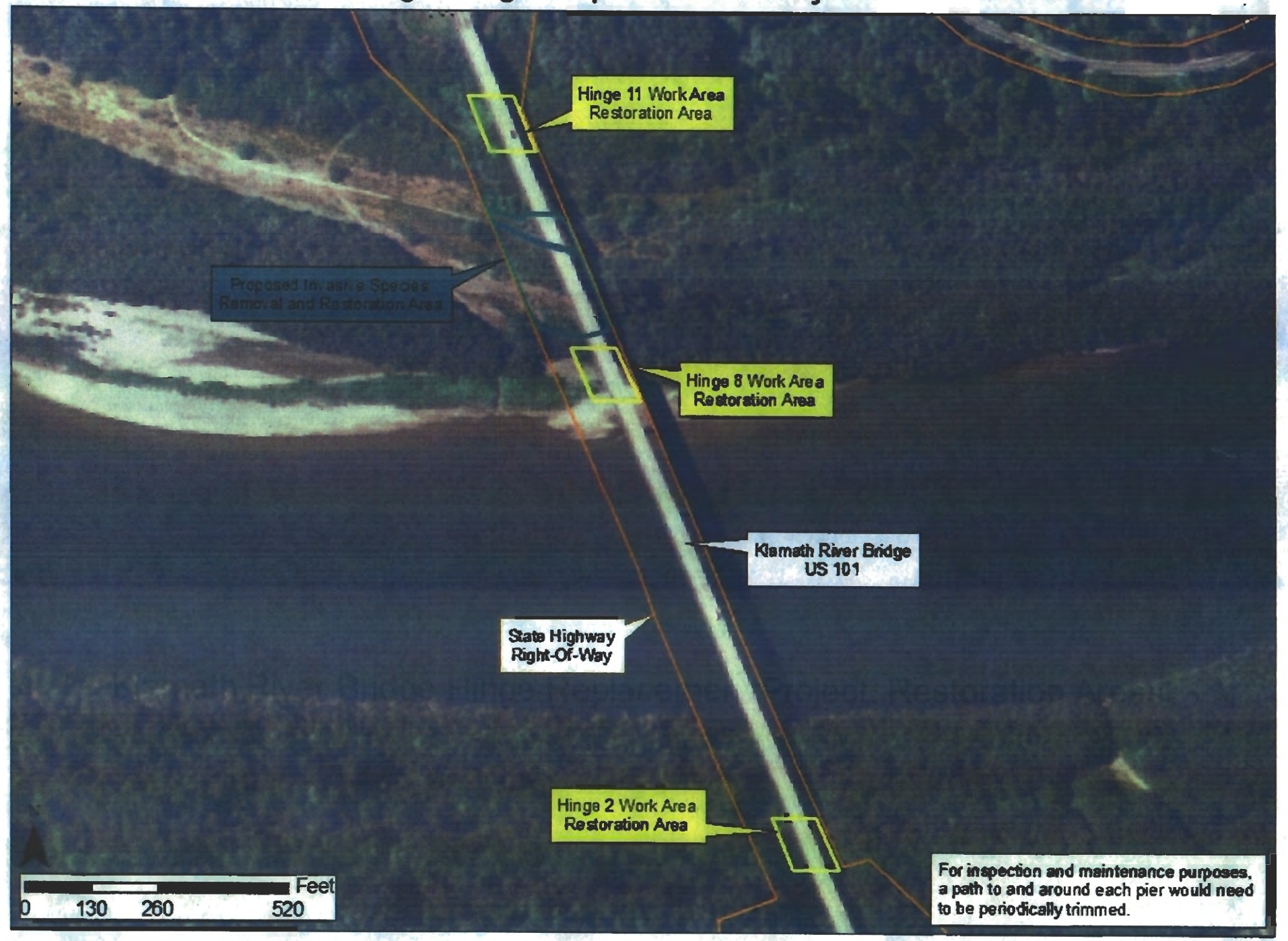

Figure 6. Maintenance Vegetation Trimming Within Hinge 2 Work Area

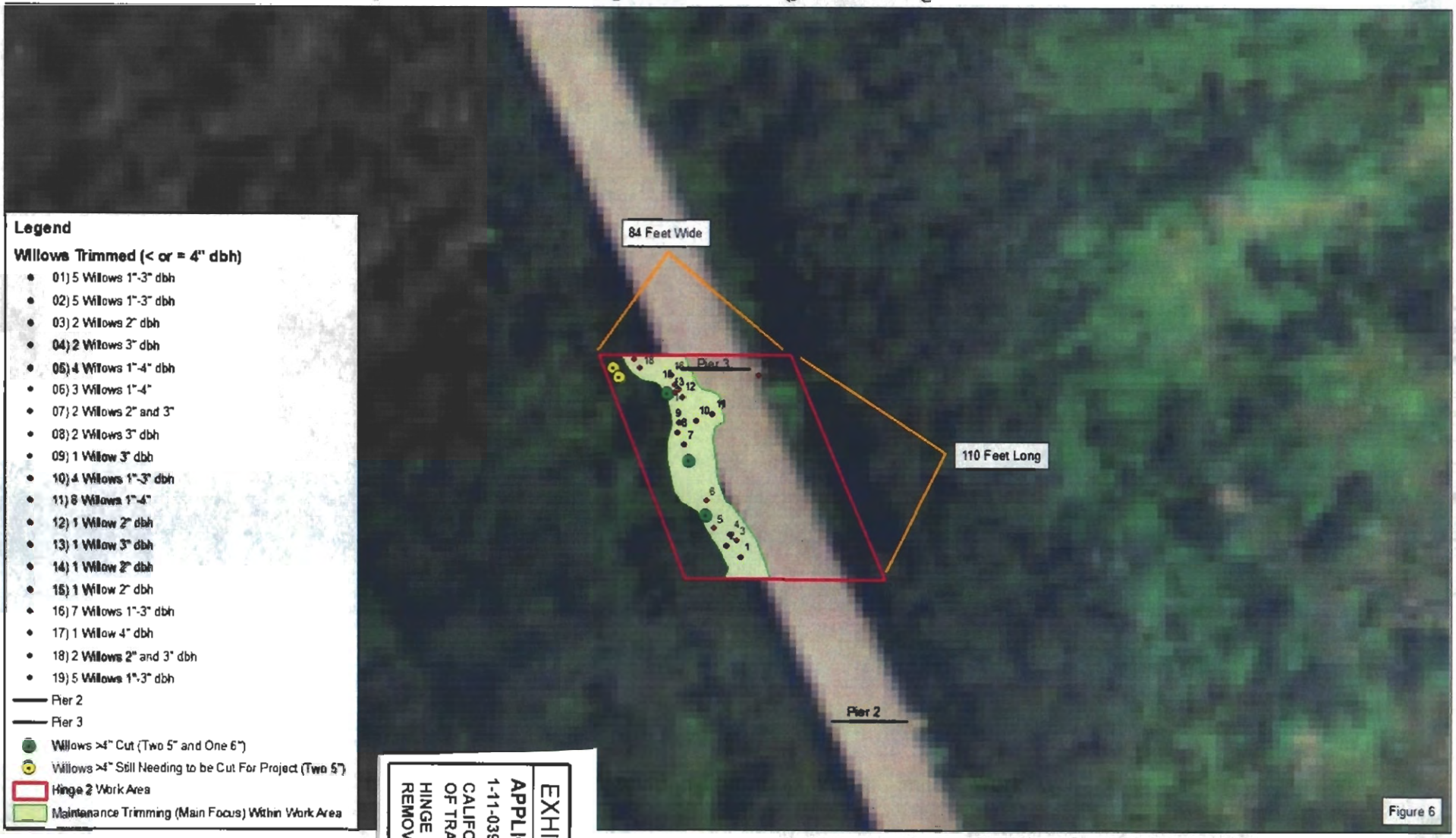

EXHIBIT NO. 8

APPLICATION NO. 1-11-039

CALIFORNIA DEPARTMENT OF TRANSPORTATION

HINGE 2 VEGETATION REMOVAL DETAILS