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CDP 1-18-1078 (CALTRANS EUREKA-ARCATA HIGHWAY 101 CORRIDOR PROJECT)

AUGUST 7, 2019

EXHIBITS

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Regional Overview
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PROJECT VICINITY MAP

Exhibit 2
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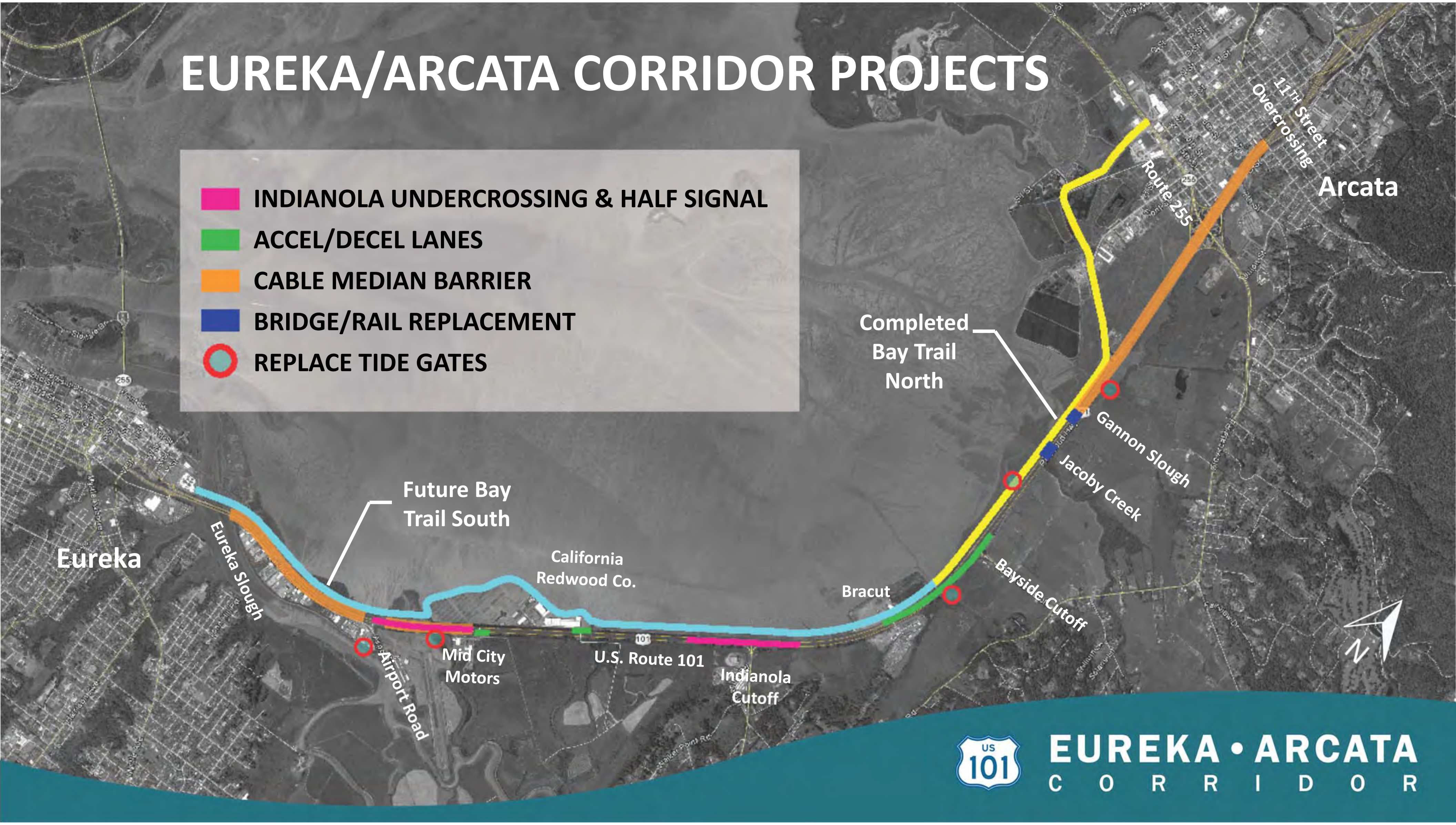

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Eureka – Arcata Route 101 Corridor Improvement Project

Project Information

Project Descriptions

The Eureka-Arcata Route 101 Corridor Improvement Project consists of five phased construction projects and the associated mitigation project—Humboldt Bay Area Mitigation (HBAM). Route 101 is one of the three routes comprising the corridor between Eureka and Arcata. The other two routes are Old Arcata Road and Route 255. This project considers improvements to Route 101 from Eureka to the 11th Street Overcrossing in Arcata, and for this report, it is referred to as the "Eureka-Arcata corridor". The Eureka-Arcata corridor is an access-controlled expressway and freeway between Eureka and Arcata adjacent to the North Coast Railroad Authority (NCRA) Railway and Humboldt Bay. The expressway extends from V Street in Eureka to the Jacoby Creek bridges in Arcata; to the north of the Jacoby Creek bridges is freeway.

This project proposes to reduce operational conflicts along the Route 101 corridor, improve safety, and reduce delay at intersections on Route 101 by closing median crossings, and constructing an interchange and signalizing an intersection on Route 101. A State Transportation Improvement Program (STIP) project was initiated and programmed by the Humboldt County Association of Governments (HCAOG) for the study of a project on the order of magnitude (cost and scope) of Alternative Y-4 (subsequently re-named Alternative 2) as identified in the Supplemental PSR (PDS) dated September 2000. This project was combined with a State Highway Operational and Protection Program (SHOPP) Roadway Rehabilitation Project within the same project limits. The rehabilitation project has subsequently been broken into smaller projects which include a CAPM paving overlay (completed 2014), extending acceleration lanes, median barrier upgrades, bridge replacement, bridge rail replacements, upgraded lighting, and tide gate replacements.

After the initial circulation of the Draft EIR/EIS, further refinements were made to reduce wetland impacts and reduce access impacts at Airport Rd, by providing a half signal. The preferred project is described as follows:

Modified Alternative 3A:

• Close median crossings (Mid City Motors, California Redwood Co., Bracut, and Bayside Cutoff);

• Construct Compact Diamond grade separation with 22 foot median and 1 ½:1 side slopes at Indianola Cutoff (to minimize wetland impacts);

• Re-align Jacobs Ave. (with retaining wall) at Airport Rd. and signalize intersection at Airport Road/Route 101;

• Construct a third Route 101 northbound (NB) lane from Airport Road to Mid City Motors;

• Lengthen right side acceleration and deceleration lanes as needed at each of the access locations;

• Install median barrier, Eureka Slough bridge to Airport Road;

• Replace southbound (SB) Jacoby Creek bridge;

• Replace bridge rails on NB Jacoby Creek and Gannon Slough bridges;

• Replace thrie-beam median barrier with High Tension Cable median barrier and paving from South G Street to 11th Street Overcrossing;

• Remove trees from the clear recovery zone;

• Upgrade lighting;

• Remove safety corridor signs;

• Replace tide gates.

The following project descriptions for the five projects are given below.

TIDE GATE REPLACEMENT

PROJECT DESCRIPTION

Six tide gates at four different locations will be replaced (Table 1). The tide gates within the environmental study limit (ESL) were installed in 1954, are aging and in poor condition, and require emergency repair at an increasing rate. Included are the tide gate south of Mid-City Motor World that connects to a roadside ditch at California Redwood Company; a tide gate at Brainard Slough north of Bracut; a tide gate at Old Jacoby Creek; and a triple tide gate at Gannon Slough, north of the NB Gannon Slough Bridge.

Currently, all the tide gates are the standard top-hinged flap gate design, either round or rectangular. At the locations where federally listed fish such as salmonids and tidewater goby may be present, a fish-friendly design will be installed to facilitate fish passage. The old Jacoby Creek, Brainard, and Gannon Sloughs are locations where both tidewater gobies and salmonids may be present and will receive fish-friendly tide gates. Once installed, the fish-friendly tide gates will be adjusted to maintain existing muted tidal flow conditions to perpetuate current habitat conditions present inland of the tide gates, such as minimum and maximum water level, salinity, and water level fluctuations.

There are a number of tide gate configurations available to provide for fish passage. These include self-regulating or buoyant gate; a permanent, adjustable guillotine gate that creates a continual passage; a Muted Tide Regulator Gate; and Mitigator Fish Passage Gate. The final tide gate design selection will be determined with technical assistance requested from the National Marine Fisheries Service (NMFS), U.S. Fish & Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW).

Operation of the tide gates, and subsequent habitat enhancement, will likely be linked to further restoration activities unrelated to the action. Caltrans will work with regulatory agencies and adjacent landowners to ensure the development and implementation of adaptive management strategies for operation of the newly installed fish-friendly tide gates to balance the habitat and fish passage needs of listed salmonids and tidewater goby with suitable land uses.

The California Redwood Company ditch has no upstream fish habitat, so this replacement gate will not have a fish-friendly design. This tide gate will be replaced in-kind with an automatic drainage gate.

All replacement gates will make use of existing headwall structures and will be installed at the same level as the existing gates. The tide gate work will generally consist of removing the existing tide gates and likely re-drilling and installing new stainless steel anchors epoxied into existing concrete. Minor structural modifications to the headwalls, including concrete placement, may be needed to mount the new gates. The new tide gates will generally be placed by cranes then bolted into place. Tide gate replacement will coincide with low flow and low tide periods during the summer and/or winter months to minimize turbidity, exposure to fish (Caltrans NMFS 2016 BA), and to ease construction.

Even at low tide there may be a small amount of run-off flow, and one or two workers may have to enter the channel to position and install the new gate. Therefore, some minor turbidity is anticipated. If water is present in the channel during tide gate replacement, temporary exclusion devices will be placed in the channel to keep water out of the construction zone. The exclusion devices are anticipated to be in place no longer than 8 hours.

Table 1. Tide Gate Replacements

No.	Location	Fish Species	Existing Gate(s)	Replacement Gate(s)
1	California Redwood Company ditch	No fish present	1 - 48″ x 36″ rectangular	1- standard or tideflex
2	Brainard Slough	Tidewater goby & salmonids	1 - 24″ round	1- fish-friendly design
3	Old Jacoby Creek	Possibly tidewater goby	1 - 60″ square	1–fish-friendly design
4	Gannon Slough	Tidewater goby & salmonids	3 - 60″ x 72″ rectangular	2- fish-friendly design 1- standard or tideflex

JACOBY CREEK BRIDGE REPLACEMENT

PROJECT DESCRIPTION

Bridge Rail Upgrades at Jacoby Creek and Gannon Slough

The existing northbound (NB) Jacoby Creek and NB Gannon Slough bridges were originally constructed in 1955 and are approximately 74.5 feet long and 76.5 feet long, respectively, and 39 feet wide. The bridges consist of reinforced concrete slabs resting on reinforced concrete pile caps on concrete piles. There are four bents in total for the NB Jacoby Creek Bridge and five for the NB Gannon Slough Bridge.

The new bridge rails will be either the ST-70 or newer ST-75 design and dull gray in color. (The ST-75 design should be approved in fall of 2019.) The new bridge rails will be cantilevered from the existing bridges, requiring no piers within the watercourses. A containment system will be placed along the edges of the bridges to keep foreign materials from entering the watercourses during construction. Construction of the bridge rails will be performed from the roadway; however, workers may need to walk on the bed, bank or channel of the watercourses to install and remove the debris containment system.

Both bridges will be widened by approximately 24 inches (12 inches on each side of the bridges) to accommodate the new bridge rails; however, the lane widths of 11 feet and 12 feet, the right shoulder (10 feet), and the left shoulder (4 feet) will match the existing widths. Steel tubular railing will meet standard height requirements for bicycle and pedestrian use. The wider bridge configurations will shade approximately an additional 75 square feet of Gannon Slough and additional 100 square feet of Jacoby Creek.

Replacement of the Southbound Jacoby Creek Bridge

The existing southbound (SB) Jacoby Creek Bridge on U.S. Highway 101 (US 101) at post mile (PM) 84.6 was originally constructed in 1920 for a two lane conventional highway. The original bridge was approximately 73 feet long and consisted of reinforced concrete beams resting on four reinforced concrete bents. The bridge was widened by approximately 16 feet in 1956 when the two lane highway was converted for use as the SB lanes of a divided highway. Due to age and deterioration, and the need for more frequent and costly maintenance, this bridge needs to be replaced.

The new bridge will be approximately 73 feet long and 43 feet wide (4 feet wider than the current bridge). The additional width is to allow for standard shoulder widths and bridge rails. The new bridge will be two lanes wide and single span with no piers in the channel, unlike the current bridge which is a three-span structure with two rows of piles within the channel. The new bridge will be constructed at a deck elevation approximately two feet higher than the existing bridge elevation to account for anticipated sea-level rise and to keep the new bottom of soffit above existing soffit elevations. The new bridge will have approximately 300 square feet more surface area and will shade an additional 300 square feet area of Jacoby Creek.

Elements of construction of the detour bridge and demolition of the SB Jacoby Creek Bridge are described in further detail below.

Construction of the Detour Bridge

The replacement southbound Jacoby Creek bridge will be constructed adjacent to the existing bridge within the median. A temporary detour of the southbound lanes will be constructed within the median and utilize the new bridge on the detoured alignment. The temporary realignment onto the new bridge allows the demolition of the existing SB Jacoby Creek Bridge. After the old bridge is removed and the new bridge abutments installed, the detour bridge will then be moved to the new bridge location by using a jack-and-slide method.

Construction of the detour will involve the removal of approximately 0.05 acre of riparian vegetation within the highway median, including four large, non-native Monterey pine (*Pinus radiata*) trees (diameter at breast height [dbh] 30-61 inches). The detour bridge approaches will require approximately two years of temporary paving in approximately 0.35 acre of wetland. Although the approaches will be restored once construction is complete, the 0.35-acre impact to wetland will be considered a permanent impact due to the extended duration of up to two years of loss of wetland function.

In the median on both sides of Jacoby Creek, two areas (each about 50 feet long, 8 feet wide, and 4 feet deep) will be excavated east of the existing bridge for the temporary detour bridge abutments. All excavated material will be contained to prevent sediments from entering waterways, or the excavated material will be placed directly into dump trucks and carried to an approved disposal site. These excavations will be above the ordinary high water mark (OHWM), avoiding the water of the active, wetted Jacoby Creek channel and associated emergent vegetation; however, water is expected to enter the excavated areas, therefore dewatering or seepage prevention will be required.

Within the excavated areas on either side of the channel, twelve 36-inch diameter cast-in-steel shell (CISS) piles would be driven on the banks of Jacoby Creek (six on either side of the creek) approximately 15 to 20 feet from the active wetted channel. The new design allows for the piles to be vibrated or rotated/oscillated for the upper 30 feet after which point impact driving would be required.

Pile sections would be staged on either side of Jacoby Creek within the work zone. The pile would be swung into position and suspended near the ground surface directly above its planned installation location. The first section of pile would likely be installed using a vibratory hammer attached to the hoisting crane, to a maximum of 30 feet below pile cut-off elevation. The remainder of the pile would be driven to pile tip elevation using an impact hammer. The pile design tips are 85 feet. Upon reaching pile tip and verifying pile capacity, the material inside the pile wall would be removed using a down-hole drill rig. It is feasible that all piles for any one abutment would be driven prior to any one pile in the group being drilled, due to space and equipment availability. Drilling spoils would be removed from the area adjacent to the pile as drilling progresses. If necessary, industry-standard practices would be used to minimize soil heaving and groundwater infiltration at the base of the pile (wet-hole drilling methods). Upon completion of drilling, a seal course would be placed at the base of the pile within the pile wall. Bar-reinforcement for the pile would be hoisted and lowered into the excavated shaft followed by placement of structural concrete.

It is estimated that one to two piles could be installed in a single day, depending on the pile lengths used and any work stoppage to add pile length. Once initiated, impact pile driving is estimated to take less than 15 minutes for each pile with continuous pile driving. The final geotechnical capacity of the piles would need to be checked after a few days using impact pile driving. The number of blows required to test capacity would depend on the Contractor's selection of pile hammer but would be a significantly shorter driving period with fewer blows compared to installation, estimated at one minute of driving and six or seven blows per pile.

A temporary concrete washout facility would be placed on-site for concrete clean up, and all pile driving equipment would be staged outside the banks of Jacoby Creek. After the piles are installed, pile caps would be constructed to form the abutment footings. The new bridge superstructure would comprise precast box girder sections, supporting cast-in-place concrete barrier railings and deck. Temporary fill will be placed for the detour bridge approaches, then paved, and then SB traffic will be diverted to the new bridge.

Demolition of the Existing Jacoby Creek Bridge

Once the detour is operational, the old bridge will be demolished. The contractor will be required to submit a demolition plan, to be approved by the Caltrans resident engineer, which will describe methods and measures taken to restrict or minimize construction debris from entering the creek channel prior to demolition. The CCC, CDFW, and NCRWQB will also have an opportunity to review the demolition plan.

Prior to demolition, a debris containment system will be installed per the approved demolition plan. Temporary containment could be mounted to either the existing bridge support piles or placed on the banks of the creek outside the wetted channel to allow for removal of the bridge rails, concrete deck, and beams while minimizing the possibility of debris entering the creek channel.

Once the containment system is in place, the bridge rails will be removed with a small hoe-ram, jackhammers and/or concrete saws. Using a crane or excavator, the deck and beams will likely be taken out in pieces from above. The pile caps supporting the existing bridge deck will then be removed, similar to the deck removal. Debris will be removed from the debris containment system as demolition work proceeds. All concrete debris will be moved outside the project limits to be recycled or disposed at an approved disposal site.

Twelve of the existing bridge piers (a row of six piers on either side of the channel) are situated above the water line on the bank of Jacoby Creek and their removal will not impact the creek channel. These piers will be cut off at an elevation sufficiently low enough to accommodate the new bridge’s foundation, which will be approximately four feet below the existing roadway elevation. Twelve remaining piers are in the water even at low tide and their removal will require in-stream work. To ensure all minimization and avoidance measures are implemented, a biological monitor will be present during all in-stream activities associated with removal of the existing SB Jacoby Creek Bridge and piers.

The twelve piers within the channel will be removed above the water line of the creek during low tide to avoid the need for excavation or isolation casing and to minimize turbidity. This will likely be accomplished by tightly wrapping containment material (high density polyethylene [HDPE] sheets to control dust and debris from entering the creek) to the piers below the water line, then using a concrete saw or pneumatic/hydraulic hammer to cut the piers above the water line. The cut piers will be tethered to an excavator or crane operating from outside the channel, then removed and placed outside the channel. Pier removal will take approximately two weeks to complete. After demolition and removal of all structural elements of the bridge, the debris containment system will be removed.

Construction of New Bridge Abutments and Final Bridge Alignment

In the excavated areas of the old abutments, new abutments will be extended to the west along both banks of Jacoby Creek. Within the excavated areas on either side of the channel Twelve 36-inch CISS piles (six on each side of Jacoby Creek) will be installed on the banks about 15 to 20 feet from the active, wetted channel for the abutments of the new bridge. The first 30 feet of each pile would likely be installed using a vibratory hammer and then impact driven to pile tip elevation (estimated to be 85 feet deep) and tested for bearing capacity as described for the temporary detour bridge piles.

The south bound (SB) roadway will be closed for one night. Using the jack-and-slide method, the detour bridge deck will be moved approximately 52 feet west to the original alignment with the highway. The bridge will be paved and striped, and traffic will be re-routed.

Once the new bridge is operational, the remaining asphalt surface of the detour bridge will be removed and recycled or properly disposed of outside the project limits. The fill placed for the detour will be removed and contoured to the pre-construction slopes within the median. The finished surface will be seeded with a California native seed mix and non-persistent cereal grain for erosion control. Once the area is stabilized, silt fences or other temporary best management practice (BMP) systems utilized to prevent construction debris or sediment from entering Jacoby Creek will be removed.

The abutments of the detour bridge will remain in place, to be utilized for traffic staging for future replacement of the northbound bridge when it reaches the end of its useful life. The abutments will be covered with topsoil and planted until such time when they will be used again.

GUARDRAIL AND CABLE RAIL SAFETY BARRIER

PROJECT DESCRIPTION

Cable rail safety barrier with a four-foot-wide concrete pad will be installed in the median between the Eureka Slough bridges and Airport Road, and from South G Street to the 11th Street overcrossing in Arcata, to replace existing three-beam guardrail at that location. At one location within the Project, North Bound PM 81.84 existing metal beam guardrail (MBGR) will be replaced to meet current guard rail design standards.

EXTENSION OF DECELERATION/ACCELERATION LANES & LIGHTING IMPROVEMENTS

PROJECT DESCRIPTION

Extension and Spot Widening of Deceleration/Acceleration Lanes

The project proposes to reduce operational conflicts along the US 101 corridor, improve safety, reduce delay at intersections on US 101, and construct acceleration and deceleration lanes at various locations. Guardrail will be reset and extended at various locations to match existing (North Bound PM 80.2, 83.6, South Bound PM 81.5 to 82.0), and may be raised 2-5 inches to match new roadway elevations. The guardrail at northbound PM 83.6 will be replaced and extended from an existing 200 feet long to approximately 575 feet long, to provide protection to the public from fixed objects within the Clear Recovery Zone (riparian trees). Work locations and descriptions can be seen in Table 2.

Table 2. Proposed Work Locations

US 101 Intersection	PM	Description
Cole Avenue	80.2	Extend the existing northbound US 101 deceleration lane to 800 feet and improve lighting.
Mid-City Motor World	81.3	Extend existing northbound US 101 acceleration lane to 1,600 feet and remove existing median crossing. Reset and extend guardrail
California Redwood Company	81.8	Realign southbound US 101 for 3,600 feet to avoid impacts to existing trees, construct acceleration/deceleration lanes, reset guardrail, and remove median crossing.
Bracut Lumber Company	83.4	Extend existing US 101 southbound deceleration lane to 800 feet, construct 1,600 foot US 101 acceleration lane, reset and extend guardrail, and remove existing median crossing.
Bayside Cutoff	83.9	Construct 700-foot northbound US 101 deceleration lane, construct 1,600 foot northbound US 101 acceleration lane, remove existing median crossing, and improve lighting.
G Street	85.0	Remove existing curbs adjacent to right side edge of traveled way, repave the shoulders with uniform super-elevation, and upgrade lighting.
Route 255 Interchange	85.8	Remove existing curbs adjacent to right side edge of traveled way, and repave the shoulders with uniform super-elevation.

INDIANOLA GRADE SEPARATION & AIRPORT ROAD IMPROVEMENTS

PROJECT DESCRIPTION

Indianola Grade Separation and Airport Road Improvements

The compact diamond grade separation (undercrossing) will elevate US 101 up to 20 feet above the existing highway, and will have a single bridge crossing Indianola Cutoff constructed in two stages. The median width will be reduced to 22 feet at the interchange, requiring median barriers, and the median within the interchange area will be paved. Indianola Cutoff will maintain its present alignment, however will be raised approximately 2 feet at the proposed undercrossing. The longitudinal distance impacted by construction of the interchange is approximately 2,000 feet both north and south of Indianola Cutoff, for a total length of approximately 4,000 feet. The width of impact will be from the limits of shoulder backing west of SB US 101 to a minimum distance of approximately 20 feet from the top of slope along the existing ditch to the east of US 101. The bridge crossing Indianola Cutoff will be a single span, slab type structure approximately 70 feet in length, 94-feet wide, and approximately 2½ feet in depth. The bridge will be supported by CISS piles driven to a depth to be determined, but could extend approximately 100-feet below existing grade. Fill slopes of up to approximately 1.5:1 will be placed along the highway and ramps to minimize impacts to wetlands. The bridge abutments will extend down to the street level of Indianola Cutoff. The abutments would appear as retaining walls to provide a wider view for traffic on Indianola Cutoff. The cross section of Indianola Cutoff will include 6-foot-wide sidewalks on each side, 8-foot-wide shoulders on each side, two 12-foot-wide lanes in each direction, and an additional 12-foot wide turn lane.

There will be a connection to the Humboldt Bay Trail South at the Indianola Undercrossing by extending sidewalks and/or bike lanes to the proposed adjacent trail. Caltrans will work with Humboldt County to create this connection, as the County develops plans for the Bay Trail South.

Geotechnical drilling was performed in the summer of 2018 to determine the earthwork placement, dewatering, and pile driving depth requirements. However, design has assumed that the placement of vertical drains at locations of fill will be required to accelerate the settlement process under the added fill material over bay muds. Fill material will be from commercial sources. Some embankment material will be placed prior to installation of the vertical drains to ensure water removed will drain. Approximately 1 foot of permeable rock will be placed over the embankment material in the areas of the vertical drains. A preliminary estimate for the vertical drains is a spacing of 6 feet with a depth of 50 feet. The vertical drains will be installed to relieve pore water pressure and will drain into the permeable rock layer above the existing grades where water will be allowed to escape. Vertical drains are installed with a truck or excavator mounted mandrel driven into the ground, and leaving in its place a synthetic drain that will allow water to drain to the permeable layer as pore pressure in the underlying soils is increased due to placing fill.

Construction of the interchange will require staged construction. During construction, existing turning movements at Indianola Cutoff will be perpetuated until the completion of the grade separation.

Construction Sequence of the Indianola Cutoff Interchange:

- Place fill within median adjacent to SB US 101 for the length of the interchange construction limits (~PM 82.3/83.1). Place base and paving for the realignment of NB US 101 within median. Place Temporary Type K railing between the temporary NB alignment and the existing SB lanes. The temporary alignment will have a median width of approximately 8 feet from the NB edge of the traveled way to the SB acceleration lane edge of the traveled way. Generally, SB left turns will be accommodated to and from Indianola Cutoff during construction of the grade separation.
- Realign NB traffic to the temporary alignment within the median.

- Place fill to approximately 2 feet above the existing pavement elevations within the east half of the interchange to be constructed.
- Place a layer of geotextile fabric on the fill, then place drain rock over this area and another layer of geotextile fabric over the drain rock.
- Place vertical drains at locations receiving more than 6 feet of fill on a 6-foot grid pattern for the NB half of grade separation.
- Place a layer of geotextile fabric on the fill, then place drain rock over this area and another layer of geotextile fabric over the drain rock.
- Place fill to the approximate finished grade of NB US 101 to form the NB lanes and ramps for the Indianola Cutoff grade separation. Fill will be monitored for compaction and settlement prior to paving.
- Trench and place conduit and lighting foundations, electrical equipment, poles, and lights for NB half of interchange and ramps.
- Concurrently with the fill operations, drive CISS abutment piles for each end of the NB half of the interchange.
- Place forms and reinforcing steel to form the abutments for the NB half of the bridge and the footings for the wing walls approaching the bridge.
- Pour concrete forming the bridge abutments and lower retaining wall footings.
- Place falsework forms across Indianola Cutoff to form the voided slab bridge deck for the NB half of the bridge.
- Place reinforcing and concrete voided slab bridge deck.
- Form and place steel bridge rail along the east edge of the bridge.
- As settlement will have occurred to the fill placed for the grade separation, add or remove fill as required to meet finish grades of NB US 101, and place aggregate base and asphalt pavement for the NB ramps and NB US 101.
- Place temporary railing (Type K) along median shoulder of grade separation.
- Relocate NB traffic to newly constructed NB undercrossing.
- Place geotextile fabric, drain rock, fill, and construct SB half of undercrossing for the NB half of the undercrossing.
- Place vertical drains at locations receiving more than six feet of fill for SB half of the grade separation.

- For the southbound half of the grade separation, place fill, place piles for the southbound half of the bridge, construct bridge foundation, wing walls, and bridge deck and bridge rail similarly to that noted above.
- Place base and paving of SB lanes.
- Construct median barrier and install guardrail transition rails and terminal systems within the median of US 101 in the area of the interchange.
- Realign SB traffic to the newly constructed SB lanes of the interchange. Regrade and remove paving of the existing SB lanes to reduce the paved width to conform to the standards of ramps (24 feet wide). Place finished paved surface of SB ramps and restripe accordingly.
- Place erosion control, seeding and trees on finished fill slopes of SB and NB half of interchange.

Road Realignment and Drainage Modification at Jacobs Avenue/Airport Road Intersection

The Airport Road and Route 101 intersection will be signalized. Southbound traffic will be continuous, and norhtbound traffic will be controlled to allow for left turns from Airport Road onto south bound Route 101. Along the northbound US 101 median, an additional lane will be constructed from approximately 800 feet south of the intersection with Airport Road extending north to Mid-City Motor World. This work will include scarifying existing soils and placing fill within the median, approximately 14 feet to 18 feet in width, to accommodate the added 12 feet of additional pavement.

The intersection of Jacobs Avenue and Airport Road will be widened to accommodate egress and access with US 101. Widening of the intersection will require the relocation of a fire hydrant and joint utility pole and anchor to the east side of Jacobs Avenue. The current stormwater drainage flows approximately 50 feet through a 24-inch concrete pipe under Jacobs Avenue. Currently, the remaining 100 feet of drainage is an open ditch along the Airport Road shoulder. A drainage inlet will be placed on the existing culvert crossing Jacobs Avenue, and a 24-inch diameter culvert approximately 80 feet long will be placed in the drainage ditch to perpetuate existing drainage patterns. An additional stormwater drainge inlet and culvert will extend into the Carl Johnson parking area to provide for site drainage affected by placing fill for the realignment of Jacobs Avenue. The existing approximately 180-foot long open ditch will be largely eliminated and realigned into a 80-foot long, 24-inch diameter culvert, discharging farther down the same ditch.

To realign the drainage and realign Jacobs Avenue, the order of work will be as follows:

- Trench and place new drainage inlet and culvert along the ditch between the Carl Johnson/Farm Store properties and Jacobs Avenue. A curb will also be placed along the edge of the Carl Johnson parking area.
- The fence between the private property and Jacobs Avenue will be temporarily removed to place fill for the realigned Jacobs Avenue.
- Imported fill will be placed to the planned grades for the realigned Jacobs Avenue and a segment of sidewalk will be placed, then the realigned Jacobs Avenue will be paved and striped.
- Fencing will be replaced along the property line between Jacobs Avenue and the private properties abuting the realigned Jacobs Avenue.
- A half signal system will be constructed at the intersection of US 101 and Airport Road, which will include signal and control cabinet foundations, traffic signals, cabinets, and underground wiring.

Close Median Crossings

Median crossings will be closed at Mid-City Motor World, California Redwood Company, Bracut Lumber Company, and Bayside Cutoff.

Work will consist of saw cutting the pavement at these locations, removal of the pavement and base rock, excavating, placing topsoil, and reseeding the median crossings to prevent their use by motorists. Pavement will be removed by cold planning, using a machine that deposits grindings directly into a truck which are then hauled away for disposal or recycling. The medians will then be excavated down to the appropriate depth to create wetlands. The material from the median crossing removal can be used as fill for the construction of the SB half of the grade separation. The medians will then be seeded with a native wetland seed mix.

MAJOR VEGETATION REMOVAL

SUMMARY

For traffic safety and to create space for widening of deceleration/acceleration lanes, it is anticipated that approximately 1.56 acres of trees and shrubs would be removed from riparian areas within the corridor (Caltrans Onsite MMP, 2019)). Species that are anticipated to be removed include Monterrey pine, Monterrey cypress (*Hesperocyparis macrocarpa*), California wax-myrtle, beach pine, Sitka spruce (*Picea sitchensis*) willow, red alder (*Alnus rubra*), red claws (*Escallonia rubra*), pittosporum (*Pittosporum* sp.), and cotoneaster (*Cotoneaster* sp.). The actual number of riparian trees and shrubs removed would be determined during construction. All trees and shrubs within riparian habitats that are removed would be replaced through planting of regionally appropriate, native riparian trees and shrubs once construction is complete.

Wetland Impact Summary

Table 4: Permanent Wetland Impacts:

EA #	Project Name	Habitat Types / Cowardin	CWA Section 404 (3 Parameter) Wetlands (acres)	CCA (1-or 2 parameter wetlands (acres)
01-0E000	Jacoby Creek Bridge Replacement	Palustrine emergent wetland / PEM	0.28	0.29
01-0E000	Jacoby Creek Bridge Replacement	Estuarine intertidal emergent wetland / E2EM	0.10	0.10
01-0C970	Guard Rails Median Barriers	Palustrine emergent wetland / PEM	1.04	1.60
01-0F220	Accel/Decel Lanes+Lighting	Palustrine emergent wetland / PEM	0.84	0.96
01-36600	Interchange/Airport Rd Improvement	Palustrine emergent wetland / PEM	6.22	7.30
	Total Permanent Impacts:		**8.48**	**10.25**

Table 5: Temporary Wetland Impacts:

EA #	Project Name	Habitat Types / Cowardin	CWA Section 404 (3 Parameter) Wetlands (acres)	CCA (1-or 2 parameter wetlands (acres)
01-0E000	Jacoby Creek Bridge Replacement	Palustrine emergent wetland / PEM	0.42	0.42
01-0C970	Guard Rails Median Barriers	Palustrine emergent wetland / PEM	0.98	1.00
01-0F220	Accel/Decel Lanes+Lighting	Palustrine emergent wetland / PEM	1.14	1.20
01-36600	Interchange/Airport Road Improvement	Palustrine emergent wetland/ PEM	1.54	1.58
	Total Temporary Impacts:		**4.08**	**4.20**

Table 6: On-site Mitigation

Onsite Mitigation SHOPP				
EA #	**Project Name**	**Onsite Description**	**Mitigation Type**	**CWA Section 404 & CCA (1-or 2) parameter wetlands (acres)**
01-0E000	Jacoby Creek Bridge Replacement	Temporary bridge moved into permanent place	Creation/establishment	0.35
Onsite Mitigation STIPP				
EA #	**Project Name**	**Onsite Description Location**	**Mitigation Type**	**CWA Section 404 & CCA (1-or 2) parameter wetlands (Acres)**
01-36600	Interchange/Airport Rd Improvement	Median removal	Creation/establishment	0.52
The On-site Mitigation and Monitoring Plan has more detailed information.				

Water Quality Impact Description

Discussion of Water Quality Impacts

The project's primary constituent of concern is sediment during and after construction. During construction, there could be temporary adverse impacts due to increased erosion that could be transported to storm drains and receiving waters. After construction, newly vegetated cut and fill slopes have potential for sediment transport from slope rills and slumps if not inspected and maintained against developing erosion potential.

There is also a potential for spills and leaks of lubricants, oils and grease, and other fluids associated with vehicles. Fueling and maintenance of construction vehicles would occur in the project area during construction and there would be a risk of accidental spills or release of fuels, oils, or other potentially hazardous materials.

Temporary Water Quality Impacts

Temporary impacts are those that occur during the construction period and until the project is considered stabilized and complete according to the Construction General Permit. Construction projects are considered stabilized when the site will not pose any additional sediment discharge risk than it did prior to the commencement of construction activity. The Eureka-Arcata Corridor projects have the potential to cause water quality impairments through soil disturbance and the highway construction process. Construction operations will abide by Caltrans 2009 Construction General Permit requirements and will require a Storm Water Pollution Prevention Plan (SWPPP) with associated Best Management Practices (BMPs) to control potential releases of visible and non-visible pollutants to surface water.

The following construction activities have the potential to contribute to increases in sediment, turbidity, floating materials, oil, grease and chemicals to receiving waters:

- Daily contractor activity - Routine construction activities such as material delivery, storage and usage, waste management, vehicle/equipment operation, cleaning, maintenance and fueling, and use of a construction staging area could result in generation of dust, sediments, debris, chemicals and garbage. Vehicle/Equipment fueling and maintenance during construction have the potential for accidental spills of gasoline, diesel, oil, grease, hydraulic fluids, and other fluids into the environment.
- Vegetation clearing and grubbing - Removal or trimming of vegetation would be required for both construction and access. This activity would eliminate the groundcover that protects the topsoil. Exposed topsoil is more susceptible to erosion.
- Earthwork – Earthwork includes removal of the natural and/or stabilizing cover (topsoil) and the creation of engineered cuts and fill slopes and material stockpiles. Prior to establishment of temporary or permanent erosion control measures, cut and fill slopes and earth stockpiles are highly susceptible to erosion.
- Bridge Demolition and Construction activities - These activities will include the placement of fill and paving within the median for a temporary detour at Jacoby Creek, the excavation on the banks of Jacoby Creek, pile placement through vibratory, or rotary/oscillation methods for the construction of foundations, and the placement of precast-prestressed box section bridge components or foundation supported falsework to construct a cast-in-place single span bridge. Temporary cofferdams and dewatering may be required for foundation excavations where pumped water would be contained within the median. Removal of a bridge structure over water will also be required. In-water activities in general have the potential for suspending sediments and increasing turbidity levels. Operation of equipment and personnel for the removal and placement of concrete over the water has the potential for spillage of fluids and construction materials.

- Dewatering – Dewatering may be necessary and will be required to meet effluent limits of a WDR permit that may be issued by the NCRWQCB. Any dewatering operations will be required to meet effluent limits established by the NCRWQCB to maintain the beneficial uses identified in the North Coast Basin Plan.
- Culvert extensions and tide gate replacement – Work on culverts and tide gates will require in-water activities that have the potential for suspending sediments and increasing turbidity levels. Operation of equipment adjacent to the water has the potential for spillage of fluids and construction materials.
- Paving activities – Paving operations involve the handling of asphalt products that, if not properly managed, could enter stormwater runoff and/or receiving waters.
- Use and storage of fluids and chemicals - Accidental spills, improper storage, and improper application of chemicals during construction such as fertilizers and concrete can potentially impact water quality. Improper storage of oils and fuels could result in accidental spills and/or leaks within the construction area.

Permanent Water Quality Impacts

The potential for long term impacts on water quality from the proposed project include:

- Hydromodification - The increase in impervious areas will typically cause an increase in the peak flow and higher runoff volumes that could lead to channel scouring and bank erosion. The result could increase sediment and turbidity in receiving waters. Due to the area's flat terrain and predominate sheet flow drainage patterns onto vegetated slopes, the 10% increase in impervious surface created by the project will not likely create channel scouring or bank failures. The project area receiving water bodies are tidal influenced and therefore will not be impacted from hydromodification; thus, a hydromodification analysis or mitigation for hydromodification is not required for this project (confirmed with the NCRWQCB on January 28, 2010).
- Concentration of runoff - Typical highway drainage design involves collecting runoff in pipes or ditches, and discharging, either directly or indirectly, into receiving waters; however, drainage patterns of this project site are predominately sheet flow with stormwater runoff discharging to the same drainages as pre-project conditions.
- Highway runoff – Contaminants generated by traffic, pavement materials, and airborne particles that settle may be carried by stormwater runoff into receiving waters; however, there should be no increase in the pollutant loading over the existing condition as this

project is not intended to generate an increase in traffic volume. The existing vegetated slopes that provide biofiltration treatment of stormwater runoff will be perpetuated. The area climate, soils, and slopes provide near ideal conditions to sustain dense vegetation growth for biofiltration treatment BMPs. The remaining vegetated slopes and new vegetated slopes after construction will still perform adequate biofiltration for stormwater runoff. The project will result in a net increase in biofiltration treatment BMPs by creating new biofiltration BMPs near the Indianola interchange by realignment of the roadway and removing existing paved median crossings. The proposed project is not likely to degrade water quality from the pre-project condition.

- Accidental spills - Spills caused by highway-related traffic accidents may cause significant impacts to water quality, depending on the type and quantity of the material spilled. The build alternatives will improve traffic safety, thereby reducing the potential for accidents and spills.

Avoidance of Direct Water Quality Impacts

The Contractor(s) will be required to develop and implement site-specific BMPs and a SWPPP.

Caltrans will ensure applicable BMPs are used to stabilize all bare soil areas to minimize adverse effects to water quality. BMPs include treatment controls, soil stabilization, minimization measures, and scheduling. An active SWPPP will provide BMP inspections and sampling to ensure their maintenance until the project is complete and the site stabilized. Any groundwater or surface water from an excavation will be fully contained. Excess material excavated from the work site will be disposed of offsite at an appropriate permitted disposal site.

Avoidance of Indirect Impacts

Limited Operations Period

To protect the most vulnerable life stages of sensitive fish species that occur within the action area, in-stream work (work within a bed, bank, or channel of a watercourse) will be restricted to the period between July 1 and October 15. Construction activities restricted to this period include all tide gate replacements, pile installation on the banks of Jacoby Creek for the new bridge and the detour bridge, and activities associated with workers potentially walking in Jacoby Creek to install/maintain the debris containment structure and remove the old bridge piers.

Work performed within a wetted channel that involves workers walking within the channel (i.e., possible tide gate replacement, and construction/maintenance of containment systems for bridge demolition and bridge pier removal) will coincide with low flow and low tide events (outside of a significant precipitation event and between the latter two hours of outgoing tides and beginning two hours of incoming tides). Limiting in-stream work to low flow/low tide periods will minimize potential turbidity associated with workers walking in the channel or rock placement.

Bridge Work

- To avoid barotrauma to fish, no piles will be installed in the active, wetted channel for the new SB Jacoby Creek Bridge. Piles will be vibrated, oscillated, and driven into place on the bank 15 to 20 feet from the wetted channel.
- Piers from the old SB Jacoby Creek Bridge will be cut above the low tide water level to avoid impacts to fish and fish habitat. The bridge piers will be removed without excavation or the use of isolation casing to minimize turbidity in the creek.
- To avoid and minimize impacts to the watercourses, all bridge debris will be contained. The demolition debris containment system may be mounted on the existing bridge piers, and/or places on the stream banks outside the wetted channel. Containment will minimize the potential for bridge demolition debris to enter the watercourse.
- No construction equipment will work within the active, wetted creek channel; however, workers will need to walk within the stream to install, maintain, and remove the debris containment system. The contractor will be required to submit a Demolition Plan to the Resident Engineer for approval. The Demolition Plan will describe measures taken to restrict or minimize construction debris from entering the creek channel and to avoid or minimize the amount and extent of workers walking in the stream channel. The Demolition Plan will prohibit the use of any structure placed within the wetted channel of Jacoby Creek and require demolition activities coincide with low flow periods to minimize watercourse impacts.
- The contractor will be required to place temporary barrier fencing (or a similar form of visual barrier) along the entire length of the north and south banks of Jacoby Creek, within the vicinity of the SB and NB Jacoby Creek bridges, to minimize visual disturbance to fish and to prevent workers from crossing the creek during routine movements within the action area. In addition, the contractor will build or install a temporary footbridge that workers may use to cross the creek without walking in the wetted channel. Both ends of the footbridge will be placed outside the wetted channel.

- Excavations for the temporary detour bridge abutments will be above the mean high tide line, avoiding the water of the active, wetted Jacoby Creek channel.
- To ensure adherences to all permit conditions and all minimization and avoidance measures are implemented, a biological monitor will be present during all in-stream activities associated with removal of the old SB Jacoby Creek Bridge and piers. The biological monitor will also ensure the temporary footbridge and the visual barrier have been properly installed and maintained.

Installation of Fish-Friendly Tide Gates

- Tide gates will be installed during low tide (i.e., when old tide gates are out of the water) to minimize sediment release into waterways and to avoid fish that may occur at the tide gate sites when water is present.
- If water is present in the channel during tide gate replacement, temporary exclusion devices will be placed in the channel to keep water out of the construction zone. The exclusion devices would be in place no longer than 8 hours.
- Pre-project hydrologic conditions will be assessed upstream of the existing tide gates by a qualified consultant (approved by the USFWS and NMFS) prior to construction to document baseline conditions.
- The qualified consultant will make the preliminary settings to the adjustable fish-friendly tide gates. Since the gates are being replaced because they no longer close effectively, the new adjustable gates will be opened enough to mimic the current hydrology. Once the tide gates are installed, upstream water conditions will be monitored daily and the adjustable gate will be opened or closed slightly until average weekly post-construction conditions are within 95 percent of preconstruction conditions.
- Monitoring and adjustment will continue for two years following tide gate installation by a qualified consultant. There will be no monitoring of water conditions at new tide gates that are not adjustable (i.e., tide gates at Jacobs Avenue and California Redwood Company ditches).

Pollutant, Sediment and Erosion Control Measures

The contractor will be required to develop and implement Site-specific Best Management Practices (BMPs) and a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will identify appropriate and relevant BMPs that must be implemented to protect water quality throughout the life of the project.

Caltrans proposes to apply all applicable BMPs presented in Table C-1 of the Stormwater Project Planning and Design Guide (PPDG). Table C-1 is a matrix of the Construction Site BMPs that have been approved for used during construction. Detailed descriptions and guidance regarding implementation of these BMPs may be found in the 2003 CSBMP. Caltrans will implement the short-term construction site BMPs and long-term design treatment BMPs, as follows:

Short-Term Construction Site BMPs

- SS-1 Scheduling
- SS-2 Preservation of Existing Vegetation
- SS-3 Hydraulic Mulch
- SS-5 Soil Binders
- SS-6 Straw Mulch
- SS-7 Geotextiles, Plastic Covers, Erosion Control Blankets/Mats
- SS-8 Wood Mulch
- SS-9 Earth Dikes/Drainage Swales & Lined Ditches
- SS-10 Outlet Protection/Velocity Dissipation Devises
- SS-11 Slope Drains
- SS-12 Streambank Stabilization
- SC-1 Silt Fence
- SC-2 Sediment/Desilting Basin
- SC-3 Sediment
- SC-4 Check Dam
- SC-5 Fiber Rolls
- SC-6 Gravel Bag Berm
- SC-7 Street Sweeping and Vacuuming
- SC-8 Sandbag Barrier
- SC-9 Straw Bale Barrier
- SC-10 Storm Drain Inlet Protection
- WE-1 Wind Erosion Control
- NS-1 Water Conservation Practices
- NS-2 (called NS-4 in PPDG and CSBMPM) Temporary Stream Crossing
- NS-3 Paving and Grinding Operations
- NS-11 Pile Driving Operations
- NS-12 Concrete Curing
- NS-13 Material and Equipment Use Over Water

- NS-14 Concrete Finishing
- NS-15 Structure Demolition/Removal Over or Adjacent to Water
- NS-6 Illicit Connection/Illegal Discharge Detection and Reporting
- NS-8 Vehicle and Equipment Cleaning
- NS-9 Vehicle and Equipment Fueling
- NS-10 Vehicle and Equipment Maintenance
- WM-1 Material Delivery and Storage
- WM-2 Material Usage
- WM-3 Stockpile Management
- WM-4 Spill Prevention and Control
- WM-5 Soil Waste Management
- WM-6 Hazardous Waste Management
- WM-8 Concrete Waste Management
- WM-9 Sanitary/Septic Waste Management
- WM-10 Liquid Waste Management
- TC-1 Stabilized Construction Entrance/Exit

Long-Term Design and Permanent Treatment BMPs

- Cut and fill slopes will receive a hydroseed application formulated by a licensed Landscape Architect to provide final stabilization.
- Use of asphalt dikes and overside drains will be kept to a minimum to maintain stormwater sheet flow drainage patterns.
- Drainage conveyance systems will be designed with consideration of downstream effects.
- Use of a retaining wall structure to minimize impacts to adjacent wetlands and existing drainage patterns.
- Sheet flow stormwater runoff drainage patterns over vegetated fill slopes and swales will be maximized for biofiltration treatment.

Temporary Construction Site BMPs

- Scheduling: construction activities involving soil disturbance will take place during dry weather conditions, generally between June 1 and October 15, to minimize sediment discharges to receiving waters. Furthermore, the SWPPP prepared by the contractor prior to construction will include a scheduling BMP that specifies: 1) the project schedule will sequence construction activities with the installation of both soil stabilization and sediment control measures; 2) BMPs will be deployed in a sequence to follow the progress of grading and construction; 3) the construction schedule will be arranged so that grading and construction will occur during the dry summer months; and 4) proper scheduling will be done to avoid grading, landscaping application, pavement striping, concrete work, and asphalt paving from occurring immediately prior to forecast rain events.

- Preparation of Rain Event Action Plans 48-hours prior to any forecasted precipitation to ensure adequate stabilization of equipment, materials, and soils is completed prior to rain.
- Any debris and sediment will be contained within the work site or diverted into a sedimentation basin before being returned to any receiving waters. Excess material excavated from the work site will be disposed off-site at an approved disposal site away from any stream course.
- Soil stabilization measures (mulching, straw wattles) will be implemented during and after construction to reduce sediment discharge from areas of disturbed soil. After construction, areas of bare soil will be seeded or planted with a non-persistent cereal grain and California native seed mix. Straw will be certified weed-free. These measures will provide for immediate soil stabilization and subsequent vegetative cover (i.e., next growing season) until natural processes resume.
- When construction is complete, watercourse banks will be returned to natural contours.
- Silt fences, straw bales, and/or fiber rolls will be placed to control sediment discharge; minimal sediment will be released into receiving waters. Certified weed-free mulch, silt fences, straw bales, and/or fiber rolls will be applied to exposed soil areas for over-wintering protection from erosion.
- Measures will be taken to prevent construction equipment discharges from contaminating soil or waters in the construction site. Construction site entrances/exits will be stabilized and street sweeping performed to prevent tracking of sediment.
- Perimeter control for the temporary stockpiling of materials, soil, and debris that may contain potential contaminants (e.g., concrete debris, treated timbers). Excavated spoils will be controlled to prevent sedimentation to the stream.
- Use of geo-synthetic fabric (e.g., plastic, filter fabric) barriers to prevent the discharge of pollutants (e.g., sediment, oil and grease, etc.) when equipment is working adjacent to or over waterways.
- A temporary concrete washout facility will be placed on-site for concrete clean up. No concrete washings or water from concrete will be allowed to flow into waterways. No concrete will be poured within the waterways. Water that has meet setting concrete will be pumped into a tank and disposed of at an approved disposal site.

- To control fugitive dust during construction, loose debris will be cleaned up using a vacuum truck (as opposed to a kick broom machine). Also, pavement will be removed by cold planing, using a machine that deposits grindings directly into a truck. The cutting teeth of the grinder are lubricated with water, which is enough to minimize dust production, but not enough to create runoff.
- Preparation and implementation of a sampling and analysis plan for discharges during construction.
- For work at Jacoby Creek, instead of conventional hydraulic fluids, non-toxic, bio-degradable vegetable or synthetic oil approved will be used for operating the vibratory hammer needed to install the bridge piles. Confirmation and approval from the Agencies will be required before oil selection and use.

Staging Areas

- Primary staging areas will be on US 101 shoulders with possible additional staging areas on nearby private property. No staging area will occur within environmentally sensitive areas.
- Any vehicles stored within 150 feet of the OHWL of drainage facilities, watercourses, sloughs, or Humboldt Bay will have spill prevention measures in place for refueling. This includes placement of an absorbent boom around the fuel port (on machine being fueled), as well as a thick absorbent mat that is rolled out on the ground under the equipment to catch a larger spill. When fueling vehicles and other equipment, there will be a person located at both the fuel nozzle and the truck valve so that emergency shut-off could be made if there was a nozzle or hose failure.
- Proper and timely maintenance of vehicles and equipment used during construction to reduce the potential for mechanical breakdowns leading to a spill of materials.
- All equipment remaining on the job site will have secondary containment placed beneath the drip zone when left overnight. Leaks will be immediately controlled with absorbent mats and repaired before equipment operates again. Clean up of petro-chemical drips will occur as soon as they are observed. All equipment will be monitored by the contractor daily for chemical leakage. To offer protection from storm events, Caltrans will require monitoring for storm events and the movement of equipment accordingly.
- For all night road work and paving operations that require use of artificial light, light shields will be used to direct lighting toward the roadway and away from adjacent water bodies to avoid impacting the aquatic environment.

Conservation of Riparian Habitat

- The width of the construction disturbance zone within riparian areas will be minimized through careful pre-construction planning.
- Exclusionary fencing will be installed along the boundaries of all riparian areas and other environmentally sensitive areas (i.e., wetlands) to avoid impacts to these habitats outside the project footprint.
- Riparian vegetation removal (e.g., tree trimming) will be restricted to the minimum needed for construction access.
- Once the bridge detour is removed, the median at Jacoby Creek will be replanted with native trees and seeded with native herbaceous vegetation that are aptly suited to the project region.

Prevention of Spread of Invasive Species

- All equipment used for off-road construction activities will be weed-free prior to entering the action area.
- If the proposed action implementation calls for mulches or fill, they will be weed-free.
- Any seed mixes or other vegetative material used for revegetation of disturbed sites will consist of non-persistent cereal grain, California native seed mix and/or locally adapted native plant materials to the extent practicable.
- Any equipment (including boots/waders) and construction equipment shall be properly disinfected or cleaned according to guidance provided by the 2008 State of California Aquatic Invasive Species Management Plan and 2012 Edition of the U.S. Bureau of Reclamation Inspection and Cleaning Manual for Equipment and Vehicles to Present the Spread of Invasive Species prior to in-water work to help prevent the spread of aquatic invasive species.

Traffic Management

Impacts to the travelling public will be minimized by these measures:

- Caltrans will maintain two lanes of traffic in both directions during peak hours throughout construction.
    - There are limited lane closures scheduled at night and on weekends.
    - There will be limited full closures for replacing Jacoby Creek Bridge, and these are scheduled during the night.
- Caltrans will maintain pedestrian and bicycle traffic throughout construction.
    - Caltrans will commit to primarily maintaining the bike lane, and not relying on buses to transport bicyclists through the construction zones.
    - However, there are going to be a few times during construction where this is not possible. During construction of the bridge rails on North Bound Jacoby Creek and Gannon Slough Bridges, there will be a few weekends where traffic is reduced to one lane, and bikes will be accommodated with a shuttle bus type service (currently scheduled as 2-4 weekend closures).

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

LEGEND

- Environmental Study Limits
- 81 Approximate Postmile
- New Edge of Paving
- Areas of new paving
- Approximate Limits of Fill
- New (or replaced) Light Standards
- Trees to be removed
- Paving to be removed

EXISTING

- Existing Edge of Paving
- Existing Railroad Tracks
- Existing Elevations (feet NAVD 88)
- Index Contour Elevation (5 foot Intervals)
- Intermediate Contour Elevation (1 foot Intervals)
- Existing Right of Way
- Underground television
- Underground telephone
- Underground electrical
- Indicates Overhead Lines
- Gas
- Water
- Sewer
- Culvert/Storm Drain

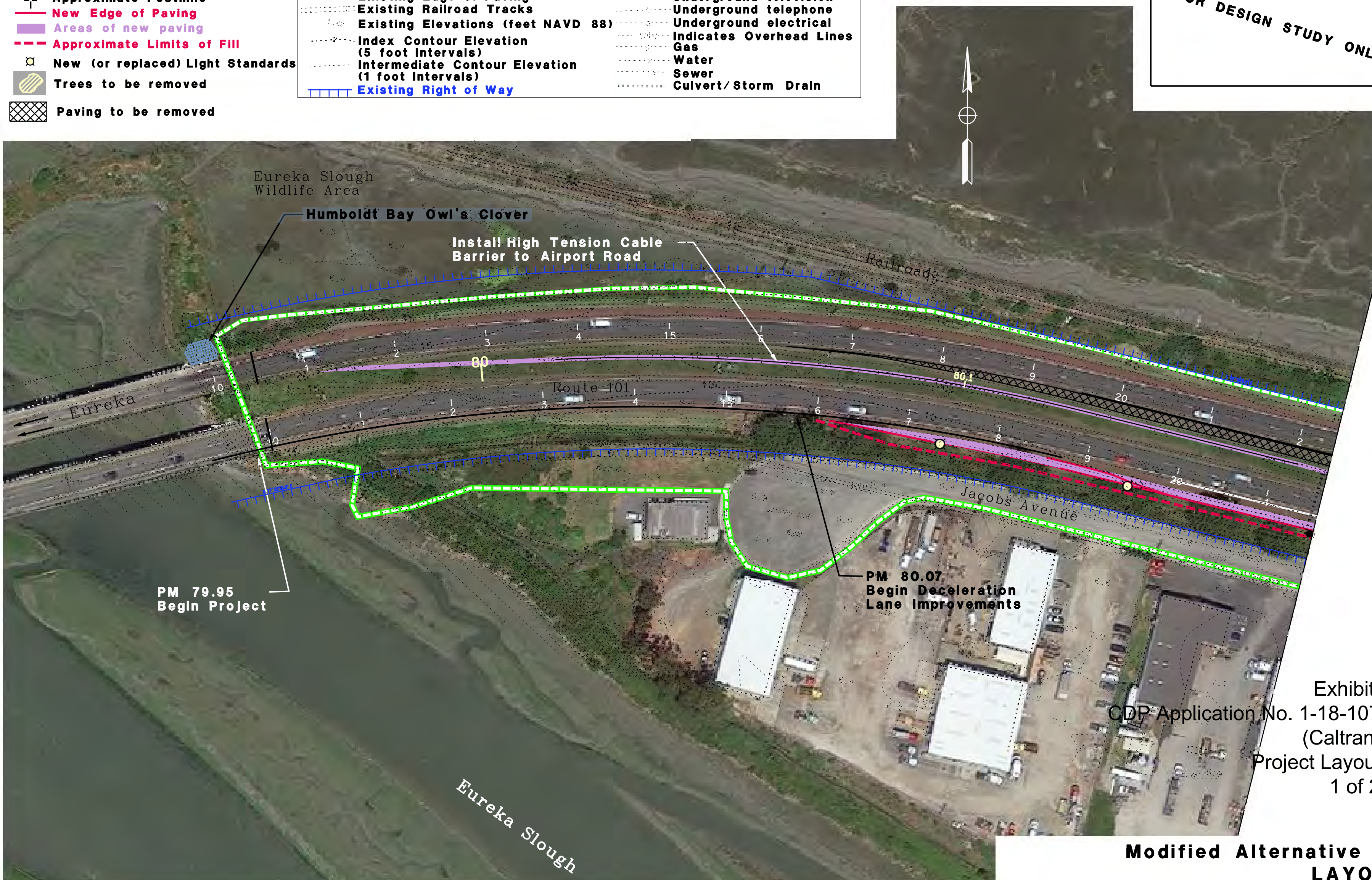

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
1 of 25

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Modified Alternative 3A
LAYOUT
L-1

SCALE: 1"=50'

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

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
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CU 03232
EA 363301
LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:20

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

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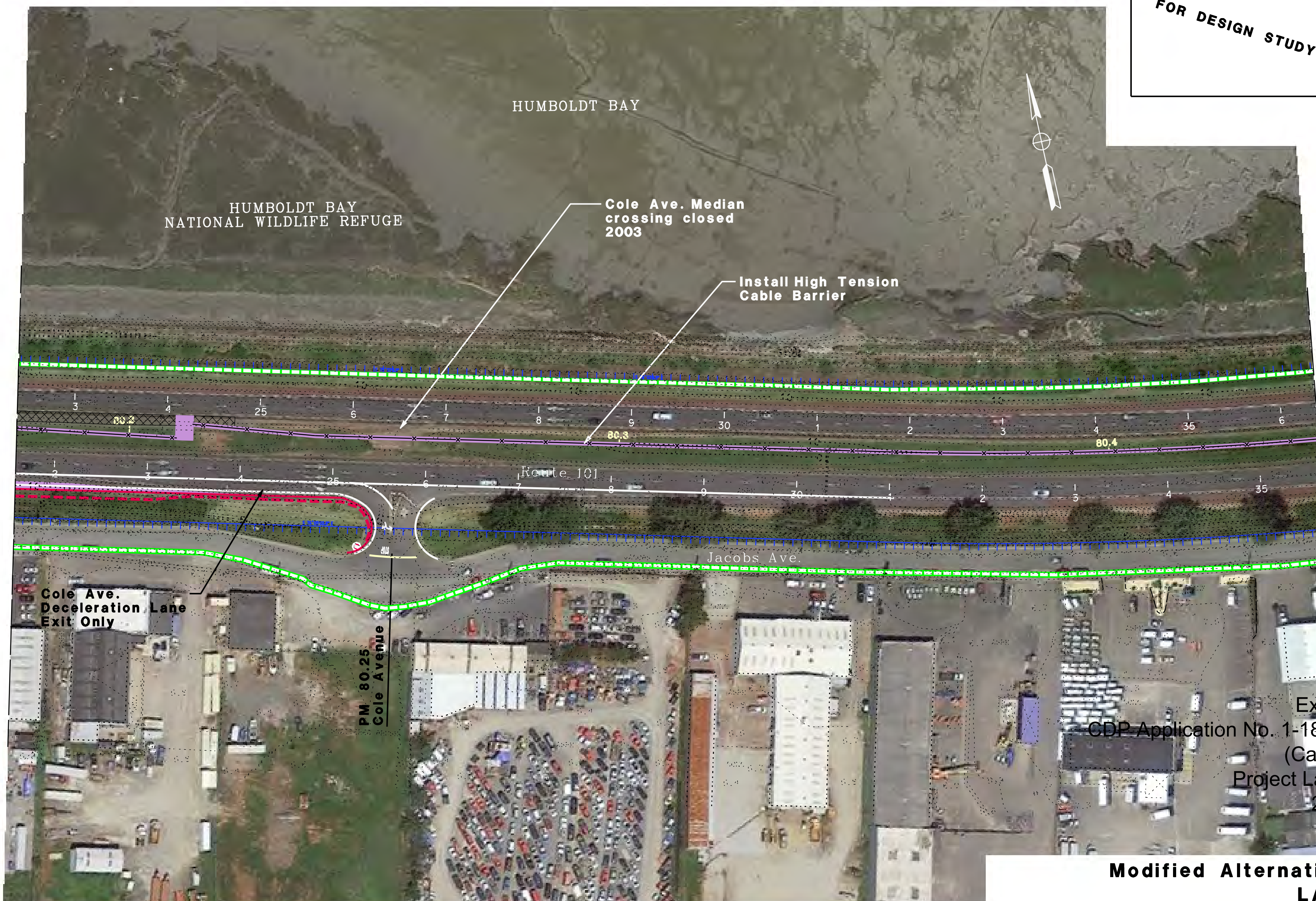

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
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Modified Alternative 3A
LAYOUT
L-2

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:20

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
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CU 03232
EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

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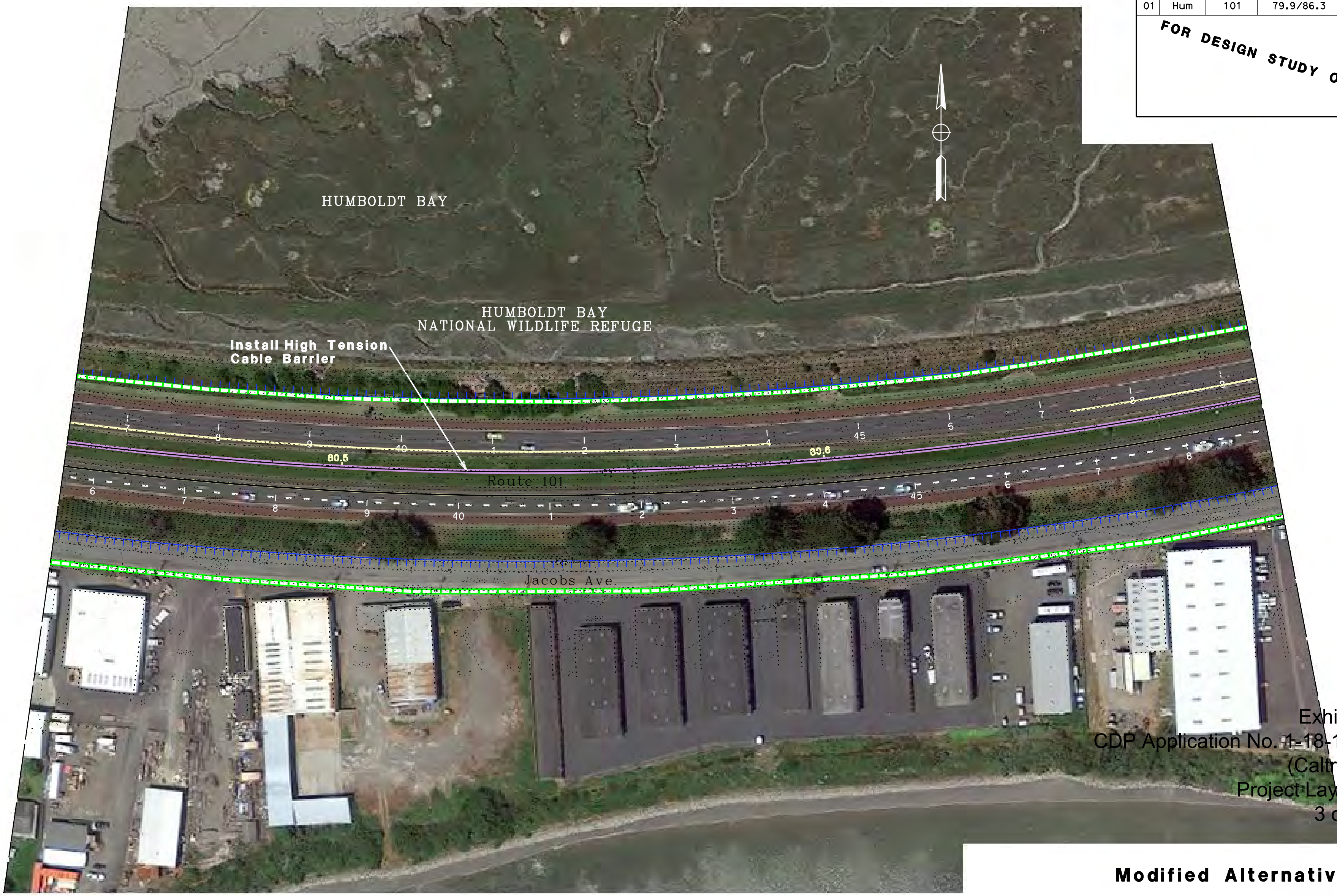

Exhibit 5
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(Caltrans)
Project Layouts
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Modified Alternative 3A

LAYOUT
L-3

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans

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

LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:21

BORDER LAST REVISED 4/11/2008
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CU 03232
EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

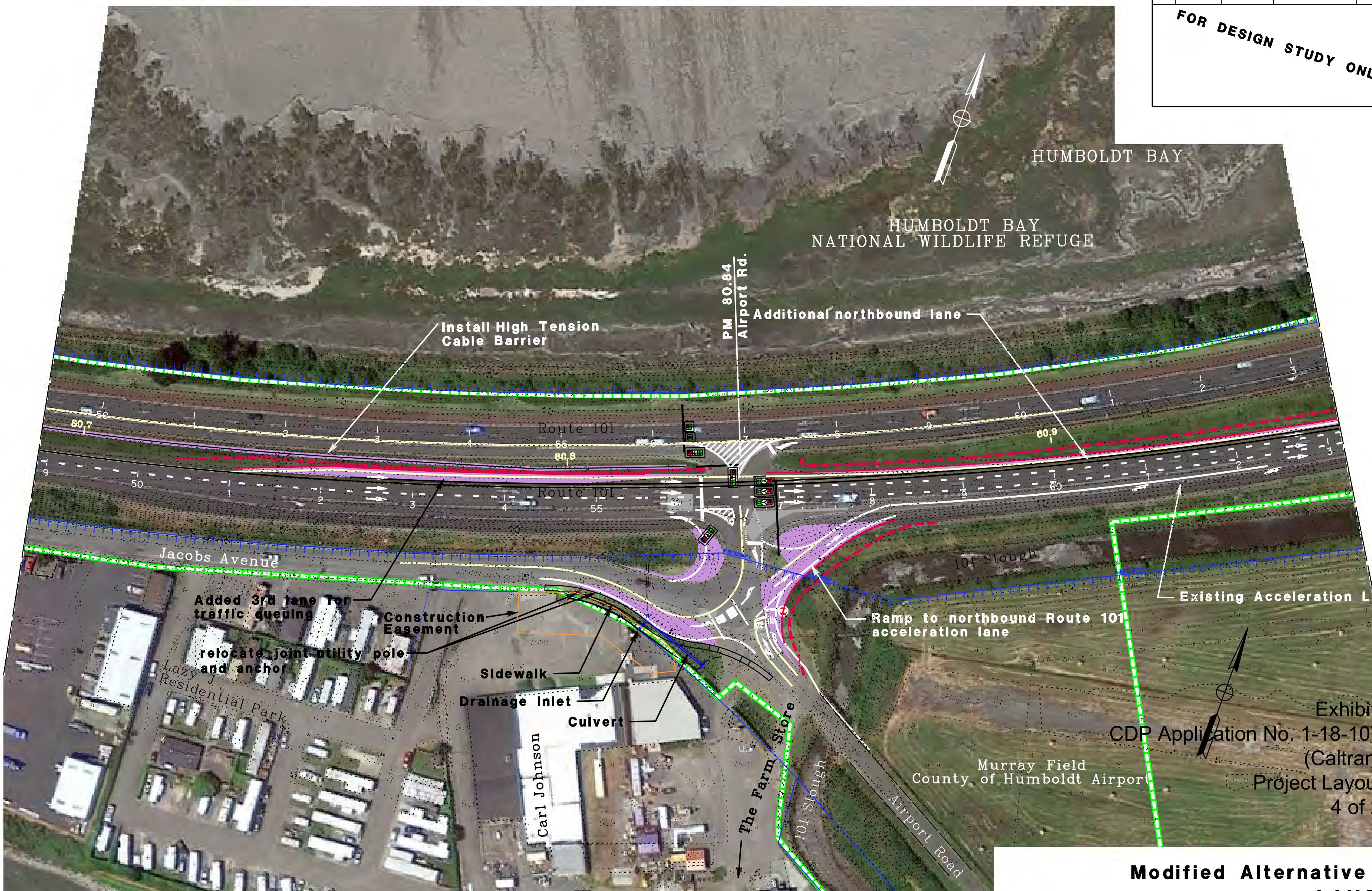

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
4 of 25

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: L.R. ASHLEY

CALCULATED-DESIGNED BY: TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

Modified Alternative 3A

LAYOUT

L-4

SCALE: 1"=50'

LAST REVISION 08-11-08

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:21

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

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DGN FILE => 136330ea004-rev-mod-3A.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

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(Caltrans)
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Modified Alternative 3A
LAYOUT
L-5

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:21

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

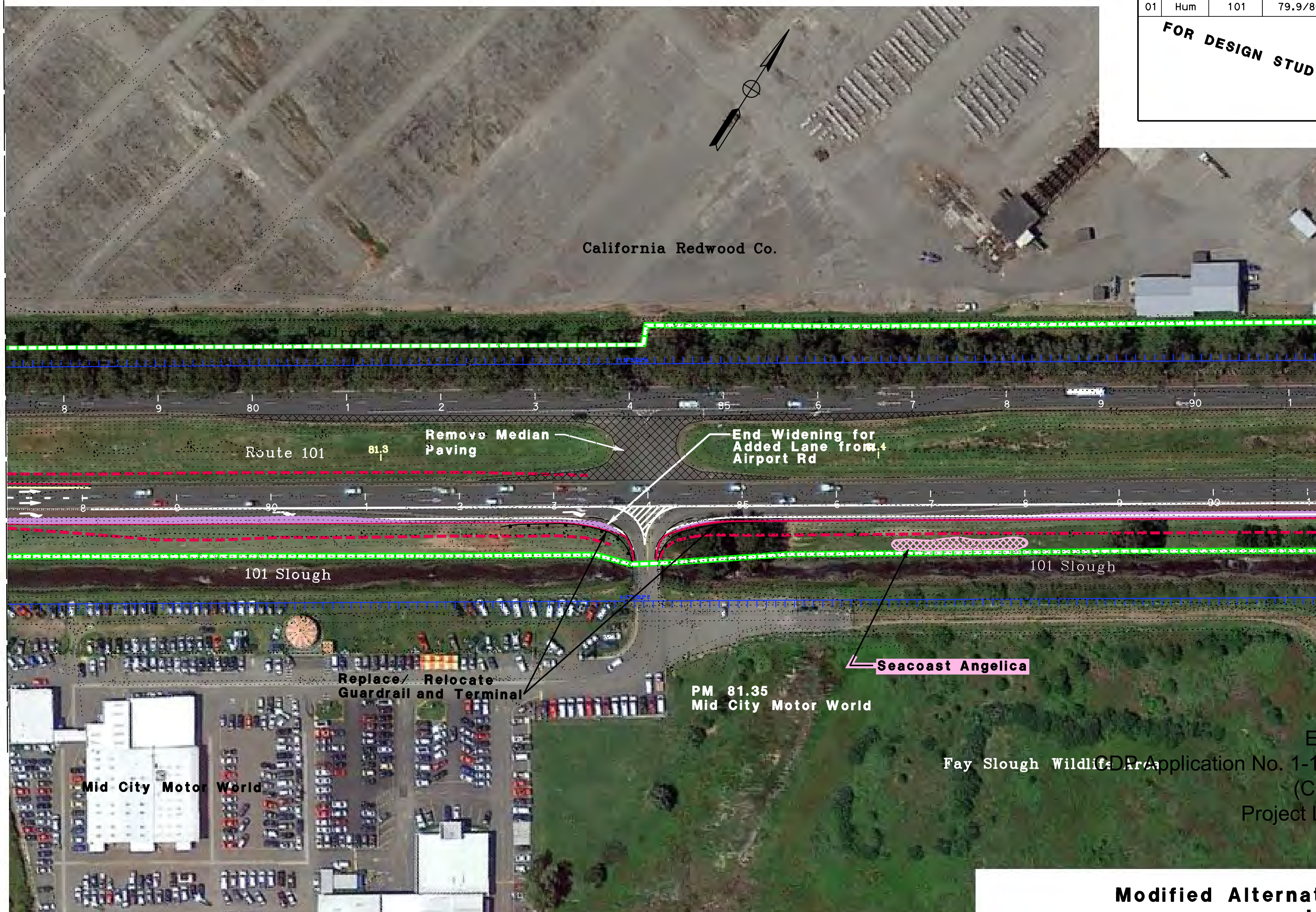


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
6 of 25

Modified Alternative 3A
LAYOUT
L-6

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

LAST REVISION: 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:22

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => s119316
DGN FILE => 136330ea006-rev-mod-3A.dgn
CU 03232
EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

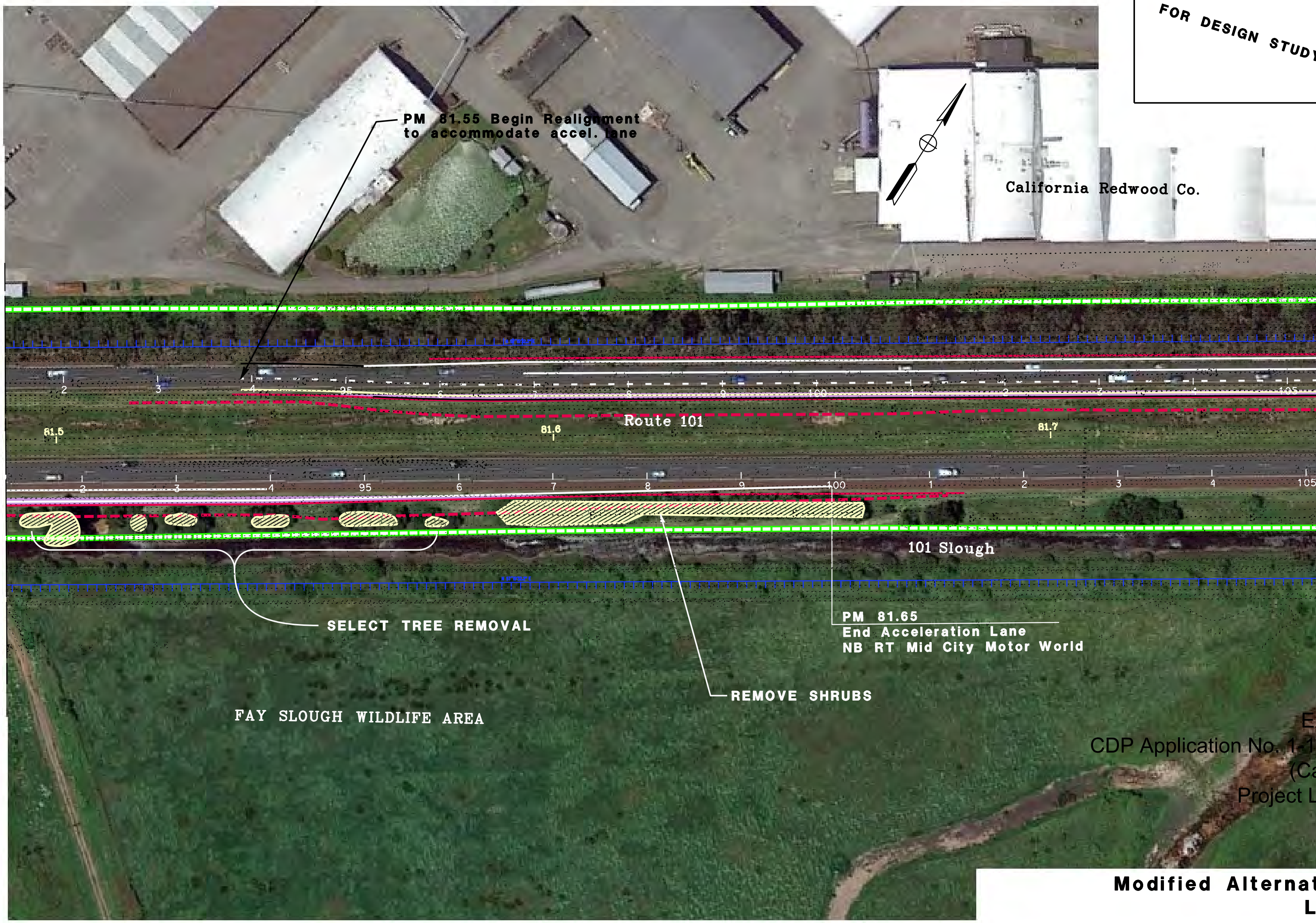


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
7 of 25

Modified Alternative 3A
LAYOUT
L-7

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans®
DESIGN

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

LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:22

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => s119316
DGN FILE => 136330ea007-mod-3A.dgn
CU 03232
EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

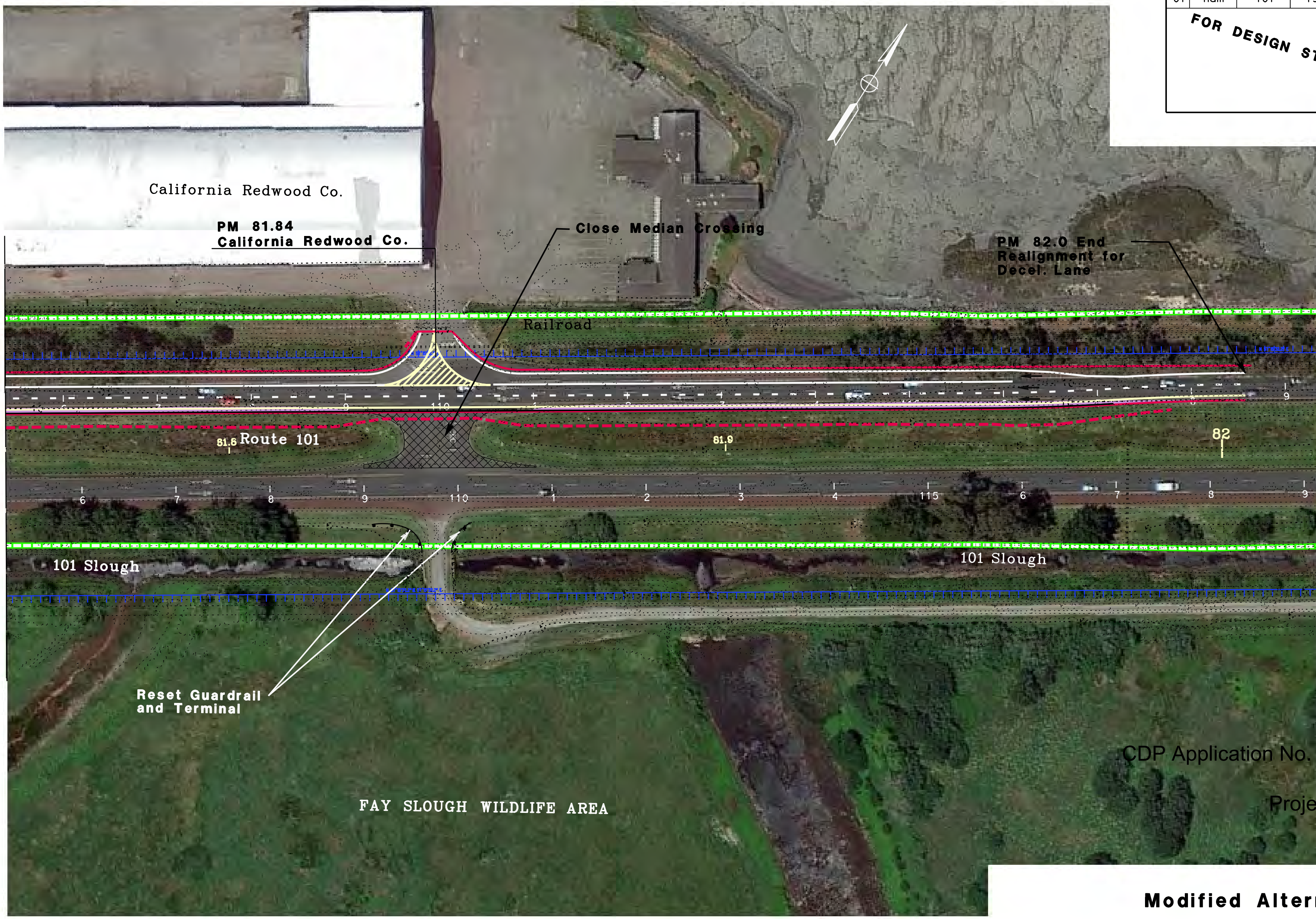


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
8 of 25

Modified Alternative 3A
LAYOUT
L-8

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans®
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:22
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136330ea008-mod-3A.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
9 of 25

Modified Alternative 3A
LAYOUT
L-9

SCALE: 1"50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans®
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:23
LAST REVISION: 08-11-08

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => s119316
DGN FILE => 136330ea009-mod-3A.dgn
CU 03232
EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

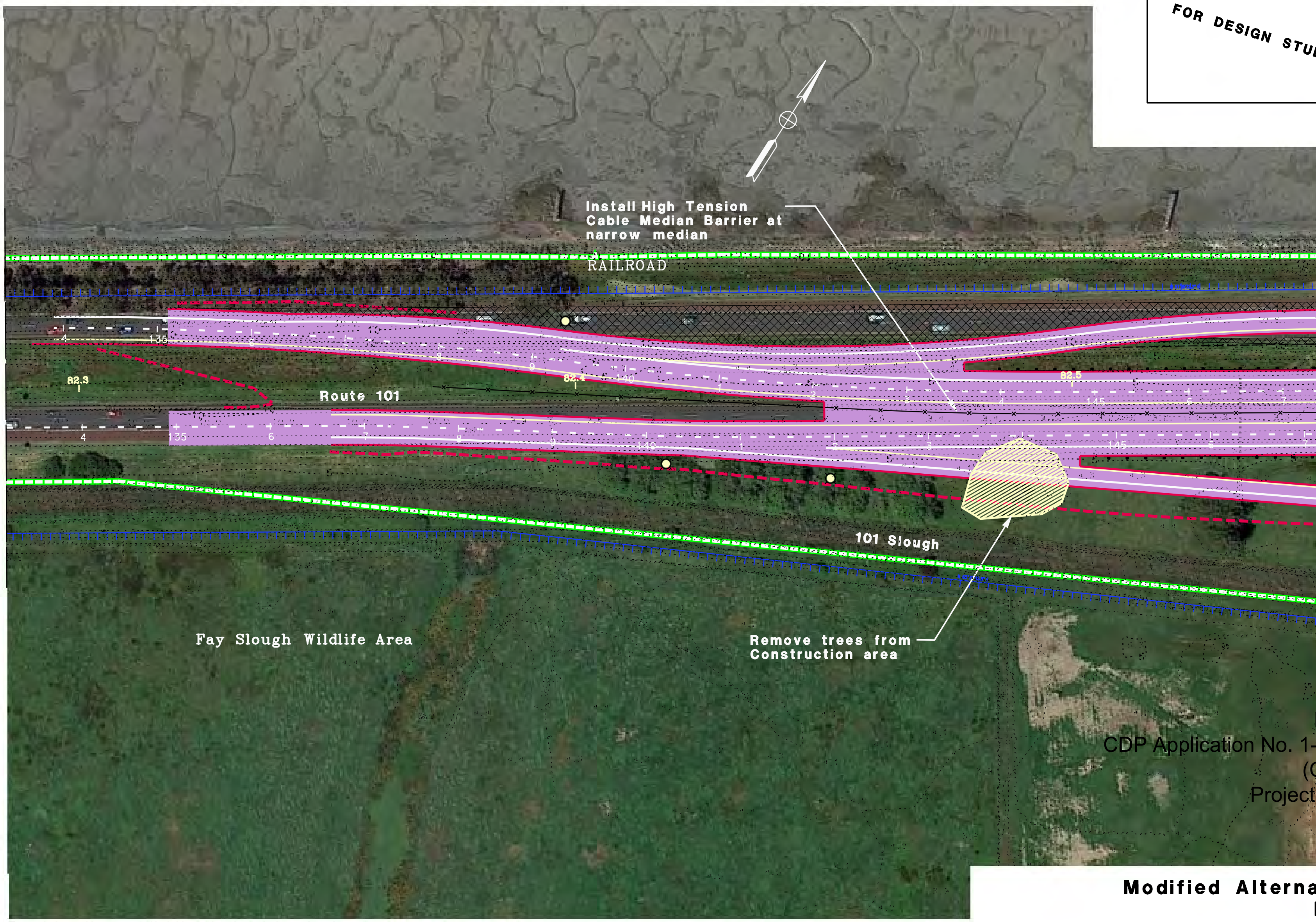


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
10 of 25

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Modified Alternative 3A
LAYOUT
L10

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136330ea010-mod-3A.dgn

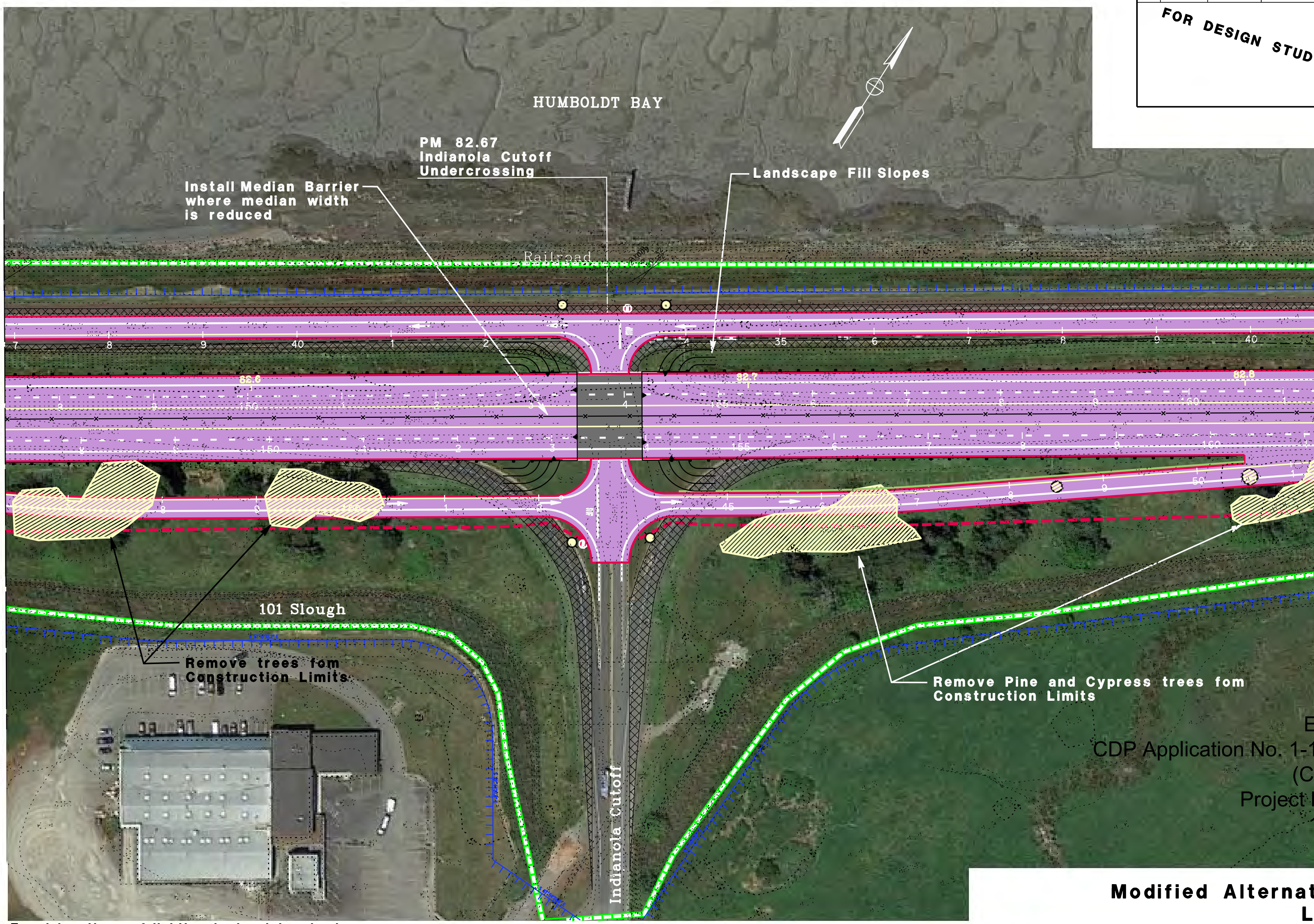
CU 03232

EA 363301

LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY



Exact locations of lighting to be determined.
Trenching for lighting not shown.

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
11 of 25

Modified Alternative 3A
LAYOUT
L-11

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:23
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136330ea011-mod-3A.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

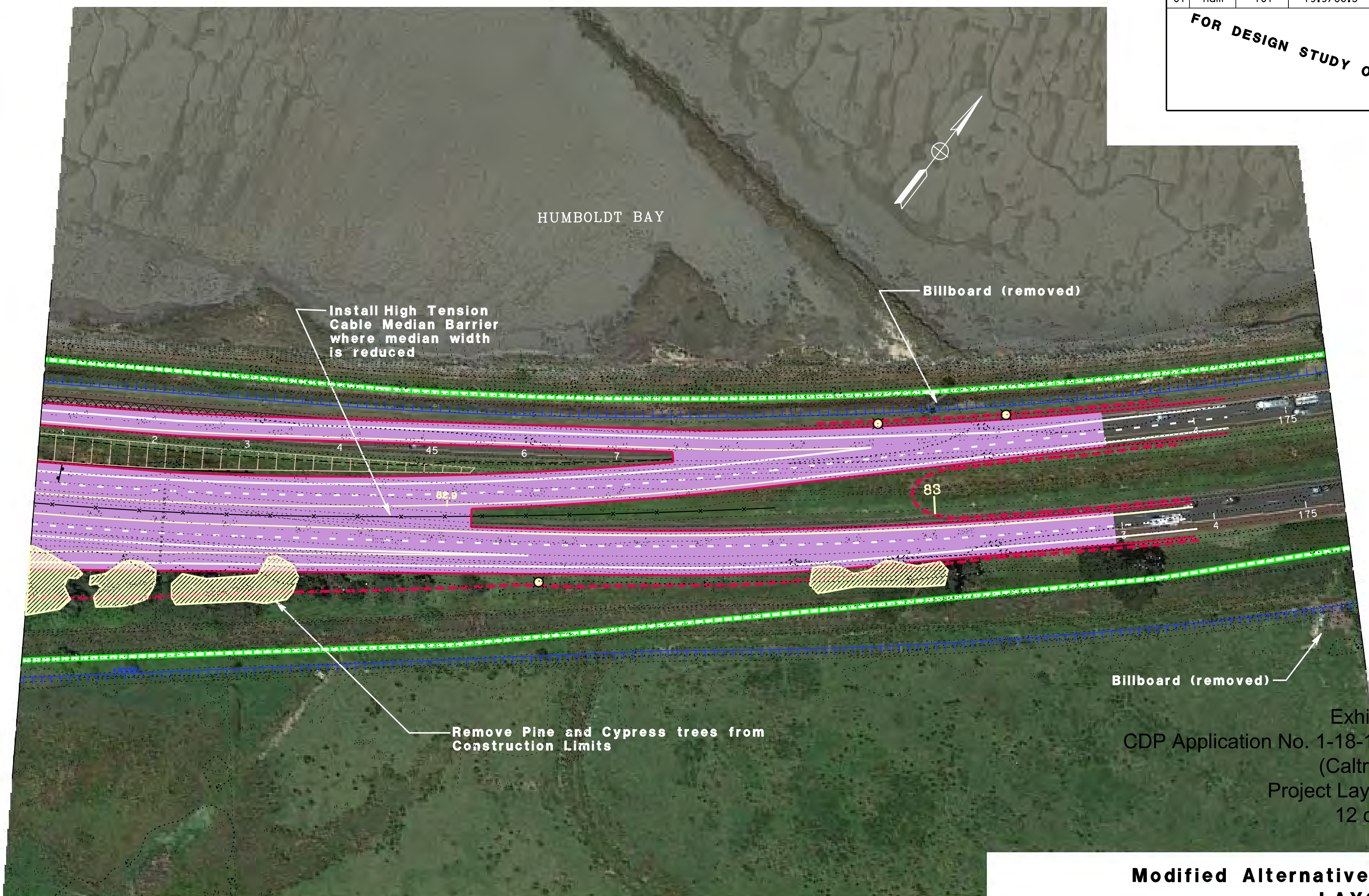


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
12 of 25

Modified Alternative 3A
LAYOUT
L-12

SCALE: 1"=50'

Exact locations of lighting to be determined.
Trenching for lighting not shown.

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Caltrans®
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:24
LAST REVISION 08-11-08

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

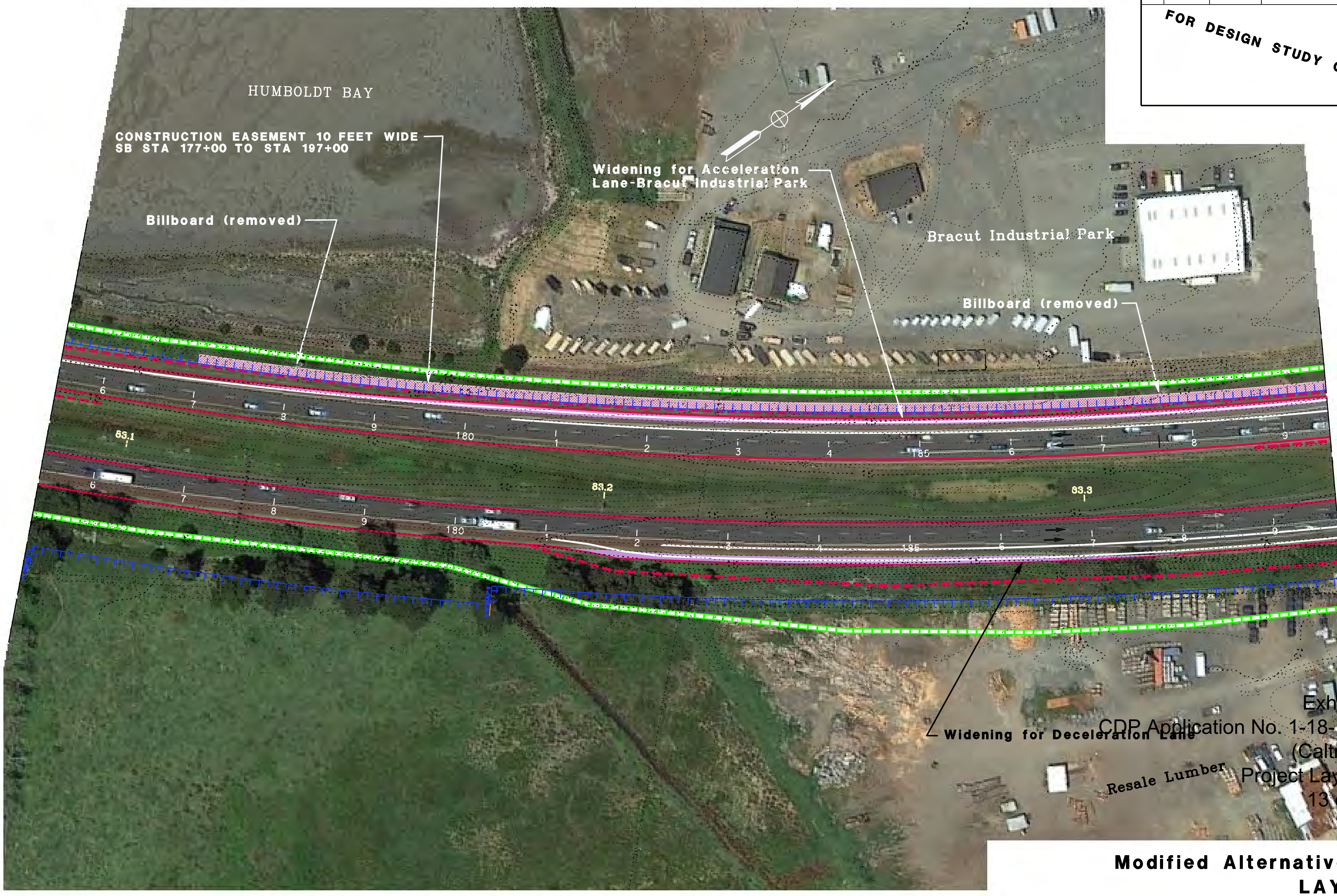

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
13 of 25

Modified Alternative 3A
LAYOUT
L-13

SCALE: 1"=50'

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:42
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136330ea013-mod-3A.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

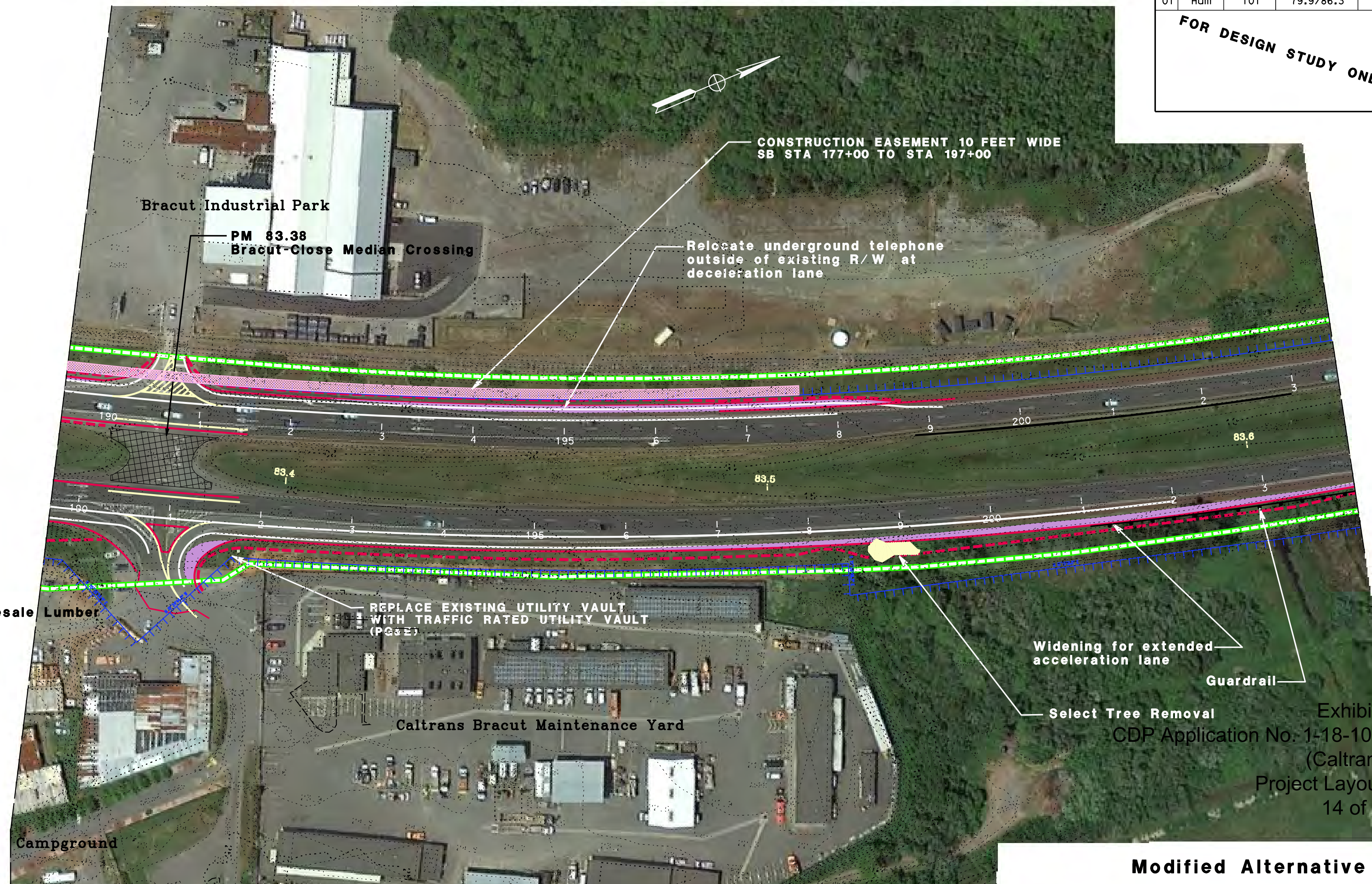

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
14 of 25

Modified Alternative 3A
LAYOUT
L-14

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 15:27
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136330ea014-mod-3A.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

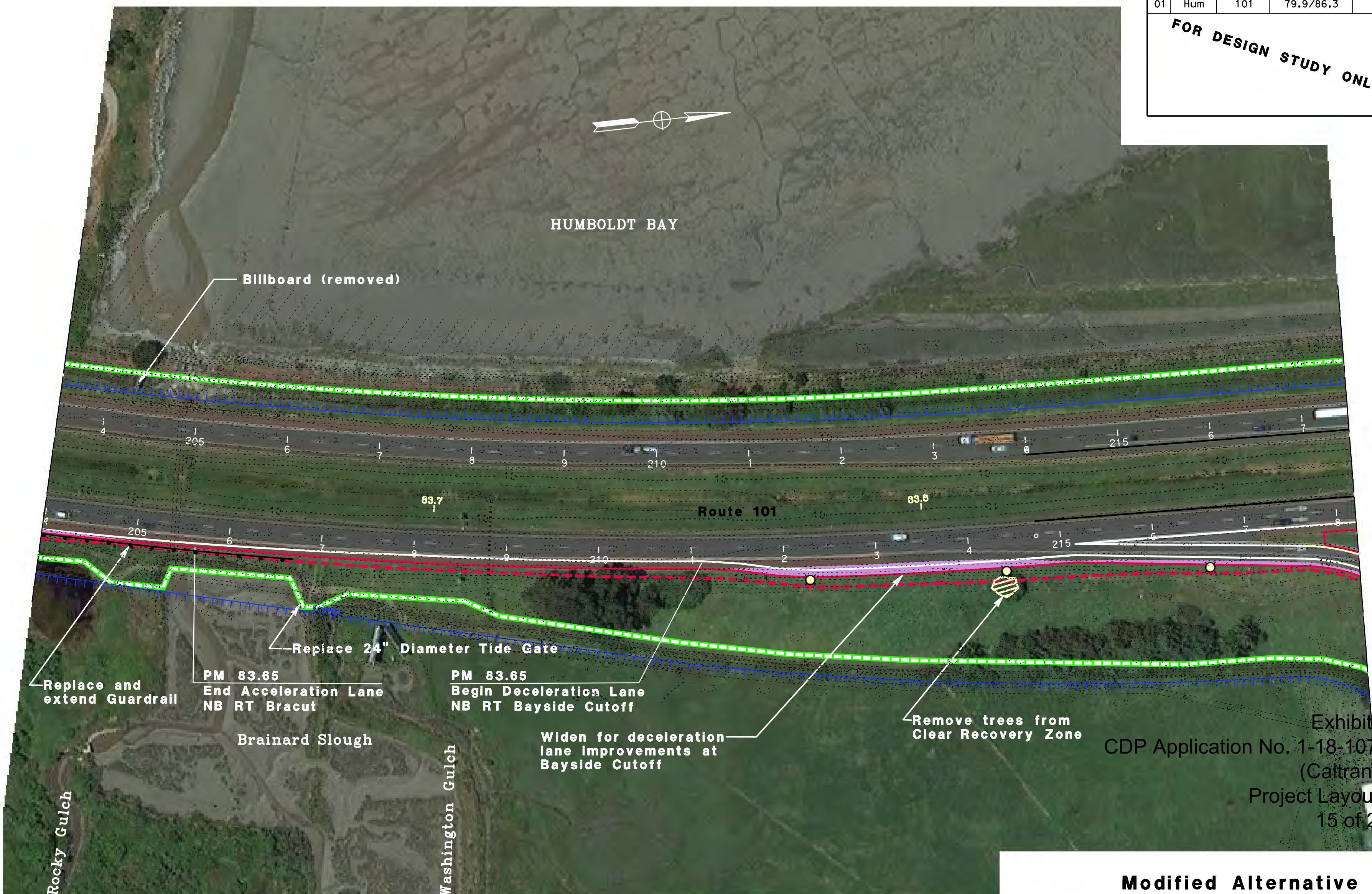

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
15 of 25

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Modified Alternative 3A
LAYOUT
L-15

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans®
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:25
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => s119316
DGN FILE => 136330ea015-mod-3A.dgn
CU 03232
EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

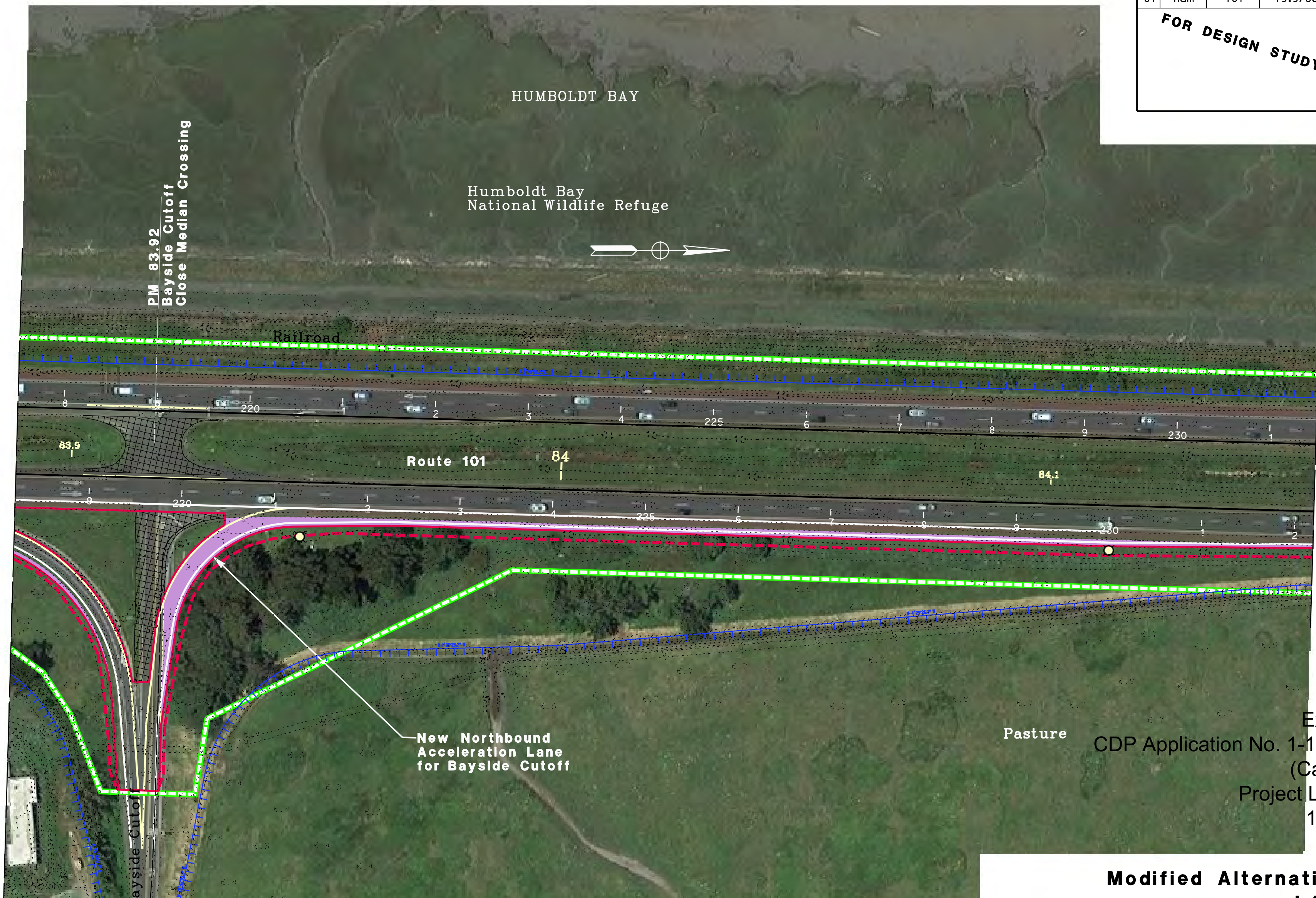

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
16 of 25

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Modified Alternative 3A
LAYOUT
L-16

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:25
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => s119316 | DGN FILE => 136330ea016-mod-3A.dgn | CU 03232 | EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

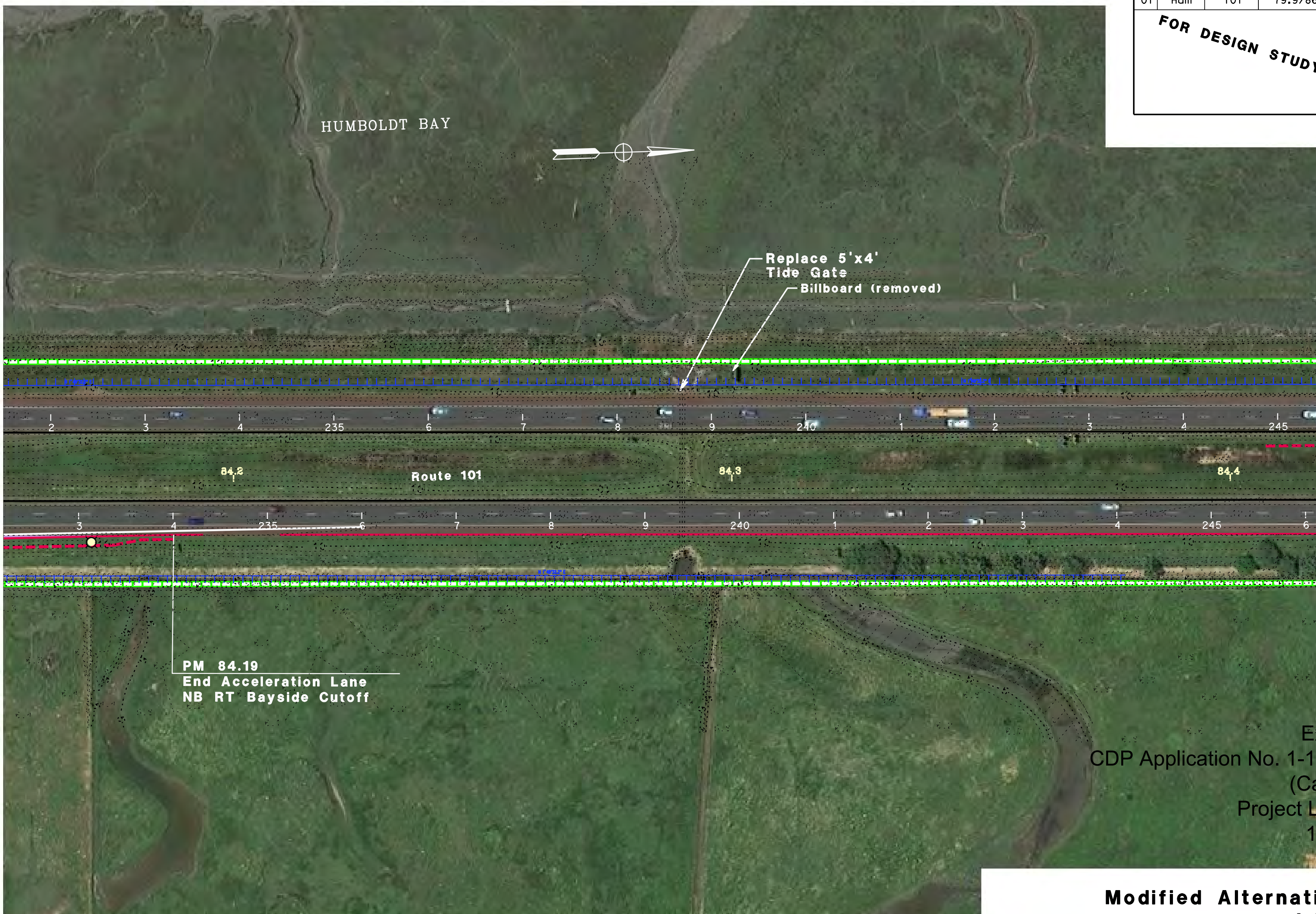

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
17 of 25

REVISED BY | DATE REVISED

TODD LARK

CALCULATED-DESIGNED BY | CHECKED BY

FUNCTIONAL SUPERVISOR | L.R. ASHLEY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

DESIGN

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Modified Alternative 3A
LAYOUT
L-17

SCALE: 1"=50'

LAST REVISION 08-11-08

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:25

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136330ea017-mod-3A.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

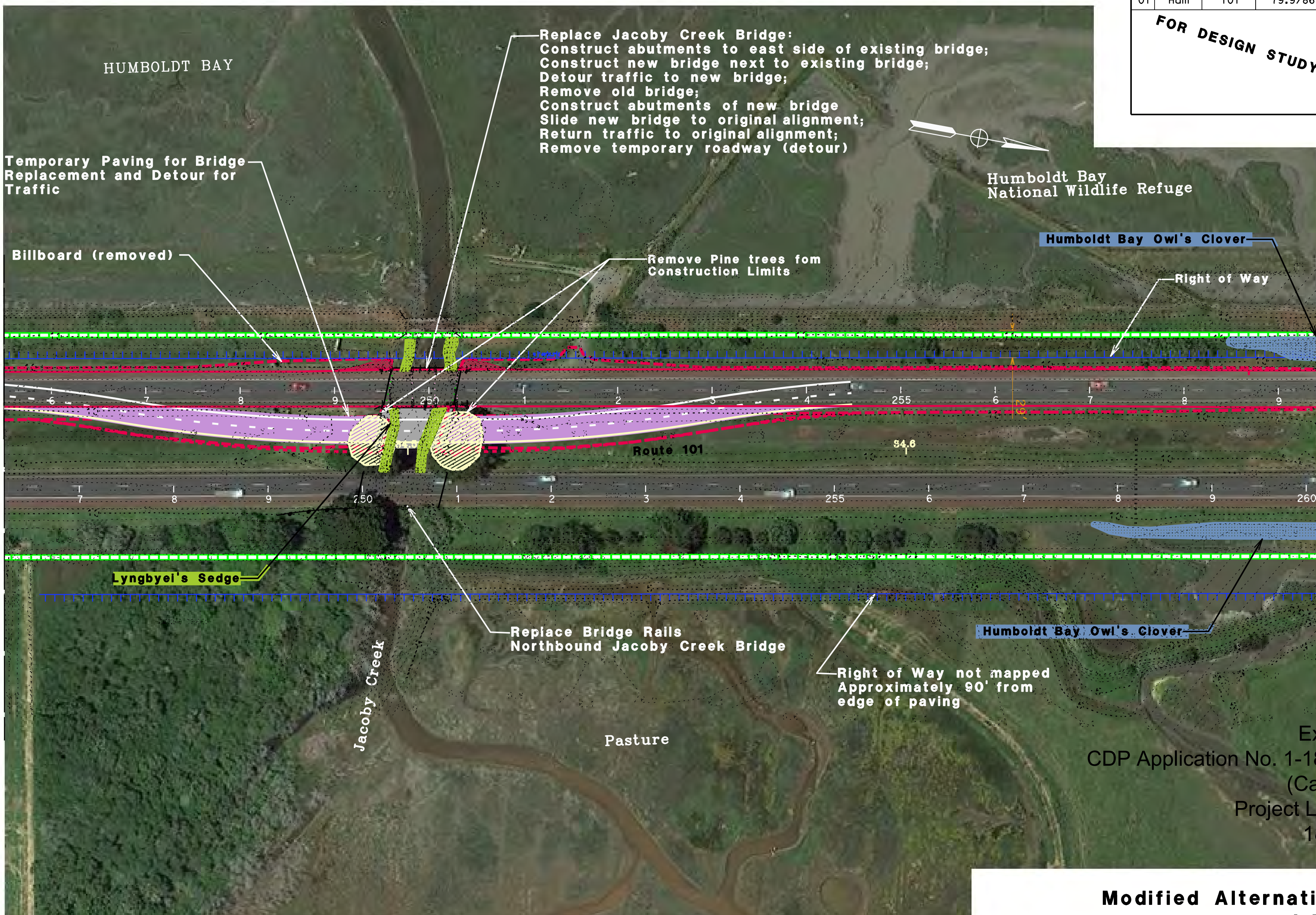


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
18 of 25

Modified Alternative 3A
LAYOUT
L-18

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:26
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => s119316
DGN FILE => 136330ea018-mod-3A.dgn
CU 03232
EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

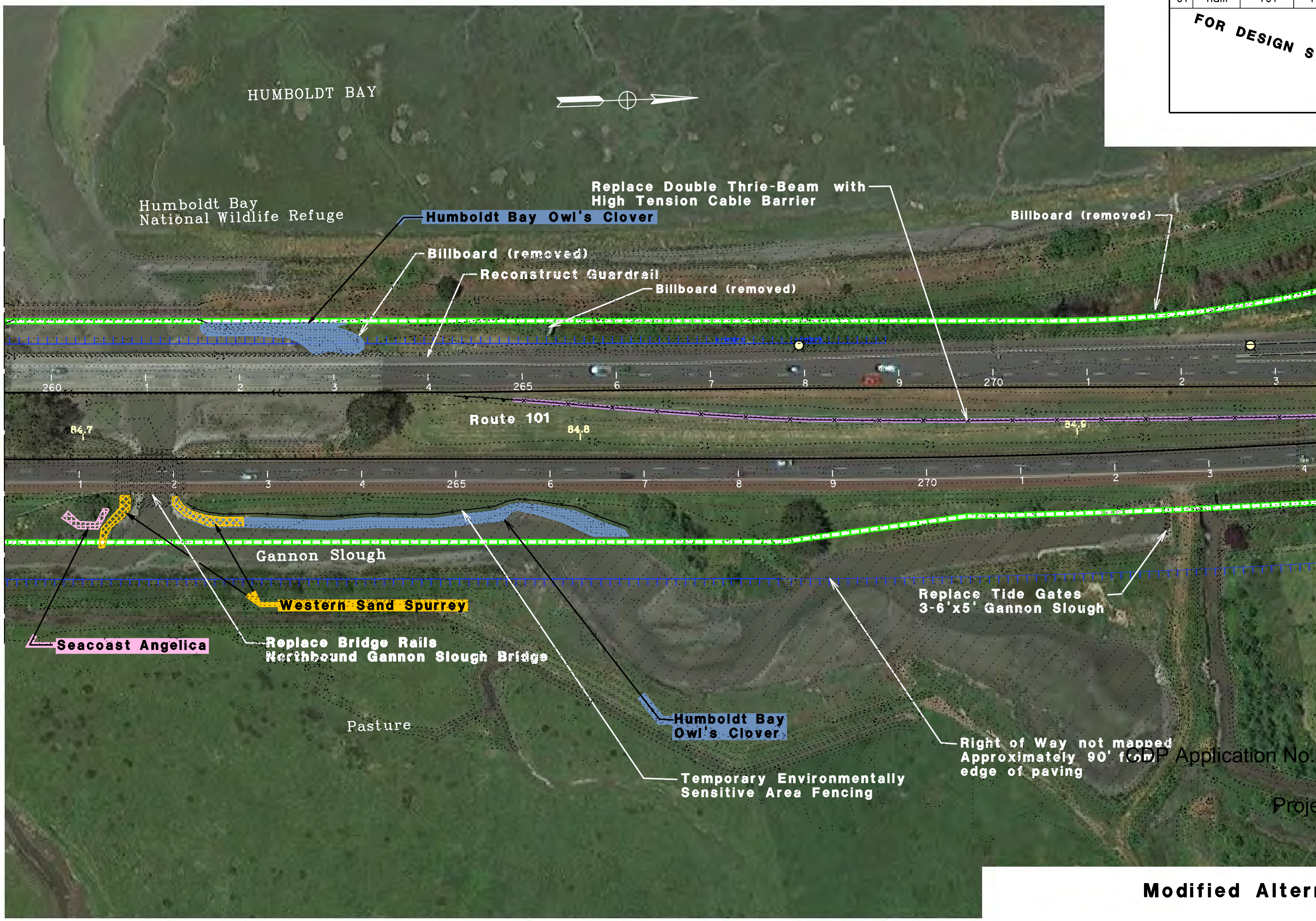


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
19 of 25

Exact locations of lighting to be determined.
Trenching for lighting not shown.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans

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

Modified Alternative 3A
LAYOUT
L-19

SCALE: 1"=50'

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:26
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => s119316
DGN FILE => 136330ea019-mod-3A.dgn
CU 03232
EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

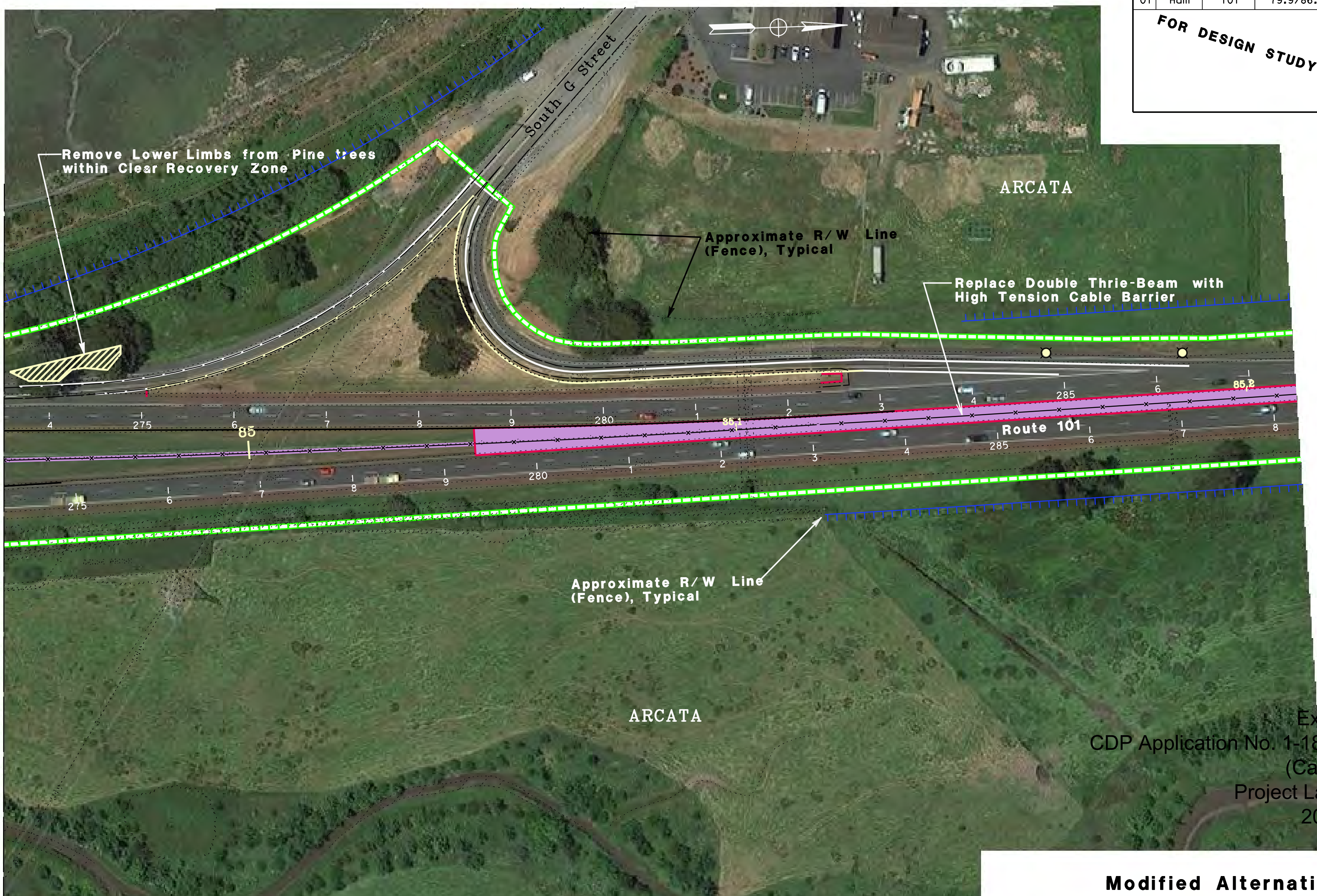


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
20 of 25

Exact locations of lighting to be determined.
Trenching for lighting not shown.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans®

DESIGN

FUNCTIONAL SUPERVISOR: L.R. ASHLEY

CALCULATED-DESIGNED BY: TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

Modified Alternative 3A
LAYOUT
L-20

SCALE: 1"=50'

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:26

LAST REVISION: 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136330ea020-mod-3A.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

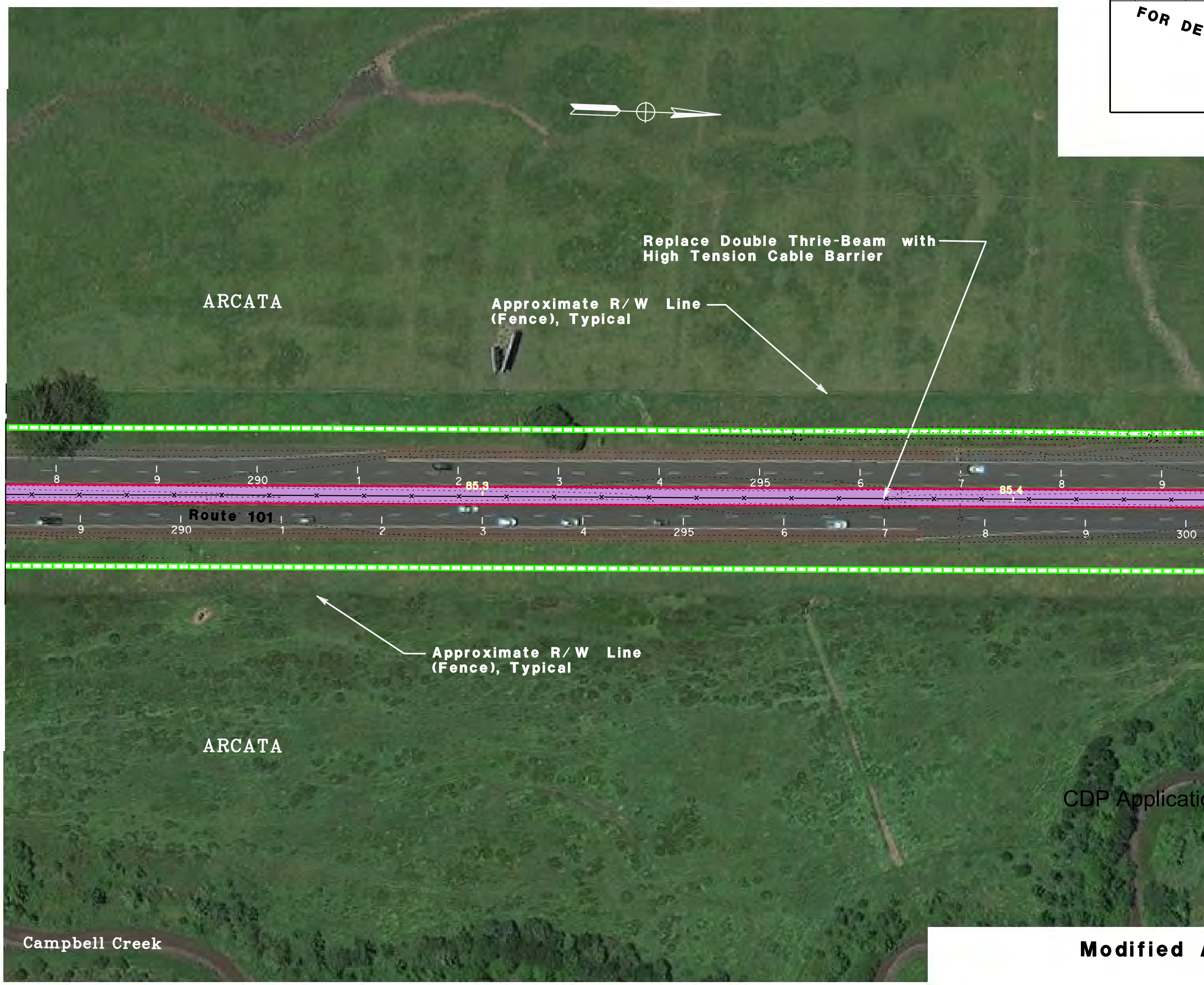


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
21 of 25

Modified Alternative 3A
LAYOUT
L-21

SCALE: 1"=50'

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

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => s119316
DGN FILE => 136330ea021-mod-3A.dgn
CU 03232
EA 363301
LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:26

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

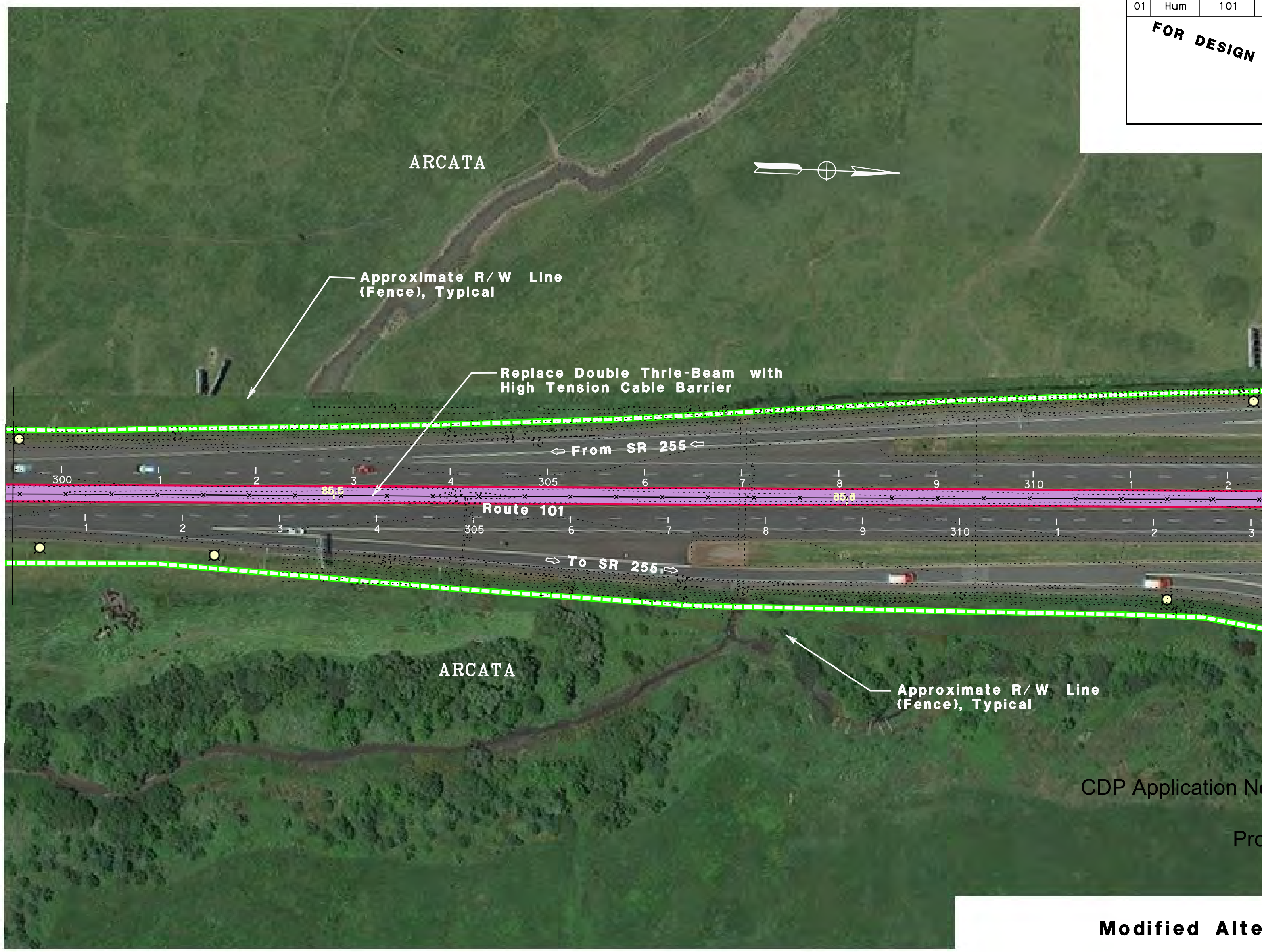


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
22 of 25

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Modified Alternative 3A

LAYOUT
L-22

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans®
DESIGN

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

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
USERNAME => s119316
DGN FILE => 136330ea022-mod-3A.dgn
CU 03232
EA 363301

LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:27

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
23 of 25

Modified Alternative 3A
LAYOUT
L-23

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans®
DESIGN

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

LAST REVISION: 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:27

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

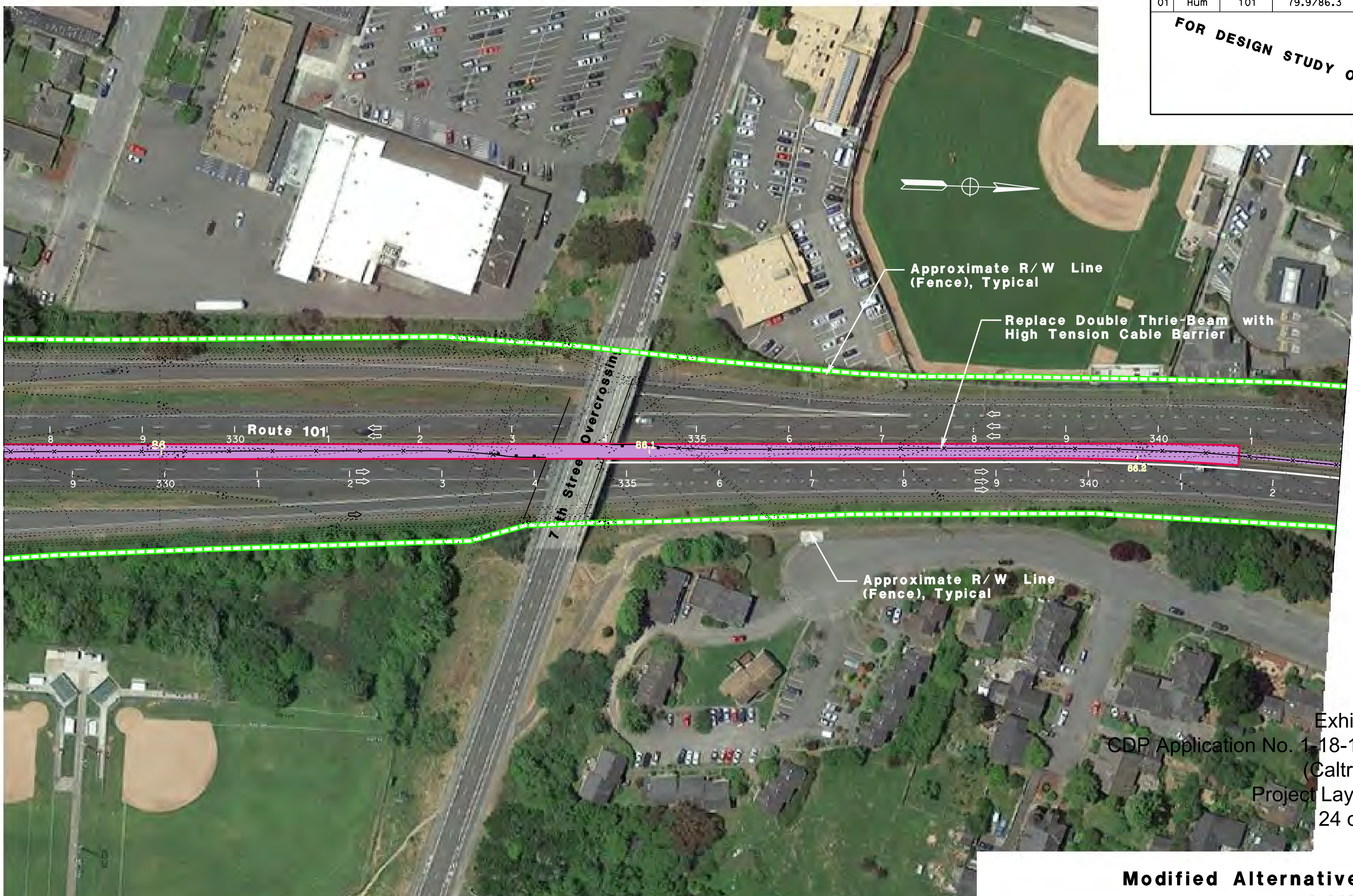


Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
24 of 25

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Modified Alternative 3A
LAYOUT
L-24

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:28
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => s119316 DGN FILE => 136330ea024-mod-3A.dgn | CU 03232 | EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

Exact locations of lighting to be determined.
Trenching for lighting not shown.

Exhibit 5
CDP Application No. 1-18-1078
(Caltrans)
Project Layouts
25 of 25

Modified Alternative 3A LAYOUT L-25

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans

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

LAST REVISION 08-11-08
DATE PLOTTED => 23-JUL-2019
TIME PLOTTED => 14:28

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136330ea025-mod-3A.dgn

CU 03232

EA 363301

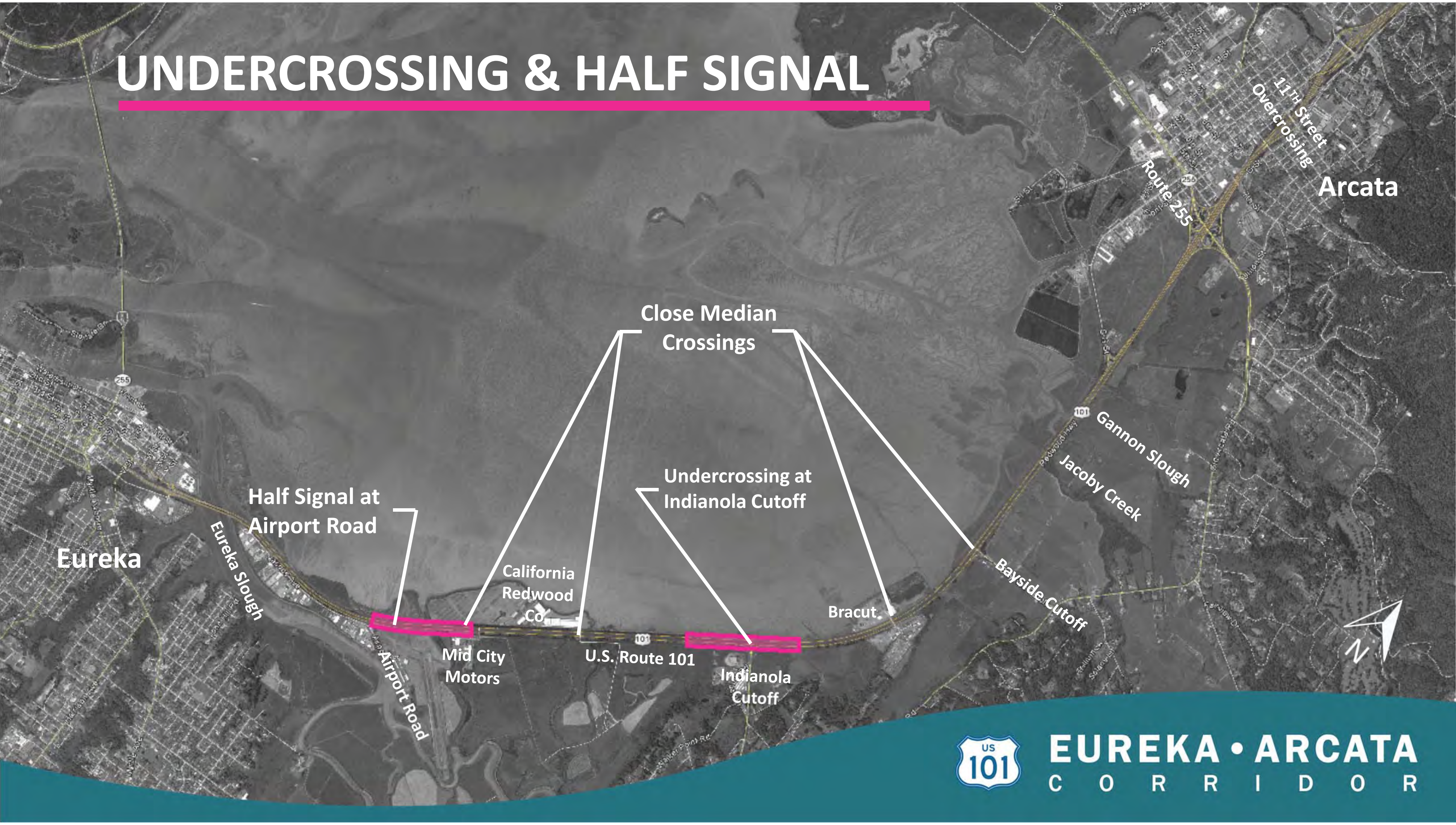


Exhibit 6
CDP Application No. 1-18-1078
(Caltrans)
Median Crossings Closures
1 of 1

Locations of Photosimulation Viewpoints

Exhibit 7
CDP Application No. 1-18-1078
(Caltrans)
Indianola Interchange Visuals
1 of 5

Photo 1

Aerial Photograph of Existing Route 101/Indianola Intersection Facing East

Photosimulation of Proposed Grade Separation at Indianola Cutoff

Photo 2

Photograph of Existing Route 101 Facing Humboldt Bay from Indianola Cutoff

Photosimulation of Proposed Grade Separation Facing Humboldt Bay from Indianola Cutoff

Photo 3

Photograph of Existing Northbound Route 101 South of Indianola Cutoff Facing North

Photosimulation of Proposed Grade Separation South of Indianola Cutoff Facing North

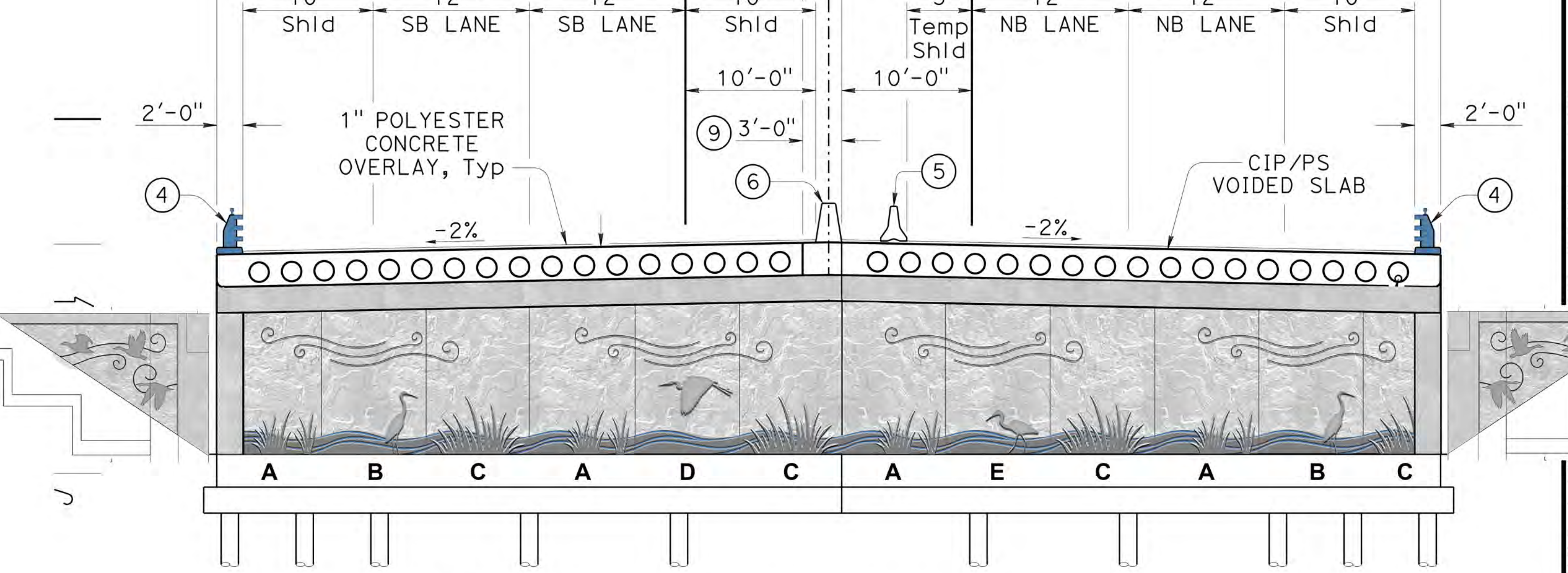
Photo 4

Photograph of Existing Southbound Route 101 Facing Indianola Cutoff Facing South

Photosimulation of Proposed Grade Separation Facing South

Exhibit 8
CDP Application No. 1-18-1078
(Caltrans)
Indianola Cut Off Intersection
1 of 1

Exhibit 9
CDP Application No. 1-18-1078
(Caltrans)
Indianola Final Design
1 of 2



NOT ALL PILES SHOWN.

TYPICAL SECTION

1/8" = 1'-0"

E OF ORNIA TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH 6	BRIDGE NO. 04-0314 POST MILE 82.67	INDIANOLA CUTOFF UC GENERAL PLAN

2 3

UNIT: 3591
PROJECT NUMBER & PHASE: 0100000127 1 CONTRACT NO.: 01-366004

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 3-8-18, 4-18-18, 6-1-18, 8-1-18

SHEET 1 OF X

FILE => 01-366001-a-gp01.dgn

USERNAME => s117606 DATE PLOTTED => 17- TIME PLOTTED => 18:08

Exhibit 9
CDP Application No. 1-18-1078
(Caltrans)
Indianola Final Design
2 of 2

Modified “Half” Signal

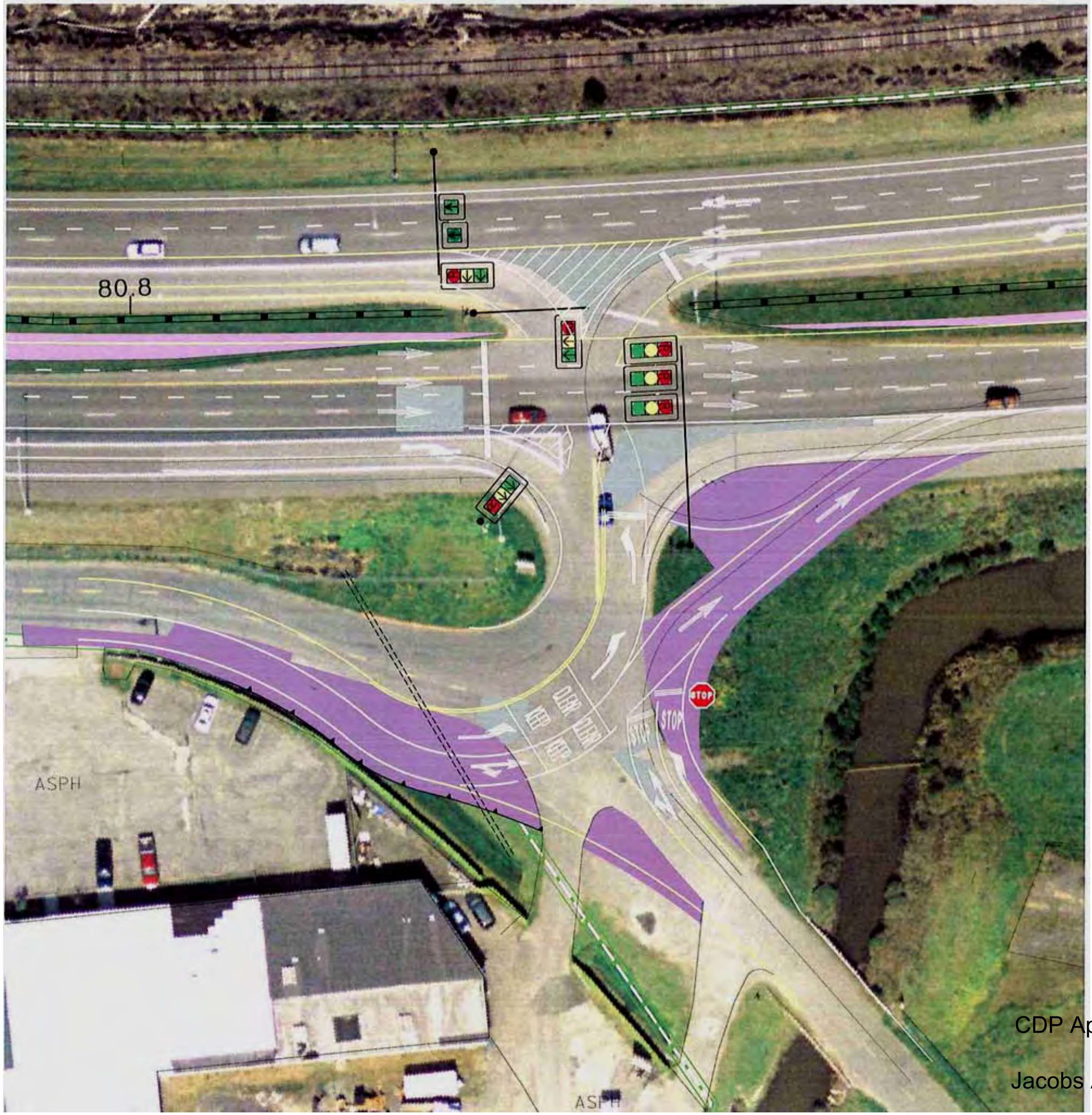


Exhibit 10
CDP Application No. 1-18-1078
(Caltrans)
Jacobs Ave/Airport Road Signal
1 of 1

Exhibit 11
CDP Application No. 1-18-1078
(Caltrans)
Gannon Slough Rails
1 of 1

Exhibit 12
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Visual
1 of 1

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

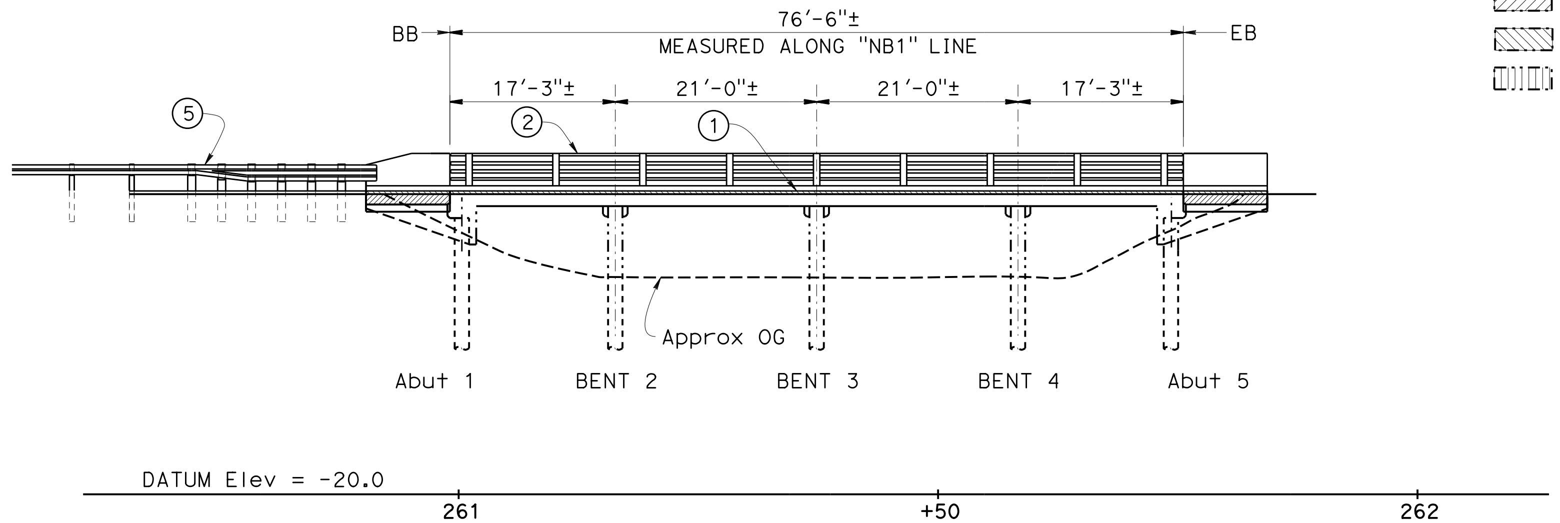
LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER

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.

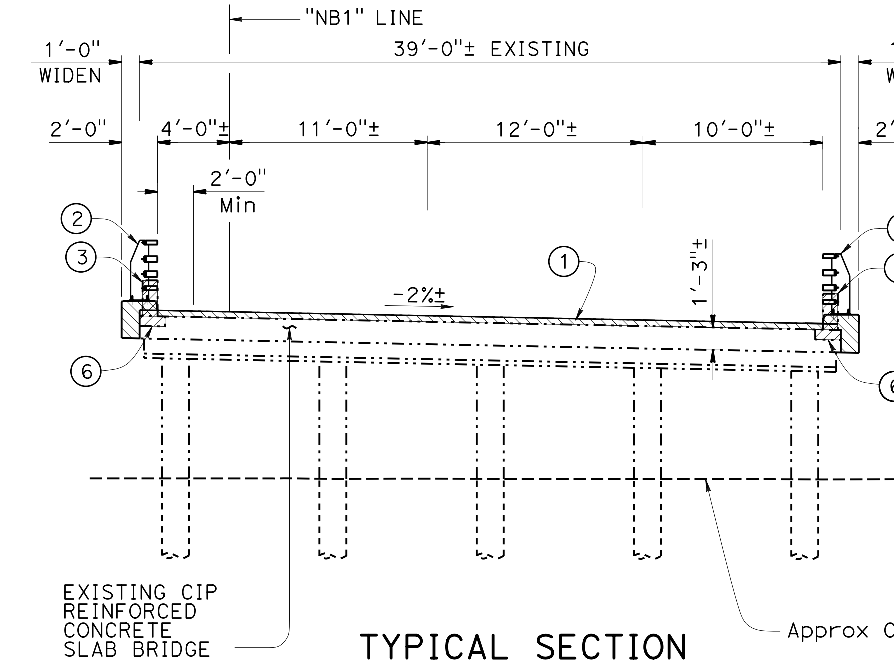
EXPEDITE

LEGEND:

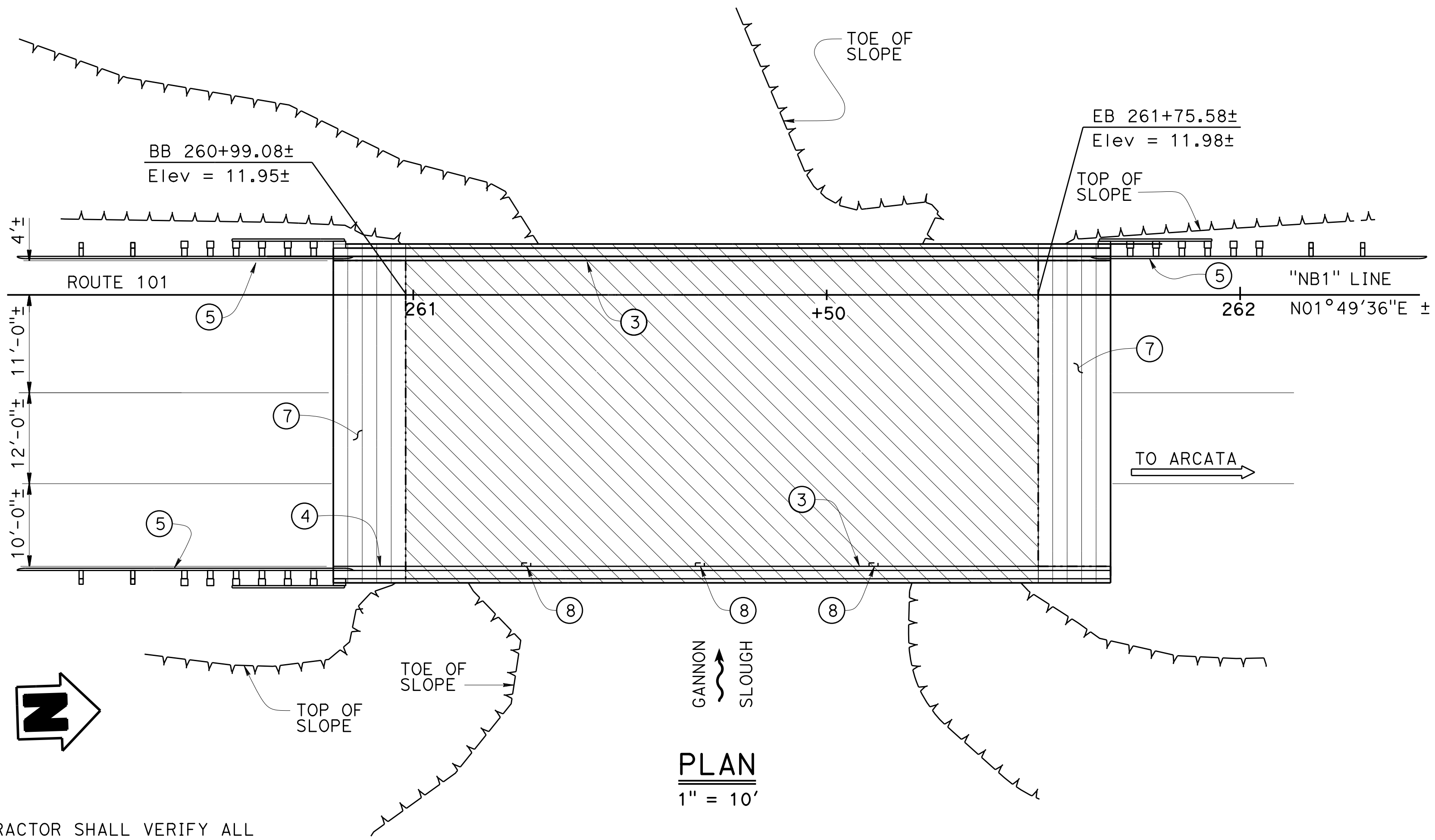
- Existing structure
- Bridge removal (portion)
- Structural Concrete, Bridge (RSC)
- Structural Concrete, Barrier Slab (RSC)



ELEVATION
1" = 10'



TYPICAL SECTION
3/16" = 1'-0"



PLAN
1" = 10'

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

NOTES:

1. Remove 4"± AC overlay, Prepare Bridge Deck, and Place 4" Structural Concrete, Bridge (RSC)
2. California ST-70 Bridge Rail
3. Remove existing concrete bridge rail
4. Paint "GANNON SLOUGH BRIDGE (RIGHT) BRIDGE No. 04-0024R"
5. MGS, see "ROADWAY PLANS"
6. Remove portion of existing bridge deck
7. Concrete Barrier Slab
8. Plug existing Deck Drain, add Scupper on Barrier
9. For "GENERAL NOTES", "STANDARD PLANS" list and "INDEX TO PLANS", see "INDEX TO PLANS" sheet

QUANTITIES

STRUCTURAL CONCRETE, BRIDGE (RSC)	47	CY
STRUCTURAL CONCRETE, BRIDGE (RSC) PATCH	44	CF
STRUCTURAL CONCRETE, BARRIER SLAB (RSC)	37	CY
DRILL AND BOND DOWEL	710	LF
JOINT SEAL (MR1/2")	82	LF
BAR REINFORCING STEEL (EPOXY COATED)(BRIDGE)	20,230	LB
REMOVE ASPHALT CONCRETE SURFACING	3,478	SF
REMOVE UNSOUND CONCRETE	44	CF
PREPARE CONCRETE BRIDGE DECK SURFACE	3,478	SF
BRIDGE REMOVAL (PORTION), LOCATION A	LUMP	SUM
PLUG DECK DRAIN	3	EA
CALIFORNIA ST-70 BRIDGE RAIL	188	LF

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
1 of 10

		BY	CHECKED
X BRANCH CHIEF	DESIGN	L. Wu	R. Washington
	DETAILS	Y. Tang	R. Washington
	QUANTITIES	R. Anderson	Y. Pulidio-Villegas

LOAD & RESISTANCE FACTOR DESIGN — LIVE LOADING: HL93 W/"LOW-BOY"; PERMIT DESIGN VEHICLE
LAYOUT — BY L. Wu — CHECKED R. Washington
SPECIFICATIONS — BY X — PLANS AND SPECS COMPARED X

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 10

BRIDGE No. 04-0024R
POST MILE 84.7

GANNON SLOUGH BRIDGE (RIGHT)
GENERAL PLAN

STRUCTURES DESIGN GENERAL PLAN SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:29
FILE => 040024rgp01.dgn USERNAME => s131596
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589
PROJECT NUMBER & PHASE: 0113000091
CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES
REVISION DATES: 09-05-17, 1/29/19, 2/19/19
SHEET 1 OF 5

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER   DATE X

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 LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA

STANDARD PLANS DATED 2018

	A10A	LEGEND - LINES AND SYMBOLS (SHEET 1 OF 5)
	A10B	LEGEND - LINES AND SYMBOLS (SHEET 2 OF 5)
	A10C	LEGEND - LINES AND SYMBOLS (SHEET 3 OF 5)
	A10D	LEGEND - LINES AND SYMBOLS (SHEET 4 OF 5)
	A10E	LEGEND - LINES AND SYMBOLS (SHEET 5 OF 5)
RSP	B0-1	BRIDGE DETAILS
	B6-21	JOINT SEAL (MAXIMUM MOVEMENT RATING = 2")
	B11-75	CALIFORNIA ST-70 BRIDGE RAIL (SHEET 1 OF 4)
	B11-76	CALIFORNIA ST-70 BRIDGE RAIL (SHEET 2 OF 4)
	B11-77	CALIFORNIA ST-70 BRIDGE RAIL (SHEET 3 OF 4)
	B11-78	CALIFORNIA ST-70 BRIDGE RAIL (SHEET 4 OF 4)

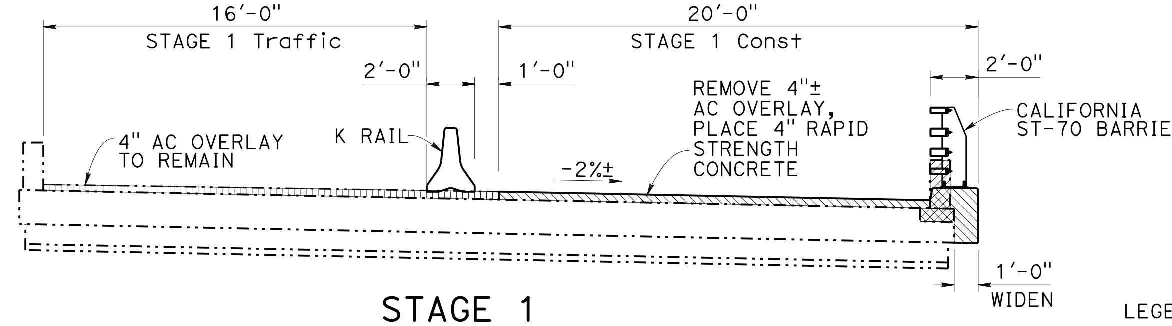
STANDARD PLAN SHEET No.

DETAIL No.

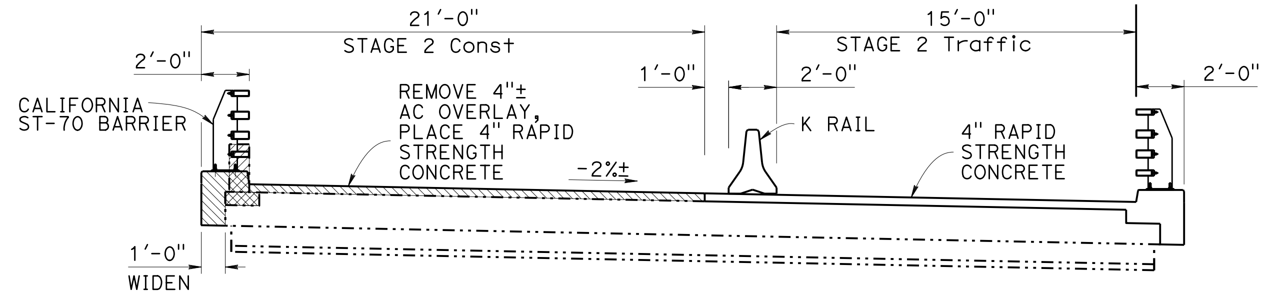
INDEX TO PLANS

SHEET No. TITLE

1. GENERAL PLAN
2. INDEX TO PLANS
3. TYPICAL SECTION
4. BARRIER DETAILS No. 1
5. BARRIER DETAILS No. 2



STAGE 1
1/4" = 1'-0"



STAGE 2
1/4" = 1'-0"

LEGEND:

- Existing structure
- Bridge removal (portion)
- Structural Concrete, Bridge, (RSC) (f'c=5,000 psi at 28 days)
- Existing AC Overlay

GENERAL NOTES
LOAD AND RESISTANCE FACTOR DESIGN

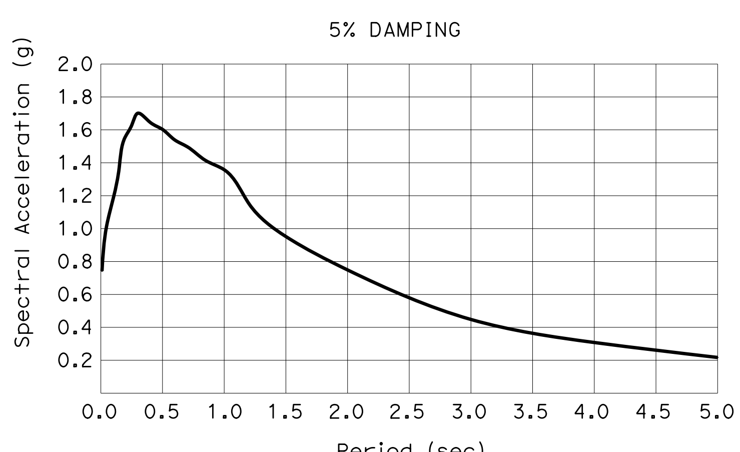
DESIGN:
AASHTO LRFD Bridge Design Specifications, 2012 edition with California Amendments, preface dated Jan 2014

SEISMIC DESIGN:
Caltrans Seismic Design Criteria (SDC), Version 1.7 dated Apr 2013

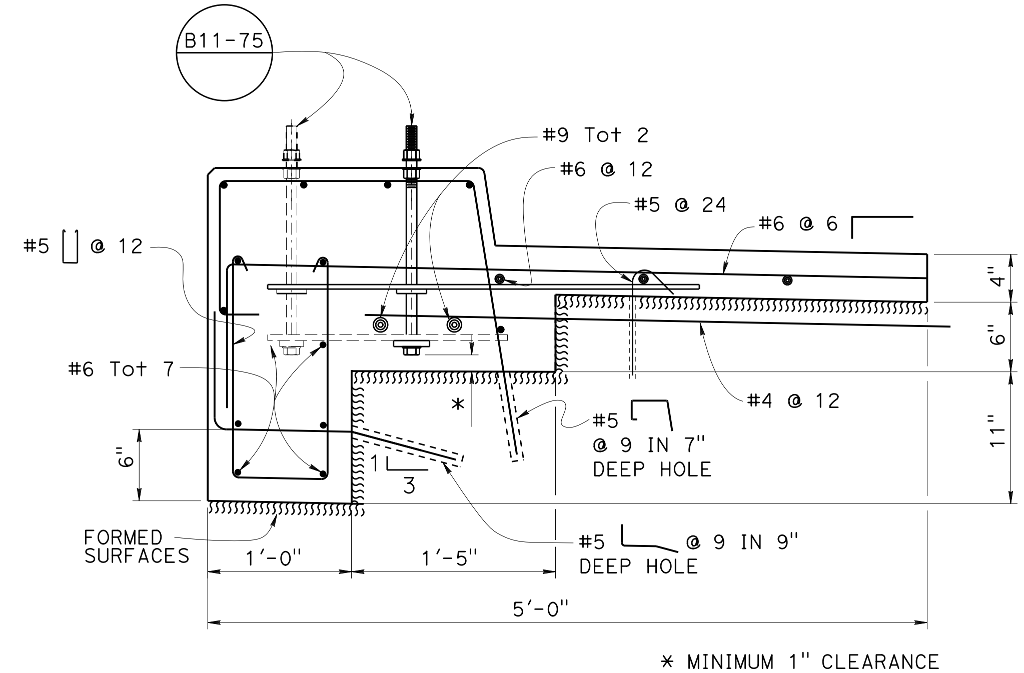
DEAD LOAD:
Does not includes future wearing surface

LIVE LOADING:
HL93 and permit design load

SEISMIC LOADING:
Soil Profile: V_{S30} = 702 ft/sec,
Moment Magnitude: Mmax = 7.7, Peak Ground Acceleration: 0.75 g



REINFORCED CONCRETE:
fy = 60 ksi
f'c = 5.0 ksi
n = 8
Rapid Strength Concrete for all new concrete including 4" deck and Barrier Slab.



DECK & OVERHANG RSC MOCK-UP
1-1/2" = 1'-0"

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
2 of 10

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

	BY	CHECKED
DESIGN	L. Wu	R. Washington
DETAILS	Y. Tang/R. Kirkland	R. Washington
QUANTITIES	R. Anderson	Y. Pulido-Villegas

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 10

BRIDGE No. 04-0024R
POST MILE 84.7

GANNON SLOUGH BRIDGE (RIGHT)
INDEX TO PLANS

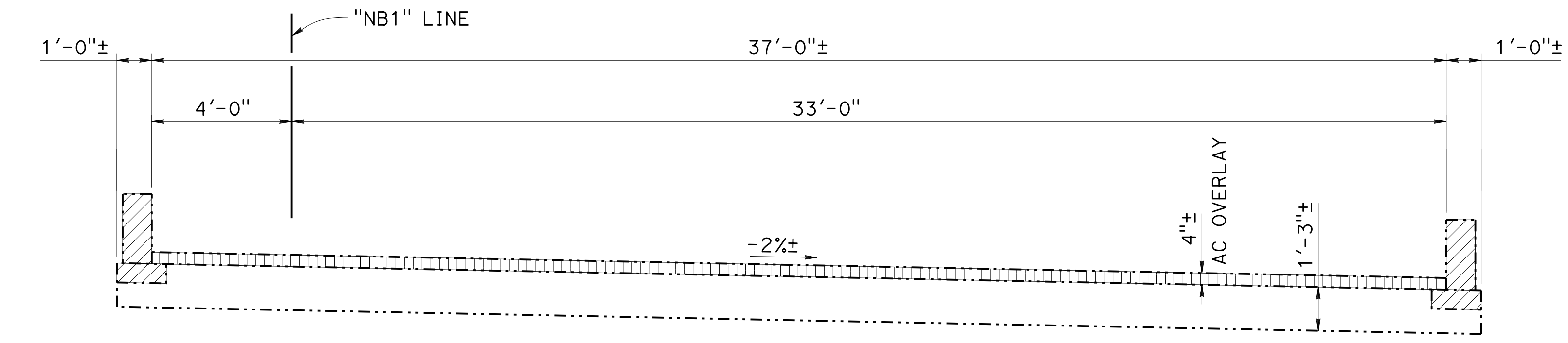
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

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

REGISTERED PROFESSIONAL ENGINEER LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA



TYPICAL SECTION (EXISTING)

3/8" = 1'-0"

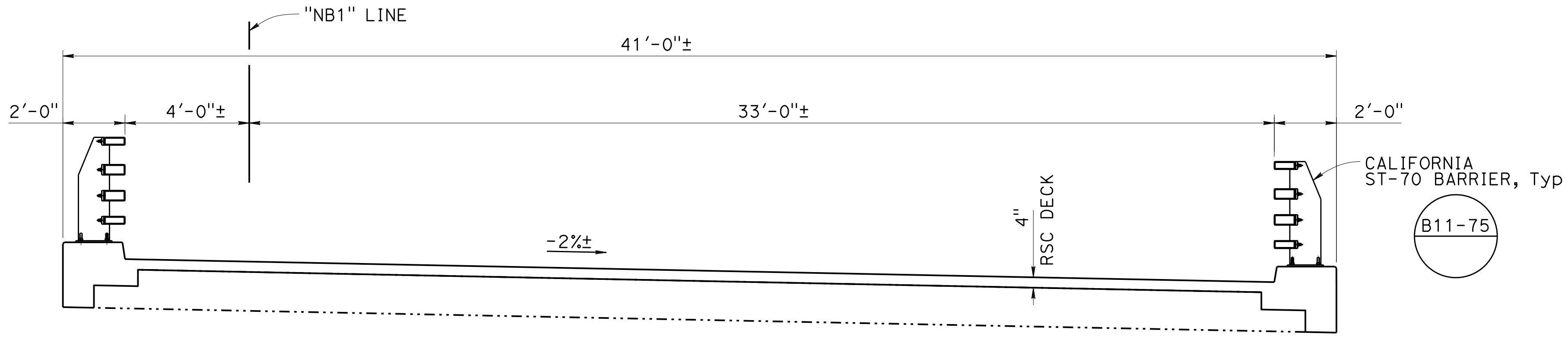
LEGEND:

—··—··— Existing structure

AC Overlay removal

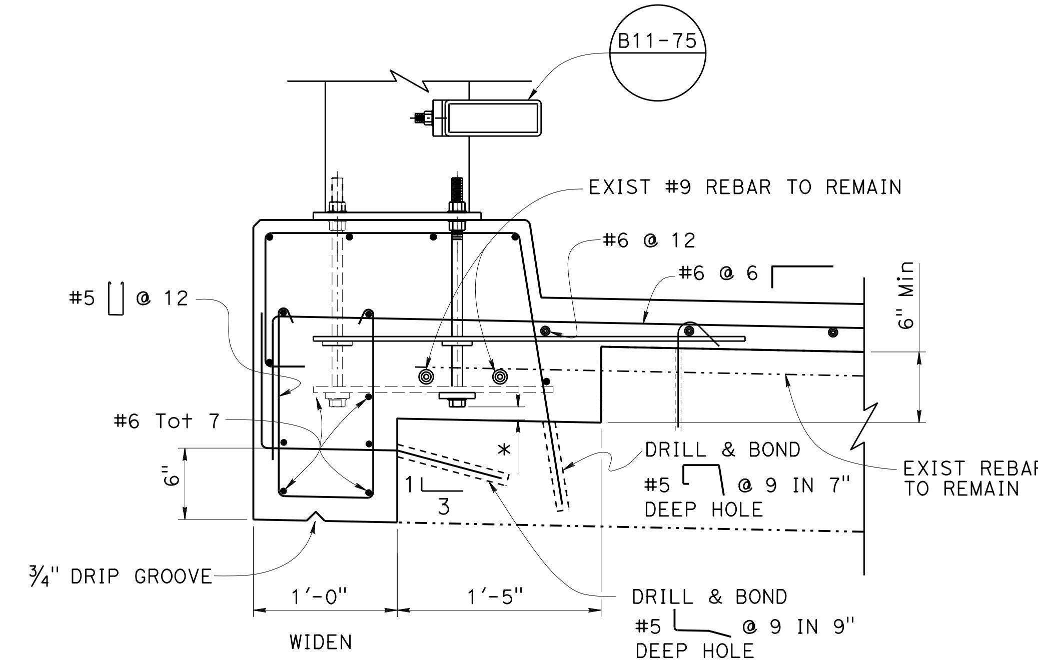
Bridge removal (portion)

NOTE: All reinforcement shall be epoxy coated.



TYPICAL SECTION (FINAL)

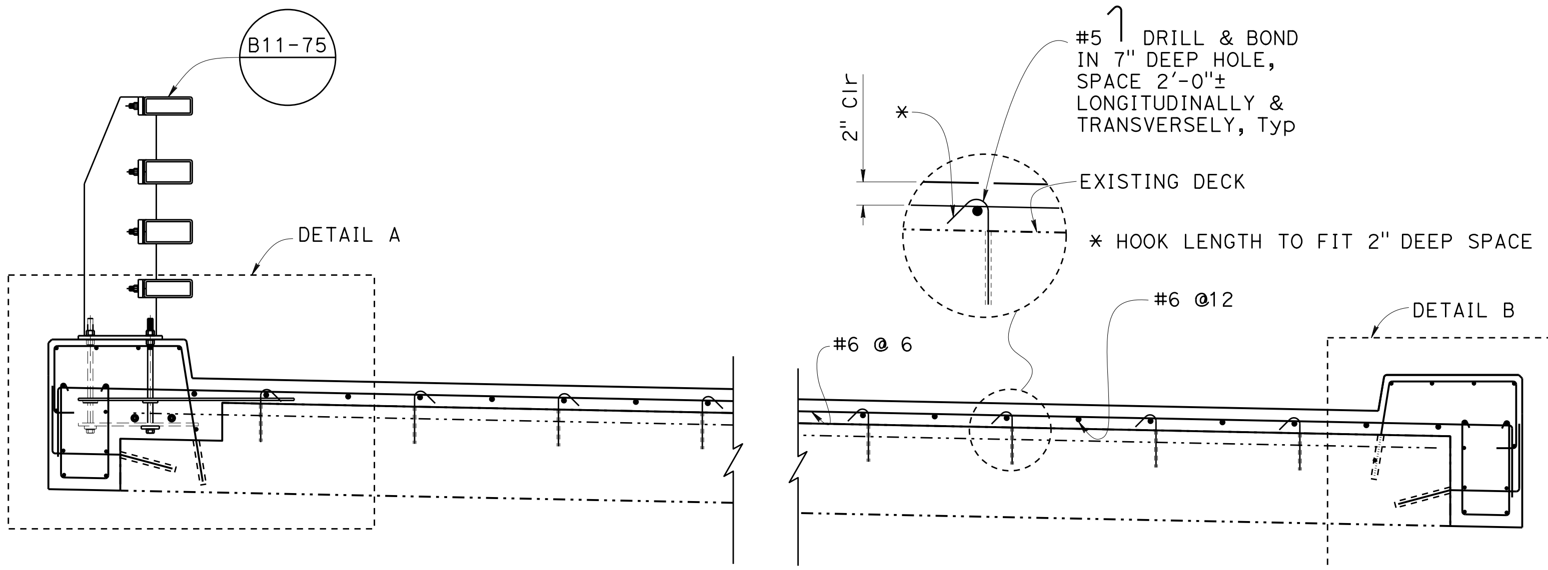
3/8" = 1'-0"



* MINIMUM 1" CLEARANCE

DETAIL A

1-1/2" = 1'-0"

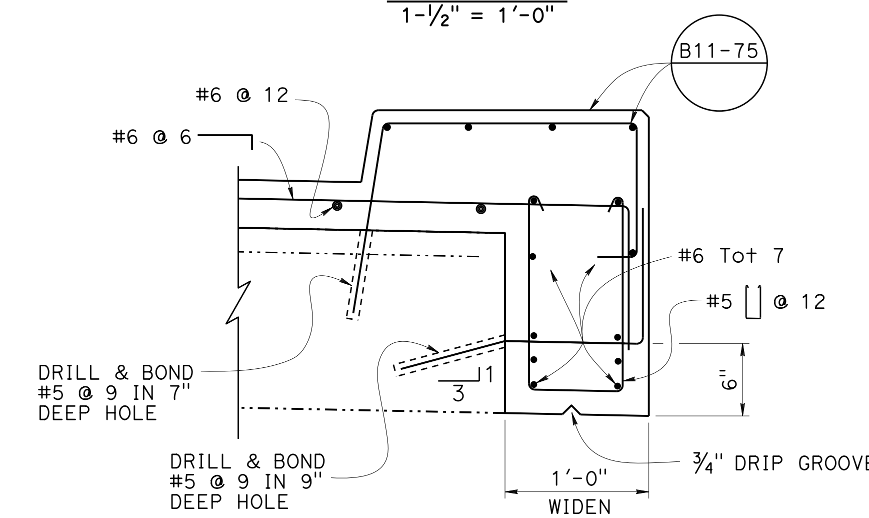


AT BRIDGE RAIL POST REGIONS

OUTSIDE BRIDGE RAIL POST REGIONS

PART TYPICAL SECTION

3/4" = 1'-0"



DETAIL B

1-1/2"= 1'-0"

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
3 of 10

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

	BY	CHECKED
DESIGN	L. Wu	R. Washington
DETAILS	Y. Tang	R. Washington
QUANTITIES	R. Anderson	Y. Pulido-Villegas

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN

DESIGN BRANCH 10

BRIDGE No. 04-0024R

POST MILE 84.7

GANNON SLOUGH BRIDGE (RIGHT)

TYPICAL SECTION

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:29

FILE => 040024rkts03.dgn USERNAME => s131596

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589

PROJECT NUMBER & PHASE: 0113000091

CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3/28/18 7/1/18 8/23/18 10/09/18

SHEET 3 OF 5

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

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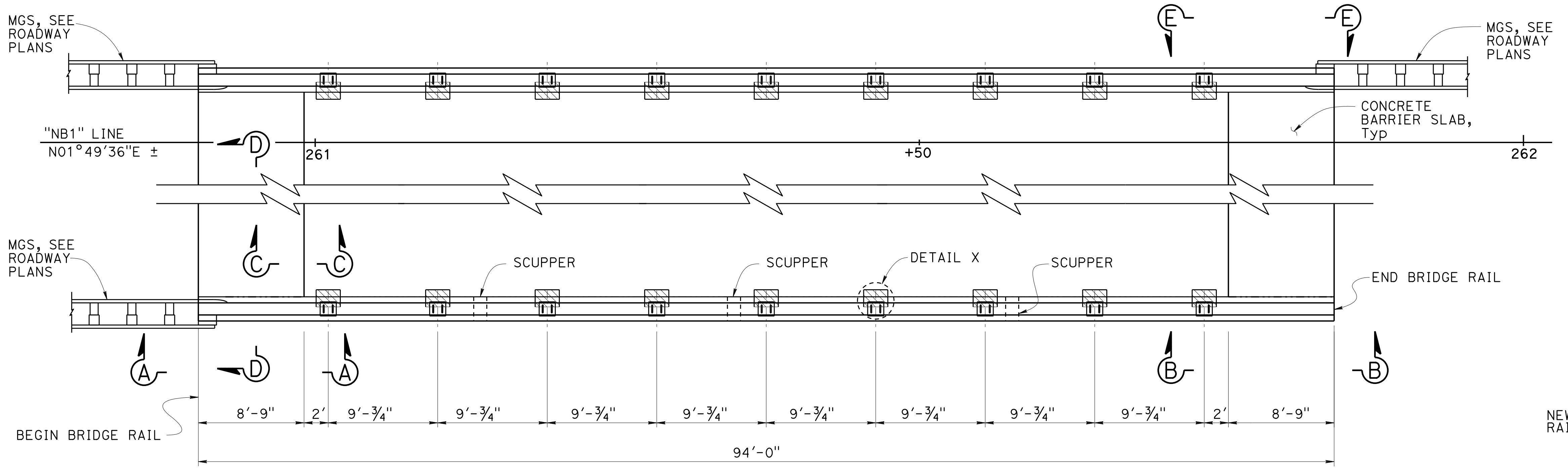
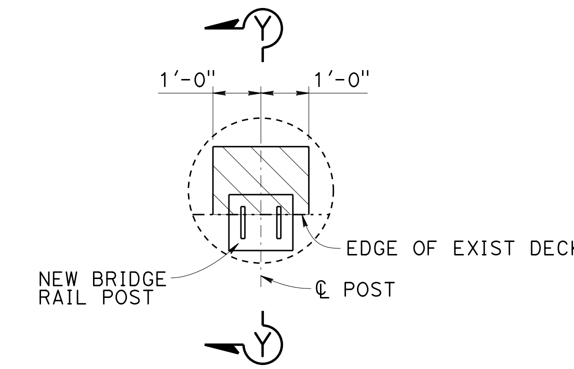
REGISTERED PROFESSIONAL ENGINEER LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA



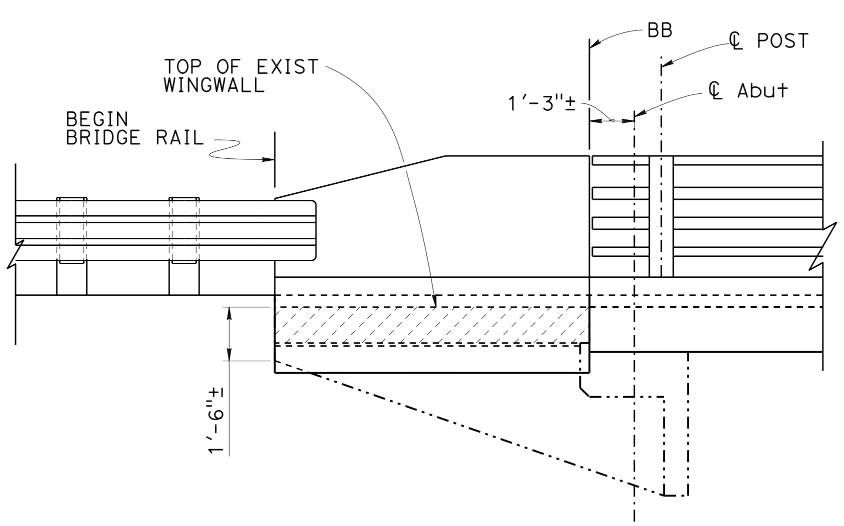
BRIDGE RAIL LAYOUT

3/16" = 1'-0"



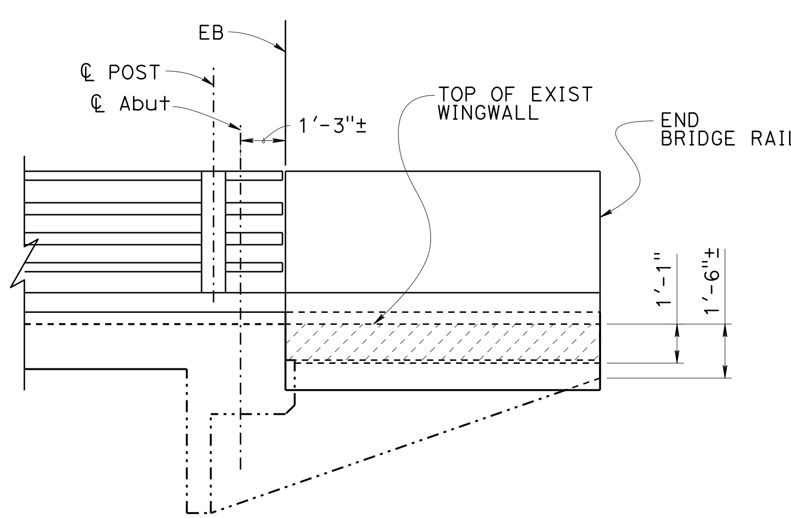
DETAIL X

½" = 1'-0"



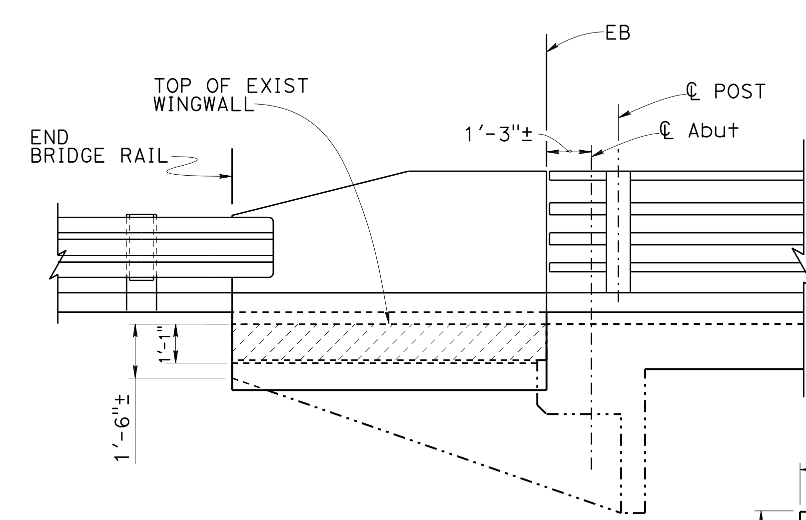
VIEW A-A

3/8" = 1'-0"



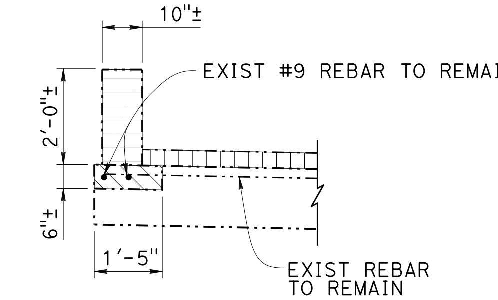
VIEW B-B

3/8" = 1'-0"



VIEW E-E

3/8" = 1'-0"



NOTE: NEW BRIDGE RAIL POST NOT SHOWN

SECTION Y-Y

½" = 1'-0"

LEGEND:

- Existing structure
- Existing Concrete Removal (Top 1'-1" existing Wingwall)
- Existing Deck Removal (6" deep)
- Existing Barrier Removal
- 4"± AC Removal

NOTES:

1. For "SECTION C-C" and "SECTION D-D see "BARRIER DETAILS No. 2" sheet.
2. For Scupper Details, see "BARRIER DETAILS No. 2" sheet.

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
4 of 10

	BY	CHECKED
DESIGN	L. Wu	R. Washington
DETAILS	Y. Tang	R. Washington
QUANTITIES	R. Anderson	Y. Pulido-Villegas

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN
DESIGN BRANCH 10

BRIDGE No. 04-0024R
POST MILE 84.7

GANNON SLOUGH BRIDGE (RIGHT)

BARRIER DETAILS No. 1

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:29
FILE => 040024r+brd+04.dgn USERNAME => s131596

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589
PROJECT NUMBER & PHASE: 0113000091
CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 3/22/18, 10/09/18, 8/07/18

SHEET 4 OF 5

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA

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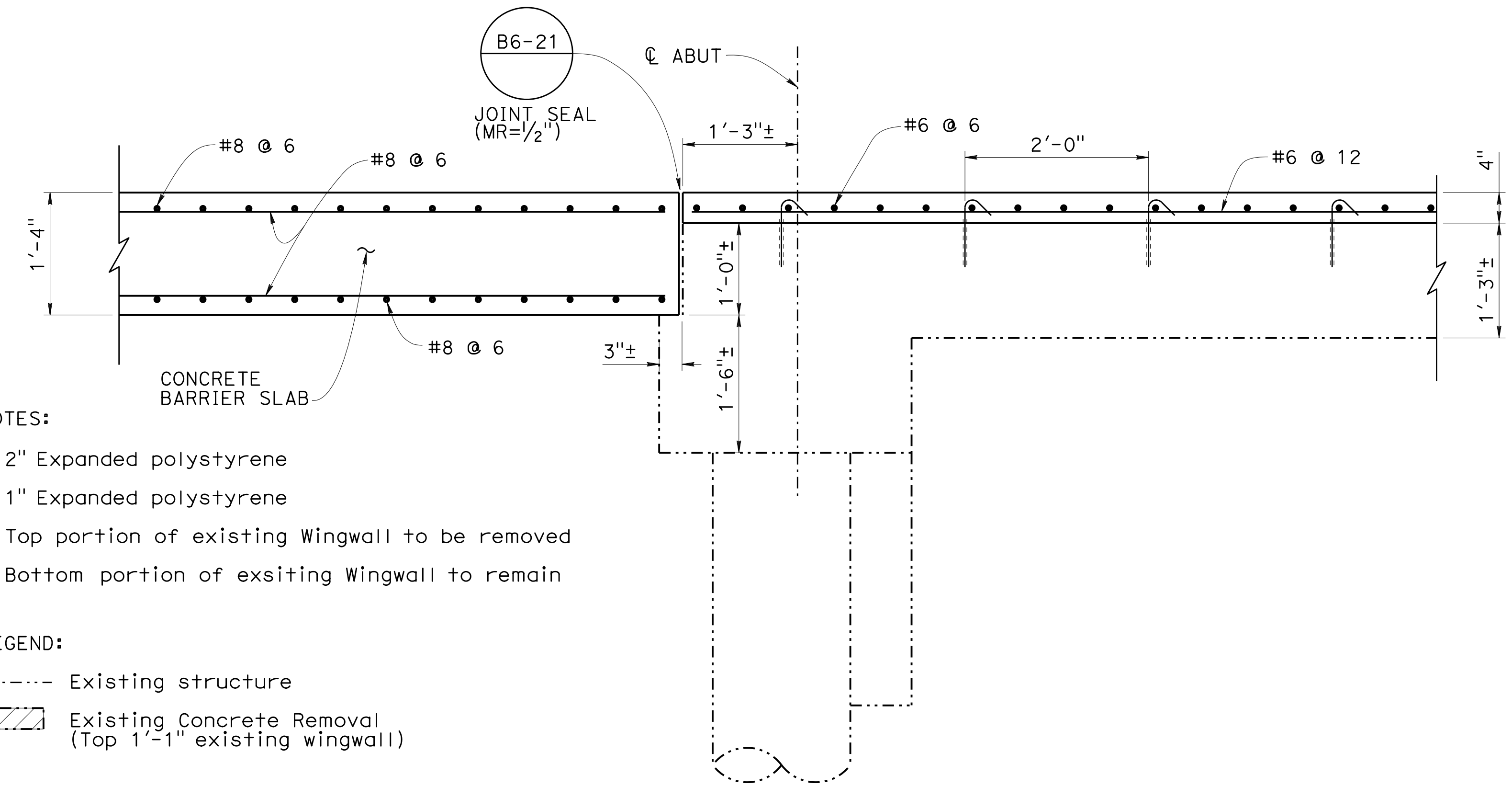


NOTES:

① 2" Expanded polystyrene

② 1" Expanded polystyrene

③ Top portion of existing Wingwall to be removed

④ Bottom portion of exsiting Wingwall to remain

LEGEND:

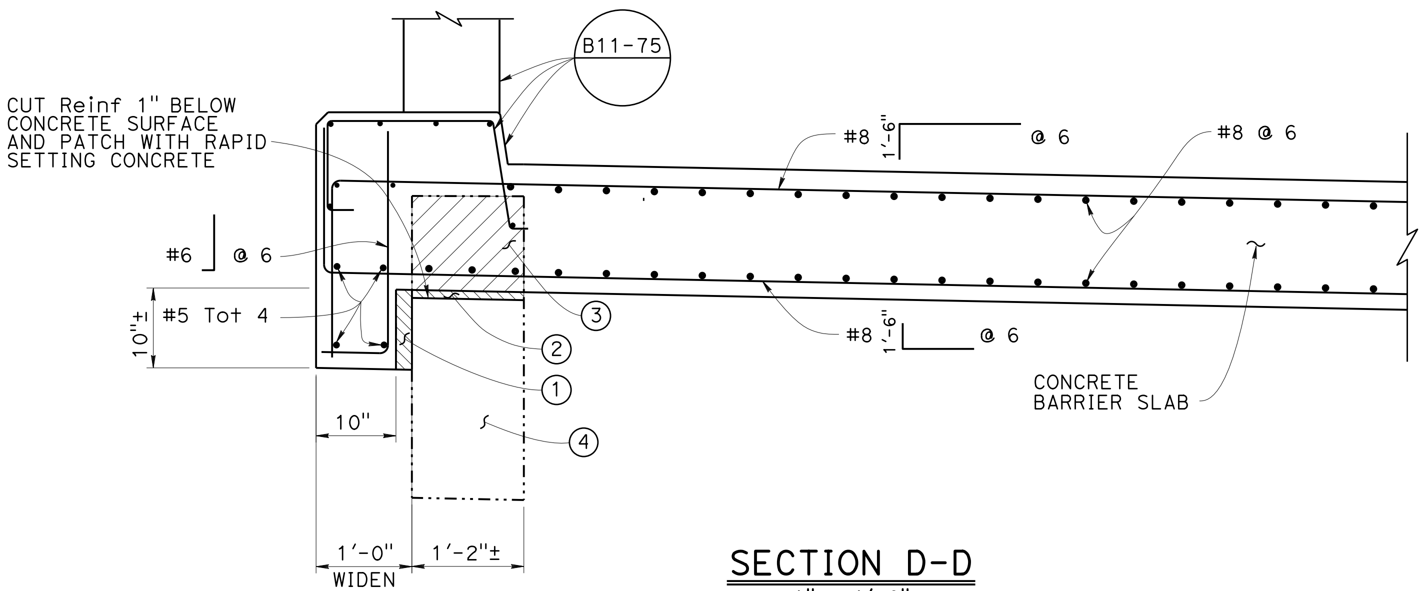
-··-··- Existing structure

Existing Concrete Removal (Top 1'-1" existing wingwall)

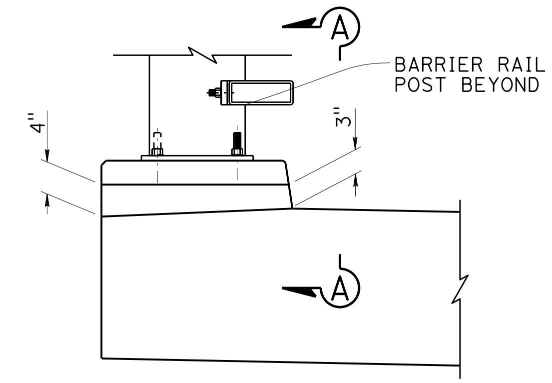
NOTES:

1. For location of "SECTION C-C" and "SECTION D-D see "BARRIER DETAILS No. 1" sheet.
2. All reinforcement shall be epoxy coated.

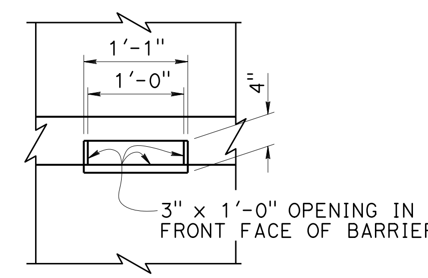
SECTION C-C
1" = 1'-0"



SECTION D-D
1" = 1'-0"

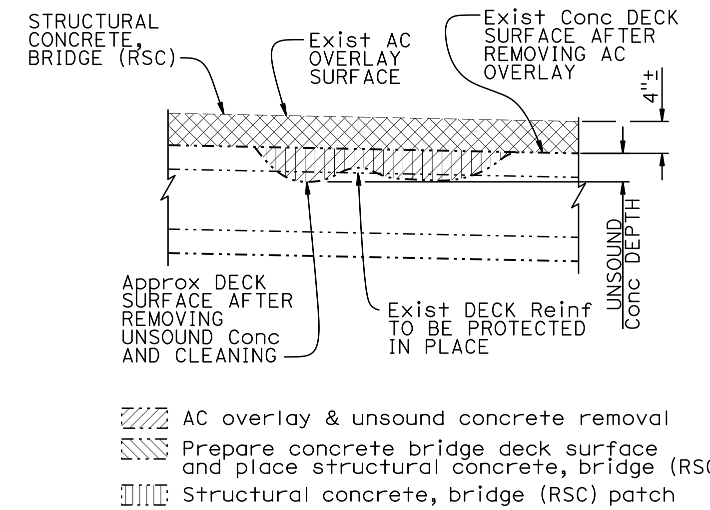


SCUPPER SECTION
1" = 1'-0"



ELEVATION A-A
1" = 1'-0"

DECK REPAIR TABLE	
Remove unsound concrete and place Structural Concrete, Bridge (RSC) Patch	
Approx Area Damaged (%)	Approx Depth (in)
5	3



EXIST DECK REPAIR DETAIL
1" = 1'-0"

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
5 of 10

NOTE:
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	BY	CHECKED
DESIGN	L. Wu	R. Washington
DETAILS	Y. Tang	R. Washington
QUANTITIES	R. Anderson	Y. Pulido-Villegas

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 10

BRIDGE No. 04-0024R
POST MILE 84.7

GANNON SLOUGH BRIDGE (RIGHT)
BARRIER DETAILS No. 2

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:30
FILE => 040024rtbrdt05.dgn USERNAME => s131596

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589
PROJECT NUMBER & PHASE: 0113000091
CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3/22/18 1/29/19 2/27/19

SHEET 5 OF 5

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

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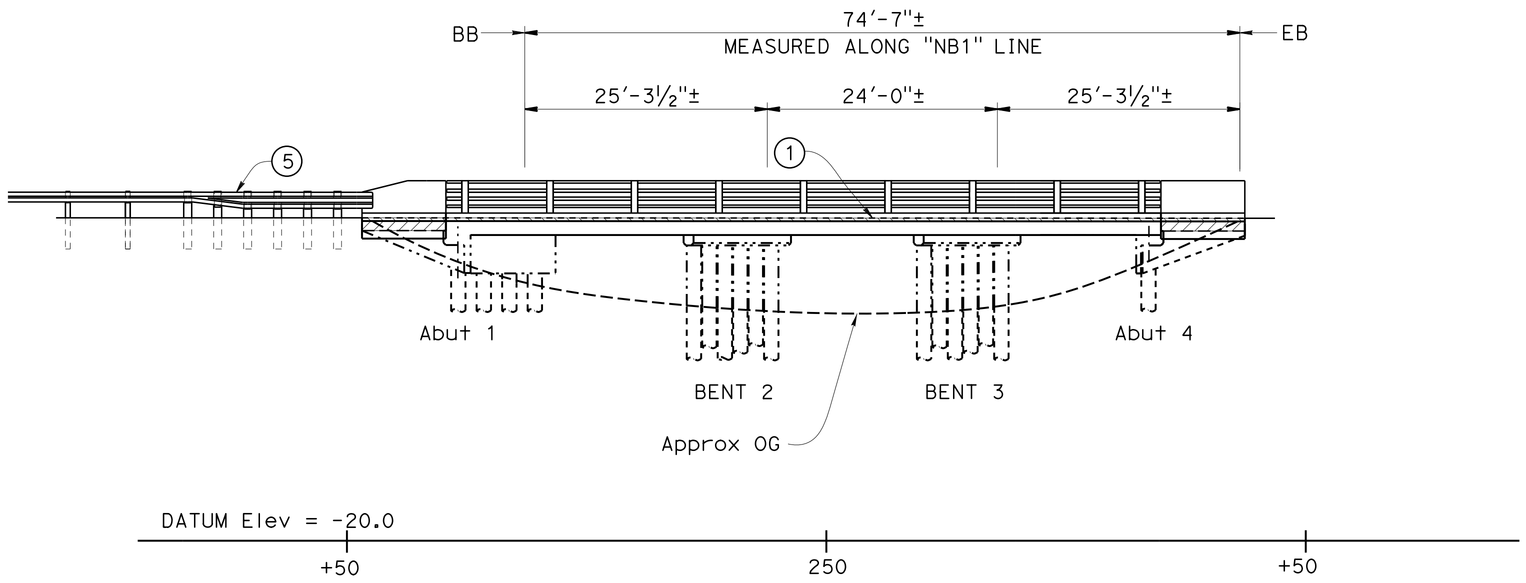
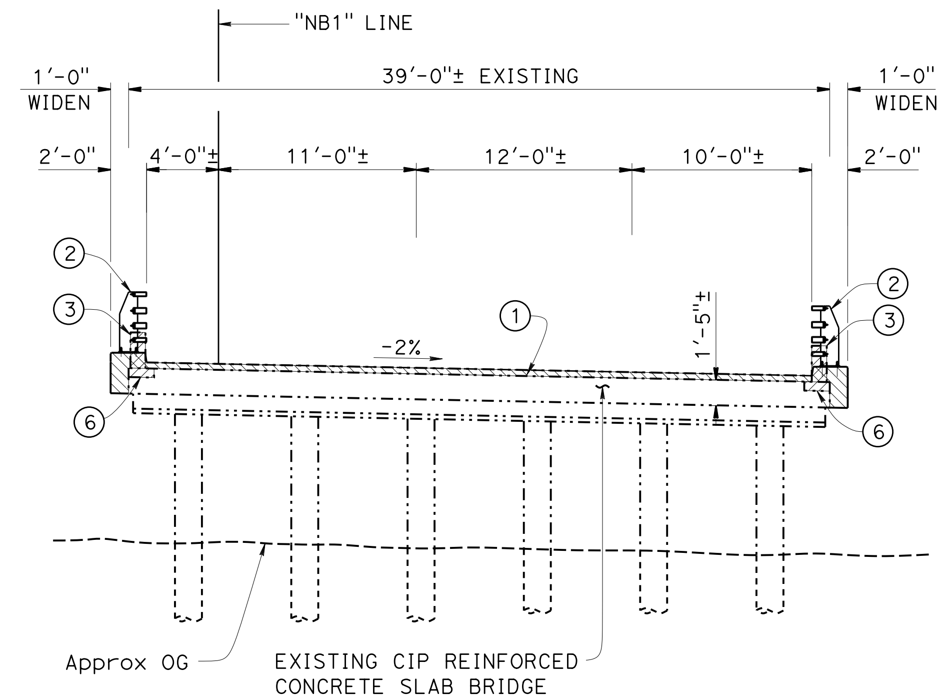
REGISTERED PROFESSIONAL ENGINEER LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA

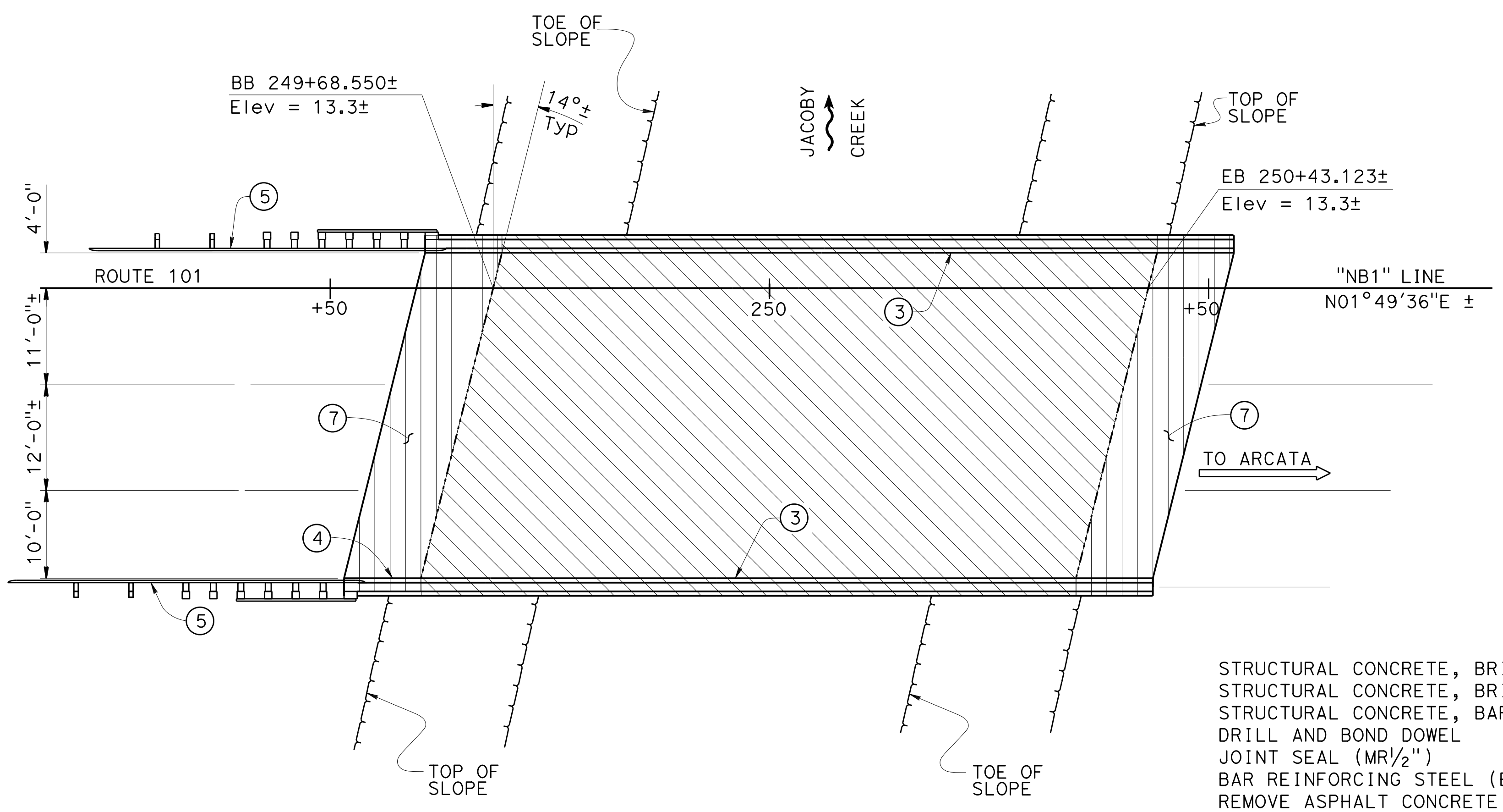
EXPEDITE



ELEVATION
1" = 10'



TYPICAL SECTION
3/16" = 1'-0"



PLAN
1" = 10'

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

QUANTITIES

STRUCTURAL CONCRETE, BRIDGE (RSC)	46	CY
STRUCTURAL CONCRETE, BRIDGE (RSC) PATCH	43	CF
STRUCTURAL CONCRETE, BARRIER SLAB (RSC)	38	CY
DRILL AND BOND DOWEL	694	LF
JOINT SEAL (MR½")	85	LF
BAR REINFORCING STEEL (EPOXY COATED)(BRIDGE)	19,650	LB
REMOVE ASPHALT CONCRETE SURFACING	3,405	SF
REMOVE UNSOUND CONCRETE	43	CF
PREPARE CONCRETE BRIDGE DECK SURFACE	3,405	SF
BRIDGE REMOVAL (PORTION), LOCATION B	LUMP	SUM
CALIFORNIA ST-70 BRIDGE RAIL	184	LF

NOTES:

1. Remove 4"± AC overlay, Prepare Bridge Deck and place Structural Concrete, Bridge (RSC)
2. California ST-70 Bridge Rail
3. Remove existing concrete bridge rail
4. Paint "JACOBY CREEK BRIDGE (RIGHT) BRIDGE No. 04-0023R"
5. MGS, see "ROADWAY PLANS"
6. Remove portion of existing bridge deck
7. Concrete Barrier Slab
8. For "GENERAL NOTES", "STANDARD PLANS" list and "INDEX TO PLANS", see "INDEX TO PLANS" sheet

LEGEND:

-··-··- Existing structure

Bridge removal (portion)

Structural Concrete Bridge (RSC)

Structural Concrete, Barrier Slab (RSC)

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
6 of 10

X
BRANCH CHIEF

	BY	CHECKED
DESIGN	L. Wu	R. Washington
DETAILS	Y. Tang	R. Washington
QUANTITIES	R. Anderson	Y. Pulido-Villegas

LOAD & RESISTANCE FACTOR DESIGN	LIVE LOADING: HL93 W/"LOW-BOY"; PERMIT DESIGN VEHICLE	
LAYOUT	BY L. Wu	CHECKED R. Washington
SPECIFICATIONS	BY X	PLANS AND SPECS COMPARED X

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 10

BRIDGE No. 04-0023R
POST MILE 84.5

JACOBY CREEK BRIDGE (RIGHT)
GENERAL PLAN

STRUCTURES DESIGN GENERAL PLAN SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:29
FILE => 040023rapg01.dgn USERNAME => s131596

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589
PROJECT NUMBER & PHASE: 0113000091
CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 09-05-17, 1/29/19, 2/20/19
SHEET 1 OF 5

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA

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.

STANDARD PLANS DATED 2018

A10A	LEGEND - LINES AND SYMBOLS (SHEET 1 OF 5)
A10B	LEGEND - LINES AND SYMBOLS (SHEET 2 OF 5)
A10C	LEGEND - LINES AND SYMBOLS (SHEET 3 OF 5)
A10D	LEGEND - LINES AND SYMBOLS (SHEET 4 OF 5)
A10E	LEGEND - LINES AND SYMBOLS (SHEET 5 OF 5)
B6-21	JOINT SEAL (MAXIMUM MOVEMENT RATING = 2")
B11-75	CALIFORNIA ST-70 BRIDGE RAIL (SHEET 1 OF 4)
B11-76	CALIFORNIA ST-70 BRIDGE RAIL (SHEET 2 OF 4)
B11-77	CALIFORNIA ST-70 BRIDGE RAIL (SHEET 3 OF 4)
B11-78	CALIFORNIA ST-70 BRIDGE RAIL (SHEET 4 OF 4)

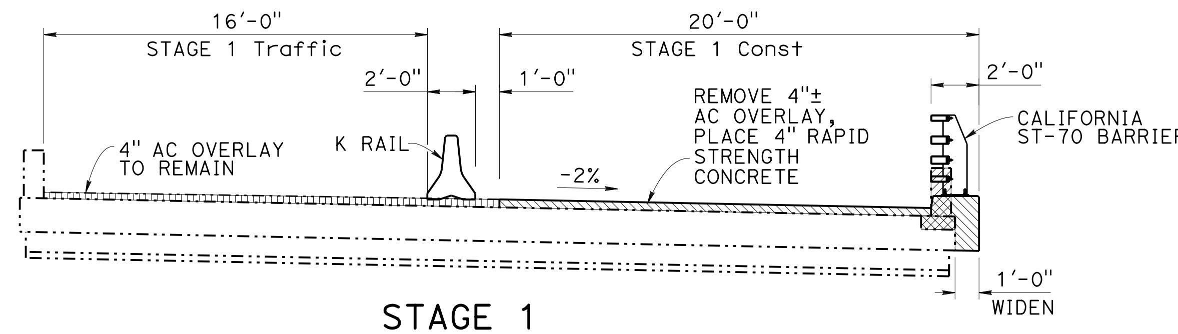
STANDARD PLAN SHEET No.

DETAIL No.

INDEX TO PLANS

SHEET No. TITLE

1. GENERAL PLAN
2. INDEX TO PLANS
3. TYPICAL SECTION
4. BARRIER DETAILS No. 1
5. BARRIER DETAILS No. 2

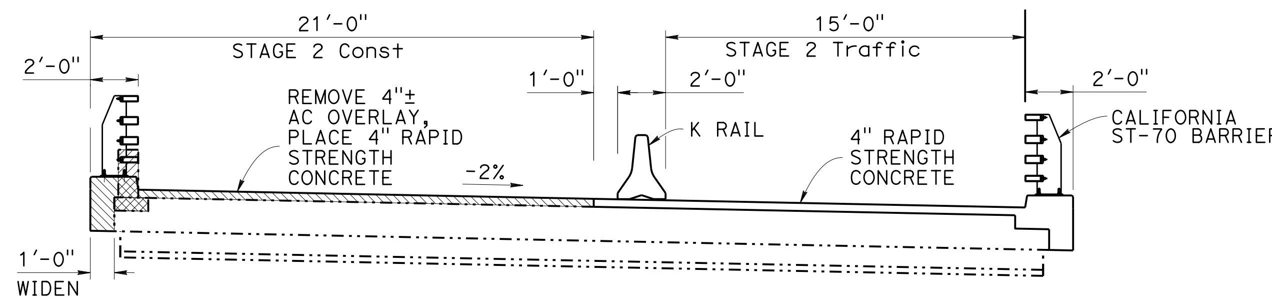


STAGE 1

1/4" = 1'-0"

LEGEND:

- Existing structure
- Bridge removal (portion)
- Structural Concrete, Bridge, (RSC) (f'c= 5,000 psi at 28 days)
- Existing AC Overlay



STAGE 2

1/4" = 1'-0"

GENERAL NOTES
LOAD AND RESISTANCE FACTOR DESIGN

DESIGN:
AASHTO LRFD Bridge Design Specifications, 2012 edition with California Amendments, preface dated Jan 2014

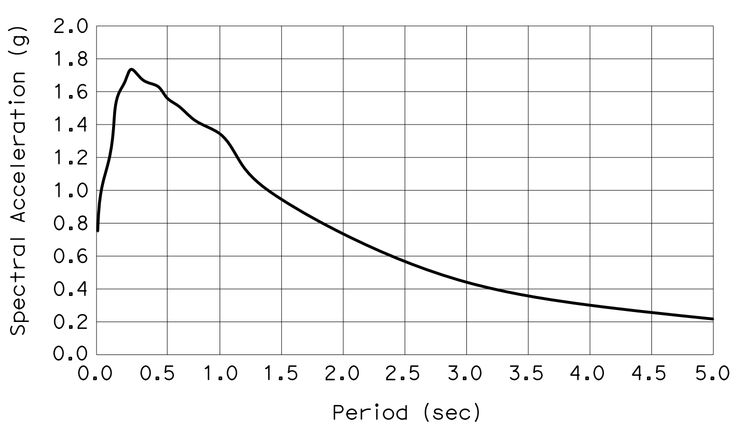
SEISMIC DESIGN:
Caltrans Seismic Design Criteria (SDC), Version 1.7 dated Apr 2013

DEAD LOAD:
Does not includes future wearing surface

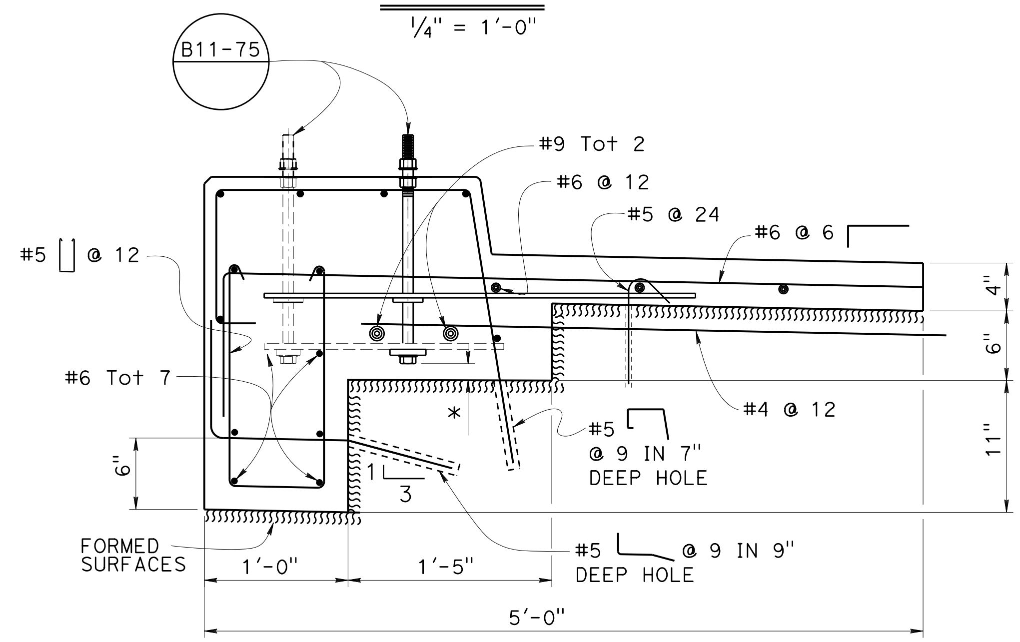
LIVE LOADING:
HL93 and permit design load

SEISMIC LOADING:
Soil Profile: V_{S30} = 726 ft/sec
Moment Magnitude: Mmax = 7.7
Peak Ground Acceleration: 0.75 g

5% DAMPING



REINFORCED CONCRETE:
fy = 60 ksi
f'c = 5.0 ksi
n = 8
Rapid Strength Concrete for all new concrete including 4" deck and Barrier Slab.



* MINIMUM 1" CLEARANCE

DECK & OVERHANG RSC MOCK-UP

1-1/2" = 1'-0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
7 of 10

	BY	CHECKED
DESIGN	L. Wu	R. Washington
DETAILS	Y. Tang /R. Kirkland	R. Washington
QUANTITIES	R. Anderson	Y. Pulido-Villegas

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 10

BRIDGE No. 04-0023R
POST MILE 84.5

JACOBY CREEK BRIDGE (RIGHT)
INDEX TO PLANS

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:29
FILE => 040023railp02.dgn USERNAME => s131596

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589
PROJECT NUMBER & PHASE: 0113000091
CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 3/21/18 2/19/19 2/22/19

SHEET 2 OF 5

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

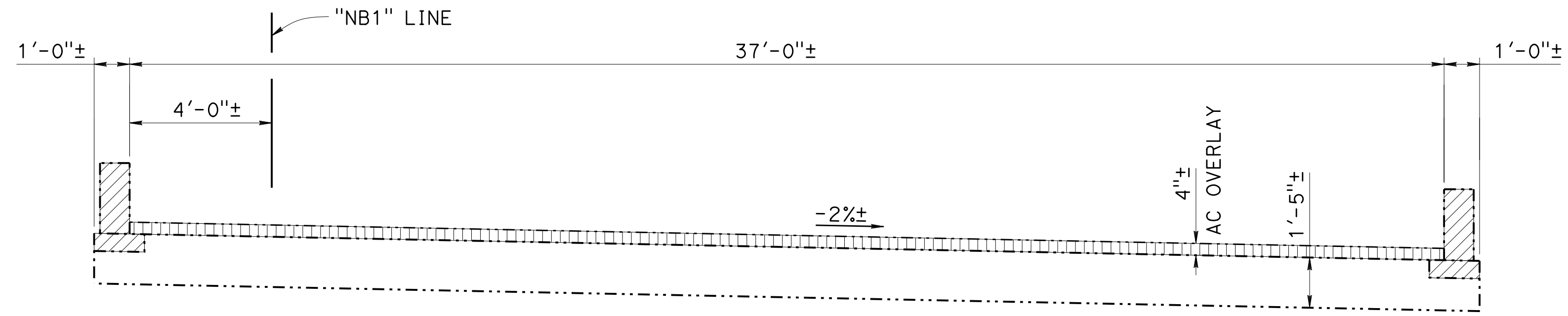
REGISTERED PROFESSIONAL ENGINEER LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA

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.

LEGEND:

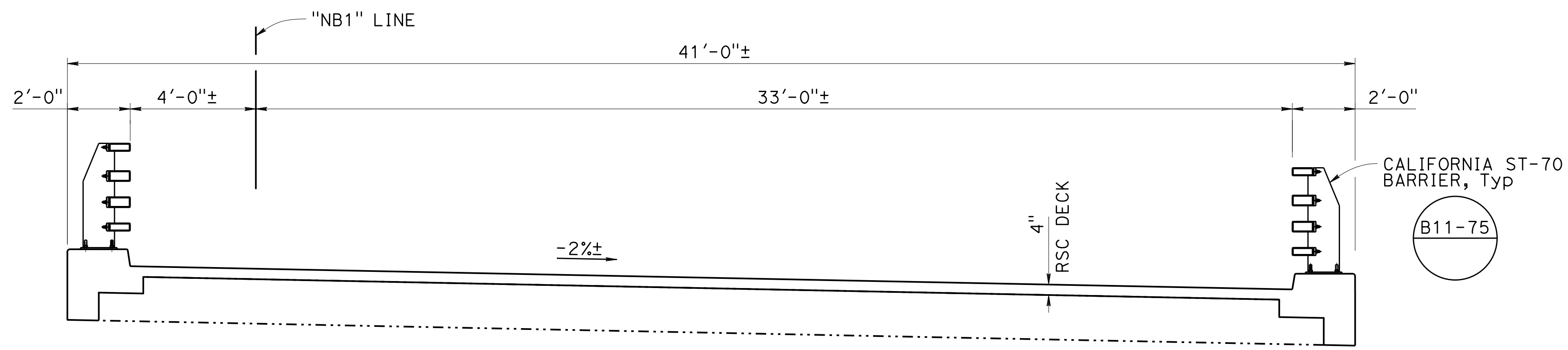
- ---·---·--- Existing structure
- AC Overlay removal
- Bridge removal (portion)

NOTE: All reinforcement shall be epoxy coated.



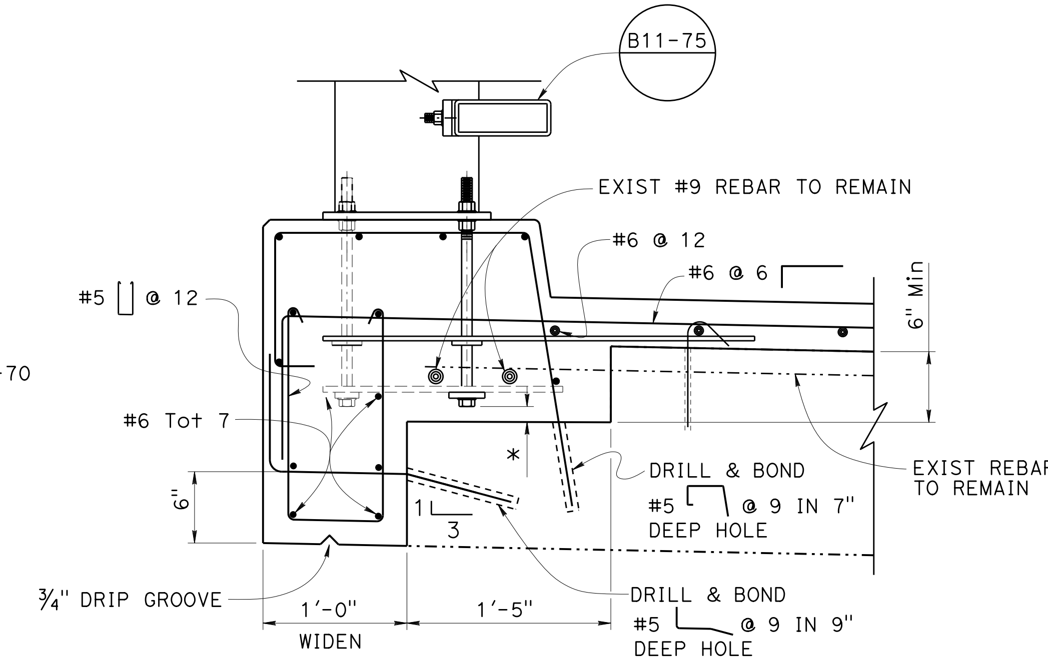
TYPICAL SECTION (EXISTING)

⅜" = 1'-0"



TYPICAL SECTION (FINAL)

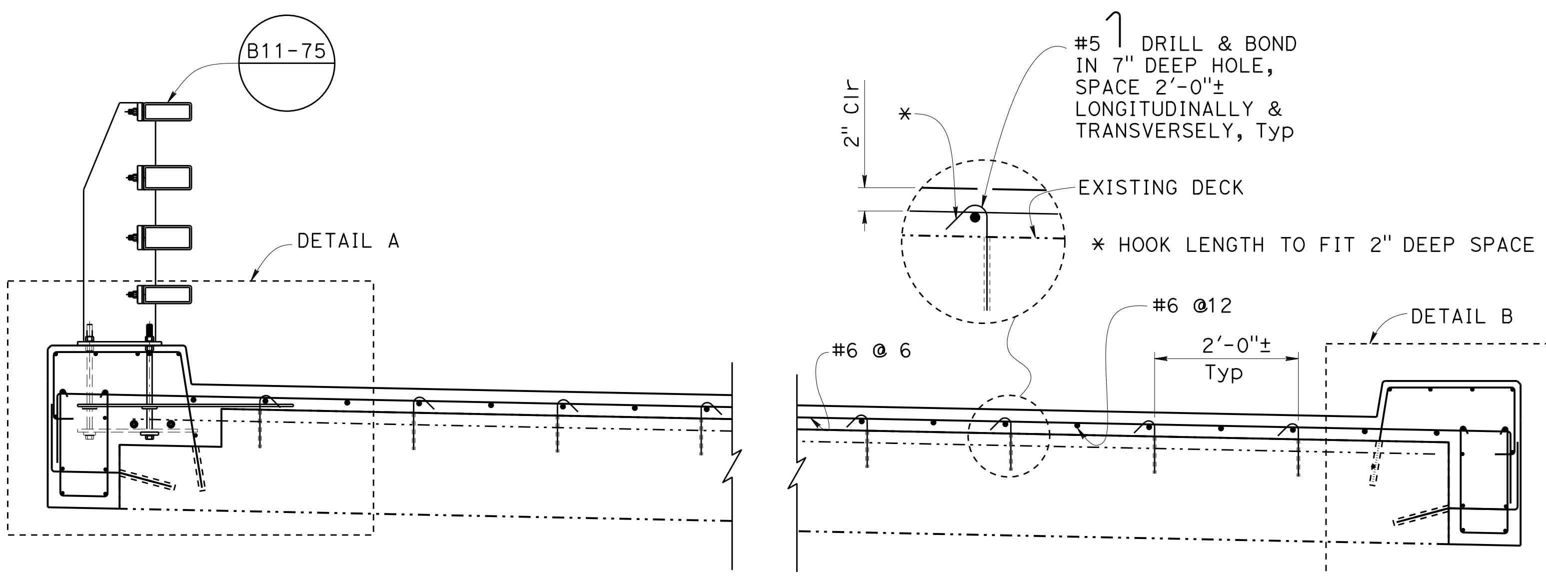
⅜" = 1'-0"



DETAIL A

1-½" = 1'-0"

* MINIMUM 1" CLEARANCE

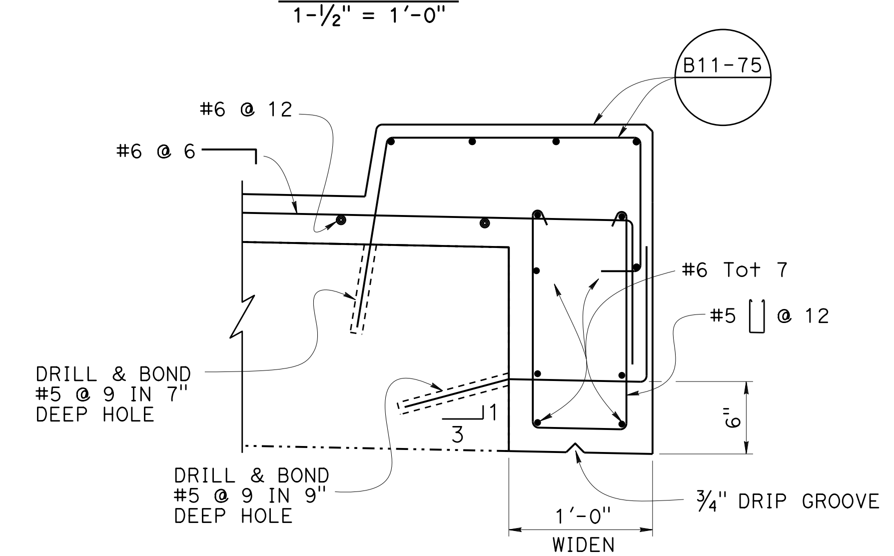


AT BRIDGE RAIL POST REGIONS

OUTSIDE BRIDGE RAIL POST REGIONS

PART TYPICAL SECTION

¾" = 1'-0"



DETAIL B

1-½"= 1'-0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
8 of 10

DESIGN	BY L. Wu	CHECKED R. Washington
DETAILS	BY Y. Tang	CHECKED R. Washington
QUANTITIES	BY R. Anderson	CHECKED Y. Pulido-Villegas

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 10

BRIDGE No. 04-0023R
POST MILE 84.5

JACOBY CREEK BRIDGE (RIGHT)
TYPICAL SECTION

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:30
FILE => 040023rkts03.dgn USERNAME => s131596

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589
PROJECT NUMBER & PHASE: 0113000091
CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES: 3/21/18, 8/29/18, 9/25/18, 10/05/18

SHEET 3 OF 5

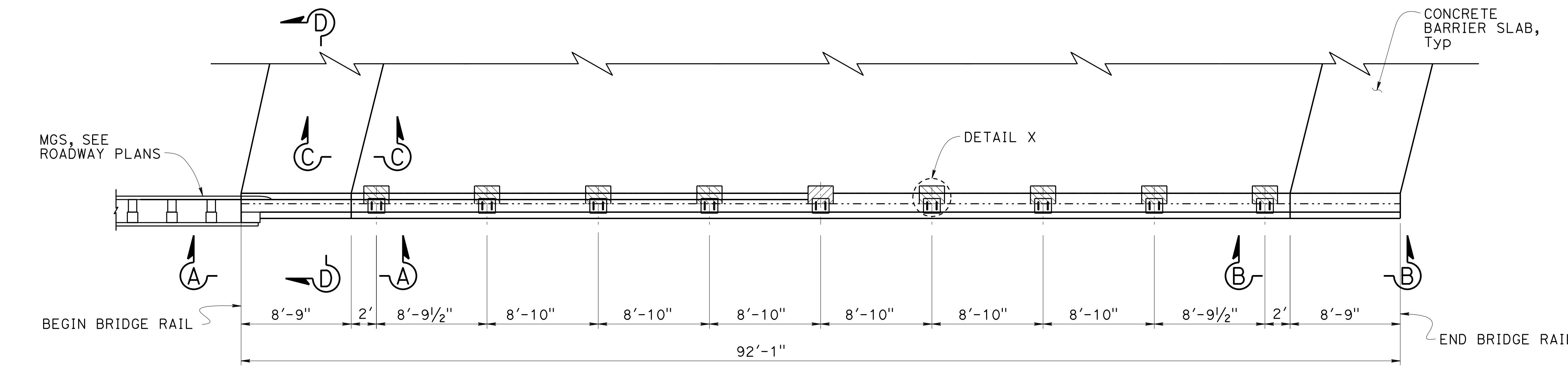
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

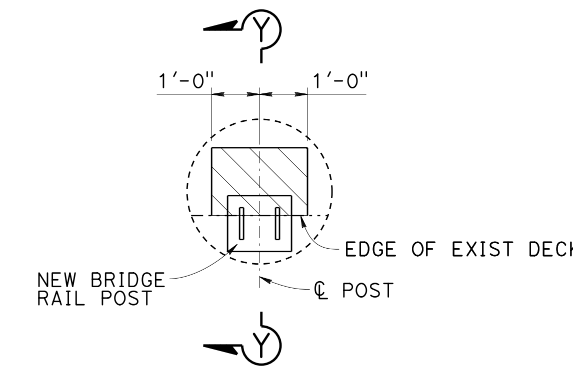
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA

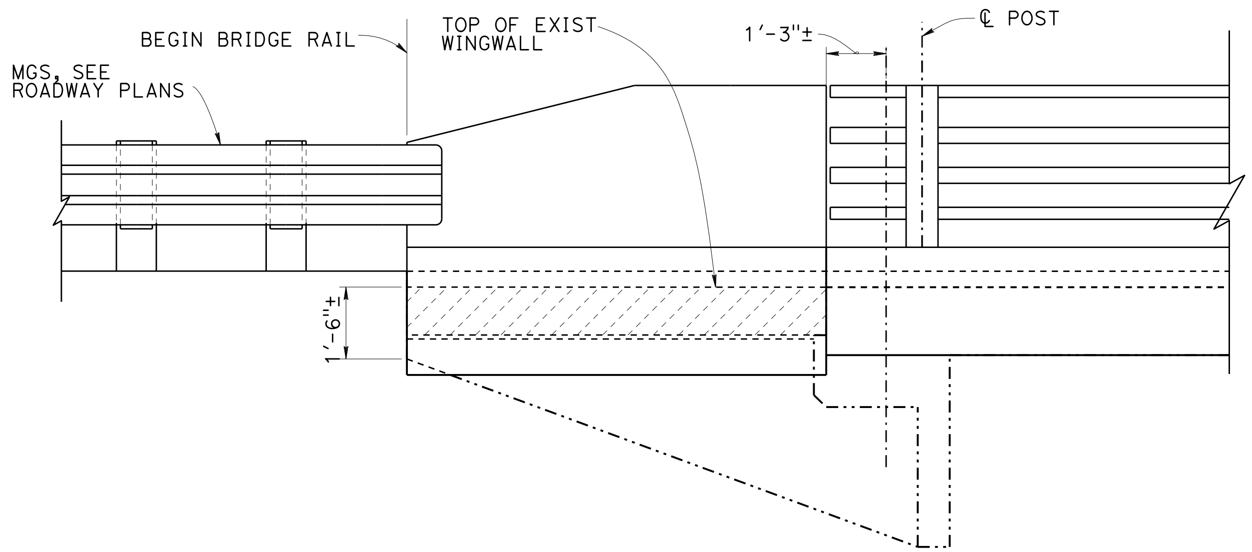
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



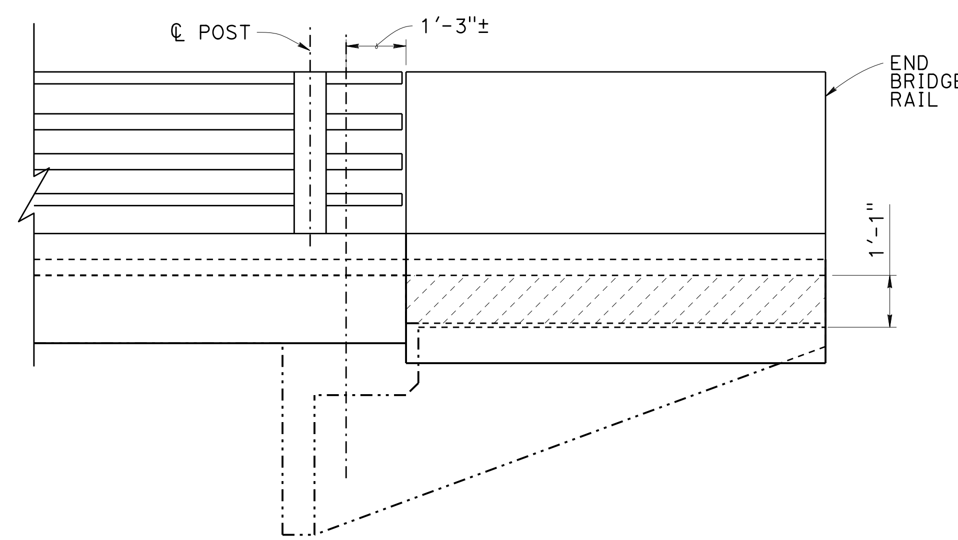
BRIDGE RAIL LAYOUT
3⁄16″ = 1′-0″



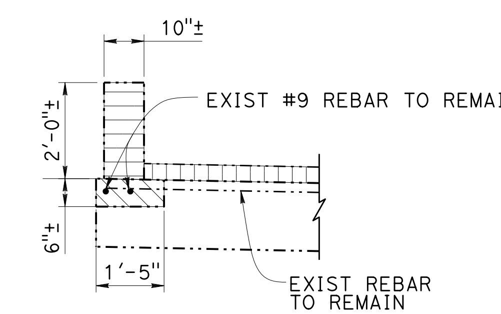
DETAIL X
½″ = 1′-0″



VIEW A-A
½″ = 1′-0″



VIEW B-B
½″ = 1′-0″



NOTE: NEW BRIDGE RAIL POST NOT SHOWN

SECTION Y-Y
½″ = 1′-0″

LEGEND:

- —·—·— Existing structure
- Existing Concrete Removal (Top 1′-1″ existing Wingwall)
- Existing Deck Removal (6″ deep)
- Existing Barrier Removal
- 4″± AC Removal

NOTE:

For "SECTION C-C" and "SECTION D-D", see "BARRIER DETAILS No. 2" sheet.

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
9 of 10

	BY	CHECKED
DESIGN	L. Wu	R. Washington
DETAILS	Y. Tang	R. Washington
QUANTITIES	R. Anderson	Y. Pulido-Villegas

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 10

BRIDGE No. 04-0023R
POST MILE 84.5

JACOBY CREEK BRIDGE (RIGHT)
BARRIER DETAILS No. 1

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:30
FILE => 040023r+brd+04.dgn USERNAME => s131596

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589
PROJECT NUMBER & PHASE: 0113000091
CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3/21/18 9-25-18 10/08/18

SHEET 4 OF 5

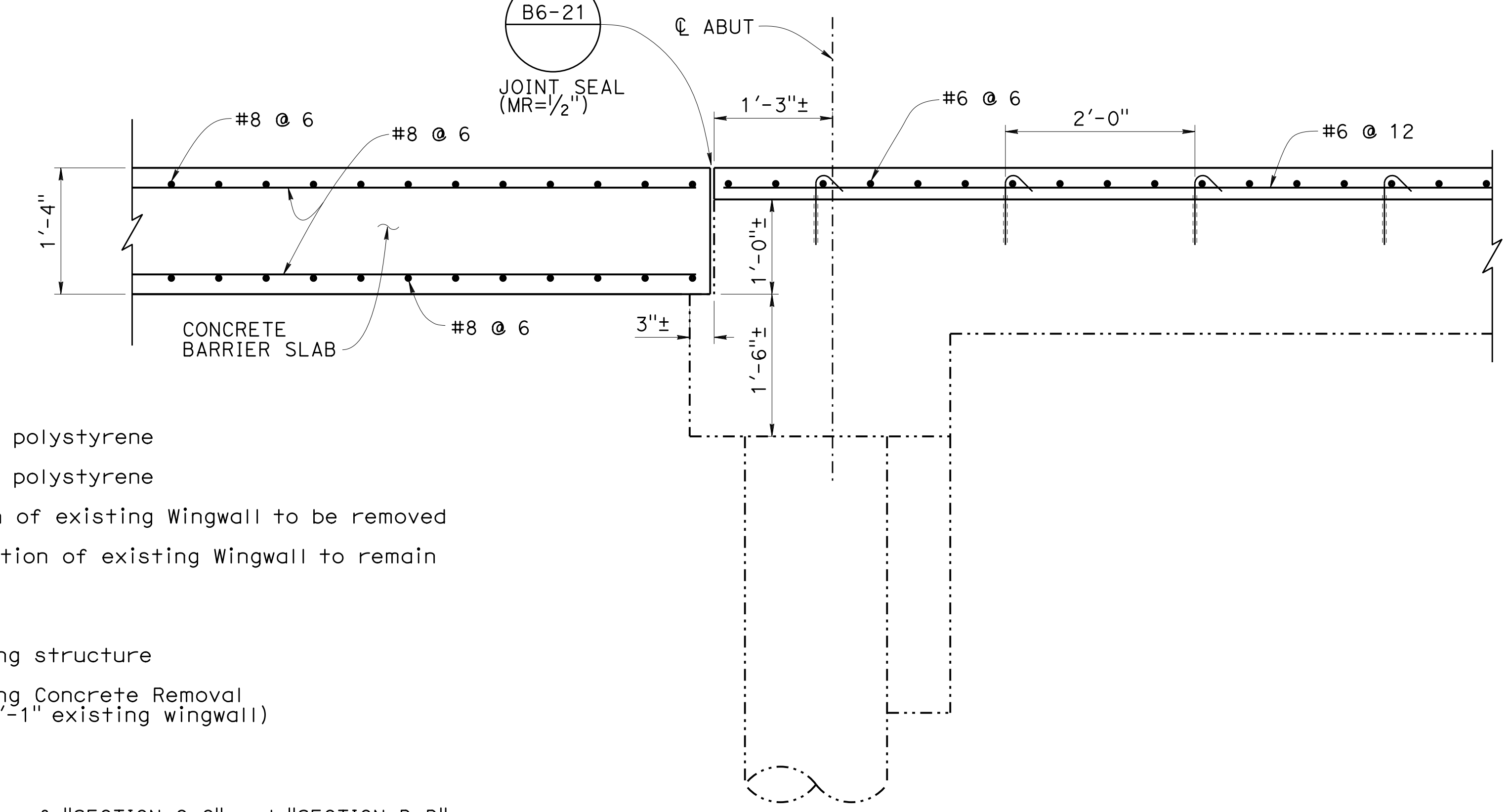
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101			

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

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

REGISTERED PROFESSIONAL ENGINEER LARRY WU No. 57035 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA



NOTES:

① 2" Expanded polystyrene

② 1" Expanded polystyrene

③ Top portion of existing Wingwall to be removed

④ Bottom portion of existing Wingwall to remain

LEGEND:

-··-··- Existing structure

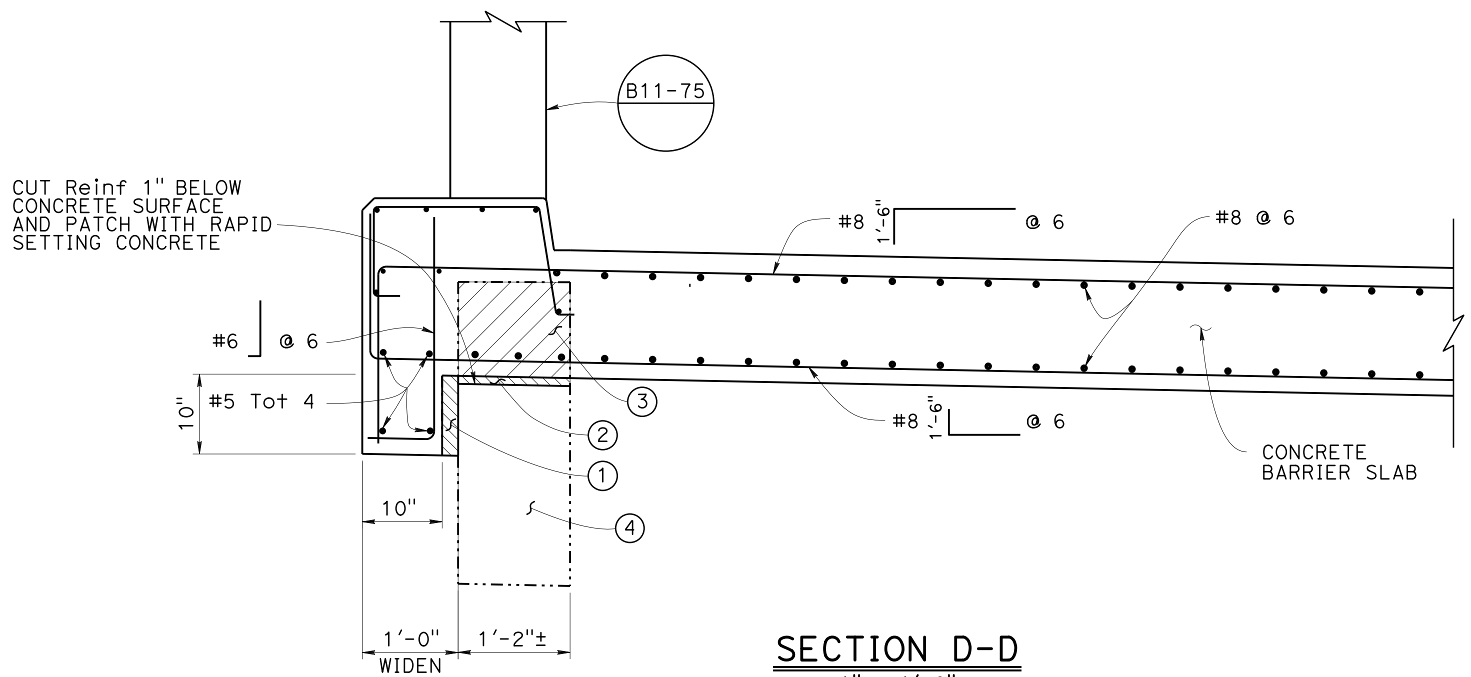
Existing Concrete Removal (Top 1'-1" existing wingwall)

NOTES:

1. For location of "SECTION C-C" and "SECTION D-D", see "BARRIER DETAILS No. 1" sheet.
2. All Reinforcement shall be Epoxy Coated.

SECTION C-C

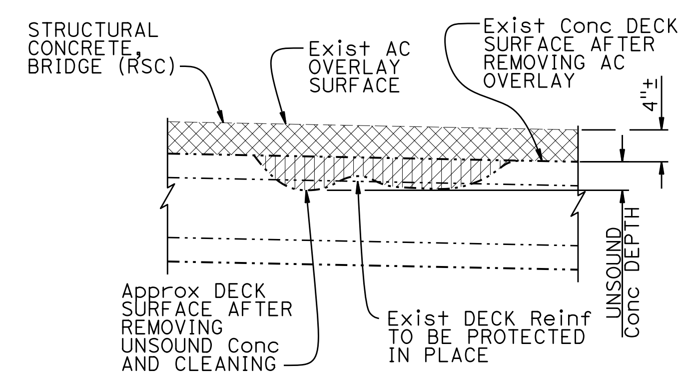
1" = 1'-0"



SECTION D-D

1" = 1'-0"

DECK REPAIR TABLE	
Remove unsound concrete and place Structural Concrete, Bridge (RSC) Patch	
Approx Area Damaged (%)	Approx Depth (in)
5	3



AC overlay & unsound concrete removal

Prepare concrete bridge deck surface and place structural concrete, bridge (RSC)

Structural concrete, bridge (RSC) patch

EXIST DECK REPAIR DETAIL

1" = 1'-0"

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

Exhibit 13
CDP Application No. 1-18-1078
(Caltrans)
Bridge Rail Plans
10 of 10

DESIGN	BY L. Wu	CHECKED R. Washington
DETAILS	BY Y. Tang	CHECKED R. Washington
QUANTITIES	BY R. Anderson	CHECKED Y. Pulido-Villegas

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN

DESIGN BRANCH 10

BRIDGE No. 04-0023R

POST MILE 84.5

JACOBY CREEK BRIDGE (RIGHT)

BARRIER DETAILS No. 2

STRUCTURES DESIGN DETAIL SHEET (ENGLISH) (REVISION 5/8/2018)

DATE PLOTTED => 27-FEB-2019 TIME PLOTTED => 12:30
FILE => 040023r-brd-05.dgn USERNAME => s131596

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3589
PROJECT NUMBER & PHASE: 0113000091

CONTRACT No.: 01-0E0001

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 3/21/18 1/29/19 2/27/19

SHEET 5 OF 5

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8	1	X

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY
IN HUMBOLDT COUNTY
NEAR ARCATA
FROM JACOBY CREEK BRIDGE
TO GANNON SLOUGH BRIDGE

TO BE SUPPLEMENTED BY STANDARD PLANS DATED MAY 2018

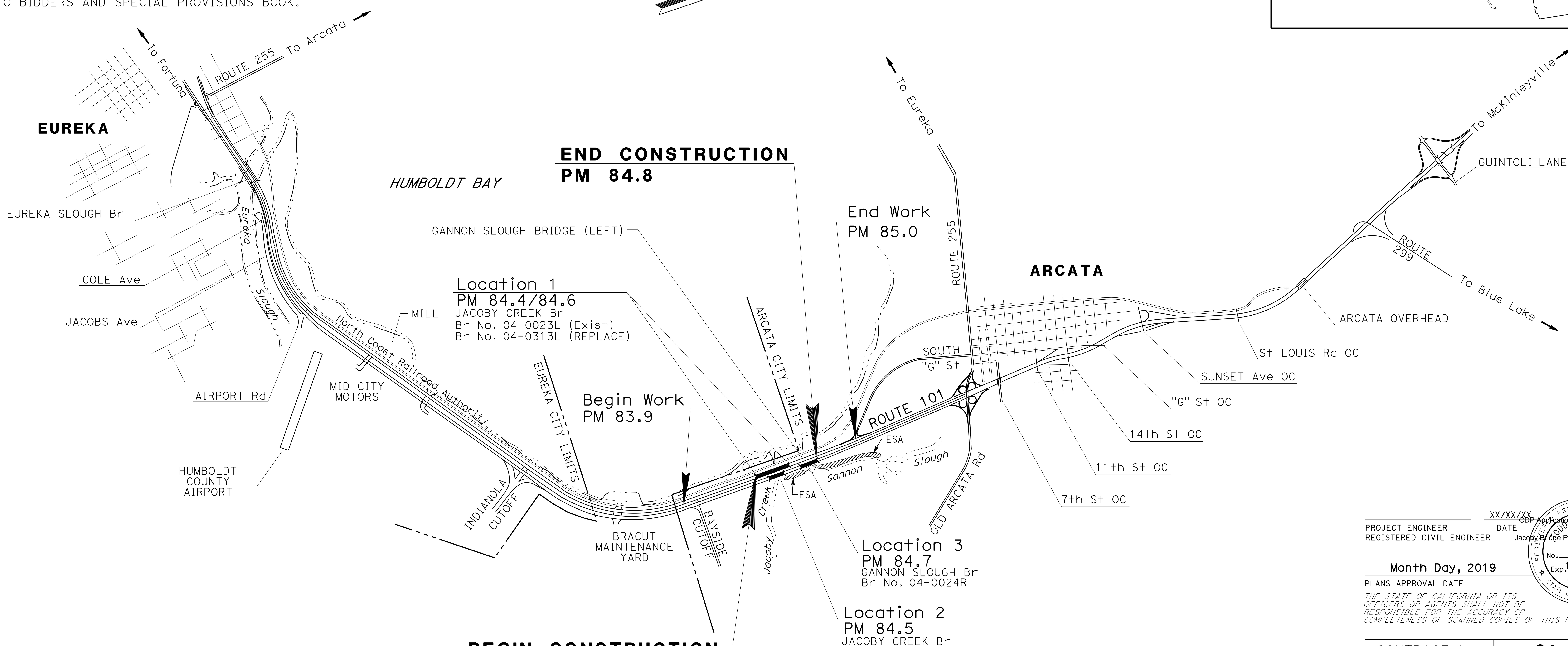
INDEX OF PLANS

SHEET No.	DESCRIPTION
1	TITLE AND LOCATION MAP
2-3	TYPICAL CROSS SECTIONS
4-5	PROJECT CONTROL
6-8	LAYOUTS, PROFILES AND SUPERELEVATION DIAGRAMS
9	CONSTRUCTION DETAILS
10	CONSTRUCTION AREA SIGNS
11-12	MOTORIST INFORMATION PLANS
13-26	STAGE CONSTRUCTION AND TRAFFIC HANDLING PLANS AND QUANTITIES
27-29	DETOUR CONSTRUCTION PLANS, PROFILES AND SUPERELEVATIONS
30	SUMMARY OF QUANTITIES
31-32	PLANTING PLANS, LEGEND AND QUAUNTITIES
33-34	EROSION CONTROL PLANS, LEGEND AND QUANTITIES
XX-XX	REVISED STANDARD PLANS

STRUCTURE PLANS

XX-XX	JACOBY CREEK BRIDGE 04-0023L (Exist) 04-0313L (NEW)
XX-XX	JACOBY CREEK BRIDGE 04-0023R BRIDGE RAILS
XX-XX	GANNON SLOUGH BRIDGE 04-0024R BRIDGE RAILS

THE STANDARD PLANS LIST APPLICABLE TO THIS CONTRACT IS INCLUDED IN THE NOTICE TO BIDDERS AND SPECIAL PROVISIONS BOOK.



THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE TO BIDDERS."

PROJECT MANAGER JEFFREY PIMENTEL
DESIGN MANAGER LENA R. ASHLEY

PROJECT ENGINEER XX/XX/XX
REGISTERED CIVIL ENGINEER DATE

REGISTERED PROFESSIONAL ENGINEER No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA

Exhibit 14
CDP Application No. 1-18-1078 (Caltrans)
Jacoby Bridge Plans (Excerpted)
1 of 34

Month Day, 2019
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.

CONTRACT No.	01-0E0004
PROJECT ID	0113000091

LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:11

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Todd Ray Lark No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA

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.

NOTES:

1. DIMENSIONS OF THE PAVEMENT STRUCTURES (STRUCTURAL SECTIONS) ARE SUBJECT TO TOLERANCES SPECIFIED IN THE STANDARD SPECIFICATIONS.
2. SUPERELEVATIONS ARE SHOWN ON THE SUPERELEVATION DIAGRAM.
3. FOR EXACT LOCATIONS OF MIDWEST GUARDRAIL SYSTEM (MGS) SEE LAYOUT SHEET.

LEGEND:

1 6" RUMBLE STRIP (AC PAVEMENT)
2 12" RUMBLE STRIP (AC PAVEMENT)
3 REPLACE AC SURFACING (SEE STAGE CONSTRUCTION) 6" RUMBLE STRIP (AC PAVEMENT)
4 REPLACE AC SURFACING (SEE STAGE CONSTRUCTION) 12" RUMBLE STRIP (AC PAVEMENT)

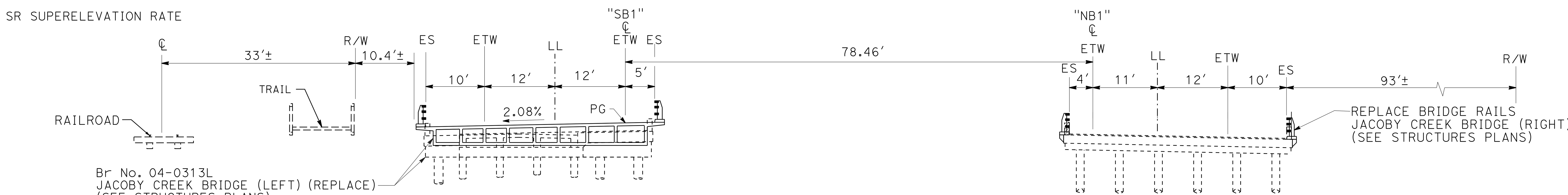
DESIGN DESIGNATION

ADT (2021)	39,800	D	58%
ADT (2041)	49,600	T	4%
DHV (2021)	4,580	V	65 mph
ESAL (2041)	5,400,000	TI_{20}	11

PAVEMENT CLIMATE REGION: NORTH COAST

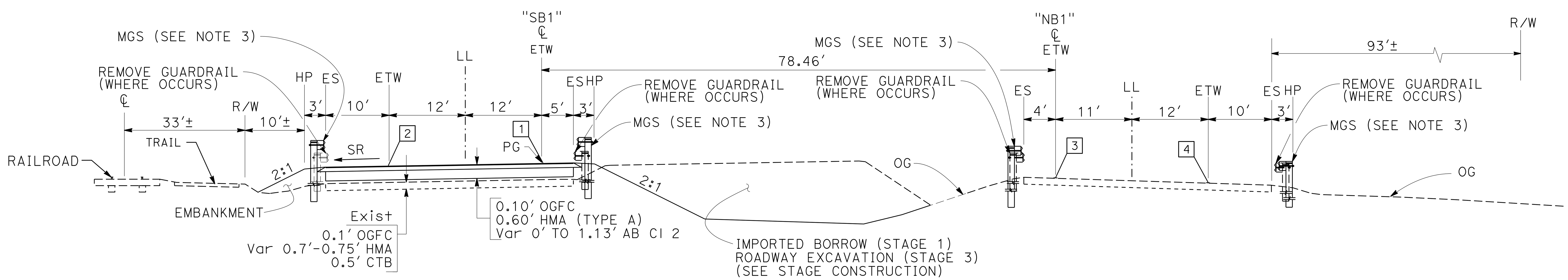
ABBREVIATIONS:

SR SUPERELEVATION RATE



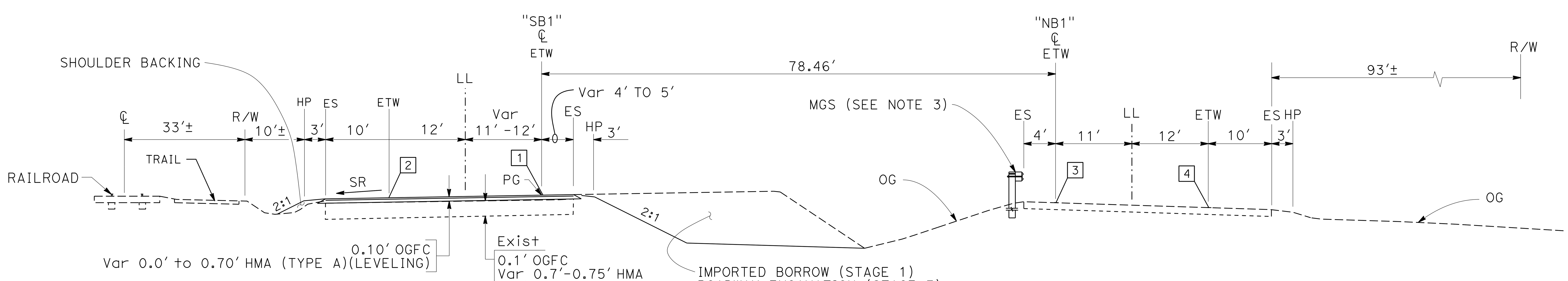
SOUTHBOUND
"SB1" 249+70 TO "SB1" 250+43

NORTHBOUND
"NB1" 249+59.80 TO "NB1" 250+51.87



SOUTHBOUND
"SB1" 246+50 TO "SB1" 249+70
"SB1" 250+43 TO "SB1" 253+50

NORTHBOUND
"NB1" 248+43 TO "NB1" 249+59.80
"NB1" 257+42 TO "NB1" 260+92



SOUTHBOUND
"SB1" 244+00 TO "SB1" 246+50
"SB1" 253+50 TO "SB1" 256+00

NORTHBOUND
"NB1" 244+00 TO "NB1" 248+43
"NB1" 250+50 TO "NB1" 254+00
"NB1" 261+84 TO "NB1" 265+00

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
2 of 34

ROUTE 101

TYPICAL CROSS SECTIONS

NO SCALE

X-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR LENA ASHLEY
CALCULATED-DESIGNED BY TODD LARK
CHECKED BY AHMAD RAHIMI
REVISED BY
DATE REVISED

P:\PROJ\01\0E000\drafting\0113000091ca001.dgn

LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:11

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091ca001.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

XX/XX/XX
REGISTERED CIVIL ENGINEER DATE

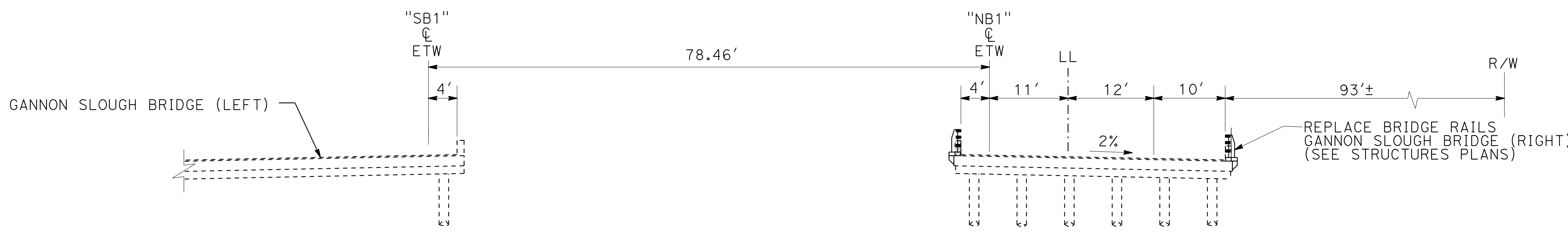
Month Day, 2019
PLANS APPROVAL DATE

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
Todd Ray Lark
No. 52481
Exp. 12/31/20
CIVIL
STATE OF CALIFORNIA

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR: LENA ASHLEY
CALCULATED-DESIGNED BY: TODD LARK
CHECKED BY: AHMAD RAHIMI
REVISED BY
DATE REVISED



NORTHBOUND

"NB1" 260+99 TO "NB1" 261+76

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
3 of 34

ROUTE 101

TYPICAL CROSS SECTION

NO SCALE

X-2

P:\PROJ\01\0E000\drafting\01130000091ca002.dgn

DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:11
LAST REVISION 05-06-19

BORDER LAST REVISED 7/2/2010

USERNAME => s132662
DGN FILE => 0113000091ca002.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0313

PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

MARCUS T. HOUSTON
PROFESSIONAL LAND SURVEYOR — DATE 5/7/2019

PLANS APPROVAL DATE

PROFESSIONAL LAND SURVEYOR — MARCUS HOUSTON — No. 7858 — Exp. 12/2020 — STATE OF CALIFORNIA

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.

NOTES:

1. FOR COMPLETE PROJECT CONTROL DATA, SEE THE SURVEY RECORDS ON FILE IN THE SURVEYS DEPARTMENT AT THE DISTRICT OFFICE.
2. FOR RECORD PROJECT CONTROL DATA SEE THE MAP FILED FOR RECORD IN BOOK 71 OF SURVEYS, PAGE 119 IN THE OFFICE OF THE COUNTY RECORDER IN THE COUNTY OF HUMBOLDT, STATE OF CALIFORNIA, JULY 2, 2015.
3. BASIS OF BEARINGS AND COORDINATES:
   THE BASIS OF BEARINGS FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983, (1992) EPOCH 1991.35, ZONE1. THE COMBINED GRID FACTOR (CGF) AND CONVERGENCE ANGLE AT CONTROL POINT HUM 101-83.42, ELEV. 19.00′, ARE 0.9998984 & -1°21′ 46″ RESPECTIVELY. DIVIDE DISTANCES BY THE APPROPRIATE CGF TO OBTAIN GROUND DISTANCES.
   AS DETERMINED LOCALLY BY A LINE BETWEEN STATION HUM 101-81.37 AND STATION HUM 101-81.85, BEING N58°05′31″E A DISTANCE OF 2,499.33 FEET FROM CONVENTIONAL SURVEY DATA.
4. BASIS OF ELEVATIONS:
   THIS PROJECT IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
   THE ELEVATIONS ARE FROM CALTRANS DIGITAL LEVEL TRAVERSE HOLDING THE FOLLOWING BENCHMARKS:
   H 75 RESET (LV0291) EL = 4.87, X 1087 RESET (LV0293) EL = 5.93,
   Z 1087 (LV0296) EL = 8.93, G 75 RESET (LV0298) EL = 12.26,
   Z 1403 (LV0626) EL = 28.01.

LEGEND:

(2) 2CM STATION

PROJECT CONTROL MONUMENTS

NAD 83 (1991.35) CCS ZONE 1 - NAVD 88 DIGITAL LEVEL ELEVATION - US SURVEY FEET					
POINT	ORDER	NORTHINGS	EASTINGS	ELEVATIONS	DESCRIPTION
HUM 101-81.07	2CM	2184560.25	5975162.23	10.31	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE
HUM 101-81.37	2CM	2185256.90	5976625.03	6.29	1-1/2" ALUMINUM CAP ON 3/4" REBAR
HUM 101-81.85	2CM	2186577.94	5978746.70	5.93	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE
HUM 101-82.70	2CM	2189161.64	5982317.90	9.63	1-1/2" ALUMINUM CAP ON 3/4" REBAR
HUM 101-83.42	2CM	2191762.71	5985043.57	18.96	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE
HUM 101-83.45	2CM	2191851.92	5985270.70	20.10	1-1/2" ALUMINUM CAP ON 3/4" REBAR
HUM 101-83.64	2CM	2192817.68	5985383.83	11.29	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE

(83.42 MAY BE DESTROYED DURING CONSTRUCTION)

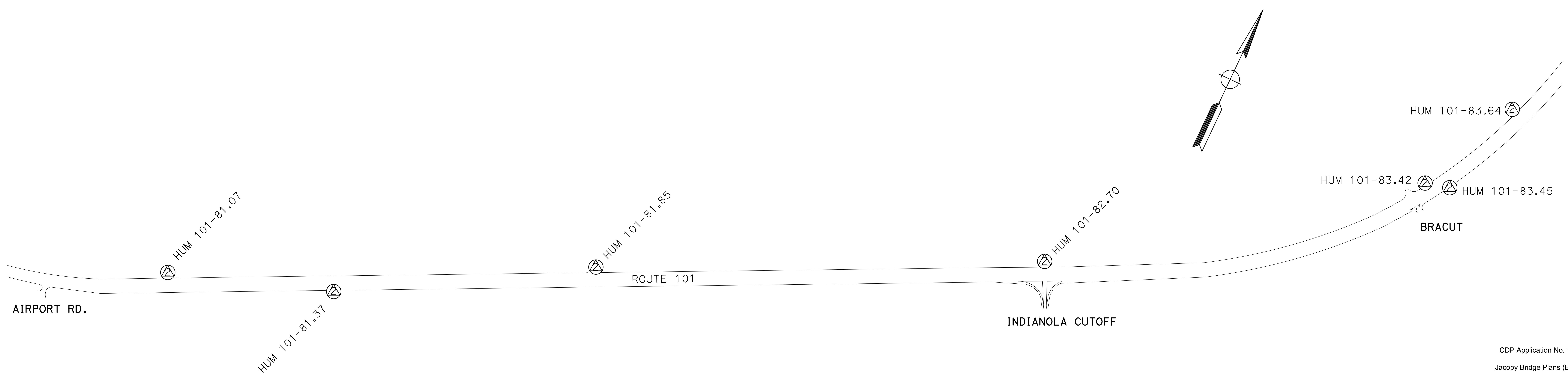


Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
4 of 34

APPROVED FOR PROJECT CONTROL INFORMATION ONLY

PROJECT CONTROL

NO SCALE

PC-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans® OFFICE SURVEYS

FUNCTIONAL SUPERVISOR: JAMES M. HARCHARIK
CALCULATED-DESIGNED BY: DYLAN F. CRABTREE — CHECKED BY: MARCUS T. HOUSTON
REVISED BY: D.F.C. — DATE REVISED: 05-07-19

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LAST REVISION 05-06-19 — DATE PLOTTED => 09-MAY-2019 — TIME PLOTTED => 11:11

BORDER LAST REVISED 7/2/2010 | USERNAME => s132662 | DGN FILE => 0113000091dc001.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0367 | PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

MARCUS T. HOUSTON 5/7/2019
PROFESSIONAL LAND SURVEYOR DATE

PLANS APPROVAL DATE

PROFESSIONAL LAND SURVEYOR MARCUS HOUSTON No. 7858 Exp. 12/2020 STATE OF CALIFORNIA

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.

NOTES:

1. FOR COMPLETE PROJECT CONTROL DATA, SEE THE SURVEY RECORDS ON FILE IN THE SURVEYS DEPARTMENT AT THE DISTRICT OFFICE.
2. FOR RECORD PROJECT CONTROL DATA SEE THE MAP FILED FOR RECORD IN BOOK 71 OF SURVEYS, PAGE 119 IN THE OFFICE OF THE COUNTY RECORDER IN THE COUNTY OF HUMBOLDT, STATE OF CALIFORNIA, JULY 2, 2015.
3. BASIS OF BEARINGS AND COORDINATES:
   THE BASIS OF BEARINGS FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983, (1992) EPOCH 1991.35, ZONE1. THE COMBINED GRID FACTOR (CGF) AND CONVERGENCE ANGLE AT CONTROL POINT HUM 101-83.42, ELEV. 19.00', ARE 0.9998984 & -1°21' 46" RESPECTIVELY. DIVIDE DISTANCES BY THE APPROPRIATE CGF TO OBTAIN GROUND DISTANCES.
   AS DETERMINED LOCALLY BY A LINE BETWEEN STATION HUM 101-84.37 AND STATION HUM 101-84.77, BEING N2°58'52"E A DISTANCE OF 2,087.52 FEET FROM CONVENTIONAL SURVEY DATA.
4. BASIS OF ELEVATIONS:
   THIS PROJECT IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
   THE ELEVATIONS ARE FROM CALTRANS DIGITAL LEVEL TRAVERSE HOLDING THE FOLLOWING BENCHMARKS:
   H 75 RESET (LV0291) EL = 4.87, X 1087 RESET (LV0293) EL = 5.93,
   Z 1087 (LV0296) EL = 8.93, G 75 RESET (LV0298) EL = 12.26,
   Z 1403 (LV0626) EL = 28.01.

LEGEND:

2CM STATION

PROJECT CONTROL MONUMENTS

NAD 83 (1991.35) CCS ZONE 1 - NAVD 88 DIGITAL LEVEL ELEVATION - US SURVEY FEET

POINT	ORDER	NORTHINGS	EASTINGS	ELEVATIONS	DESCRIPTION
HUM 101-83.64	2CM	2192817.68	5985383.83	11.29	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE
HUM 101-84.01	2CM	2194818.68	5985547.06	9.92	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE
HUM 101-84.37	2CM	2196701.05	5985605.97	10.83	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE
HUM 101-84.77rr	2CM	2198794.34	5985652.59	9.79	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE
HUM 101-85.00	2CM	2199995.91	5985741.79	11.46	1-1/2" ALUMINUM CAP ON 3/4" REBAR IN CONCRETE
HUM 101-85.21	2CM	2201080.77	5985844.09	9.25	1-1/2" ALUMINUM CAP ON 3/4" REBAR
HUM 101-85.41	2CM	2202108.77	5985705.91	10.86	1-1/2" ALUMINUM CAP ON 3/4" REBAR
HUM 101 85.81	2CM	2204414.13	5985457.54	29.10	1-1/2" ALUMINUM CAP ON 3/4" REBAR
HUM 101-86.13	2CM	2206038.75	5985553.86	21.46	1-1/2" ALUMINUM CAP ON 3/4" REBAR

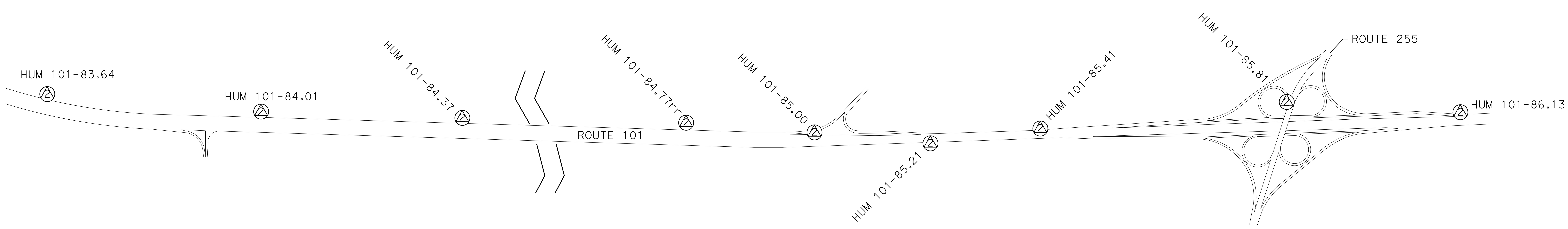

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
5 of 34

APPROVED FOR PROJECT CONTROL INFORMATION ONLY

PROJECT CONTROL

NO SCALE

PC-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans OFFICE SURVEYS

FUNCTIONAL SUPERVISOR: JAMES M. HARCHARIK
CALCULATED-DESIGNED BY: DYLAN F. CRABTREE
CHECKED BY: MARCUS T. HOUSTON
REVISED BY: D.F.C.
DATE REVISED: 05-07-19

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LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:11

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091dc002.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0367
PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

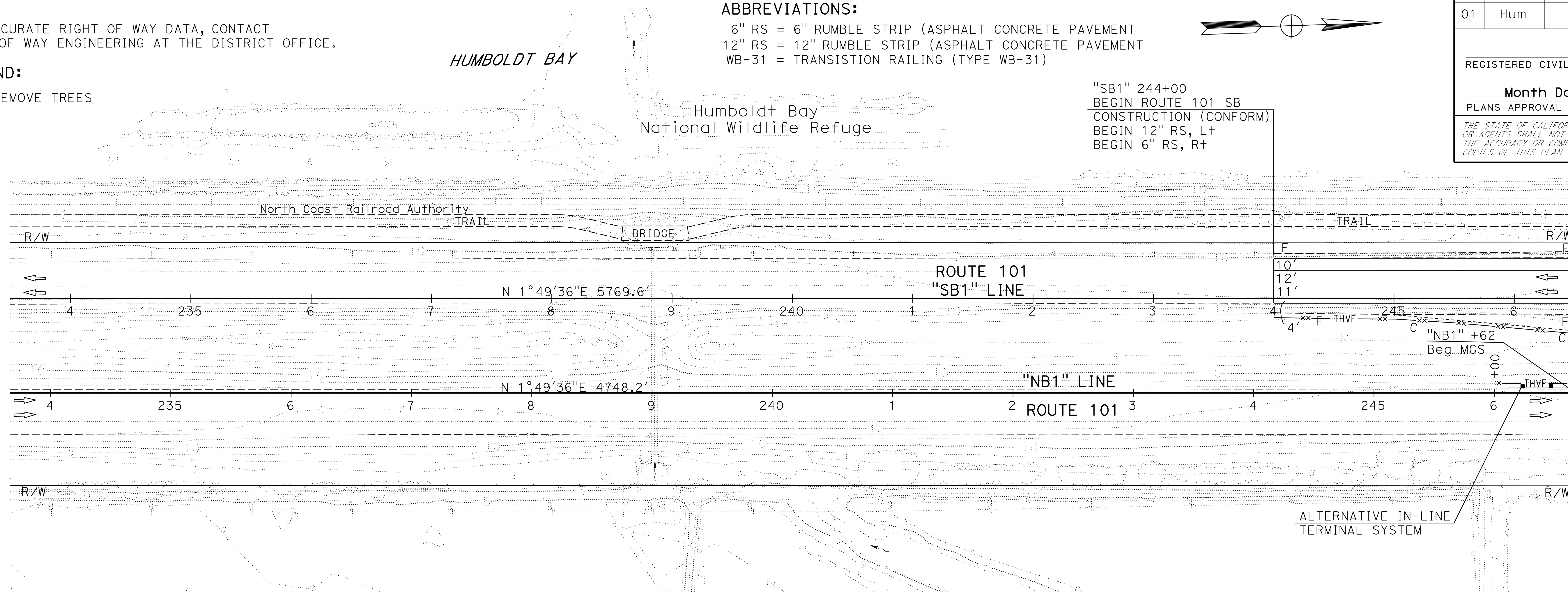
Todd Ray Lark No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER

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.

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

LEGEND:
REMOVE TREES

ABBREVIATIONS:
6" RS = 6" RUMBLE STRIP (ASPHALT CONCRETE PAVEMENT
12" RS = 12" RUMBLE STRIP (ASPHALT CONCRETE PAVEMENT
WB-31 = TRANSISTION RAILING (TYPE WB-31)



PLAN
SCALE: 1"=50'

SUPERELEVATION DIAGRAM
"SB1" LINE

PROFILE
ROUTE 101
"SB1" LINE

LAYOUT
L-1
SCALE: 1" = 50' Horiz
1" = 5' Vert

STATION	4	245	6	7	TOTAL
CY Exc		0			0
CY Emb		N/A			N/A

Exhibit 14
CDP Application No. 1-18-1078 (Caltrans)
Jacoby Bridge Plans (Excerpted)
6 of 34

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans

FUNCTIONAL SUPERVISOR: LENA ASHLEY
CALCULATED-DESIGNED BY: TODD LARK
CHECKED BY: AHMAD RAHIMI
REVISED BY
DATE REVISED

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DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:11
LAST REVISION 05-06-19

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091ea001.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE
01130000911

Exhibit 14
CDP Application No. 1-18-1078 (Caltrans)
Jacoby Bridge Plans (Excerpted)
7 of 34

NOTE:

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

HUMBOLDT BAY

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019

PLANS APPROVAL DATE

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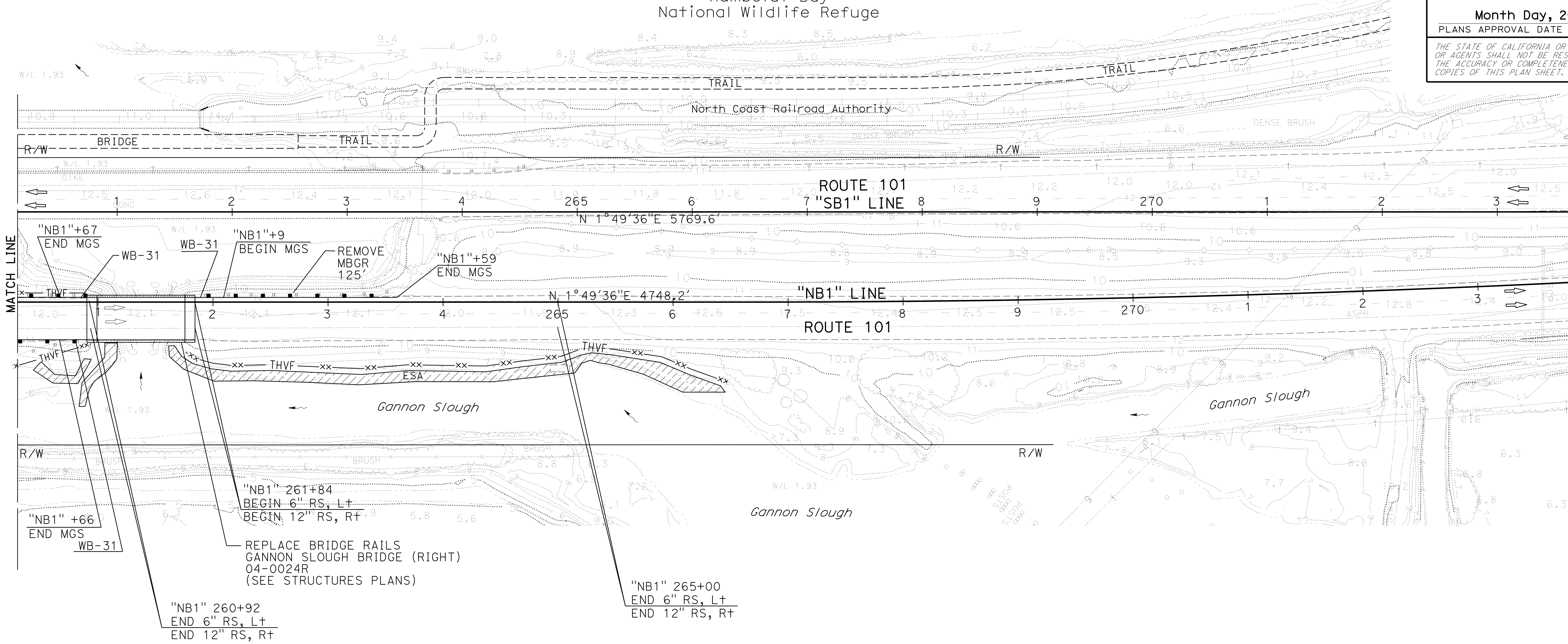
REGISTERED PROFESSIONAL ENGINEER Todd Ray Lark No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA



PLAN

"SB1" LINE

SCALE: 1" = 50'

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
8 of 34

REVISED BY | DATE REVISED

TODD LARK | AHMAD RAHIMI

CALCULATED-DESIGNED BY | CHECKED BY

FUNCTIONAL SUPERVISOR | LENA ASHLEY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

DESIGN

Caltrans®

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DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:12

LAST REVISION 05-06-19

LAYOUT L-3

SCALE: 1" = 50'

BORDER LAST REVISED 7/2/2010

USERNAME => s132662
DGN FILE => 01130000091ea003.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0313

PROJECT NUMBER & PHASE

01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

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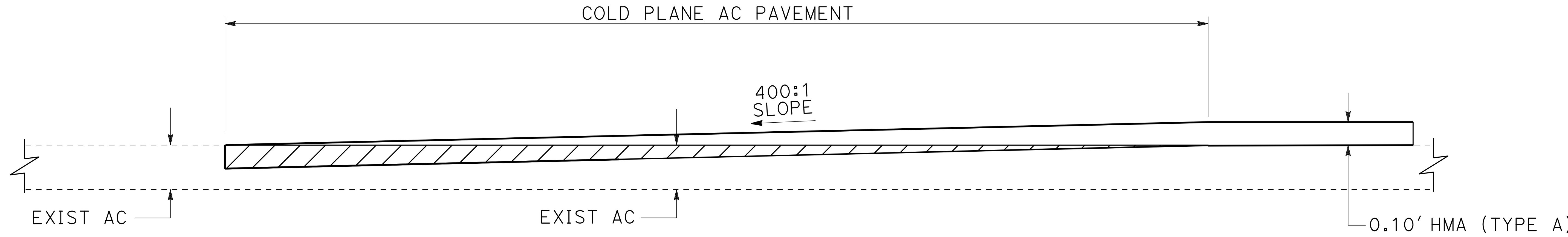
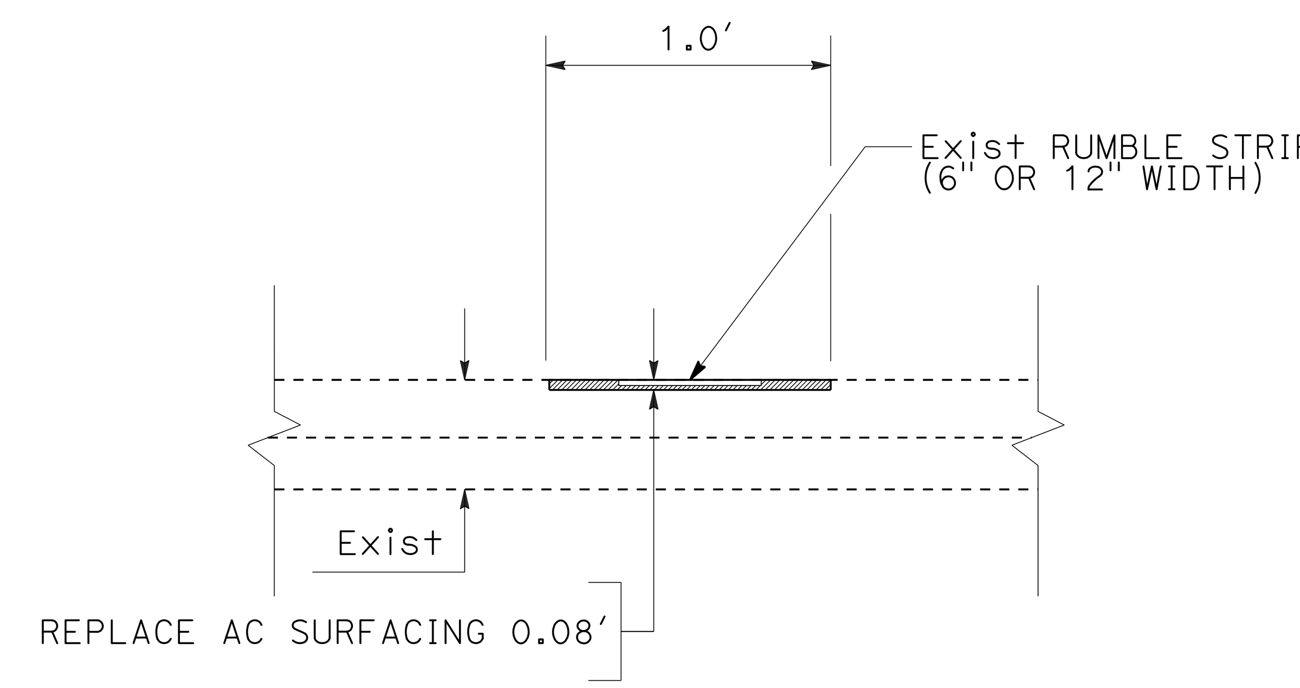
REGISTERED PROFESSIONAL ENGINEER Todd Ray Lark No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA

LEGEND:

COLD PLANE AC PAVEMENT



PROFILE
PAVEMENT CONFORM



TYPICAL
REPLACE AC SURFACING

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
9 of 34

CONSTRUCTION DETAILS
NOT TO SCALE
C-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR: LENA ASHLEY
CALCULATED-DESIGNED BY: TODD LARK
CHECKED BY: AHMAD RAHIMI
REVISED BY
DATE REVISED

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LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:12

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091ga001.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

NOTES:

1. EXACT SIGN LOCATIONS TO BE DETERMINED BY THE ENGINEER.
2. ADDITIONAL CONSTRUCTION AREA SIGNS SHOWN ON DETOUR SHEETS.
3. SIGN No. F MUST BE USED SOUTHBOUND 101 STAGE 2 ONLY.

STATIONARY MOUNTED CONSTRUCTION AREA SIGNS

SIGN No. (X)	SIGN DESIGNATION	PANEL SIZE	SIGN MESSAGE	NUMBER OF POSTS AND SIZE	NUMBER OF SIGNS
A	C40 (CA)	144"x60"	TRAFFIC FINES DOUBLED IN CONSTRUCTION ZONES	2 - 6"x8"	2
B	W20-1 C23B (CA)	48"x48" 54"x24"	ROAD WORK AHEAD BRIDGE REPLACEMENT	1 - 6"x6"	1
C	W20-1 C23B (CA)	48"x48" 54"x24"	ROAD WORK AHEAD BRIDGE REPAIR	1 - 6"x6"	1
D	G20-2	48"x24"	END ROAD WORK	1 - 4"x6"	2
E	W11-1 W16-1	36"x36" 24"x30"	BICYCLE SYMBOL SHARE THE ROAD	1 - 6"x6"	2
F	W24-1L W13-1P	48"x48" 30"x33"	SYMBOL-REVERSE CURVE 55 MPH	1 - 6"x6"	2
G	N/A	N/A	TEMPORARY PORTABLE RADAR FEEDBACK SIGN	N/A	2

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Todd Ray Lark No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA

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.

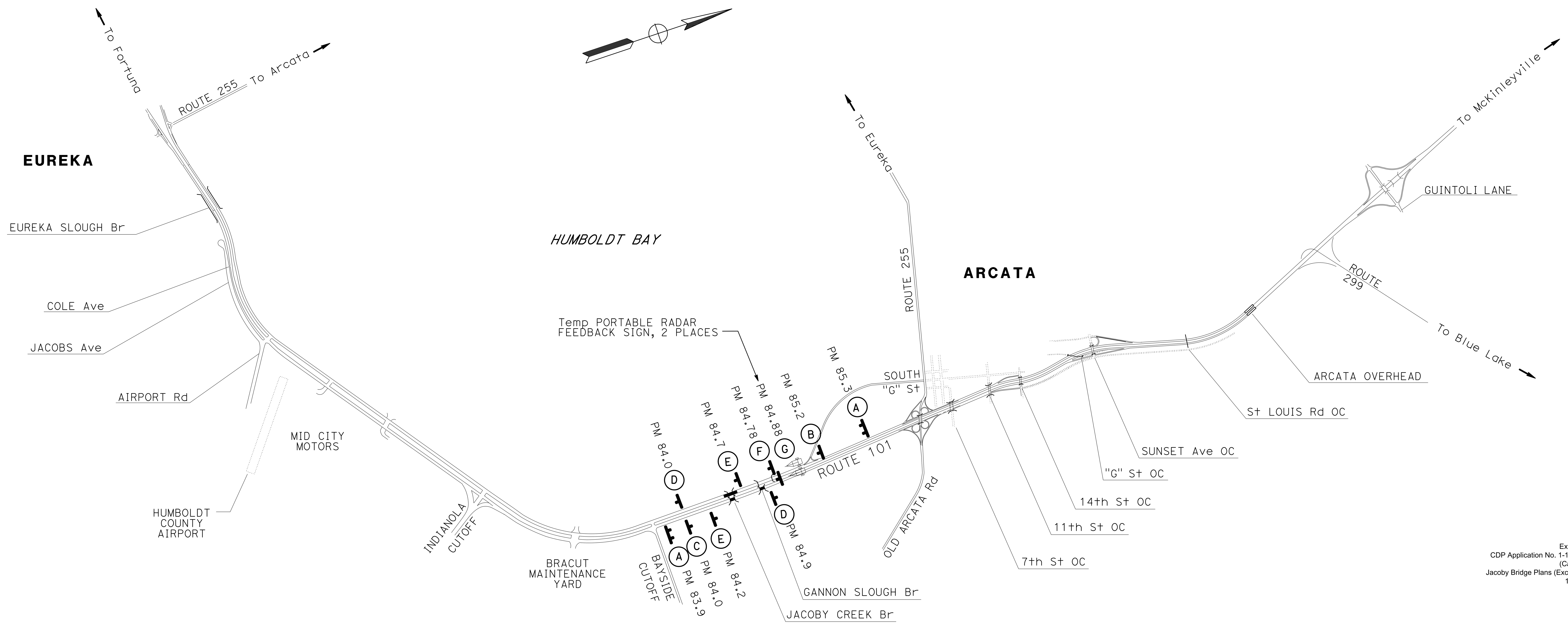

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
10 of 34

APPROVED FOR CONSTRUCTION AREA SIGN WORK ONLY

CONSTRUCTION AREA SIGNS

NO SCALE

CS-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR: LENA ASHLEY
CALCULATED-DESIGNED BY: TODD LARK
CHECKED BY: AHMAD RAHIMI
REVISED BY
DATE REVISED

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LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:12

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

Todd Ray Lark No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER

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.

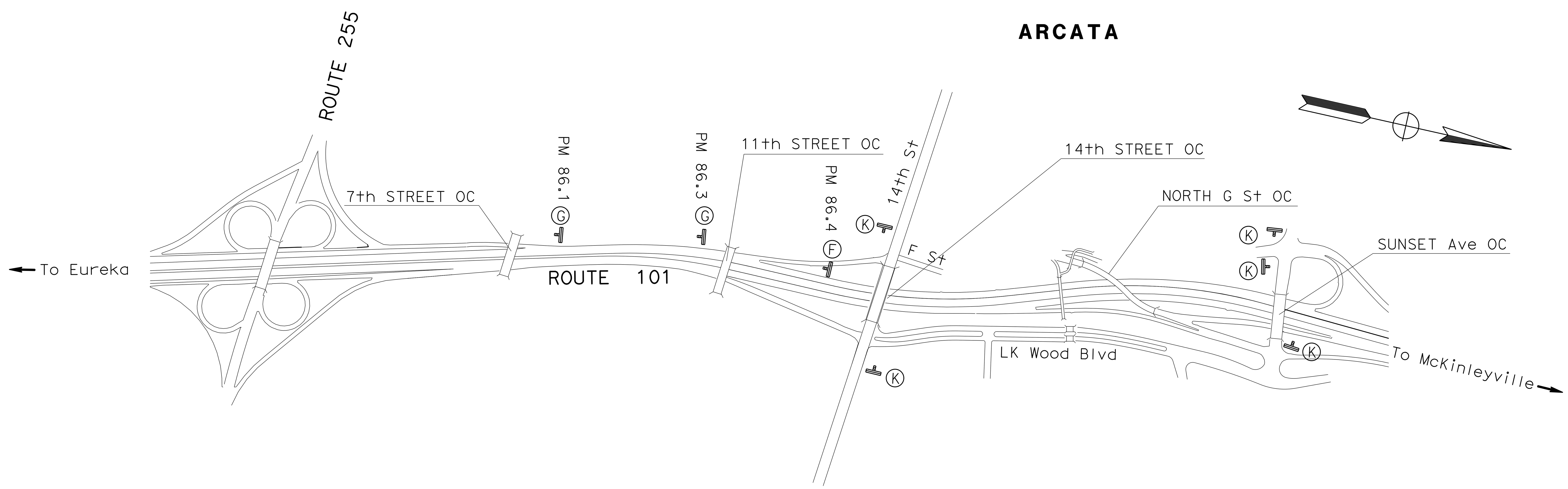
NOTES:

1. FOR ADDITIONAL CONSTRUCTION AREA SIGNS, SEE THE CONSTRUCTION AREA SIGN SHEETS.
2. CLOSE SB ROUTE 101 AND SB ONRAMPS AT ROUTE 255 PER STANDARD PLANS.

STATIONARY MOUNTED CONSTRUCTION AREA SIGNS

SIGN No. (X)	SIGN DESIGNATION	PANEL SIZE	SIGN MESSAGE	NUMBER OF POSTS AND SIZE	NUMBER OF SIGNS (N)
F	W20-2	48" x 48"	DETOUR 1500 FEET	1 - 4" x 6"	1
G	M4-8	30" x 15"	DETOUR	1 - 6" x 6"	2
	G26-2(CA)	35" x 30"	US 101		
	M6-2	30" x 21"	DIRECTIONAL ARROW		
H	M4-8	30" x 15"	DETOUR	1 - 4" x 6" OR TYPE III BARRICADE	7
	M3-3	30" x 15"	SOUTH		
	G26-2(CA)	35" x 30"	US 101		
I	M4-8	30" x 15"	DETOUR	1 - 4" x 6" OR TYPE III BARRICADE	2
	G26-2(CA)	35" x 30"	US 101		
	M5-1L	30" x 21"	DIRECTIONAL ARROW		
J	M4-8a	24" x 18"	END DETOUR	1 - 4" x 6" OR TYPE III BARRICADE	1
	M3-3	30" x 15"	SOUTH		
	G26-2(CA)	35" x 30"	US 101		
K	W20-2	36" x 36"	DETOUR AHEAD	TYPE III BARRICADE	5

(N) - NOT A SEPARATE BID ITEM



PLAN
FOR CLOSURE OF SB 101

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
11 of 34

MOTORIST INFORMATION PLAN
NO SCALE
MI-1

APPROVED FOR MOTORIST INFORMATION WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR: LENA ASHLEY
CALCULATED-DESIGNED BY: TODD LARK
CHECKED BY: AHMAD RAHIMI
REVISED BY
DATE REVISED

P:\PROJ\01\0E000\drafting\0113000091lb001.dgn

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091lb001.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:12

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

XX/XX/XX
REGISTERED CIVIL ENGINEER DATE

Month Day, 2019
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
Todd Ray Lark
No. 52481
Exp. 12/31/20
CIVIL
STATE OF CALIFORNIA

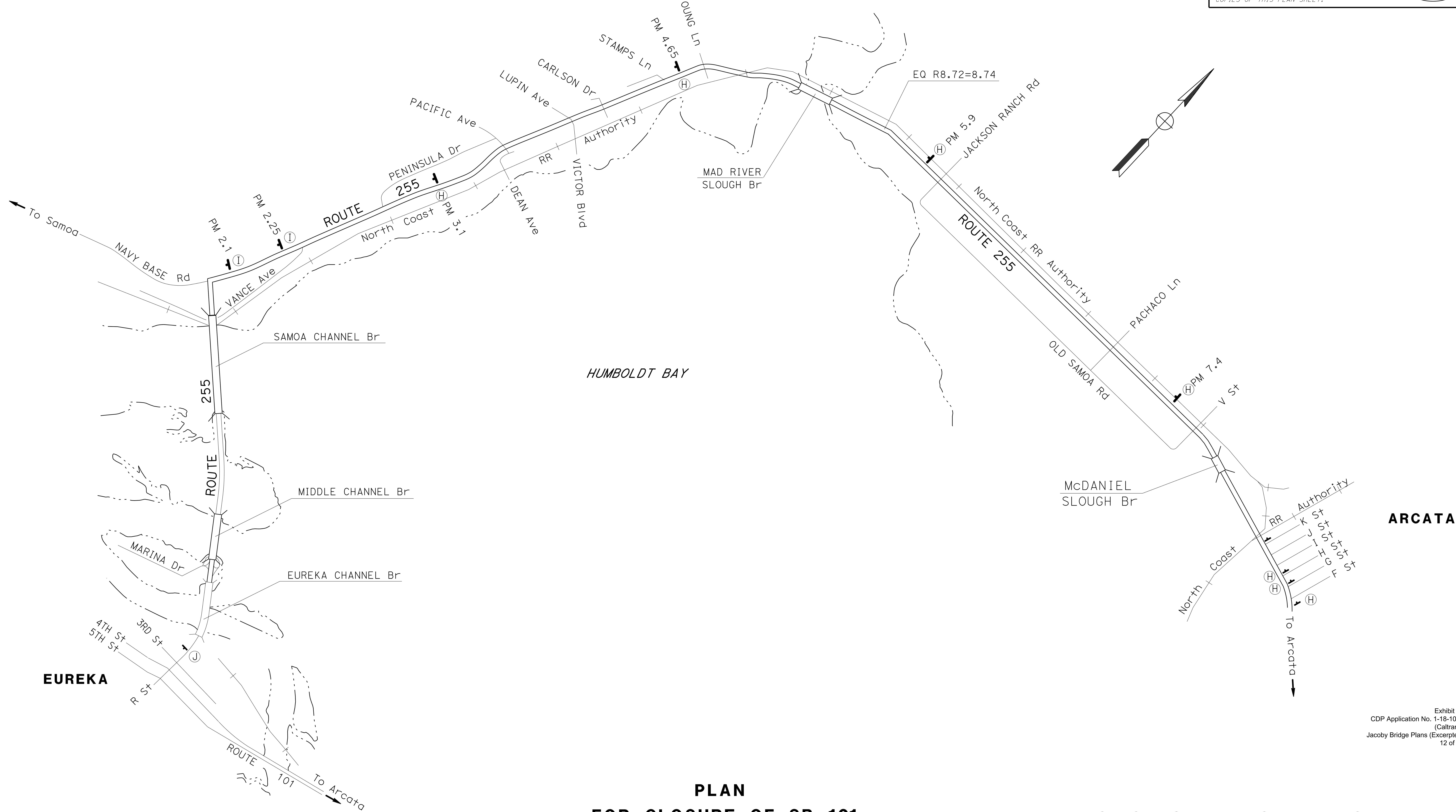


Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
12 of 34

PLAN
FOR CLOSURE OF SB 101

APPROVED FOR MOTORIST INFORMATION WORK ONLY

MOTORIST INFORMATION PLAN
NO SCALE
MI-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR: LENA ASHLEY
CALCULATED-DESIGNED BY / CHECKED BY
REVISED BY: TODD LARK
DATE REVISED: AHMAD RAHIMI

P:\PROJ\01\0E000\drafting\0113000091lb002.dgn

LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:12

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091lb002.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

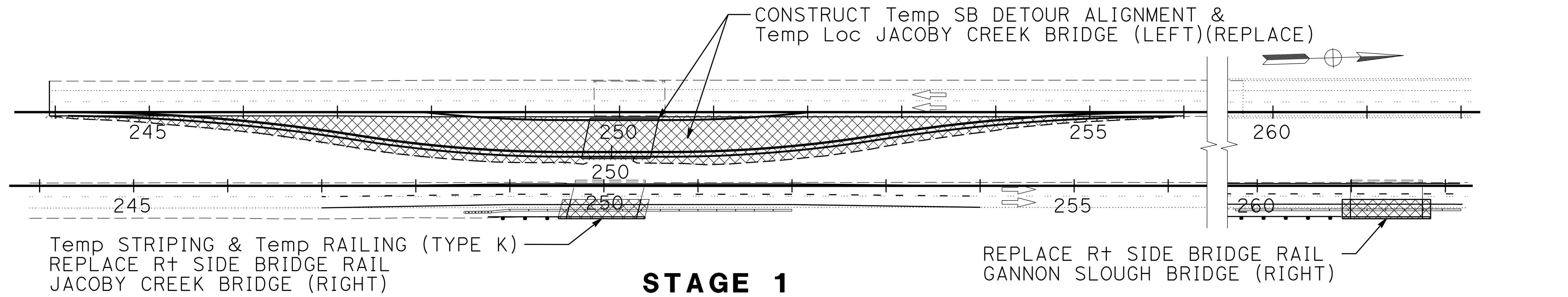
REGISTERED PROFESSIONAL ENGINEER Todd Ray Lark No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA

LEGEND

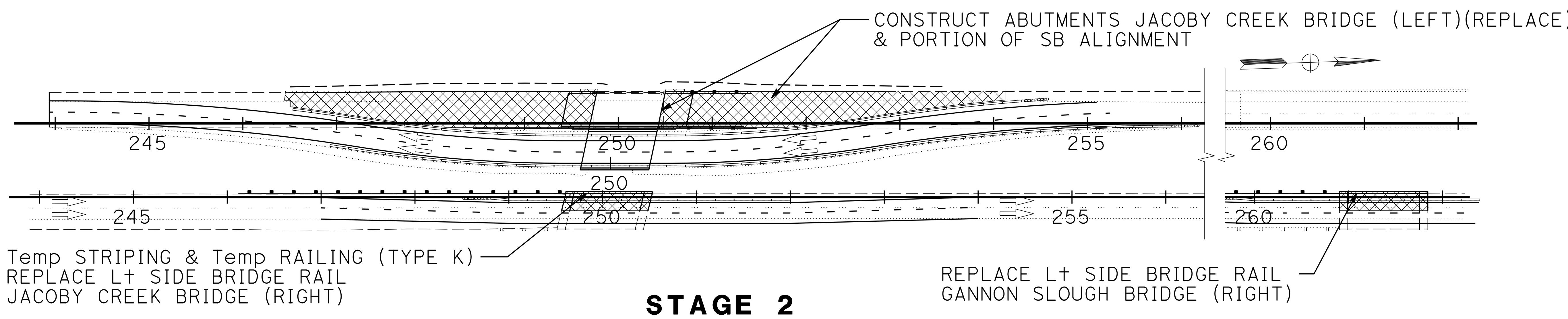
- XX TRAFFIC STRIPE DETAIL NUMBER
- TXX TEMPORARY TRAFFIC STRIPE DETAIL NUMBER
- AREAS OF CONSTRUCTION EACH STAGE
- REMOVE TREE(S)

ABBREVIATIONS:

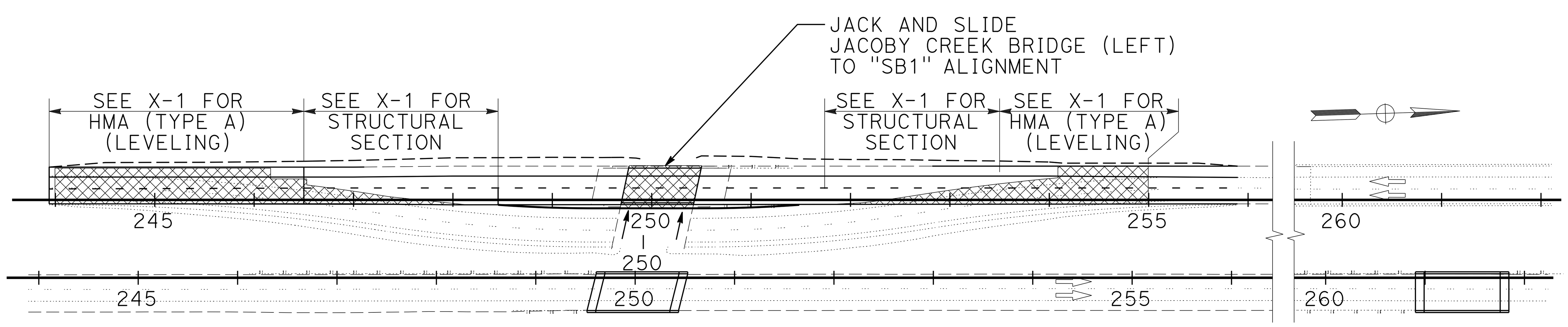
TW	TRAVELED WAY
TTS	THERMOPLASTIC TRAFFIC STRIPE
TTSP	TEMPORARY TRAFFIC STRIPE (PAINT)
SR	MATCH SUPERELEVATION RATE
WB-31	(SEE L-1)



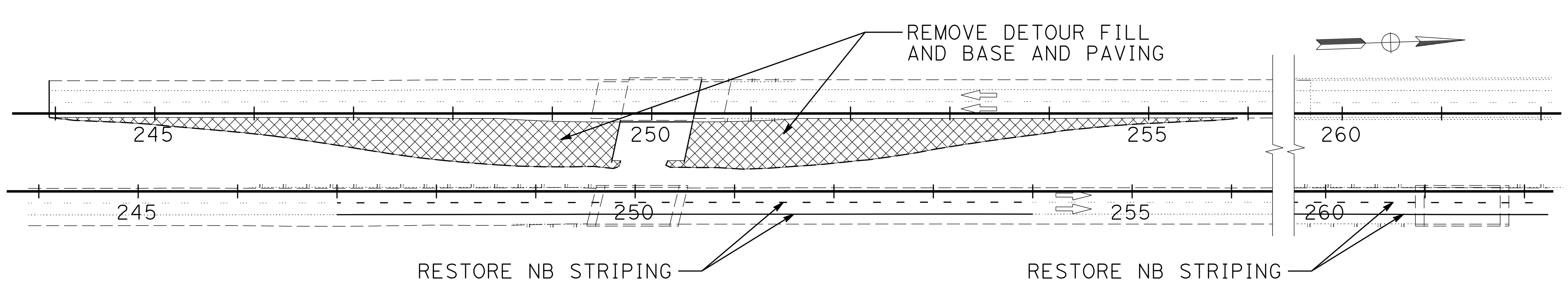
STAGE 1



STAGE 2



STAGE 3
(SB Overnight Closure)



STAGE 4

NOTES:

1) Northbound stage construction and southbound stage construction are not expected to occur on the same timeline.

STAGE 1

Southbound:
Under Standard Plan Traffic Control System for Lane Closure on Freeways and Expressways:
1) Construct Jacoby Creek Bridge (Left)(Replace) per Structures plans
2) Construct SB "DET" excavation, imported borrow and structural section

Northbound:
3) Install Stage 1 Traffic Control Devices per these plans
4) Remove right bridge rail Jacoby Creek Bridge (Rt) and Gannon Slough Bridge (Rt) per Structures Plans

Weekend Lane Closure Northbound: (STAGE 1B)
5) Friday 20:00 to Monday 6:00 Under Standard Plan Traffic Control System for Lane Closure;
   a) Install Temporary Railing (Type K) per these plans
   b) Remove AC surfacing from Rt half of bridge deck (Jacoby Creek Bridge (Rt) and Gannon Slough Bridge (Rt)) and place reinforcing and concrete per Structure Plans
   c) Restore Stage 1 Traffic Control Devices per these plans.

6) Construct right bridge rails and surface for Jacoby Creek Bridge (Rt) and Gannon Slough Bridge (Rt) per Structures Plans
7) Place MGS and WB-31 on right side of northbound 101.

STAGE 2

Southbound:
1) Install Stage 2 Traffic Control Devices per these plans
2) Construct foundation, wingwalls, approach slabs, and bridge rails per these (Structure) plans
3) Construct "SB1" excavation, embankment and structural section per these plans

Northbound:
4) Install Stage 2 Traffic Control Devices per these plans
5) Remove left bridge rail Jacoby Creek Bridge (Rt) and Gannon Slough Bridge (Rt) per Structures Plans

Weekend Lane Closure Northbound: (STAGE 2B)
6) Friday 20:00 to Monday 6:00 Under Standard Plan Traffic Control System for Lane Closure;
   a) Install Temporary Railing (Type K) per these plans
   b) Remove AC surfacing from Lt half of bridge deck (Jacoby Creek Bridge (Rt) and Gannon Slough Bridge (Rt))and place reinforcing and concrete per Structure Plans
   c) Restore Stage 2 Traffic Control Devices per these plans.

7) Construct left bridge rails and surface for Jacoby Creek Bridge (Rt) and Gannon Slough Bridge (Rt) per Structures Plans
8)Place MGS and WB-31 on left side of northbound 101.

STAGE 3: (SB Overnight Closure)

Complete Overnight Closure Southbound:
1) Install lane and ramp closures and close SB Route 101 per these plans and Standard Plans.
2) Jack and slide Jacoby Creek Bridge (Left)(Replace) per structures plans.
3) Place pavement structural section and temporary delineation on southbound 101 per these plans.
4) Remove lane and ramp closures to return operation of SB lanes.

STAGE 4

Southbound:
Under Standard Plan Traffic Control System for Lane Closure on Freeways and Expressways:
1) Place permanent pavement delineation
2) Remove detour and complete remaining roadway items

Northbound:
3) Place permanent pavement delineation

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Project Plans (Excerpted)
13 of 34

STAGE 1
STAGE CONSTRUCTION AND TRAFFIC HANDLING

NO SCALE

SC-1

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Caltrans
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FUNCTIONAL SUPERVISOR LENA ASHLEY
CALCULATED-DESIGNED BY TODD LARK
CHECKED BY AHMAD RAHIMI
REVISED BY
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TIME PLOTTED => 11:12

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

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Month Day, 2019
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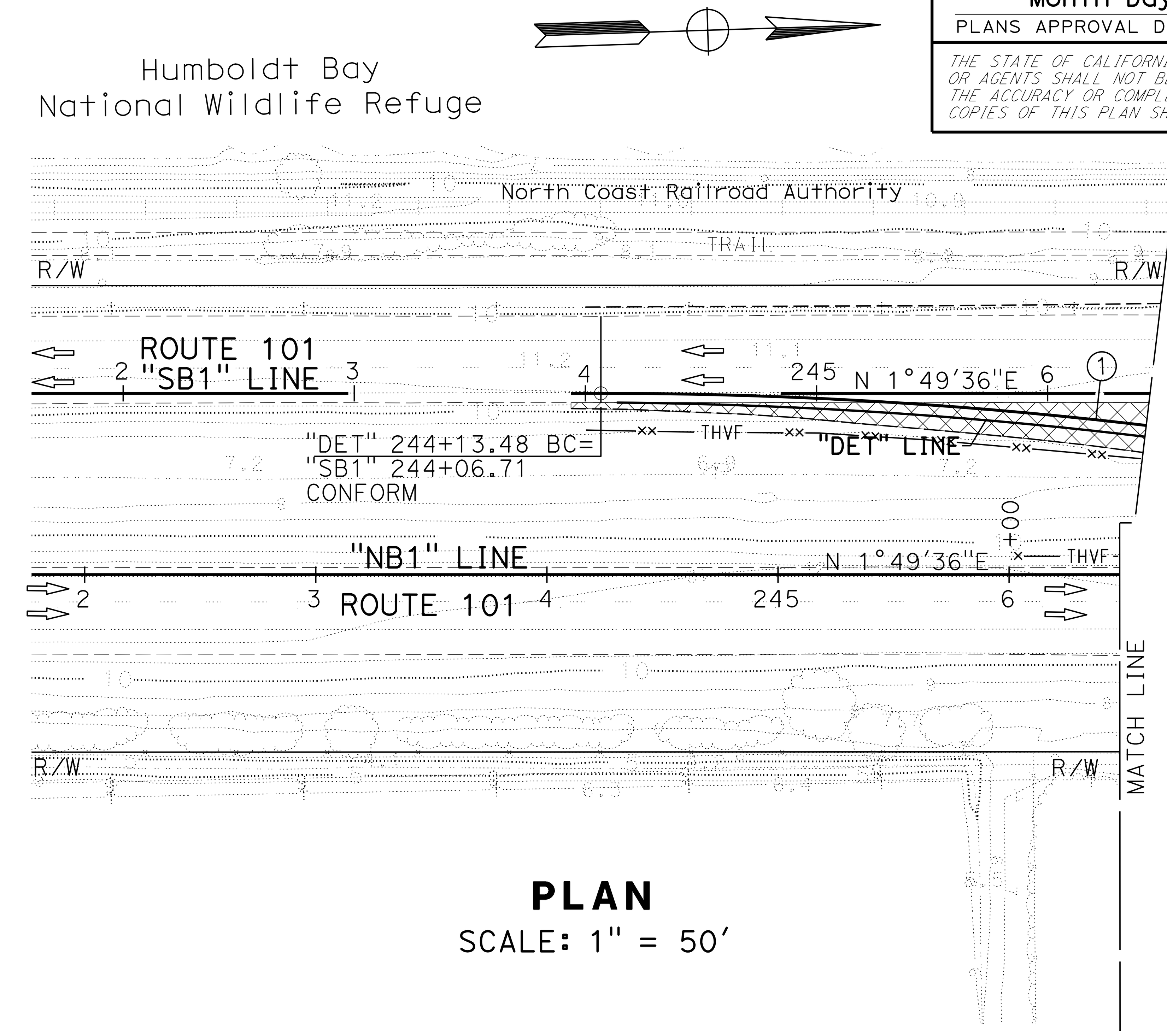
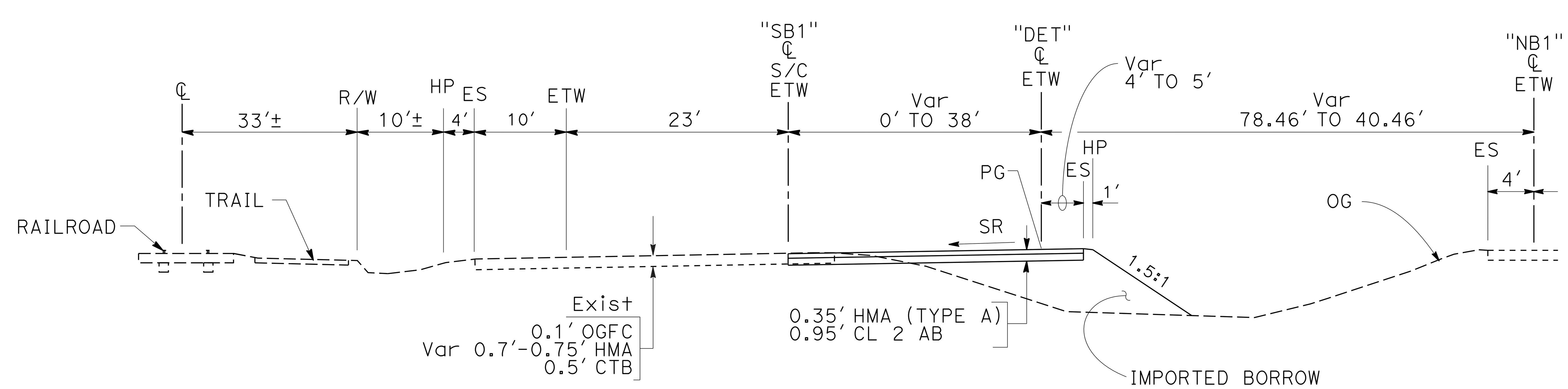


PLAN
SCALE: 1" = 50'



SOUTHBOUND
"DET" 244+00 TO "DET" 248+00
"DET" 252+15 TO "DET" 256+00
NO SCALE

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
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STAGE 1
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN
SC-2

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Caltrans
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FUNCTIONAL SUPERVISOR LENA ASHLEY
CALCULATED-DESIGNED BY TODD LARK
CHECKED BY AHMAD RAHIMI
REVISED BY
DATE REVISED

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LAST REVISION 05-06-19 DATE PLOTTED => 09-MAY-2019 TIME PLOTTED => 11:13

BORDER LAST REVISED 7/2/2010
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DGN FILE => 0113000091ma002.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

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Month Day, 2019
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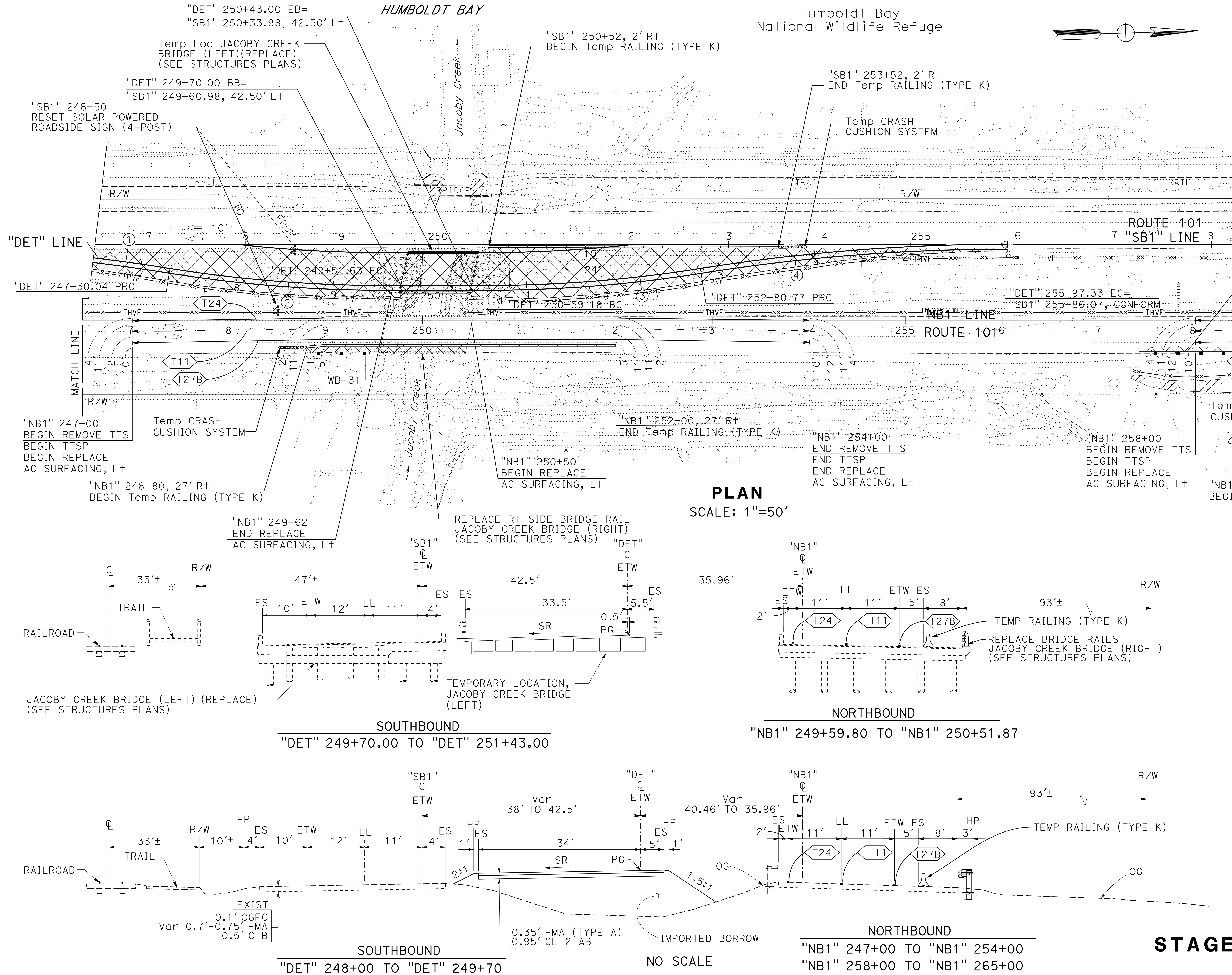

APPROVED FOR STAGE CONSTRUCTION AND TRAFFIC HANDLING WORK ONLY

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
15 of 34

STAGE 1
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN

SC-3

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

XX/XX/XX
REGISTERED CIVIL ENGINEER DATE

Month Day, 2019
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Todd Ray Lark
No. 52481
Exp. 12/31/20
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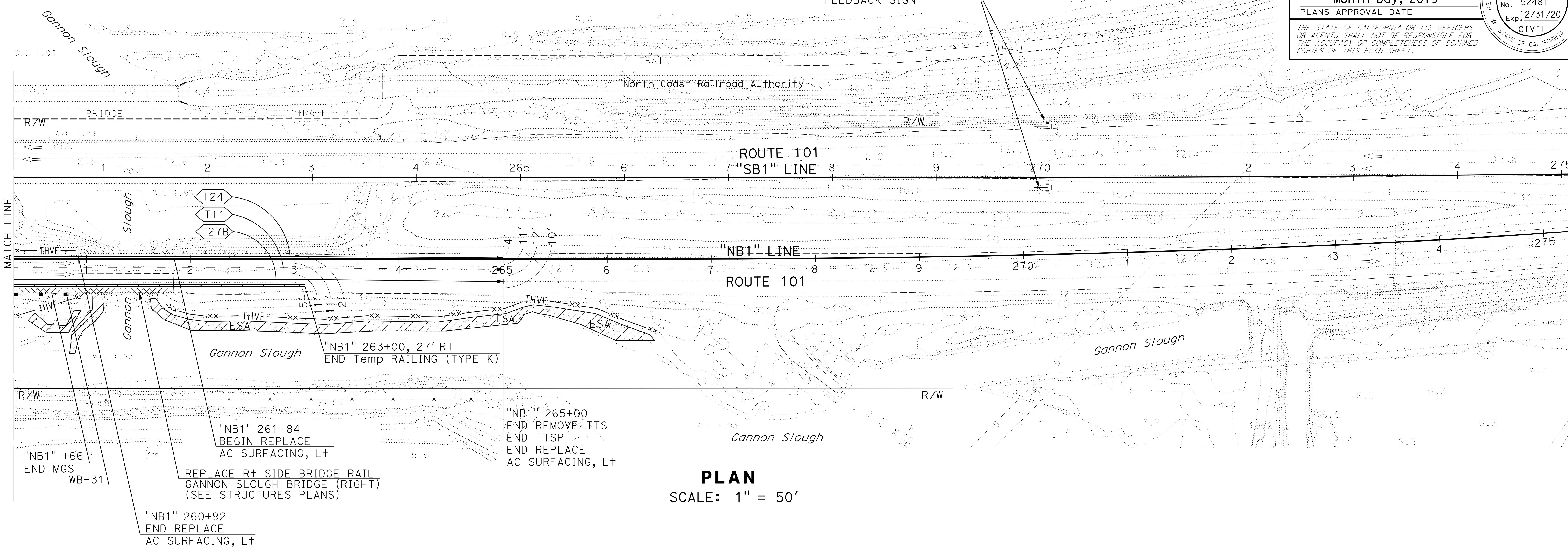
STATE OF CALIFORNIA



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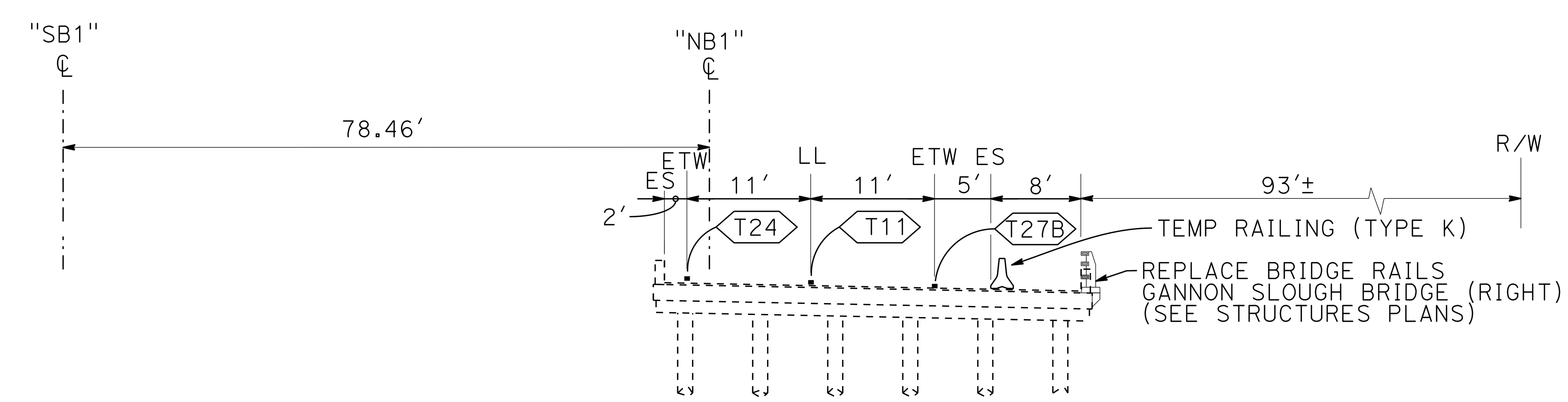

NORTHBOUND
"NB1" 260+90.33 TO "NB1" 261+84.33

NO SCALE

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
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STAGE 1
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN
SC-4

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Caltrans
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DATE REVISED

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LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:13

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

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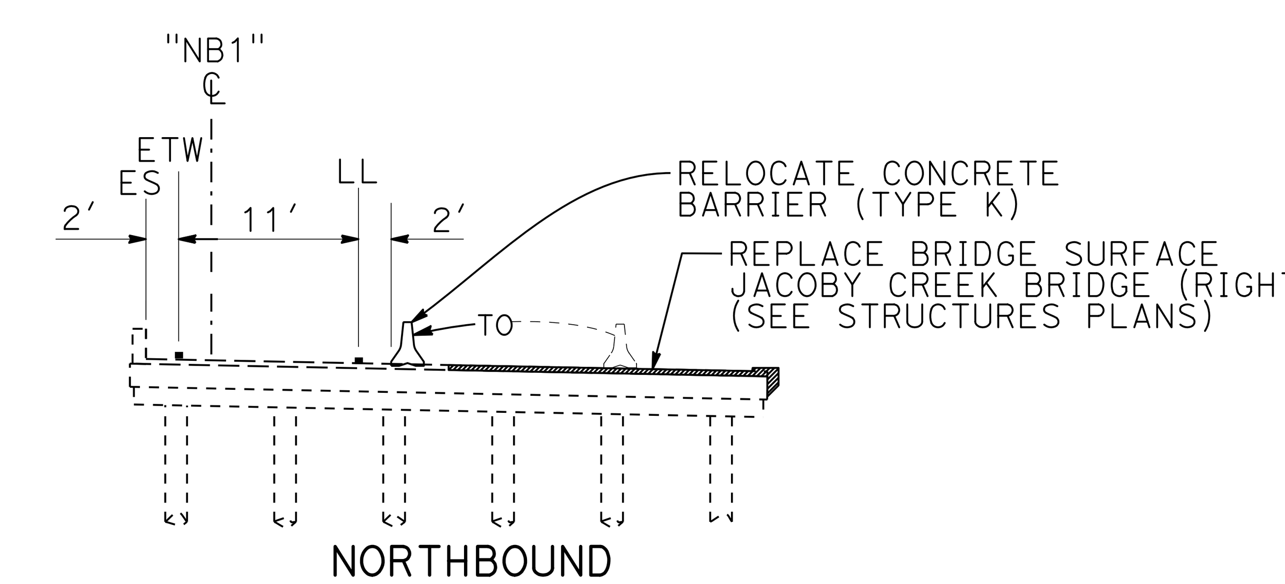
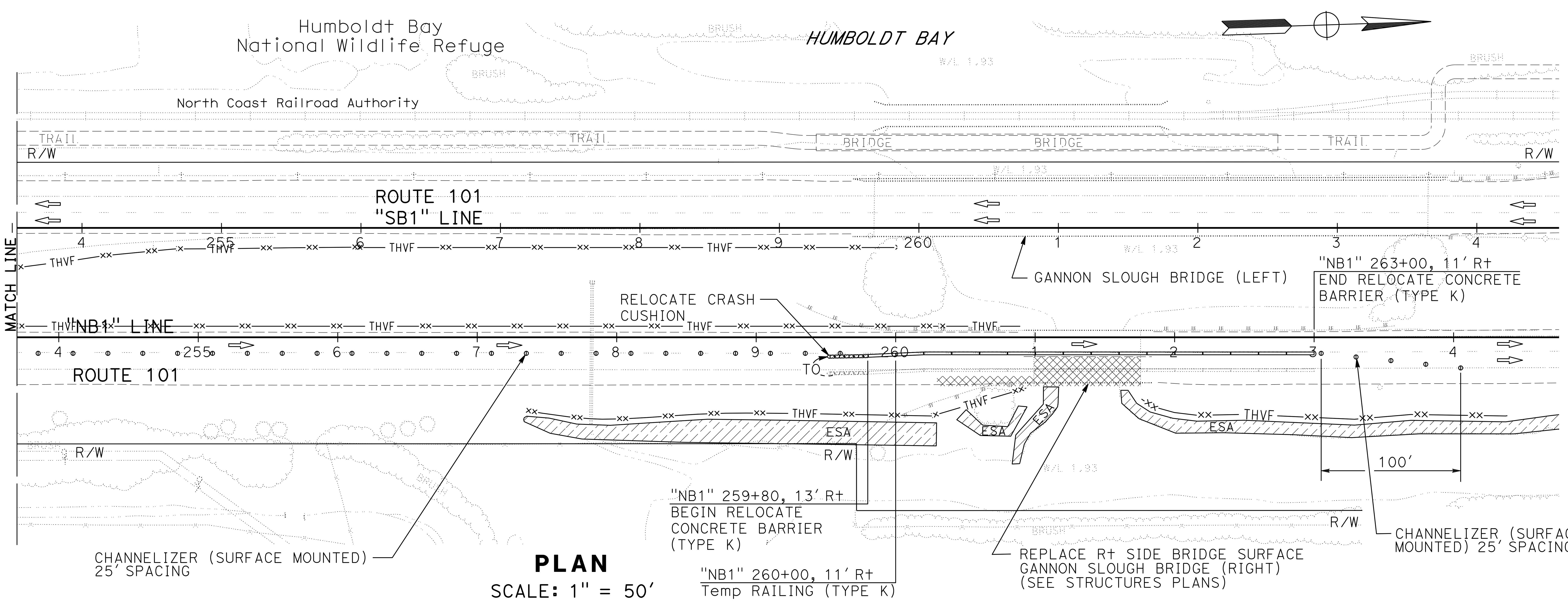
PLAN
SCALE: 1" = 50'



NORTHBOUND
"NB1" 249+50± TO "NB1" 250+50±
"NB1" 260+90± TO "NB1" 261+83±



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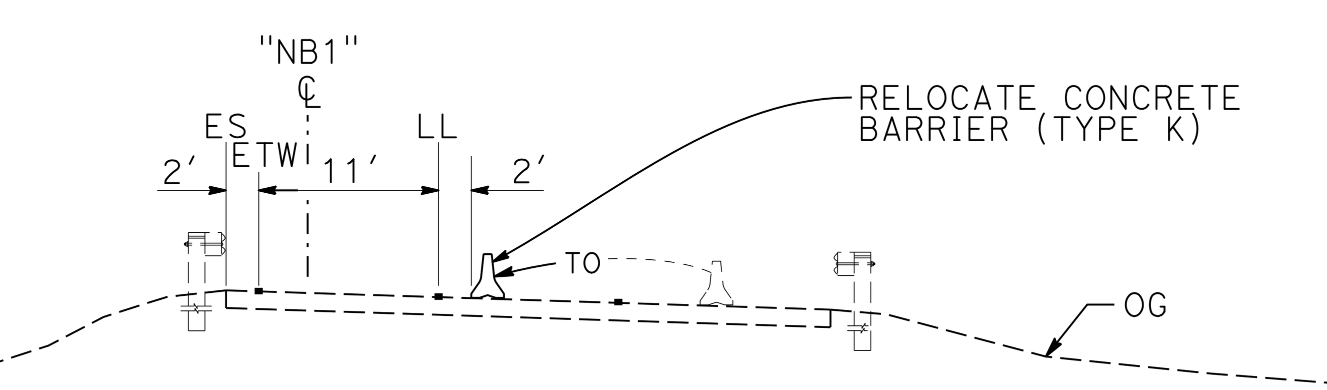

NORTHBOUND
"NB1" 249+00± TO "NB1" 249+50±
"NB1" 250+50± TO "NB1" 252+00±
"NB1" 260+00± TO "NB1" 260+90±
"NB1" 261+83± TO "NB1" 263+00±
NO SCALE

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Jacoby Bridge Plans (Excerpted)
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STAGE 1B (NB Weekend Closure)

STAGE CONSTRUCTION AND TRAFFIC HANDLING

SCALE AS SHOWN

SC-5

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REVISED BY | DATE REVISED
TODD LARK | AHMAD RAHIMI
CALCULATED-DESIGNED BY | CHECKED BY
FUNCTIONAL SUPERVISOR | LENA ASHLEY
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

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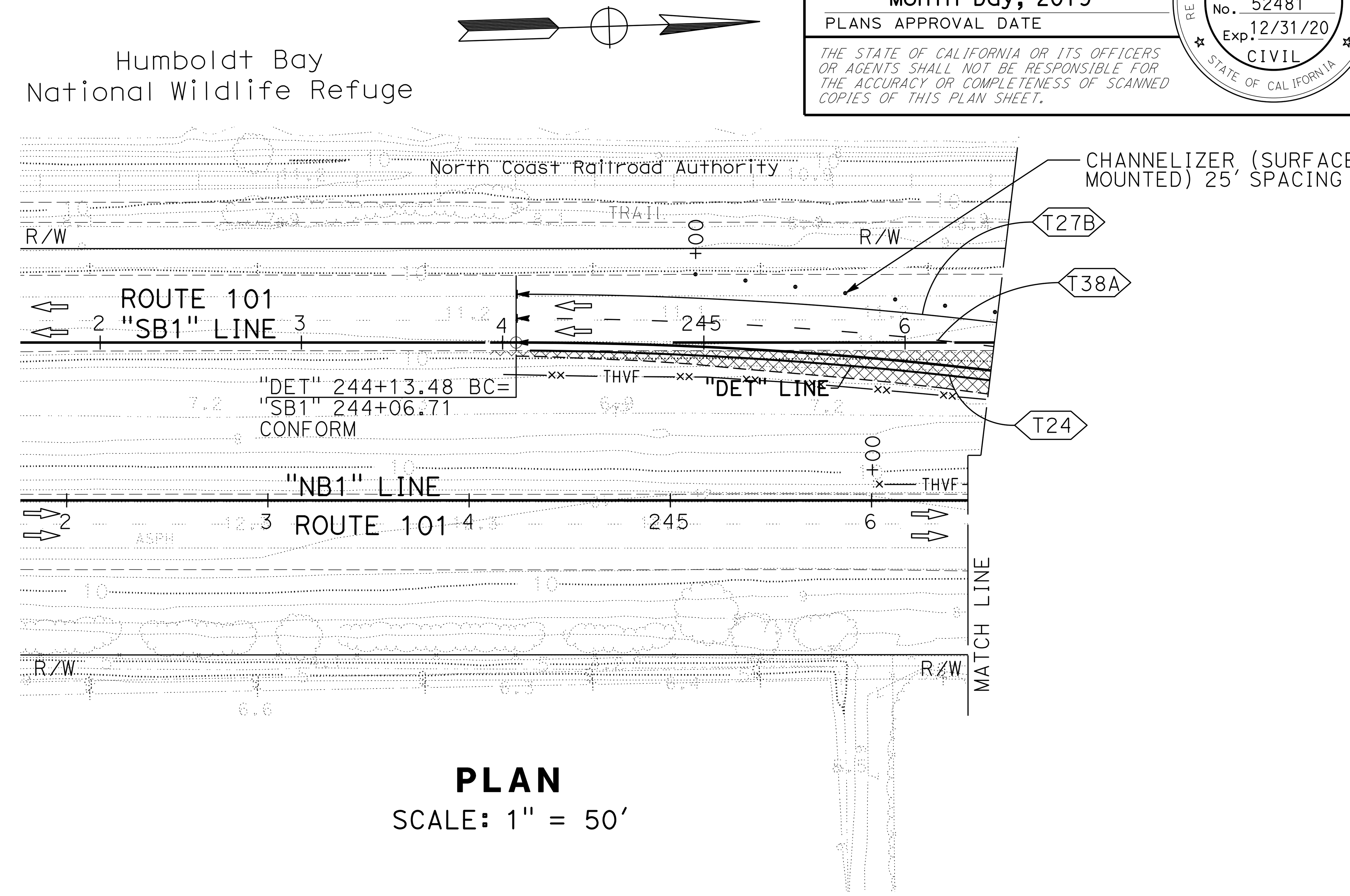

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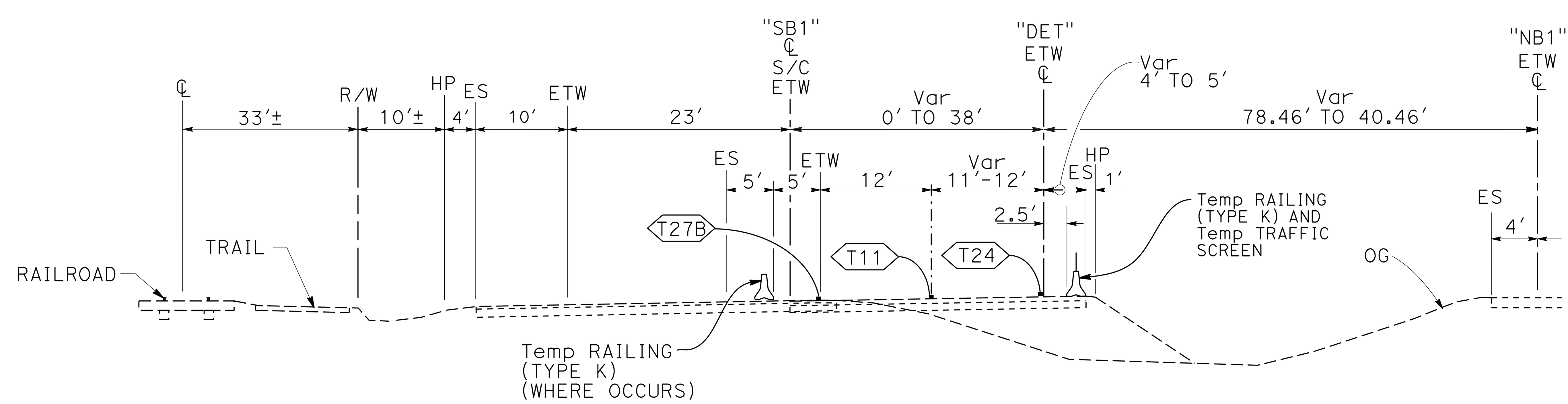

SOUTHBOUND
"DET" 244+00 TO "DET" 248+00
"DET" 252+15 TO "DET" 256+00
NO SCALE

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
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STAGE 2
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN
SC-6

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TIME PLOTTED => 11:13

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

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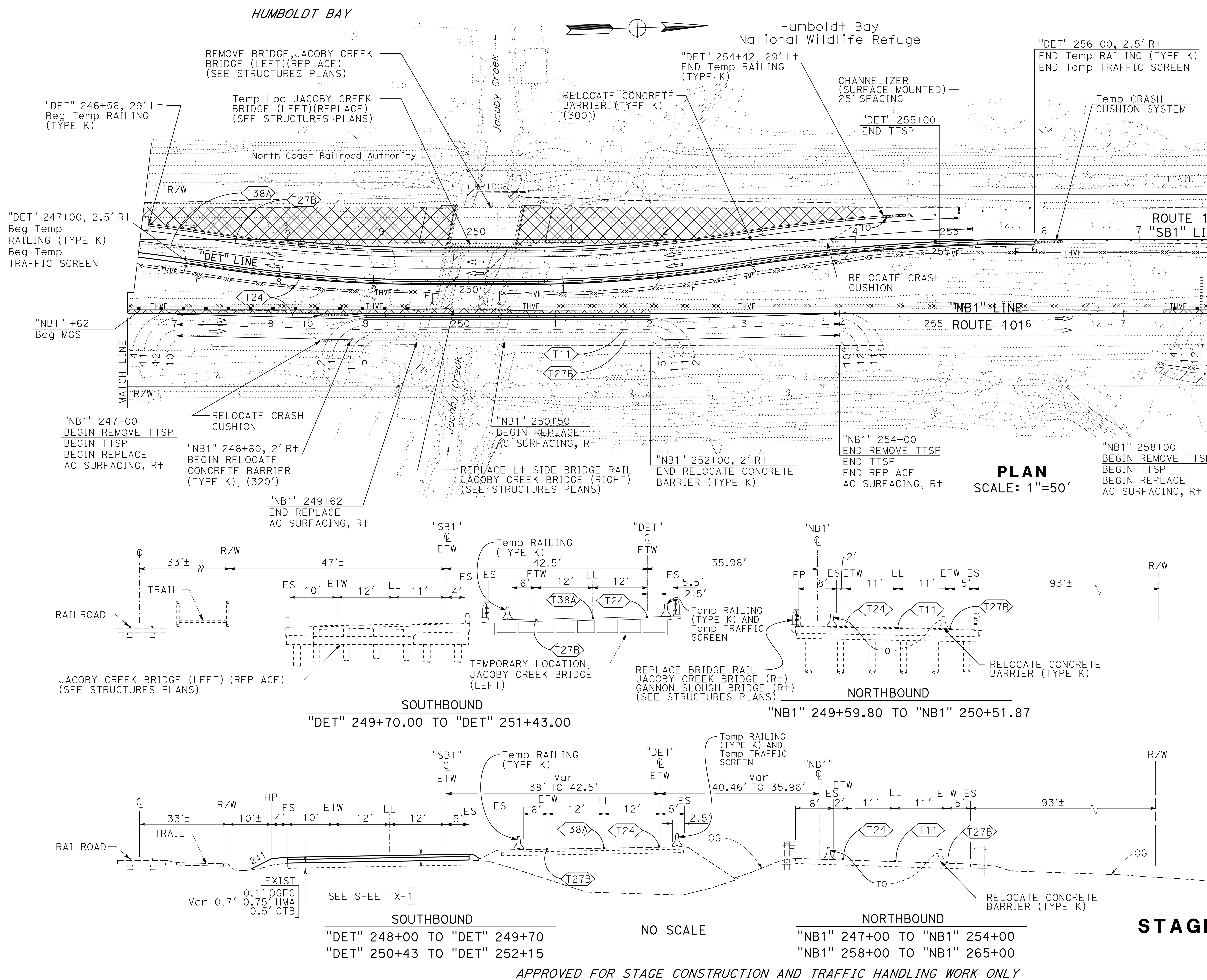

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
19 of 34

STAGE 2
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN
SC-7

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LAST REVISION 05-06-19 | DATE PLOTTED => 09-MAY-2019 | TIME PLOTTED => 11:13

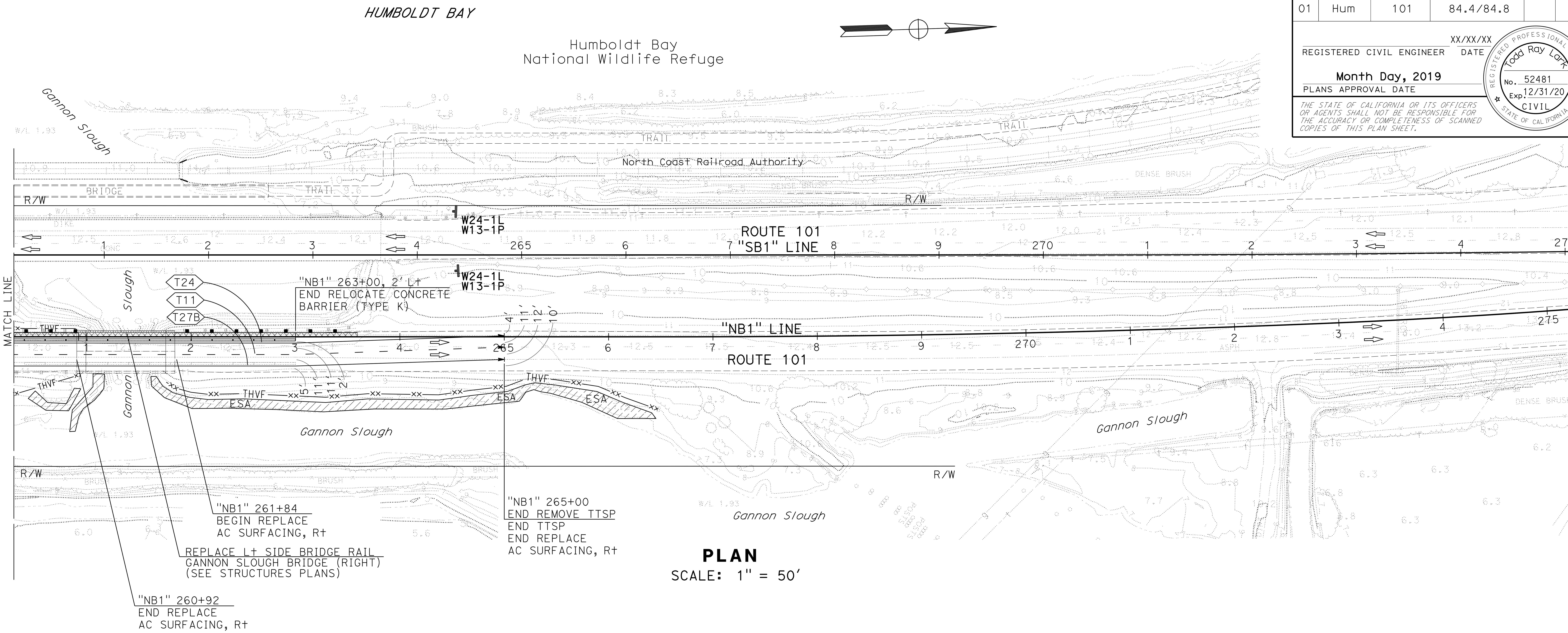
BORDER LAST REVISED 7/2/2010 | USERNAME => s132662 | DGN FILE => 0113000091ma007.dgn | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | UNIT 0313 | PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Todd Ray Lark No. 52481 Exp. 12/31/20 CIVIL STATE OF CALIFORNIA



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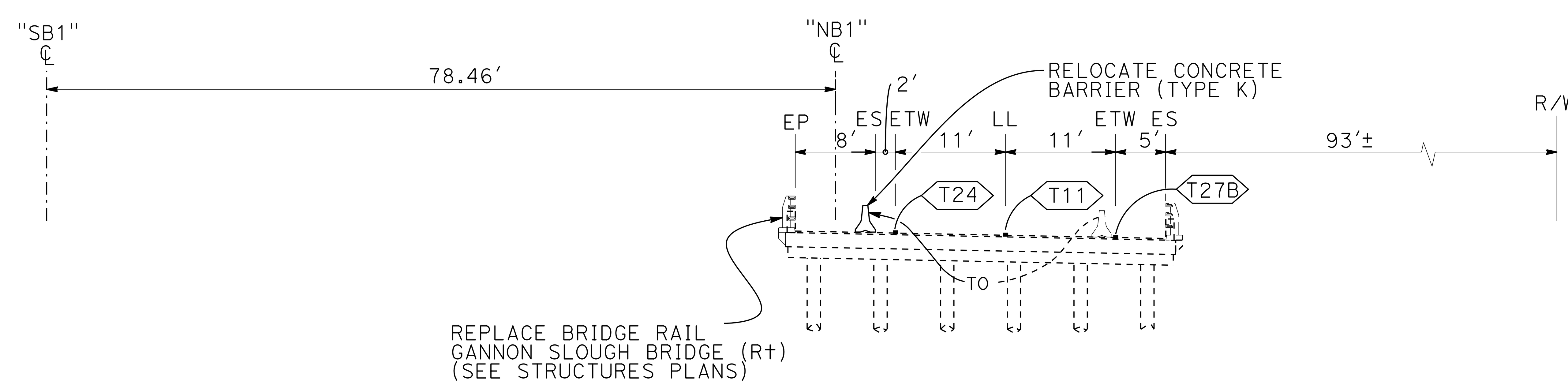

NORTHBOUND
"NB1" 260+90.33 TO "NB1" 261+84.33
NO SCALE

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
20 of 34

STAGE 2
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN
SC-8

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

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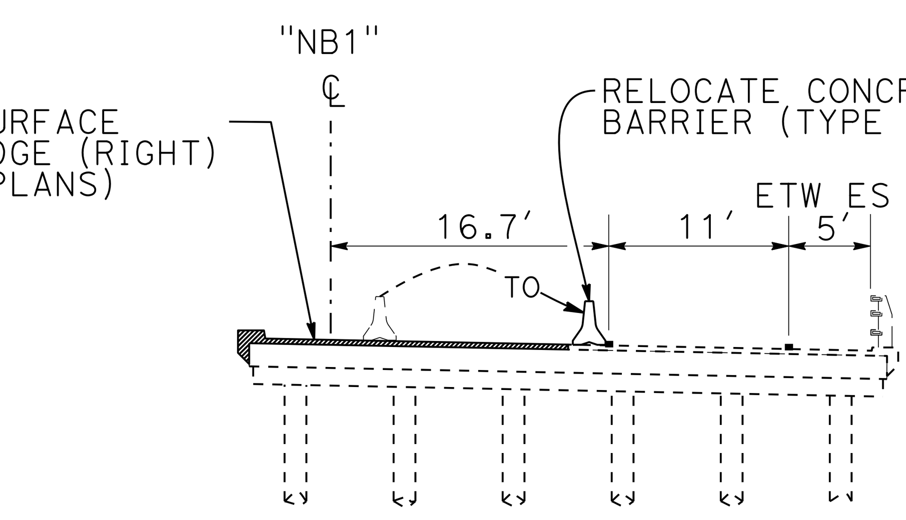
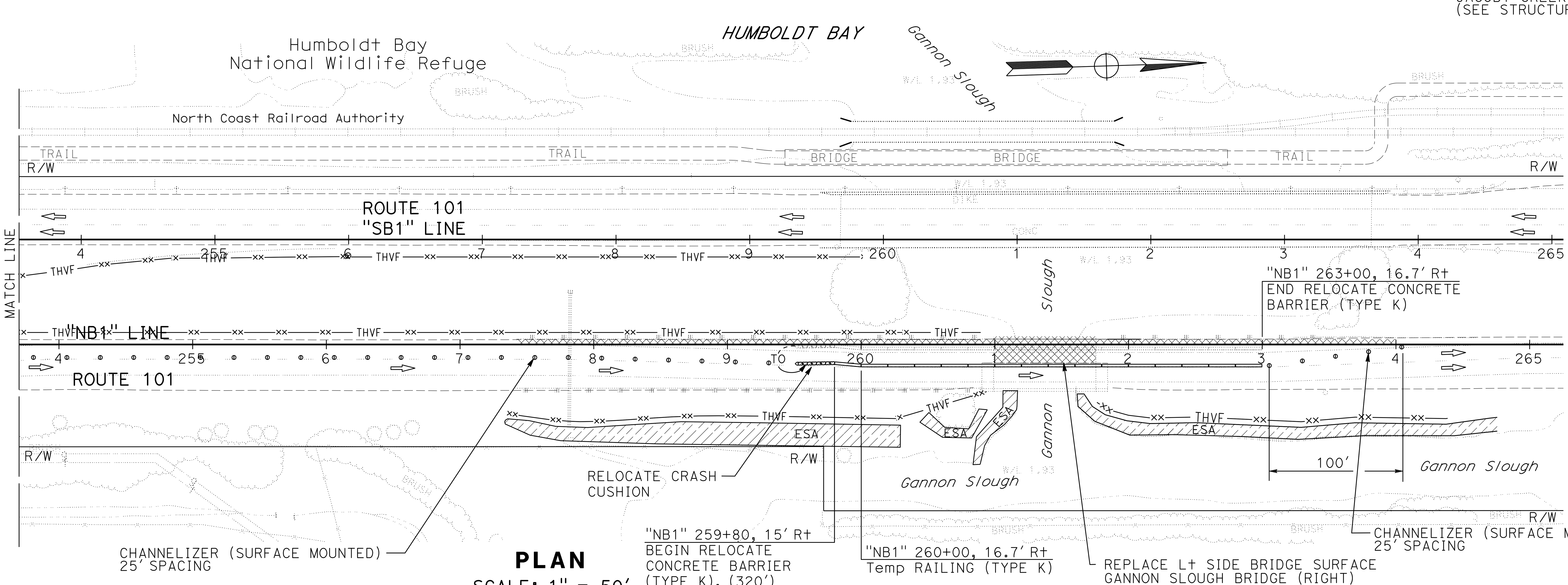
PLAN
SCALE: 1" = 50'



NORTHBOUND
"NB1" 249+50± TO "NB1" 250+50±
"NB1" 260+90± TO "NB1" 261+83±



PLAN
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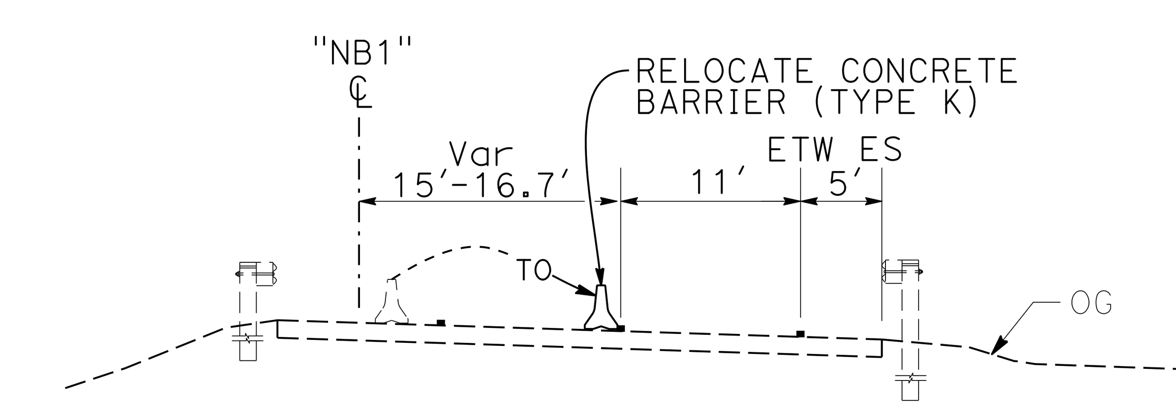

NORTHBOUND
"NB1" 249+00± TO "NB1" 249+50±
"NB1" 250+50± TO "NB1" 252+00±
"NB1" 260+00± TO "NB1" 260+90±
"NB1" 261+83± TO "NB1" 263+00±
NO SCALE

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
21 of 34

STAGE 2B (NB Weekend Closure)

STAGE CONSTRUCTION AND TRAFFIC HANDLING

SCALE AS SHOWN

SC-9

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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REVISED BY
DATE REVISED

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TIME PLOTTED => 11:13

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

XX/XX/XX
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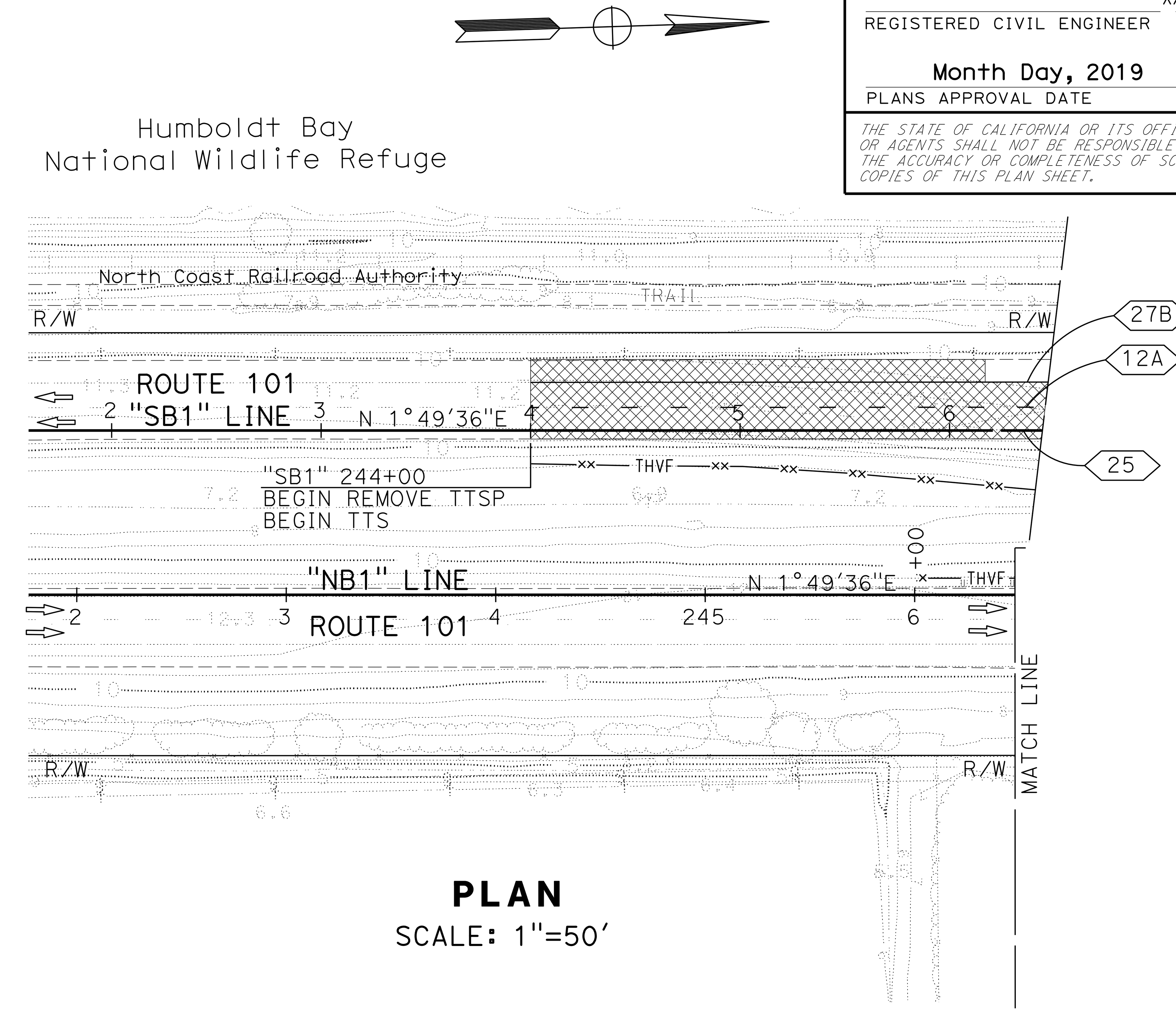
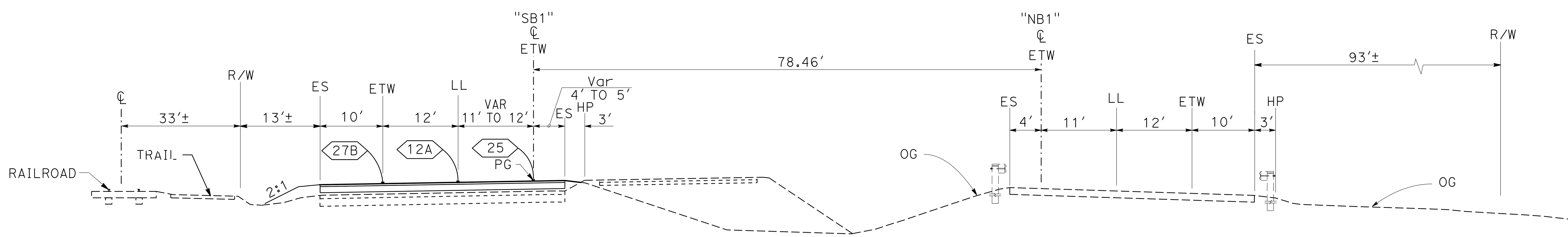


PLAN
SCALE: 1"=50'



SOUTHBOUND
"SB1" 244+00 TO "SB1" 246+50

NO SCALE

NORTHBOUND
"NB1" 248+97 TO "NB1" 249+60

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
22 of 34

STAGE 3 (SB Overnight Closure)
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN
SC-10

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FUNCTIONAL SUPERVISOR: LENA ASHLEY
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REVISED BY
DATE REVISED

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LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:14

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

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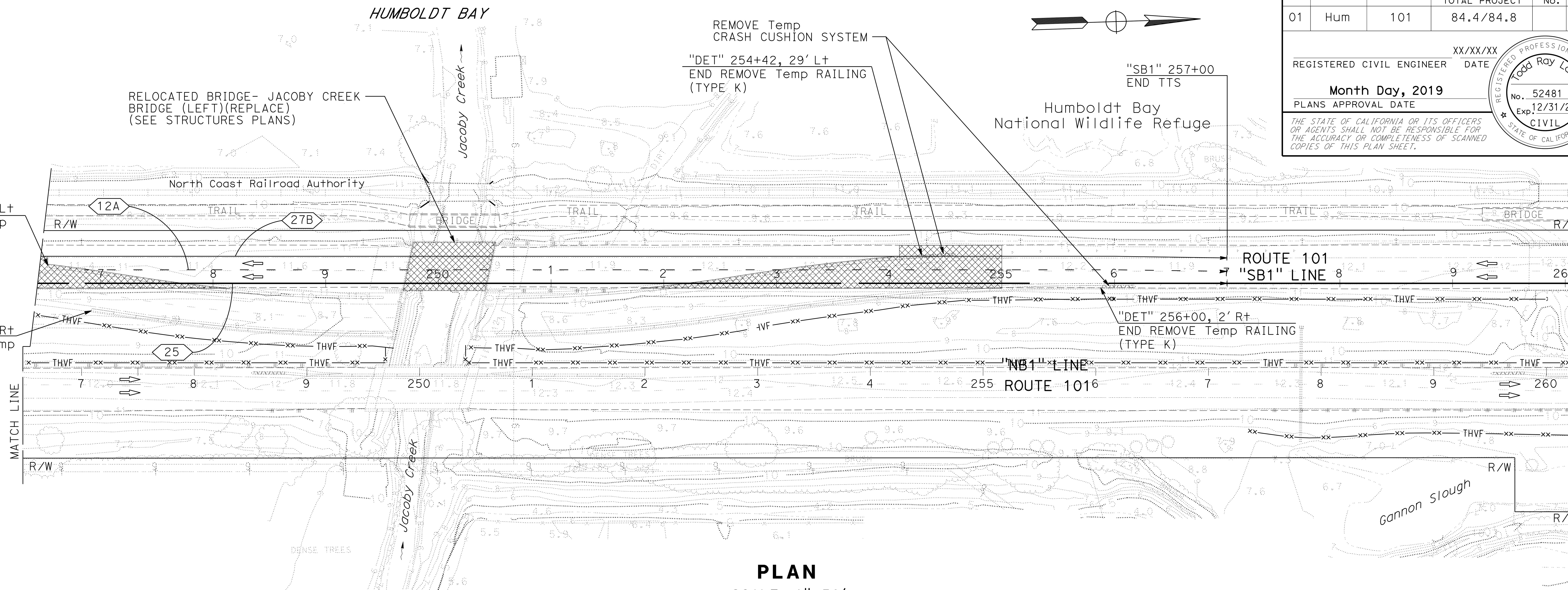
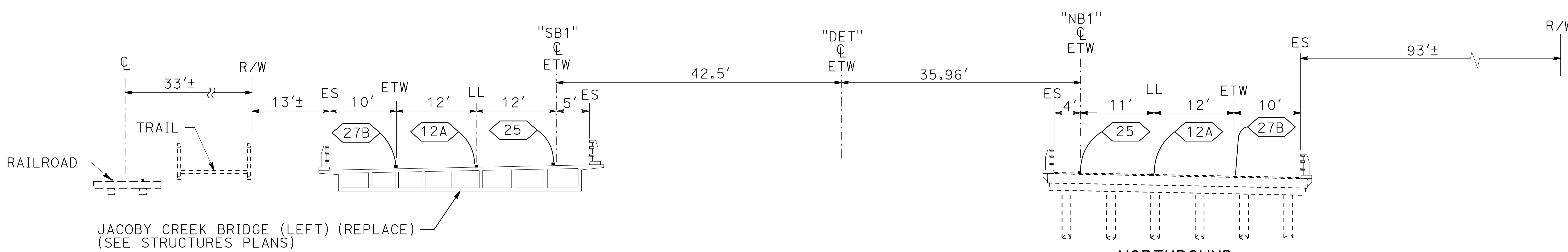


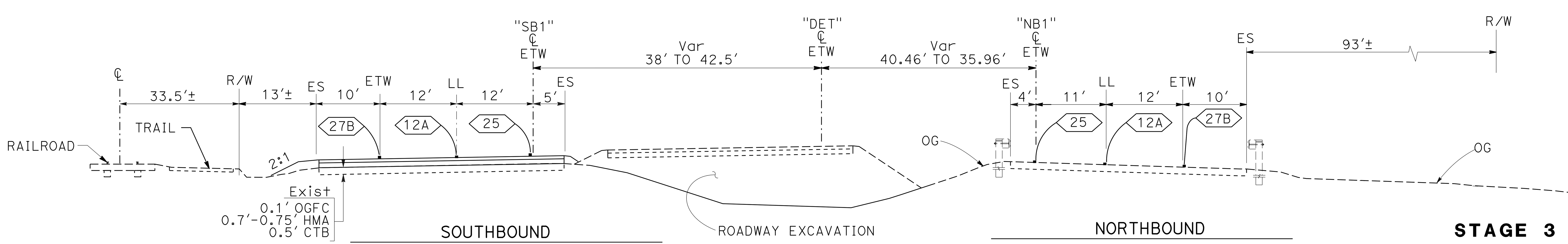
PLAN

SCALE: 1"=50'



SOUTHBOUND
"SB1" 249+70.00 TO "SB1" 251+43.00

NORTHBOUND
"NB1" 249+59.80 TO "NB1" 250+51.87



SOUTHBOUND
"DET" 248+00 TO "DET" 249+70
"DET" 250+43 TO "DET" 252+15

NORTHBOUND
"NB1" 247+00 TO "NB1" 254+00
"NB1" 258+00 TO "NB1" 265+00

NO SCALE

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
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STAGE 3 (SB Overnight Closure)

STAGE CONSTRUCTION AND TRAFFIC HANDLING

SCALE AS SHOWN

SC-11

APPROVED FOR STAGE CONSTRUCTION AND TRAFFIC HANDLING WORK ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

FUNCTIONAL SUPERVISOR: LENA ASHLEY
CALCULATED-DESIGNED BY: TODD LARK
CHECKED BY: AHMAD RAHIMI
REVISED BY
DATE REVISED

LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:14

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BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091ma011.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

XX/XX/XX
REGISTERED CIVIL ENGINEER DATE

Month Day, 2019
PLANS APPROVAL DATE

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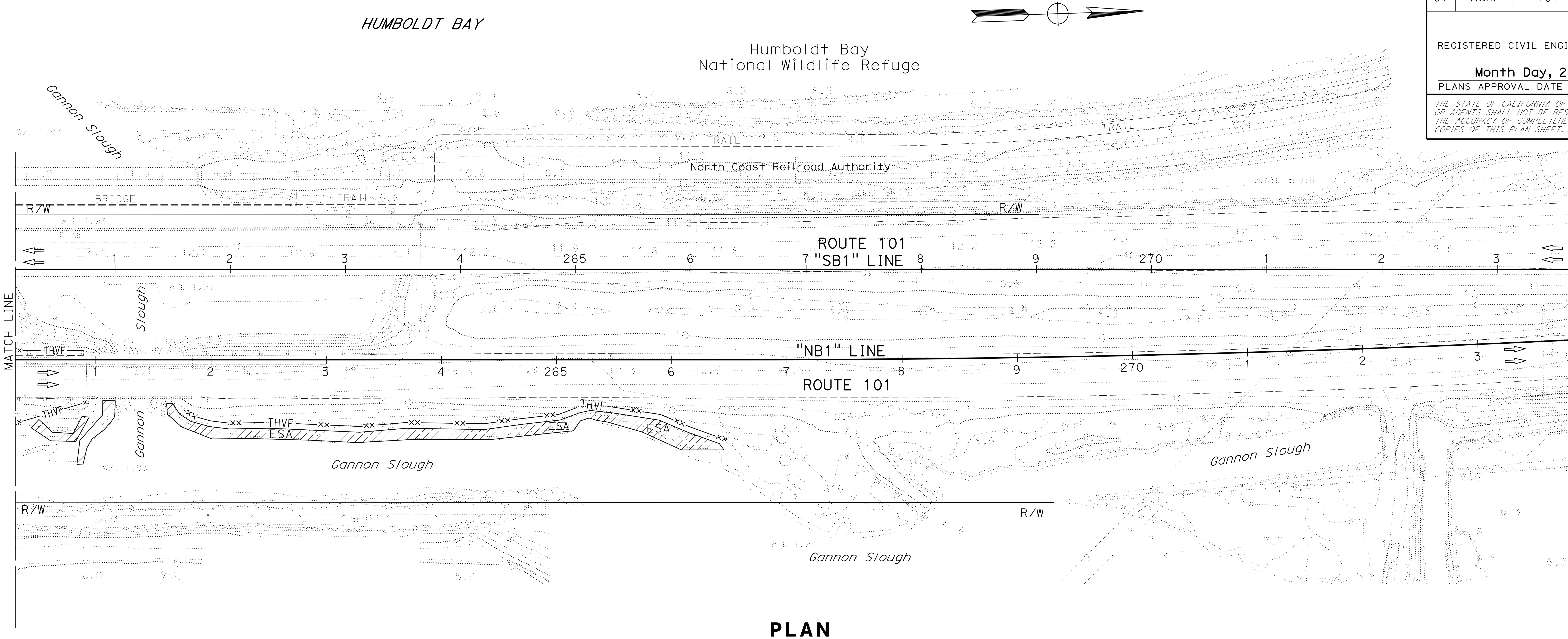
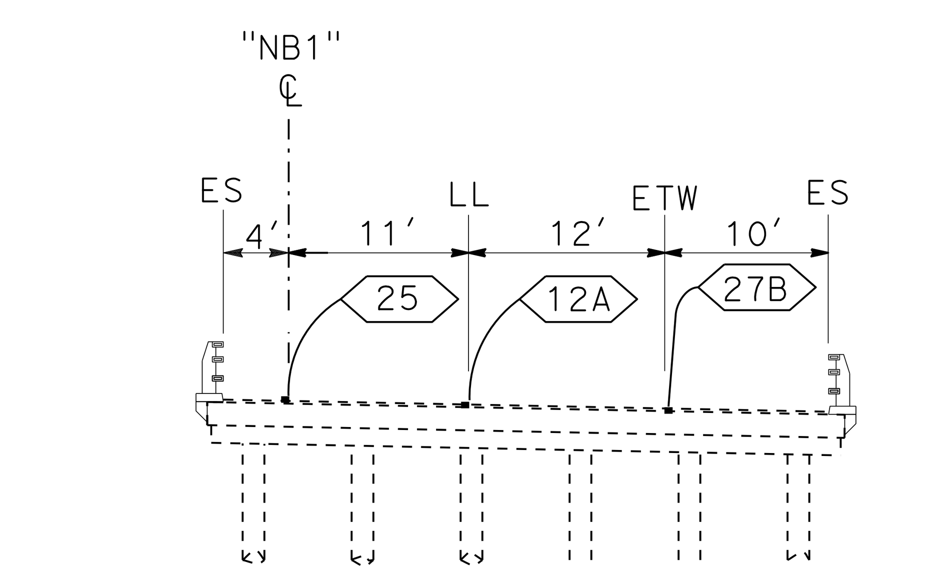


PLAN
SCALE: 1" = 50'



NORTHBOUND
"NB1" 260+90.33 TO "NB1" 261+84.33
NO SCALE

Exhibit 14
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(Caltrans)
Jacoby Bridge Plans (Excerpted)
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STAGE 3 (SB Overnight Closure)
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN
SC-12

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

XX/XX/XX
REGISTERED CIVIL ENGINEER DATE

Month Day, 2019
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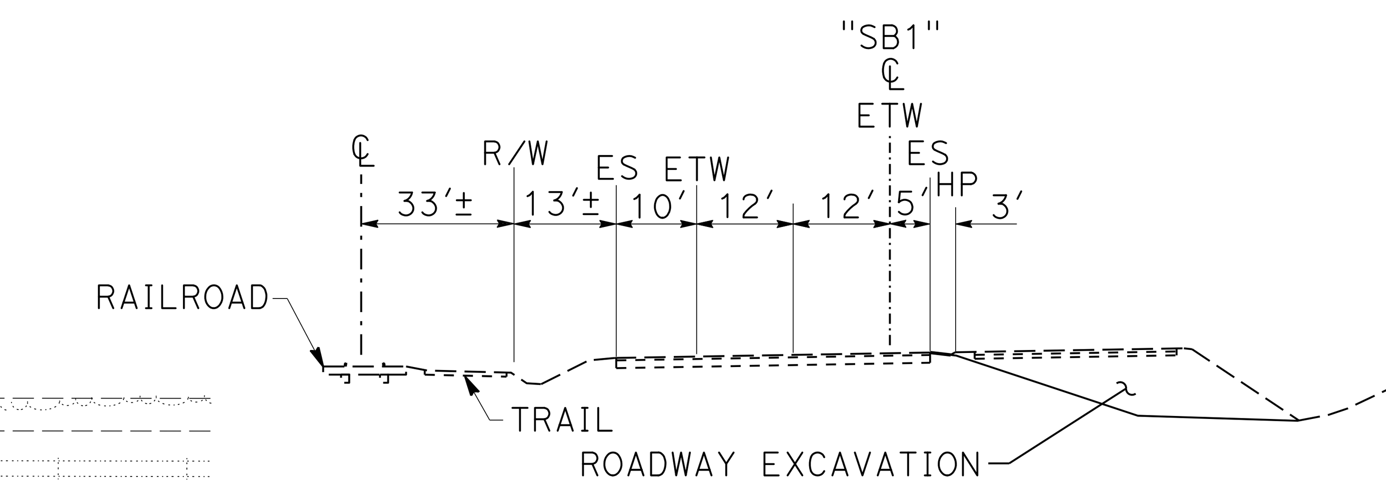
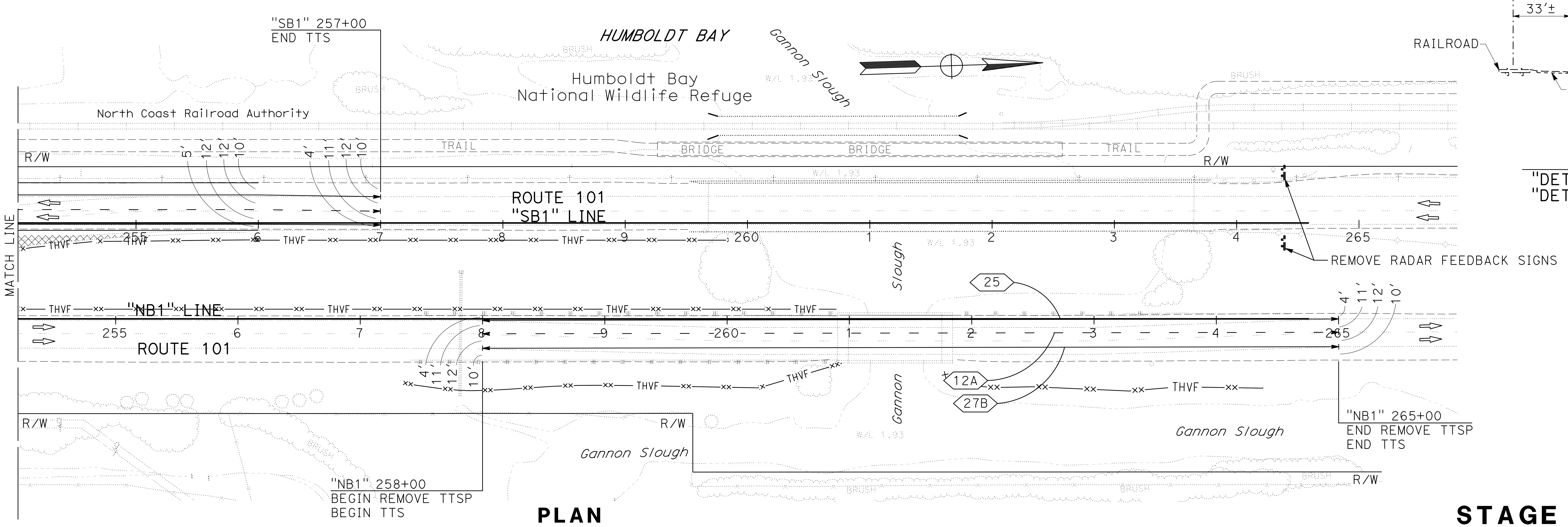
PLAN
SCALE: 1" = 50'



SOUTHBOUND
"DET" 248+00 TO "DET" 249+70
"DET" 250+43 TO "DET" 252+15
NO SCALE



PLAN
SCALE: 1" = 50'

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
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STAGE 4
STAGE CONSTRUCTION AND TRAFFIC HANDLING
SCALE AS SHOWN
SC-13

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LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:14

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091ma013.dgn
RELATIVE BORDER SCALE IS IN INCHES
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

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PAVEMENT DELINEATION

LOCATION (STATION) FROM	TO	DETAIL NO.	(N) DETAIL LENGTH	REMOVE THERMOPLASTIC TRAFFIC STRIPE YELLOW LF	WHITE LF	REMOVE PAVEMENT MARKER EA	REMOVE PAINTED TRAFFIC STRIPE YELLOW LF	WHITE LF	TEMPORARY TRAFFIC STRIPE (PAINT) YELLOW LF	WHITE LF	CHANNELIZER (SURFACE MOUNTED) EA	TYPE III BARRICADE EA	REMARKS
"NB1" 240+90	"NB1" 248+75										32	4	STAGE 1B WEEKEND LANE CLOSURE BARRICADES TO SUPPORT CONSTRUCTION AREA SIGNS
"NB1" 252+00	"NB1" 259+75										32		
"NB1" 263+00	"NB1" 264+00										5		
"DET" 244+00	"DET" 256+00	24	1200						1200		14		STAGE 2-DETOUR DELINEATION
"" ""	"" ""	38A	1200							364			
"" ""	"" ""	27B	1200							1200			
"NB1" 247+00	"NB1" 254+00	24	700	700		16			700				STAGE 1-JACOBY BRIDGE (RIGHT)
"" ""	"" ""	11	700		211	16				211			
"" ""	"" ""	27B	700		700					700			
"NB1" 258+00	"NB1" 265+00	24	700	700		16			700				STAGE 1-GANNON BRIDGE (RIGHT)
"" ""	"" ""	11	700		211	16				211			
"" ""	"" ""	27B	700		700					700			
"NB1" 240+90	"NB1" 248+75										32	4	STAGE 2B WEEKEND LANE CLOSURE BARRICADES TO SUPPORT CONSTRUCTION AREA SIGNS
"NB1" 252+00	"NB1" 259+75										32		
"NB1" 263+00	"NB1" 264+00										5		
"NB1" 247+00	"NB1" 254+00	24	700				700		700				STAGE 2-JACOBY BRIDGE (RIGHT)
"" ""	"" ""	11	700					211		211			
"" ""	"" ""	27B	700					700		700			
"NB1" 258+00	"NB1" 265+00	24	700				700		700				STAGE 2-GANNON BRIDGE (RIGHT)
"" ""	"" ""	11	700					211		211			
"" ""	"" ""	27B	700					700		700			
"NB1" 247+00	"NB1" 254+00	25	700				700						PERMANENT-JACOBY BRIDGE (RIGHT)
"" ""	"" ""	12A	700					211					
"" ""	"" ""	27B	700					700					
"NB1" 258+00	"NB1" 265+00	24	700				700						PERMANENT-GANNON BRIDGE (RIGHT)
"" ""	"" ""	11	700					211					
"" ""	"" ""	27B	700					700					
			SUBTOTAL	1400 *	1822 *	64 *	2800	3644	4000	5208	152	8	
			TOTAL				6444		9208		152	8	

(N) - NOT A SEPARATE BID ITEM
* - SEE SUMMARY OF QUANTITIES FOR PROJECT TOTALS

ROADWAY

LOCATION (STATION) FROM	TO	RESET SOLAR POWERED ROADSIDE SIGN (4-POST) EA	OBLITERATE SURFACING SQYD	TEMPORARY TRAFFIC SCREEN CY	CLASS 2 AGGREGATE BASE CY	HMA (TYPE A) TON	TACK COAT TON	IMPORTED BORROW CY	TEMPORARY RAILING (TYPE K) LF	RELOCATE CONCRETE BARRIER (TYPE K) LF	TEMPORARY CRASH CUSHION SYSTEM EA	RELOCATE CRASH CUSHION EA	REMARKS
"DET" 244+00	"DET" 248+25				278	199	0.9	591					CONFORM
"DET" 246+56	"DET" 254+42			780					480	300		1	
"DET" 247+00	"DET" 254+42								900		1		
"DET" 248+25	"DET" 249+70		65		209	151		627					
"DET" 250+43	"DET" 251+75		60		186	134		470					
"DET" 251+75	"DET" 256+00				287	205		530					CONFORM
"SB1" 248+50		1											STAGE 2
"SB1" 248+50		1											STAGE 4
"NB1" 248+80	"NB1" 252+00								320		1		STAGE 1 Ln AND Shld REDUCTIONS
"" ""	"" ""									320		1	STAGE 1B WEEKEND Rt Ln CLOSURE
"" ""	"" ""									320		1	RETURN TO STAGE 1 CONFIGURATION
"" ""	"" ""									320		1	STAGE 2 Ln AND Shld REDUCTIONS
"" ""	"" ""									320		1	STAGE 2B WEEKEND Lt Ln CLOSURE
"" ""	"" ""									320		1	RETURN TO STAGE 2 CONFIGURATION
"NB1" 259+80	"NB1" 263+00								320		1		STAGE 1 Ln AND Shld REDUCTIONS
"" ""	"" ""									320		1	STAGE 1B WEEKEND Rt Ln CLOSURE
"" ""	"" ""									320		1	RETURN TO STAGE 1 CONFIGURATION
"" ""	"" ""									320		1	STAGE 2 Ln AND Shld REDUCTIONS
"" ""	"" ""									320		1	STAGE 2B WEEKEND Lt Ln CLOSURE
"" ""	"" ""									320		1	RETURN TO STAGE 2 CONFIGURATION
"DET" 246+56	"DET" 254+42								780		1		
"DET" 247+00	"DET" 256+00								600		1		
"SB1" 250+52	"SB1" 253+52								300	300		1	
	SUBTOTAL	2	125 *	780	960 *	689 *	0.9 *	2218 *	3700	3800	5	12	
	TOTAL	2		780					3700	3800	5	12	

* - SEE SUMMARY OF QUANTITIES FOR PROJECT TOTALS

Exhibit 14
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(Caltrans)
Jacoby Bridge Plans (Excerpted)
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STAGE CONSTRUCTION AND TRAFFIC HANDLING QUANTITIES
SCQ-1

FUNCTIONAL SUPERVISOR LENA ASHLEY
CALCULATED-DESIGNED BY TODD LARK
CHECKED BY AHMAD RAHIMI
REVISED BY
DATE REVISED

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DATE PLOTTED => 09-MAY-2019
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BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091mc001.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

Month Day, 2019
PLANS APPROVAL DATE

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NOTE:

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

LEGEND:

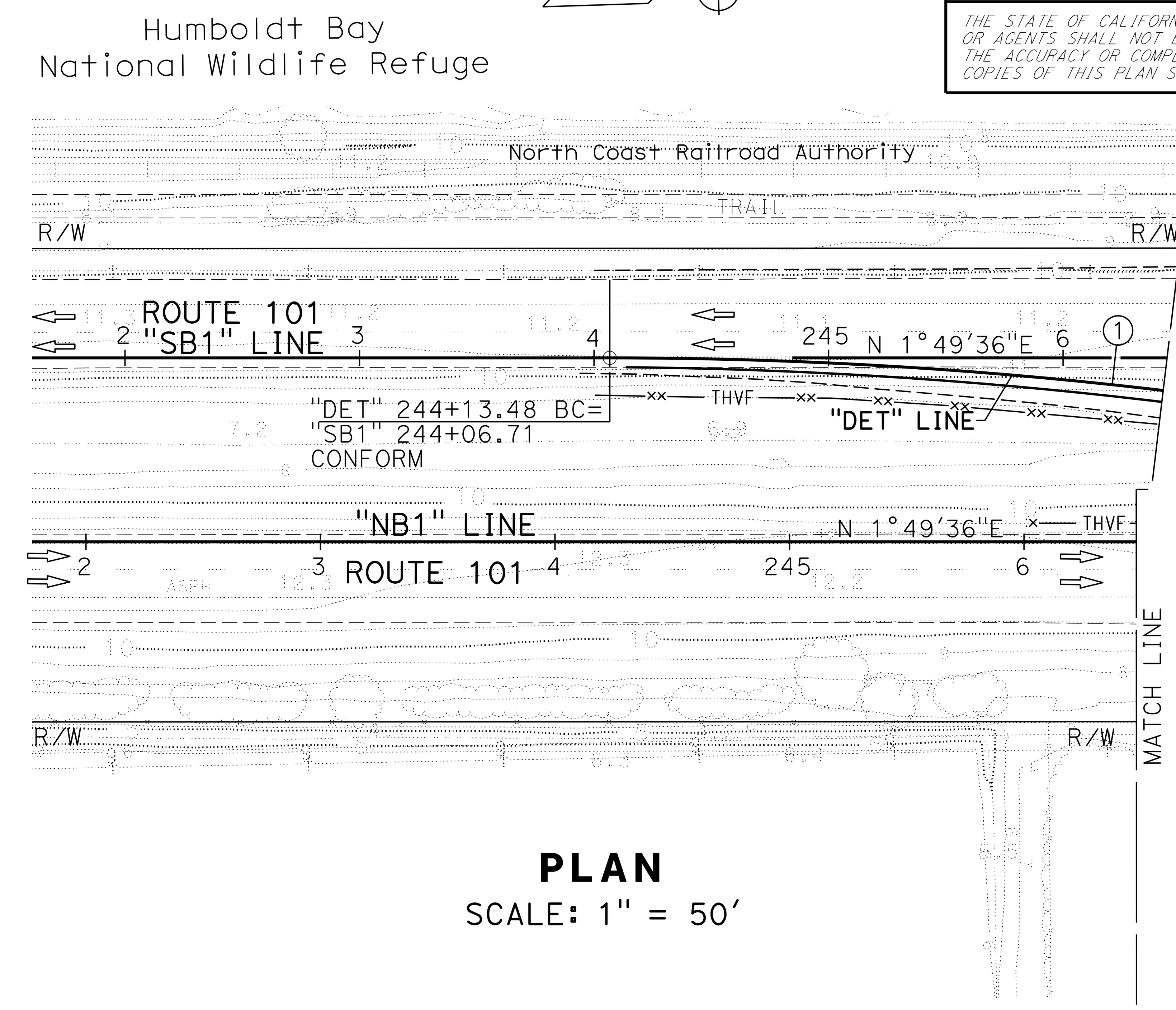
REMOVE TREE(S)

ABBREVIATIONS:

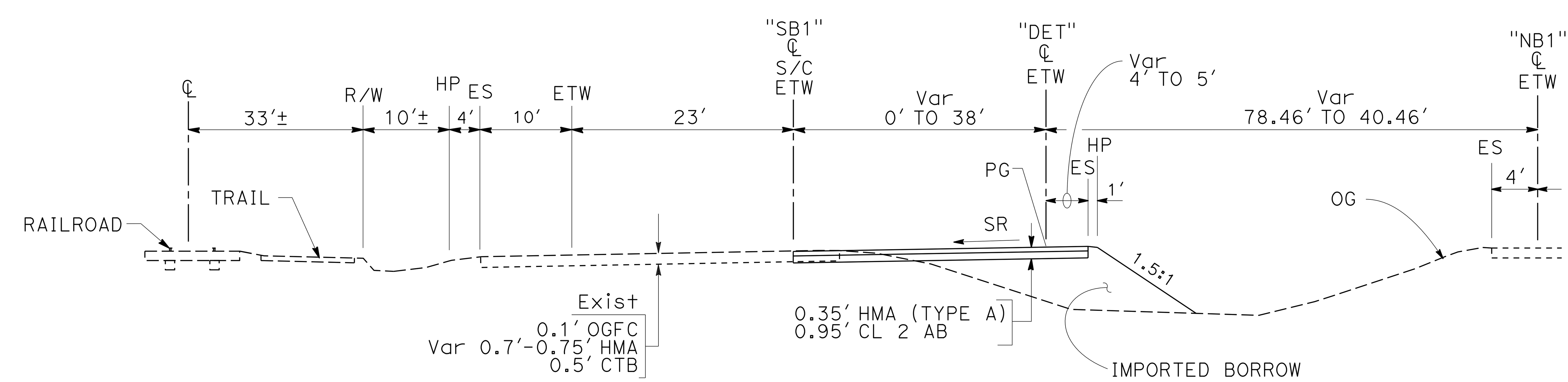
TW TRAVELED WAY
SR MATCH SUPERELEVATION RATE

CURVE DATA

No.	R	Δ	T	L	N	E
1	2000'	09°04'07"	158.61'	316.56'	2196748.53	5987689.10



PLAN
SCALE: 1" = 50'



SOUTHBOUND
"DET" 244+00 TO "DET" 248+00
"DET" 252+15 TO "DET" 256+00
NO SCALE

Exhibit 14
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(Caltrans)
Jacoby Bridge Plans (Excerpted)
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DETOUR CONSTRUCTION
(STAGE 1)
SCALE: AS SHOWN

DE-1

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FUNCTIONAL SUPERVISOR LENA ASHLEY
CALCULATED-DESIGNED BY TODD LARK
CHECKED BY AHMAD RAHIMI
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DATE REVISED

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DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:14
LAST REVISION 05-06-19

NOTE:

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

CURVE DATA

No.	R	Δ	T	L	N	E
1	2000'	09°04'07"	158.61'	316.56'	2196748.53	5987689.10
2	1400'	09°04'07"	111.03'	221.59'	2197391.18	5984350.38
3	1400'	09°04'07"	111.03'	221.59'	2197498.68	5984353.81
4	2000'	09°04'07"	158.61'	316.56'	2197927.30	5987726.69

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

REGISTERED CIVIL ENGINEER XX/XX/XX DATE

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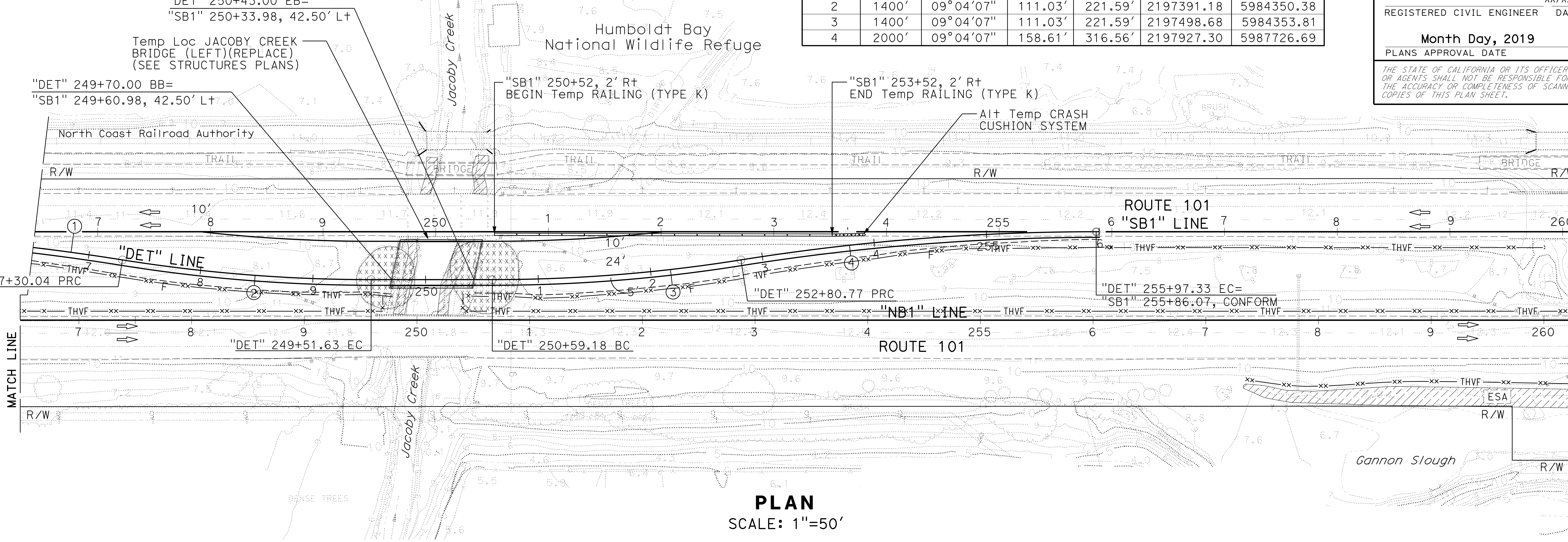
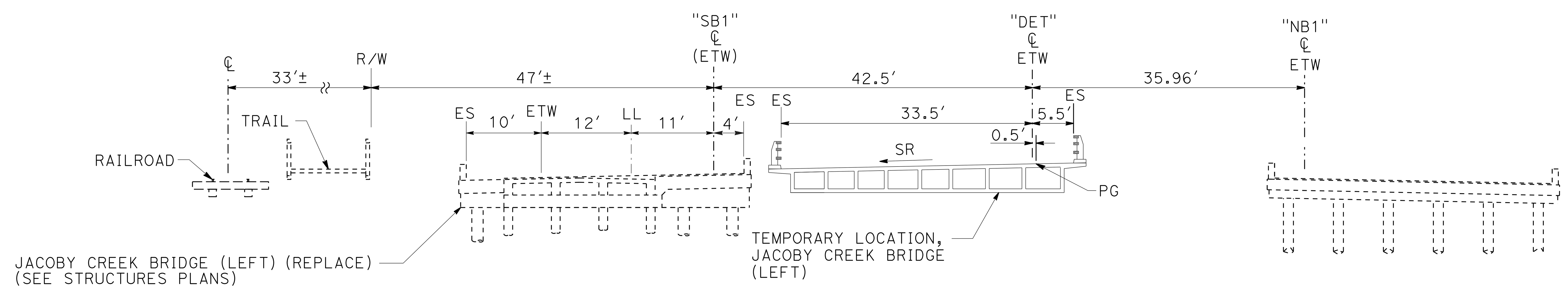


PLAN

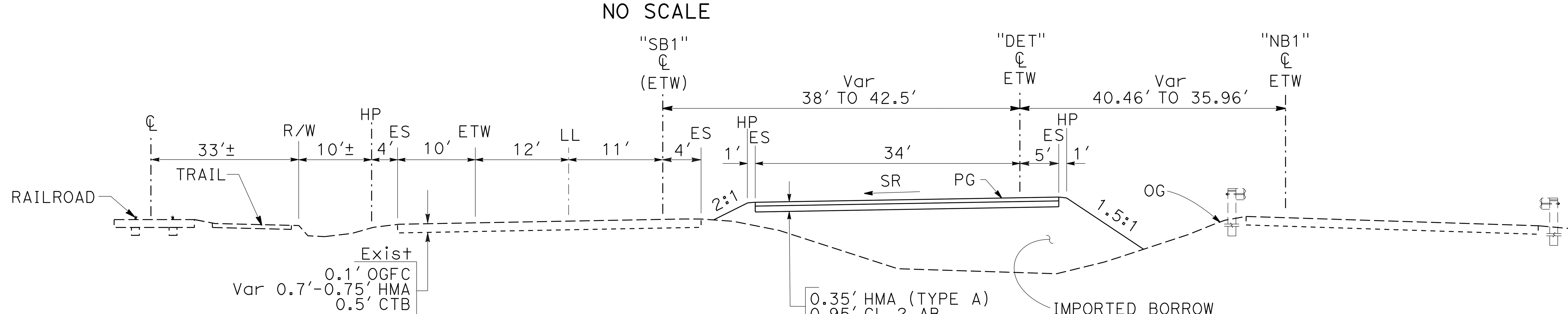
SCALE: 1"=50'



SOUTHBOUND

"DET" 249+70.00 TO "DET" 251+43.00

NO SCALE



SOUTHBOUND

"DET" 248+00 TO "DET" 249+70

"DET" 250+43 TO "DET" 252+15

NO SCALE

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DETOUR CONSTRUCTION

(STAGE 1)

SCALE: AS SHOWN

DE-2

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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FUNCTIONAL SUPERVISOR: LENA ASHLEY

CALCULATED-DESIGNED BY: TODD LARK

CHECKED BY: AHMAD RAHIMI

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LAST REVISION 05-06-19 | DATE PLOTTED => 09-MAY-2019 | TIME PLOTTED => 11:14

BORDER LAST REVISED 7/2/2010

USERNAME => s132662

DGN FILE => 0113000091mg002.dgn

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0313

PROJECT NUMBER & PHASE 01130000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

XX/XX/XX
REGISTERED CIVIL ENGINEER DATE

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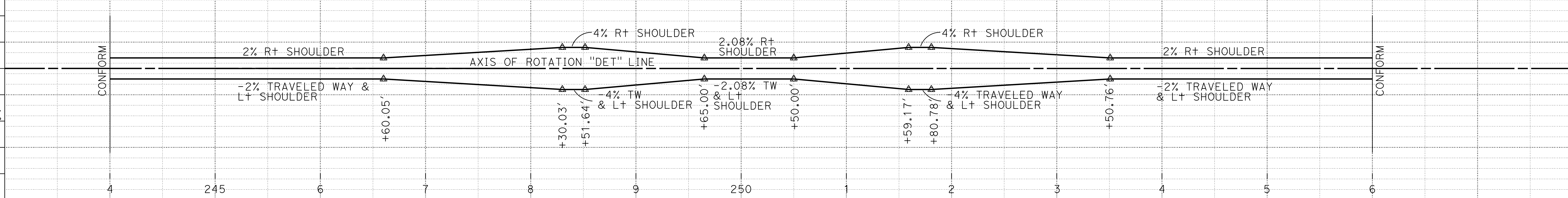
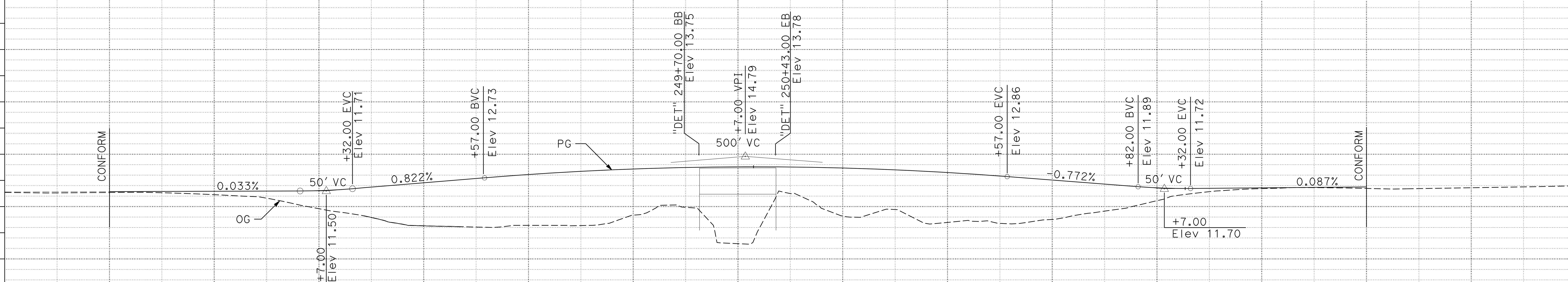


SUPERELEVATION DIAGRAM
ROUTE 101
"DET" LINE



PROFILE
ROUTE 101
"DET" LINE

STATION	4	245	6	7	8	9	250	1	2	3	4	5	6	TOTAL
CY Exc	N/A							N/A						N/A
CY Emb	1218							1000						2218

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(Caltrans)
Jacoby Bridge Plans (Excerpted)
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DETOUR PROFILE AND SUPERELEVATION DIAGRAM

SCALE: 1" = 50' Horiz
1" = 5' Vert

DEPS-1

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DESIGN

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CALCULATED-DESIGNED BY: TODD LARK
CHECKED BY: AHMAD RAHIMI
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DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:15
LAST REVISION 05-06-19

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091mg003.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0313
PROJECT NUMBER & PHASE 01130000911

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ROADWAY

LOCATION (STATION) FROM	LOCATION (STATION) TO	COLD PLANE AC PAVEMENT	OBLITERATE SURFACING	ROADWAY EXCAVATION	IMPORTED BORROW	REMOVE BASE AND SURFACING	CLASS 2 AGGREGATE BASE (CY)	HMA (TYPE A)	(OPEN GRADED FRICTION COURSE)	COLORIZED OPEN GRADED WMA	TACK COAT	HOT MIX ASPHALT (LEVELING)	REMARKS
		SQYD	SQYD	CY	CY	CY	CY	TON	TON	TON	TON	TON	
"SB1" 244+00	"SB1" 244+50	206									0.5		CONFORM
"SB1" 244+00	"SB1" 246+50			93	112				51.25	18.75	0.9	347	
"SB1" 246+50	"SB1" 249+70		1300	1069	231		610	525	69	24			
"SB1" 250+43	"SB1" 253+50		1300	970	182		687	533	65	23			CONFORM
"SB1" 253+50	"SB1" 256+00			239	23				51.25	18.75		365	
"SB1" 254+00	"SB1" 256+00	822									0.1		OGFC OVERLAY
SUBTOTAL		1028	2600	2457	548		1297	1058	237	85	1.5	712	
SUBTOTAL FROM SHEET SCQ-1		0	125		2218	10	960	689			0.9		
TOTAL		1028	2725	2457	2766	10	2257	1747	237	85	2.4	712	

MILEPOST MARKER

LOCATION (STATION)	Lt/Rt	CODE	SIGN MESSAGE	PANEL SIZE	MILEPOST MARKER
					EA
"SB1" 249+00	Lt	G11-6 (CA)	HUM 101 84.50	12" x 24"	1
"NB1" 249+50	Rt	G11-6 (CA)	HUM 101 84.56	12" x 24"	1
				TOTAL	2

GUARDRAIL

LOCATION (STATION) FROM	LOCATION (STATION) TO	Lt/Rt	REMOVE GUARDRAIL	MIDWEST GUARDRAIL SYSTEM	TREATED WOOD WASTE	TRANSITION RAILING (TYPE WB-31)	ALTERNATIVE IN-LINE TERMINAL SYSTEM
			LF	LF	LB	EA	EA
"NB1" 246+62	"NB1" 249+38	Lt	80	25	2080	1	1
"NB1" 248+75	"NB1" 249+50	Rt	80	275	2080	1	1
"SB1" 250+50	"SB1" 251+50	Lt & Rt	190		4940	2	2
"NB1" 259+50	"NB1" 260+90	Lt & Rt	270	550	6990	2	2
"NB1" 261+85	"NB1" 263+50	Lt	175	150	4550	1	
TOTAL			800	1000	20,640	7	6

RUMBLE STRIP

SHEET No.	ALIGNMENT	STATION FROM	STATION TO	DETAIL No.	REPLACE AC SURFACING	6" RUMBLE STRIP (ASPHALT CONCRETE PAVEMENT)	12" RUMBLE STRIP (ASPHALT CONCRETE PAVEMENT)	DESCRIPTION/ COMMENTS
					CY	STA	STA	
L-1	"SB1"	244+00	249+40	27B			5.5	
L-1	"SB1"	244+00	249+40	25		5.5		
SC-3	"NB1"	247+00	249+62	25	0.8	2.6		
SC-7	"NB1"	247+00	249+62	27B	0.8		2.6	
SC-3	"NB1"	250+50	254+00	25	0.8	2.5		
SC-7	"NB1"	250+50	254+00	27B	0.8		2.5	
SC-3	"NB1"	258+00	260+92	25	0.9	3.0		
SC-7	"NB1"	258+00	260+92	27B	0.9		3.0	
SC-3	"NB1"	261+84	265+00	25	1.0	3.2		
SC-7	"NB1"	261+84	265+00	27B	1.0		3.2	
				TOTAL	7.0	16.8	16.8	

PAVEMENT DELINEATION

LOCATION (STATION) FROM	LOCATION (STATION) TO	DETAIL No.	(N) DETAIL LENGTH	REMOVE THERMOPLASTIC TRAFFIC STRIPE YELLOW	REMOVE THERMOPLASTIC TRAFFIC STRIPE WHITE	REMOVE PAVEMENT MARKER	THERMOPLASTIC TRAFFIC STRIPE (ENHANCED WET NIGHT VISIBILITY) YELLOW	THERMOPLASTIC TRAFFIC STRIPE (ENHANCED WET NIGHT VISIBILITY) WHITE	PAVEMENT MARKER (RETROREFLECTIVE) TYPE RY	PAVEMENT MARKER (RETROREFLECTIVE) TYPE C
				LF		EA	LF		EA	
"SB1" 244+00	"SB1" 256+00	25	1200	400		10	1200		26	
"SB1" 244+00	"SB1" 256+00	27B	1200		400			1200		
"SB1" 244+00	"SB1" 256+00	12A	1200		120	10		360		26
"NB1" 247+00	"NB1" 254+00	25	700				700		16	
"NB1" 247+00	"NB1" 254+00	12A	700					211		16
"NB1" 247+00	"NB1" 254+00	27B	700					700		
"NB1" 258+00	"NB1" 265+00	25	700				700		16	
"NB1" 258+00	"NB1" 265+00	12A	700					211		16
"NB1" 258+00	"NB1" 265+00	27B	700					700		
SUBTOTAL				400	520	20	1200	1560	58	58
SUBTOTAL FROM SHEET SCQ-1				1400	1822	64				
TOTAL				4142		84	5982		116	

(N) - NOT A SEPARATE BID ITEM

SUMMARY OF QUANTITIES

Q-1

REVISED BY / DATE REVISED

TODD LARK / AHMAD RAHIMI

CALCULATED-DESIGNED BY / CHECKED BY

FUNCTIONAL SUPERVISOR LENA ASHLEY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans® DESIGN

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LAST REVISION 05-06-19

DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:15

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

LICENSED LANDSCAPE ARCHITECT

Month Day, Year
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NOTE:

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

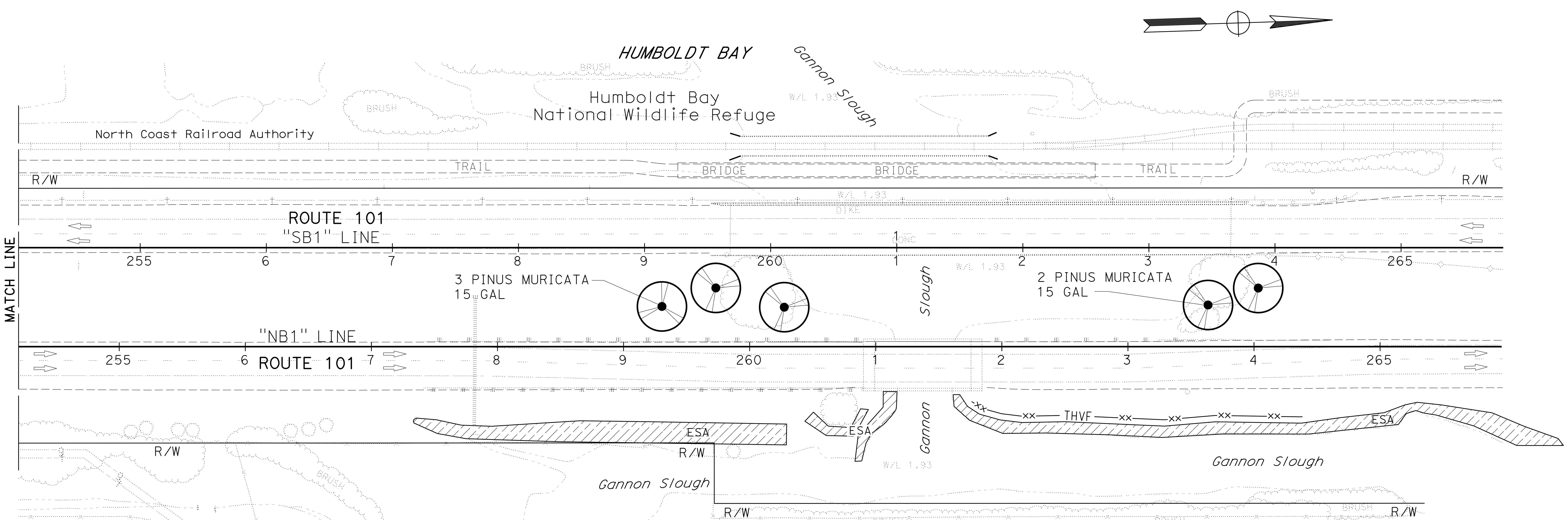

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
31 of 34

PLANTING PLAN

SCALE: 1" = 50'

PP-1

APPROVED FOR PLANTING WORK ONLY

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Caltrans® LANDSCAPE ARCHITECTURE

FUNCTIONAL SUPERVISOR: TIM BOESE
CALCULATED-DESIGNED BY: LAURA LAZZAROTTO
CHECKED BY: PHLORA BARBASH
REVISED BY
DATE REVISED

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LAST REVISION 05-06-19
DATE PLOTTED => 09-MAY-2019
TIME PLOTTED => 11:15

BORDER LAST REVISED 7/2/2010
USERNAME => s132662
DGN FILE => 0113000091su001.dgn
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0314
PROJECT NUMBER & PHASE 0113000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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NOTES: APPLICABLE WHERE CIRCLED

1 AS SHOWN ON PLANS

PLANT QUANTITIES

SHEET PP-1	PLANT GROUP		SLOW-RELEASE FERTILIZER	SOIL AMENDMENT	WOOD MULCH
	U	PACKET FERTILIZER	PLANT ESTABLISH-MENT	PLANT HOLE	PLANT BASIN
	EA	EA	LB	CY	CY
TOTAL	11	22	1.4	0.4	0.5

PLANT LEGEND

PLANT GROUP (SIZE)	SYMBOL	BOTANICAL NAME	COMMON NAME	HOLE SIZE		BASIN TYPE	APPLICATION RATES				ON CENTER SPACING	REMARKS
				DIAMETER	DEPTH		WOOD MULCH BASIN	SOIL AMENDMENT	SLOW-RELEASE FERTILIZER PLT ESTB	PACKET FERTILIZER		
				INCH	INCH		CF	CF	oz	EA	ft	
U (No. 15)		PINUS MURICATA	BISHOP PINE	18	18	II	1.23	0.3	1	2	1	

Exhibit 14
CDP Application No. 1-18-1078
(Caltrans)
Jacoby Bridge Plans (Excerpted)
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PLANT LEGEND AND QUANTITIES

PQ-1

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01	Hum	101	84.4/84.8		

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Laura Lazzarotto 4045
Signature
Renewal Date
Date
STATE OF CALIFORNIA

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LEGEND:

EROSION CONTROL TYPE 1

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Jacoby Bridge Plans (Excerpted)
33 of 34

EROSION CONTROL PLAN

SCALE: 1" = 50'

EC-1

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Caltrans LANDSCAPE ARCHITECTURE

FUNCTIONAL SUPERVISOR: TIM BOESE
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REVISED BY
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BORDER LAST REVISED 7/2/2010

USERNAME => s132662
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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

UNIT 0314

PROJECT NUMBER & PHASE 0113000911

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	84.4/84.8		

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EROSION CONTROL TYPE 1

SEQUENCE	ITEM	MATERIAL		APPLICATION RATE
		DESCRIPTION	TYPE	
STEP 1	FIBER REINFORCED MATRIX (FRM)	SEED	SEED MIX	53 LB/ACRE
		FRM	WOOD	1200 LB/ACRE
STEP 2	FIBER REINFORCED MATRIX (FRM)	FRM	WOOD	1200 LB/ACRE

SEED MIX

BOTANICAL NAME (COMMON NAME)	PERCENT GERMINATION (MINIMUM)	POUNDS PURE LIVE SEED PER ACRE (SLOPE MEASUREMENT)
FESTUCA RUBRA [1] (RED FESCUE)	55	10
HORDEUM BRACHYANTHERUM [1] (MEADOW BARLEY)	50	15
HORDEUM CALIF. 'PROSTRATA' [1] (PROSTRATE CALIFORNIA BARLEY)	50	20
JUNCUS PATENS HUMBOLDT [1] (COMMON RUSH)	35	2
SISYRINCHIUM BELLUM [1] (BLUE-EYED GRASS)	35	2
VULPIA MICROSTACHYS (SMALL FESCUE)	65	4

[1] SEED PRODUCED IN CALIFORNIA ONLY

EROSION CONTROL QUANTITIES

SHEET	STATION		DESCRIPTION	FIBER REINFORCED MATRIX (FRM)
	FROM	TO		SQFT
EC-1	"SB1" 244+00	"SB1" 266+00	EC TYPE 1	37,710
EC-1	"NB1" 258+00	"NB1" 265+00	EC TYPE 1	3,835
			TOTAL	41,545

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(Caltrans)
Jacoby Bridge Plans (Excerpted)
34 of 34

EROSION CONTROL LEGEND AND QUANTITIES

ECQ-1

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Caltrans® LANDSCAPE ARCHITECTURE

FUNCTIONAL SUPERVISOR: TIM BOESE
CALCULATED-DESIGNED BY: LAURA LAZZAROTTO
CHECKED BY: PHLORA BARBASH
REVISED BY
DATE REVISED

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RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
UNIT 0314
PROJECT NUMBER & PHASE 0113000911

Locations of proposed bridgework
and tide gate replacements,
HUM 101-79.8/86.3,
Eureka-Arcata Corridor
Improvements

	PM/dir	Location	Existing	Proposed
TIDE GATES	81.13/NB	1. Simpson Sawmill	48"x 36" gate	1- standard
	83.6/NB	2. Brainard Slough	24" round gate	1- Fish Friendly Design
	84.26/SB	3. Old Jacoby Creek	5'x5' gate	1- Fish Friendly Design
	84.93/NB	4. Gannon Slough	triple 5'x 6' gates	1- Fish Friendly Design, 2- standard or tideflex,
BRIDGES	84.3/NB	A. Jacoby Creek	39-foot wide bridge	Replace Bridge Rail
	84.3 SB	B. Jacoby Creek	39-foot wide bridge	New Bridge 51.4 feet wide (increase of 12.4 ft.)
	84.5 NB	C. Gannon Slough	39-foot wide bridge	Replace Bridge Rail

Exhibit 15
CDP Application No. 1-18-1078
(Caltrans)
Tide Gate Replacements
1 of 1

WETLAND MITIGATION PLAN

For the Humboldt Bay Area Mitigation (HBAM) Project

EA / EFIS
01-36601 / 0114000065
In Humboldt County, California

Photo: North Coast Journal, January 24, 2019

Updated July 16, 2019

STATE OF CALIFORNIA
Department of Transportation
North Region Environmental
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Eureka, CA 95501
707-445-5273

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Chapter 1. Introduction

The California Department of Transportation proposes to remove invasive cordgrass *Spartina densiflora* (Spartina) at specific sites within Humboldt Bay and conduct follow up removal as needed to mitigate for impacts to coastal wetlands associated with the Eureka-Arcata Corridor project (Caltrans 2016b) (Table 1). The planned offsite mitigation would also provide mitigation for two regional trail projects; the County of Humboldt's South Bay Trails Project and the City of Arcata (Arcata) North Bay Trails for the California Coastal Commission (CCC). Caltrans has entered into agreements with the County of Humboldt and Arcata to provide mitigation for the trails projects. The above-named projects will be referred to as "The Project."

For this effort, Caltrans is working with partners who are the local experts in the science of Spartina control as well as landowners who are currently working to remove Spartina on their lands, including but not limited to: Redwood Community Action Agency [RCAA], Humboldt Bay Harbor Recreation and Conservation District [HBHD], U.S. Fish and Wildlife Service [USFWS], California Department of Fish and Wildlife [CDFW], City of Arcata, City of Eureka and the Wiyot Tribe.

1.1 Project Impacts and Proposed Mitigation

The purpose of this Wetland Mitigation Plan (WMP) is to describe Caltrans' mitigation approach for the 18.61 acres of permanent impacts to coastal wetlands that are regulated by the CCC that are anticipated as a result of the construction activities required for The Project (Caltrans, 2016b) through Spartina removal. CCC requires a 4:1 credit-to-impact mitigation ratio for impacts to coastal wetlands. Therefore, Caltrans needs 73.57 acres of mitigation credit.

Table 1. Updated estimated net impacts for all projects associated with the Eureka-Arcata Corridor Improvement Project.

Project Component	Wetland Type / Cowardin Code	CWA Section 404 (3-parameter) wetlands (acres)	CCA (1- or 2-parameter) wetlands (acres)[1]	Project Implementation schedule
PROJECT 1: Eureka/Arcata Corridor Project				
Jacoby Creek Bridge Replacement (01-0C930)	Palustrine Emergent Persistent / PEM1	0.28	0.29	2019-2024
Jacoby Creek Bridge Replacement (01-0C930)	Estuarine Intertidal Emergent / E2EM	0.10	0.10	2019-2021
Guard Rails Median Barriers (01-0C970)	Palustrine Emergent Persistent / PEM1	1.04	1.60	2019-2021
Acceleration / Deceleration Lanes & Lighting (01-0F220)	Palustrine Emergent Persistent / PEM1	0.84	0.96	2019-2022
Interchange and Airport Road Improvements (01-36600)	Palustrine Emergent Persistent / PEM1	6.22	7.30	2021-2026
Eureka/Arcata Corridor Mitigation Subtotal		**8.48**	**10.25**	2019-2026
PROJECT 2: Humboldt Bay Trail North[2]				
Trail through estuarine habitats (0.48 at a 2:1 ratio)	Estuarine Intertidal Emergent / E2EM	0.96	0.96	2017
Trail through palustrine habitats (1.30 at a 1:1 ratio)	Palustrine Emergent Persistent / PEM1	1.30	1.30	2017
Humboldt Bay Trail North Mitigation Subtotal		**2.26**	**2.26**	Complete
PROJECT 3: Humboldt Bay Trail South[3]				
Trail through estuarine habitats	Estuarine Intertidal Emergent Ditch / E2EMd	2.67	2.67	2019
Trail through estuarine habitats	Estuarine Intertidal Emergent / E2EM	0.52	0.52	2019
Modification of estuarine shore and bottom	Estuarine Intertidal Rocky Shore and Unconsolidated Bottom / E2RS2 and E2US	0.01	0.01	2019
Trail through palustrine habitats	Palustrine Emergent Persistent Open Water Ditch / POWd	1.91	1.91	2019
Trail through palustrine habitats	Palustrine Emergent Persistent / PEM1	0.37	0.47	2019
Trail through palustrine habitats	Palustrine Scrub-Shrub / PSS	0.49	0.52	2019
Humboldt Bay Trail South Mitigation Subtotal		**5.97**	**6.10**	Pending
Total Permanent Impacts		**16.71**	**18.61**	

[1] California Coastal Act (CCA) wetland total reflects Clean Water Act (CWA) Section 404 wetland acreages plus additional 1- and 2-parameter CCA wetlands.

[2] The actual impact to these wetland types is 1.78 acres. The acres listed in the table include multiplication of this area by the listed ratios which are based on previous regulatory approvals between the City of Arcata and regulatory agencies.

[3] Includes proposed High-Tension Cable Barrier.

Mitigation activities will be carried out through a service contract and an endowment executed by Caltrans to an implementing entity. The implementing entity would perform the initial treatment work for the first two (2) years using primarily mechanical methods (i.e. brush cutters, Marsh Master, etc.) and perform the monitoring and maintenance for the first two years, plus an additional five (5)-year monitoring period after achieving successful initial treatment of Spartina at less than five percent (5%) cover of the site. The implementing entity would also manage the contract and the endowment to treat any new populations of Spartina as it invades from other areas of the bay. For the first seven (7) years of treatment, the work and monitoring will be overseen, and quality control will be conducted by Caltrans mitigation specialists and Caltrans project biologists. At the time that the contract is executed, the funding necessary for the first seven years of treatment would be made available immediately to the implementing entity. A separate fund for a non-wasting endowment would be provided to the implementing entity to invest and use interest earned for maintenance after the first seven years of treatment. The endowment would be reflective of actual costs of maintenance at the site after the success criteria for the first seven years has been met and provide funding for additional clearing necessary at the site to maintain a cover of Spartina of less than 5% until regional eradication is achieved. The endowment may be increased at the end of the initial 7-year monitoring and maintenance period based on the empirical estimates of maintenance costs. An appropriate investment firm may be recommended by Caltrans to the implementing entity.

As part of the contract between Caltrans and the implementing entity, access agreements would be in place with the land owners for treatment of Spartina on their sites. Appendix B includes letters granting Caltrans and the implementing entity access from both the Wiyot Tribe and City of Eureka to treat Spartina on their lands. In addition, the letter states that both landowners do not wish to develop within Spartina mitigation lands in perpetuity.

On April 4, 2019 Caltrans staff met with members of the Humboldt County Spartina Working Group which included staff from RCAA, USFWS, the Wiyot Tribe and the California Coastal Conservancy. Sites around Humboldt Bay with Spartina were assessed to determine where the control effort should occur. Several factors were discussed such as: site access logistics; strategic locations based on seed dispersal, ecological continuity, and containment; Spartina density; land ownership; and topography. Based on that discussion, Caltrans identified the following location to meet the Project's mitigation requirement.

Remove Spartina at Tuluwat Island (Table 2; Appendix A, Figures A-1 – A-2): Caltrans proposes to remove 179 acres of Spartina at Tuluwat Island in Humboldt Bay. Treating the entire island is proposed due to the ease of working with 2 landowners (currently) who both support our project, the Wiyot Tribe and the City of Eureka, as well as the ease of site access, seed dispersal and ecological continuity. The proposed mitigation credit for Spartina treatment would be at a 1.24:1 ratio for Spartina cover class of 61% +; a 2.33:1 mitigation ratio for Spartina cover class of 26-60%; and 7.69:1 mitigation ratio for Spartina cover class of 1-25% cover. This sliding scale mitigation was created by Coastal Commission ecologists to reflect the ecological benefit to Humboldt Bay by creating continuity between treated and untreated areas of Spartina and eliminating a major source of Spartina seed from the bay. Using this scale, treating 179 acres of Spartina would produce 80.18 acres of mitigation credit which exceeds the mitigation need of 73.57 acres at a 4:1 mitigation ratio. The Wiyot Tribe treated 18.6 acres of Spartina at Tuluwat Island northwest of State Route 255 in 2017. Caltrans also proposes to maintain this area as part of the Plan. The Wiyot Tribe has been very supportive of this proposal and has allowed Caltrans and the implementing entity to access their lands to treat Spartina and maintain it in perpetuity. (Appendix B).

Table 2. Summary of Spartina Treatment and Mitigation Credit at a 1.24:1 mitigation credit for Spartina cover class of 61%+; a 2.33:1 mitigation credit for Spartina Cover Class 26-60%; and 7.69:1 mitigation credit for Spartina Cover Class of 1-25%.

Spartina Cover Class	Acres of Spartina proposed to be treated	Mitigation Credit Ratio Proposed (acres of treatment to acres of mitigation credit)	Credit Acres earned
Tuluwat Island			
1-25	52.27	7.69:1	6.80
26-60	76.66	2.33:1	32.90
61+	50.20	1.24:1	40.48
Total	**179.13**		**80.18**
Credit acres needed at a 4:1 mitigation ratio			**74.44**
Credit acres of on-site mitigation			**0.87**
Credit acres of mitigation needed off-site			**73.57**

1.2 Anticipated Agency Permits and Environmental Review

The following agency permits and environmental documentation will be used or are anticipated for the Spartina Removal project:

i) Existing Final Programmatic Environmental Impact Report (HBHD) prepared by H.T. Harvey & Associates and GHD (2013)

ii) Existing California Coastal Commission (CCC) Permit No. 1-14-0249 – Programmatic Coastal Development Permit for Spartina Removal in the Humboldt Bay (approved by the CCC on June 12, 2015)

iii) Potential approvals from the North Coast Regional Water Quality Control Board and the North Coast Unified Air Quality Management District

iv) Potential need for a National Pollutant Discharge Elimination System (NPDES) Permit issued by the US Environmental Protection Agency (USEPA)

Chapter 2. Implementation

2.1 Implementation Plan

The mitigation activities that will be taken on by the implementing entity and overseen by Caltrans include but are not limited to:

- Working with landowners to gain written permission in the form of a Memorandum of Understanding for Caltrans and the implementing agency to access sites that would be ideal to treat Spartina. Landowners would be the Wiyot Tribe and potentially the City of Eureka while the land transfer is taking place to the Wiyot Tribe.

- Conduct preliminary site evaluations to measure and describe the size and density of Spartina infestation in the treatment areas chosen, and record vegetation composition, substrate characteristics, topography, tidal circulation and elevations, the presence of tidal channels on or adjacent to the site, site accessibility, the presence of sensitive resources, distances to the nearest aquaculture operation and residential areas, public access use in and around the area, and other factors relevant to the proposed treatment method.

- Prior to Spartina removal, conduct analyses and, as applicable, survey for sensitive cultural resources as well as biological resources such as fish, birds, plants, and other sensitive species consistent with the relevant mitigation measures agreed upon in the Final Programmatic Environmental Impact Report (FPEIR) prepared for the Humboldt Bay Regional Spartina Eradication Plan project (dated March 21, 2013).

- Plans for Spartina removal would be consistent with the FPEIR for all of the following, as applicable: (a) the posting of educational signage, (b) noise monitoring, (c) bird nesting habitat protection, (d) rare plant protection, (e) eelgrass avoidance, (f) erosion and sediment control, (g) hazardous materials spill prevention and containment, (h) worker health and safety, and (i) public access protection.

- Use mechanical treatment (i.e. Marsh Master, brush cutters etc.) to treat Spartina.

- The implementing entity will obtain any necessary approvals from the North Coast Regional Water Quality Control Board, the North Coast Unified Air Quality Management District, and other agencies as applicable for the proposed site-specific treatment areas.

- In the event of an inadvertent discovery of artifacts or archaeological deposits, a plan consistent with the requirements of Special Condition 8 of CDP 1-14-0249 would be in place.

2.2 Implementation Schedule

Table 3: Schedule of Proposed Spartina Removal and Monitoring

Restoration Task	Year								
	Pre-Treatment	1	2	3	4	5	6	7	9+
Initial Treatment		X	X						
Initial Maintenance				X	X	X	X	X	
Revegetation (if needed)		X	X						
Long-term Maintenance									X
Monitoring	X*	X	X	X	X	X	X	X	X**
Reporting		X	X	X	X	X	X	X	X**

* Baseline
**Frequency of monitoring is dependent on data. Likely every other year.

Table 4. Example of Site-specific Treatment Stages over a 7-yr Treatment Period*

Treatment Stage	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Primary	April-May (before seed set)						
Resprouts	Sep-March (when natives are dormant)						
Seedlings	March-Aug. (when seedlings flush and grow)						
Resprouts	March of Y1 to March of Y2						
Seed Suppression	July-August of Y1 and Y2 (in high threat stands if necessary)						
Natural Recolonization	No resource allocation needed other than monitoring to determine natural revegetation process soon after bare ground is exposed						
Revegetation Measures	If needed, plant during rainy season						
Maintenance Treatments			Treat volunteer *Spartina* plants as needed				

*Modified from Table 4-4 in the Humboldt Bay Regional *Spartina* Eradication Plan (2012)

Chapter 3. Success Criteria, Monitoring and Reporting

3.1 Performance and Success Criteria

The Spartina removal activities will be evaluated annually using the performance and success criteria described below. For this WMP, the category of “performance criteria” indicates whether the initial treatment was successful. The performance criteria will be used to guide site maintenance activities. The category of “Success criteria” indicates whether the restoration goals have been achieved at the end of the monitoring period. For this WMP, the goal is to meet the success criteria by year 7 of the project, also known as year 5 of the monitoring and maintenance period that follows the 2-year initial treatment period.

Beyond year 7, further monitoring would be conducted by the implementing agency without Caltrans oversite to inform additional clearing necessary to maintain a 5% or less cover of Spartina until regional eradication is achieved.

Performance Criteria for Initial Treatment

Year 1: Demonstrate percent cover of Spartina decreased by 50% in treatment areas.

Year 2: Demonstrate Spartina cover is <5% in treatment areas.

Success Criteria for the 5-year Maintenance and Monitoring Period

Year 7 (Year 5 of the maintenance and monitoring period): Demonstrate that the cover of Spartina is <5% in treatment areas and that the absolute percent cover of native salt marsh species is ≥80%.

Beyond Year 7: Demonstrate percent cover of Spartina remains at <5% in treatment area and absolute percent cover of native salt marsh species remains ≥80%.

3.2 Monitoring Methods and Schedule

Monitoring will be conducted to evaluate progress towards the project goal of restoring tidal marsh communities by eradicating Spartina and to document the natural recovery of native salt marsh species. The monitoring schedule is summarized in Table 5.

Table 5: Schedule of proposed monitoring*

Timeline	Monitoring Activity
Prior to treatment	Document baseline conditions: Spartina cover class, vegetation composition and relative cover; establish photopoints; and evaluate for sensitive biological and cultural resources.
Soon after primary treatment	Describe early post-treatment conditions.
6 months after treatment (Year 1)	Inspect site to evaluate treatment success and determine the need for follow-up treatment (will vary depending on the method(s) selected for primary treatment).
1st spring after each treatment (Mar.-Aug. of Year 2)	Survey for Spartina seedlings and assess the need for treatment.
Annually during years 3 – 7	Inspect site in the field for Spartina to determine the need for follow-up treatments. Document Spartina cover in the field when native plants are dormant (Sep.-Mar.). Photograph site at established points.
Maintenance and monitoring period every other year (years 3, 5 and 7)	Evaluate site using unmanned aerial vehicles (UAVs) and visual ground-truthing estimates of cover of native plants in the field to determine whether success criteria will be met in year 7 or if adaptive measures are warranted.
Long-term monitoring	Surveys at sufficient intervals (to be determined based on monitoring results to date) to detect reinfestation early and allow rapid response.

*Modified from Table 4-4 in the Humboldt Bay Regional *Spartina* Eradication Plan (2012)

Baseline monitoring: As part of the regional mapping effort, data were initially collected in 2010 in the proposed mitigation areas (Figures A-2 – A-4). Data collected include percent Spartina cover, average Spartina density per acre, average plant diameter and height, substrate, degree of freshwater influence, tidal inundation, and whether native plants were directly colonizing mudflats. To update this mapping, Spartina density mapping will be conducted in 2019 using imagery acquired from the use of unmanned aerial vehicles (UAVs). UAV predictions will be verified using visual estimates by trained botanists on the ground. Specific effort will be paid to areas of low density Spartina to assure the imagery interpretation is able to differentiate Spartina from native species.

Effectiveness Monitoring for the Initial Treatment: Absolute cover of Spartina and of native marsh species will be recorded in the proposed mitigation areas before treatment. Monitoring during year 1–2 would take place on an annual basis using visual estimates by trained botanists able to differentiate Spartina from native marsh vegetation at low densities (Table 5). Particular effort will be paid to those areas where Spartina overlaps with native cover. These field visits will determine the need for continued maintenance of Spartina and the effectiveness of the initial treatment.

Monitoring during the 5-year Maintenance Period: Spartina will be searched for annually in the field during the 5-year maintenance period (project years 3–7) to estimate absolute cover of Spartina. Spartina will then be treated after recording the cover. Every other year (years 3, 5 and 7) during the maintenance period, trained botanists will estimate cover of native plants. This effort will be assisted with the use of UAV's. Monitoring efforts will be primarily conducted by staff employed or contracted by the implementing entity. Caltrans will closely oversee or implement the use of any UAV mapping and will confirm the findings documented in annual monitoring reports though ground-truthing efforts. Detailed mapping efforts are described below. Photos taken at established photo points and aerial imagery will provide a consistent qualitative measure of restoration success.

High Resolution Aerial Imagery and Mapping using UAVs: Collection of high-resolution aerial imagery (RGB and Multispectral), processing and spectral analysis of the imagery for the purposes of developing distribution maps of Spartina and monitoring for native vegetation.

Initial fieldwork would include the layout of ground control and the deployment of the UAV for mapping Spartina cover. Ground control targets would be distributed across the areas of interest (AOIs) and surveyed using a Trimble RTK GPS unit prior to the flight(s). AOIs would be defined as areas on the island where Spartina is present or could potentially be present. Trained botanists would sample a representative area of the site to focus on Spartina's elevation, physical structure and spectral signature to differentiate Spartina from native plant cover and inform the data collected by the UAV. A small aluminum boat or kayak may be employed to set targets along the perimeter while interior targets would be deployed on foot. Permanent targets could be potentially set, if permissible, with rebar for use in future surveys. Ground control is necessary to accurately georectify the imagery and mapping products.

The UAV used for this project will be equipped with both a high-resolution RGB camera as well as a multispectral camera. Mapping missions will be conducted as close to solar noon as feasible with consideration of weather, lighting conditions, and tide stage. Multiple flights of a given area may be conducted, with varying elevations and/or lighting, to capture the most optimum conditions.

Both the RGB and the multispectral imagery will be processed using photogrammetric software to develop a series of geo-rectified orthophotos of each AOI. In addition, a digital surface model (DSM) will be developed from the RGB data set.

Spectral analysis of both the multispectral imagery as well as the high-resolution RGB imagery will be performed in ArcGIS to differentiate and ultimately map the distribution of Spartina. Previous mapping as well as the currently planned on-the-ground mapping with trained botanists will be used to “train” the software and ground truth the results. Results of the mapping will be consolidated into polygons of the mapped Spartina populations and grouped into distribution range classes. After Spartina density is less than 5%, all monitoring efforts would consist of searching for Spartina in the field. UAV(s) would be utilized in concurrence with the field monitoring in years 3, 5 and 7 to assist in assessing whether the native plant cover is meeting the success criterion for the maintenance and monitoring period.

The results of the Spartina mapping will be provided as a series of GIS shape files. A brief technical summary will also be included in the monitoring report(s) describing the methods used, the accuracy of the data, and any changes to the methods that would be recommended in the future.

Long-term monitoring: Sites will be surveyed after the success criteria have been met for the 5-year monitoring and maintenance period in year 7, starting in year 9, for early detection and rapid response to reinfestation by Spartina. This will be conducted using visual estimates on the ground and potentially with the use of UAVs. The frequency of monitoring will be dependent on the rate at which Spartina colonizes the site. This will likely be every other year and driven by the data collected in the initial 5-year monitoring period, and therefore the frequency suggested in this report is subject to change.

3.3 Reporting

The implementing entity will prepare annual monitoring reports for Spartina removal activities. To verify the report’s findings, Caltrans would perform site visits of approximately 20% of the annual treatment areas for verification of native and Spartina plant cover estimates. Monitoring reports documenting Spartina removal activities, monitoring results, and field verification will be prepared and submitted to the CCC following each annual monitoring effort. The reports will evaluate whether the Spartina treatment areas have achieved the goals and the performance and success criteria set forth in the approved WMP.

Each monitoring report will include the following information:

- A summary of the project location and description of Spartina removal activities in each treatment area.

- Maps of the locations of and treatment areas, annotated to show treatment methods and timing.

- A summary of the monitoring methods including details associated with any interpretation of images obtained through the use of UAVs.
- A list of the names, titles, and companies of the people who prepared the content of the annual report or conducted the monitoring activities that year.
- A reference to the resource agency permits and any subsequent letters of modification, as an appendix.
- A summary and analysis of the monitoring results, including an evaluation of site conditions in the context of the performance standards and success criteria.
- A discussion of the monitoring results, field verification efforts conducted by Caltrans, any modifications made to monitoring methods, and the cumulative maintenance efforts
- Management recommendations, including discussion of any areas with inadequate performance and recommendations for remedial action.
- Maps showing locations of photograph points, and photographs taken from the established points, in an appendix.
- A hard drive of any aerial imagery obtained via the use of UAVs.

3.4 Remedial Actions and Adaptive Management

If the monitoring results indicate that the performance criteria are not being met, the Mitigation Specialist and project Biologist will assess the potential reasons for the criteria not being met and will work with the implementing entity to develop adaptive management strategies. If the success criteria are not met in year 7, Caltrans will coordinate with CCC to discuss the removal method effectiveness issues and to develop an Adaptive Mitigation Plan to resolve the issues. If necessary, Caltrans will extend the monitoring and maintenance period of the initial treatment to 10 years. All remedial or adaptive management measures will be documented in the monitoring reports.

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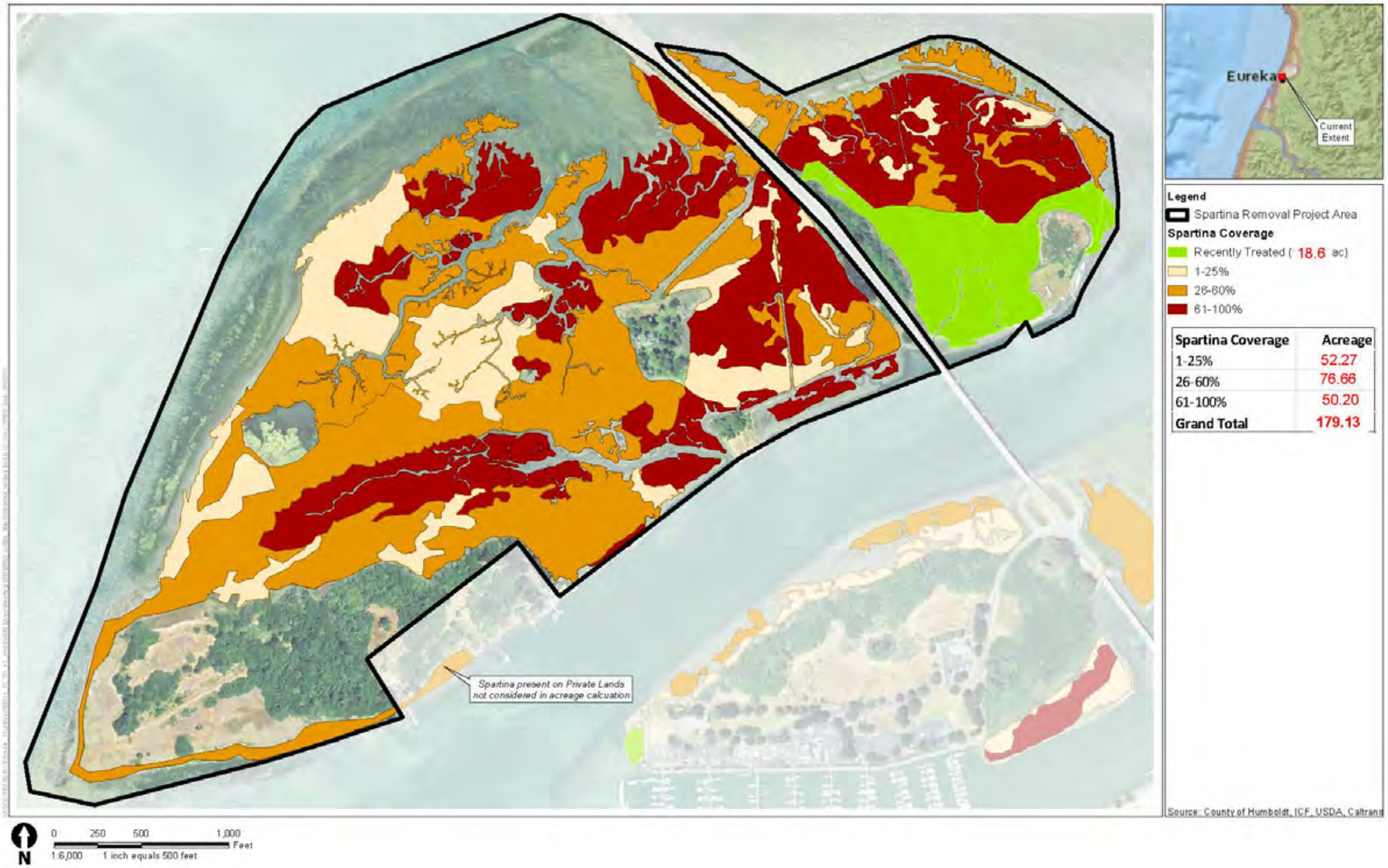
Appendix A: Project Maps



Spartina Coverage	Acreage
1-25%	52.27
26-60%	76.66
61-100%	50.20
Grand Total	179.13

Figure A-1: Map of Tuluwat Island showing Spartina treatment areas.

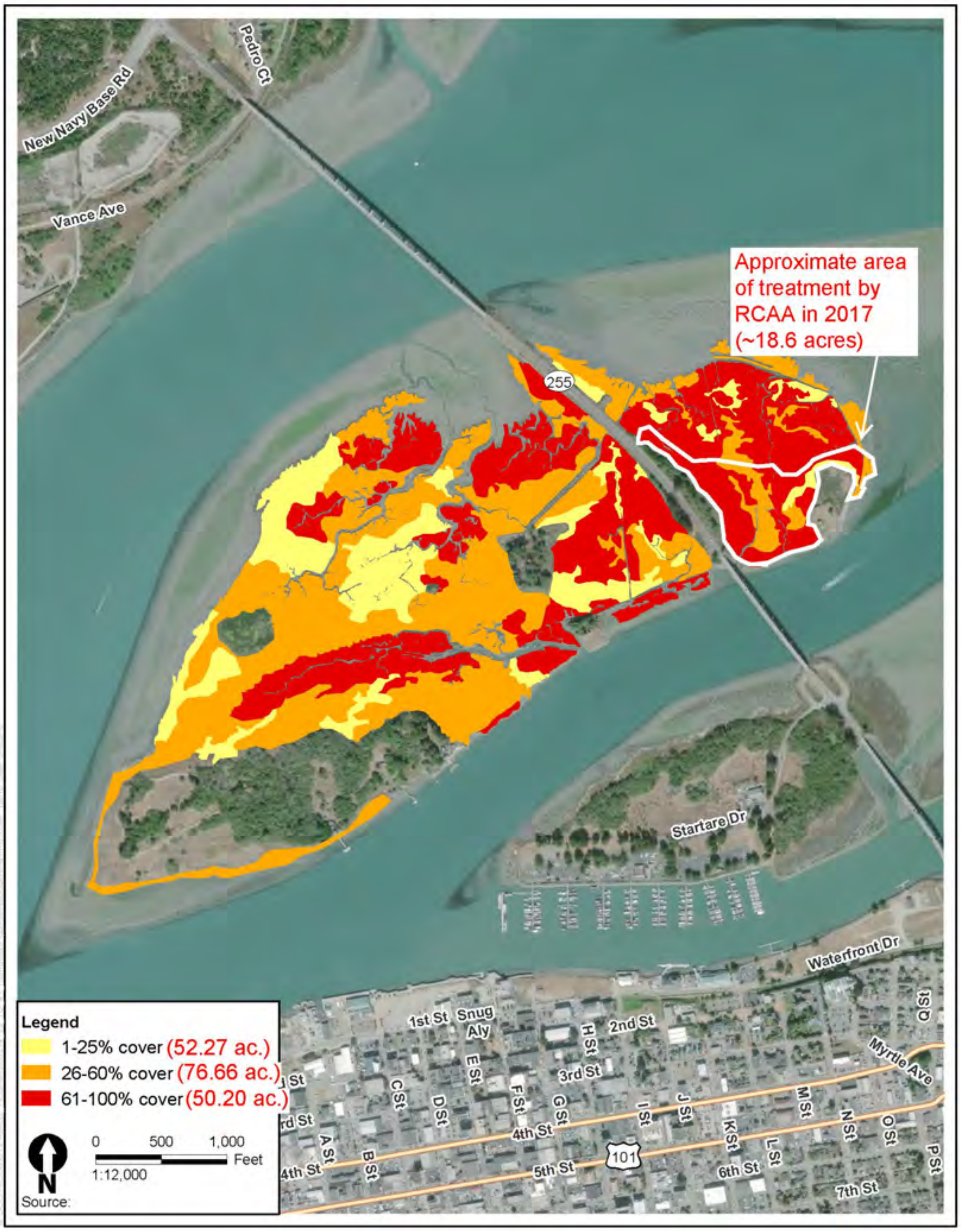


Figure A-2: Map of Tuluwat Island showing Spartina Cover Classes (Map provided by U.S. Fish and Wildlife Service on May 6, 2019 and are from *The Distribution of Spartina densflora in the Humboldt Bay Region: Baseline Mapping,* August 2011 by the Humboldt Bay National Wildlife Refuge, August 2011)

Appendix B: Letters of Support from Partner Agencies

California Department of Transportation
1656 Union Street
Eureka, CA 95501
Attn: Matt Brady, District 1 Director

June 11, 2019

Re: Spartina Mitigation Project - Wiyot Tribal landholdings on Indian Island

He'ba'lo' Mr. Brady,

For time immemorial the Wiyot Tribe (Tribe) has been stewards of its ancestral natural resources, including the waters and habitats of ***Wigi***, known today as Humboldt Bay. The Tribe's ongoing commitment to the protection and enhancement of the natural environment is evidenced by its current and past projects in and around Humboldt Bay, which include Brownfields remediation, invasive species control, water quality monitoring, and biological assessments. The Tribe also acknowledges the importance of collaboration and cooperation with other agencies to accomplish common restoration and protection goals. In the spirit of such collaboration, the Tribe is writing to verify our support of the project presented by the California Department of Transportation (Caltrans) to mitigate for impacts to coastal wetlands from the Eureka-Arcata Corridor safety improvement project. Treatment will entail the removal of the non-native, invasive *Spartina densiflora* (Spartina) on Indian Island, home to Wiyot village sites ***Tuluwat*** and ***Etpidohl***, the site of the Tribe's World Renewal Ceremony, and the Center of the Wiyot Universe.

One of the primary impacts on the land and trust resources on Indian Island's saltmarsh and mudflat habitats is the presence of invasive Spartina. Similar to most tidal marshes in Humboldt Bay, Spartina degrades estuarine habitat by excluding native salt marsh plants, altering the benthic macroinvertebrate community, reducing net primary productivity, and potentially transforming mudflats to salt marsh. Furthermore, the presence of invasive Spartina on Indian Island threatens both essential Tribal Trust resources such as medicinal and traditional plants, shellfish, and waterfowl as well as the cultural landscape of this vitally important spiritual center. This project aligns with Tribal objectives and goals set forth in Phase IV of the Indian Island Cultural and Environmental Restoration Project (IICERP) which includes the restoration of habitats surrounding the *Tuluwat* village site on Indian Island.

The Tribe fully supports the Caltrans mitigation project to remove Spartina on Tribally owned land on Indian Island. As such the Tribe agrees to allow access to personnel representing Caltrans and/or the implementing entity to perform initial treatment work, monitoring and maintenance in perpetuity, or until regional eradication is achieved. In addition to allowing access, the Tribe commits to restricting development within Spartina treatment areas, as defined in Section 30106 of the California Coastal Act, to removal or non-native vegetation and planting and maintenance of native vegetation to improve habitat value. In January 2019, the Eureka City Council voted unanimously to transfer approximately 200 acres of city owned land on Indian Island back to the Tribe. Though the Tribe does not have an official deed for these acres, Tribal Council has conditionally approved access while also restricting development in treated areas pending official transfer from the City of Eureka.

Čawokš,

Chairman Theodore Hernandez

1000 Wiyot Drive · Loleta, California 95551 · (707) 733-5055 · (800) 388-7633 · FAX (707) 733-5601

EUREKA
COMMUNITY SERVICES

COMMUNITY SERVICES DEPARTMENT
1011 Waterfront Drive • Eureka, California 95501-1146 • (707) 441-4241

June 13, 2019

California Department of Transportation
1656 Union Street
Eureka, CA 95501
Attn: Matt Brady, District 1 Director

Dear Mr. Brady,
I am writing to allow Caltrans and their contractors and/or consultants to access City of Eureka owned lands, such as Elk River Slough, Palco Marsh and the salt marsh between the Samoa boat launch and the marsh lands behind Target. This is to allow Caltrans to access and treat areas that have the invasive cordgrass Spartina densiflora (Spartina) in salt marshes around Humboldt Bay. Caltrans is also allowed to conduct any necessary actions such as monitoring and maintenance of native salt marsh on these lands, in perpetuity, or until regional eradication of Spartina is achieved. The City of Eureka is willing to restrict any development within the proposed areas for Spartina treatment to removal of non-native vegetation, and planting and maintenance of native vegetation to improve habitat value, in perpetuity.

The City of Eureka is in the process of formally returning ownership of Tuluwat Island to the Wiyot Tribe. It is understood that Caltrans has presented to the Wiyot Tribal Council on June 10th, regarding the management of Spartina within Humboldt Bay on Tuluwat Island, as part of a mitigation package for various Caltrans projects. As a result, the Wiyot Council sent a letter in support of the project on June 11th, that grants access to Tuluwat Island for Spartina management activities in perpetuity. In addition, the Wiyot Tribe is willing to restrict any development within the proposed areas for Spartina treatment to removal of non-native vegetation, and planting and maintenance of native vegetation to improve habitat value, in perpetuity.

If the land transfer from the City has not taken place with the Wiyot Tribe, at the time Caltrans mitigation activities are required to occur, the City of Eureka would allow Caltrans and any of Caltrans' contractors to access the island to conduct management of Spartina during the transfer period.

Sincerely,

Miles Slattery
Community Services Director

ON-SITE MITIGATION AND MONITORING PLAN

For the Eureka-Arcata Route 101 Corridor Improvement Project

EA / EFIS
01-36600 / 0100000127
01-0E000 / 0113000091
01-0C970 / 0113000094
01-0C930 / 0113000078
01-0F220 / 0115000092

U.S. Highway 101 (1-HUM-101)
from Post Miles 79.9 to 86.3
in Humboldt County, California

July 2019

CALIFORNIA DEPARTMENT OF TRANSPORTATION

STATE OF CALIFORNIA
Department of Transportation

North Region Environmental

ON-SITE MITIGATION AND MONITORING PLAN

For the Eureka-Arcata Route 101 Corridor Improvement Project

EA / EFIS
01-36600 / 0100000127
01-0E000 / 0113000091
01-0C970 / 0113000094
01-0C930 / 0113000078
01-0F220 / 0115000092

U.S. Highway 101 (1-HUM-101)
from Post Miles 79.9 to 86.3
in Humboldt County, California

USACE Individual Permit #: Pending

401 Water Quality Certification #: Pending

California Coastal Permit #: Pending

California Department of Fish & Wildlife 1600 LSAA Permit #: Pending

STATE OF CALIFORNIA
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- Brandon Larsen, Supervising Environmental Planner, California Department of Transportation
- Wesley Stroud, Supervising Environmental Planner, California Department of Transportation
- Jeffrey Pimentel, Senior Transportation Engineer & Project Manager, California Department of Transportation
- Robert Wall, Senior Environmental Planner, California Department of Transportation
- Kevin Church, Senior Transportation Engineer, California Department of Transportation
- Robert Meade, Senior Environmental Planner, California Department of Transportation
- Laura Lazzarotto, Senior Landscape Architect, California Department of Transportation
- Jason Meyer, Senior Environmental Planner, California Department of Transportation
- Andrew Rogers, Associate Environmental Planner, California Department of Transportation
- Melissa Kraemer, District Supervisor, California Coastal Commission North Coast District
- Michael Van Hattem, Senior Environmental Scientist Specialist, California Department of Fish & Wildlife (CDFW)
- Brandon Stevens, Environmental Scientist, North Coast Regional Water Quality Control Board (NCRWQCB)
- Dan Breen, Caltrans Liaison, U.S. Army Corps of Engineers (USACE) San Francisco District
- Keith Hesse – Eureka Field Office, U.S. Army Corps of Engineers (USACE) San Francisco District
- L. Kasey Sirkin, Lead Biologist – Eureka Field Office, U.S. Army Corps of Engineers (USACE) San Francisco District

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Chapter 1. Introduction

The California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) propose to make safety and operational improvements to the U.S. Highway 101 (US 101) corridor between the Eureka Slough bridges and the 11th Street overcrossing in Arcata between post miles (PMs) 79.9 to 86.3 in Humboldt County (Appendix A: Figure A-1). The Eureka-Arcata Route 101 Corridor Improvement Project consists of five projects and the associated off-site mitigation:

1. Tide Gate Replacement (01-0C930)
2. Jacoby Creek Bridge Replacement (01-0E000)
3. Extension of Acceleration/Deceleration Lanes and Lighting Improvements (01-0F220)
4. Guardrail and Cable Rail Safety Barrier (01-0C970)
5. Indianola Interchange and Airport Road Improvements (01-36600)
6. Humboldt Bay Area Off-site Mitigation (HBAM) (01-36601) – Off-site Mitigation

1.1 Project Description

The features of the five projects, hereafter collectively referred to as one project, include closing roadway median crossings, extending right turn acceleration and deceleration lanes, constructing a grade separation at Indianola Cutoff, replacing the southbound (SB) Jacoby Creek Bridge and partially signalizing US 101 at the Airport Road intersection. The purpose of the project is to improve safety at intersections and reduce operational conflicts resulting from left turn traffic movements.

1.2 Project Impacts and Proposed Mitigation

Within the project's environmental study limits (ESL), there are approximately 53.4 acres of palustrine emergent persistent wetlands (PEM), 3.7 acres of estuarine intertidal wetlands (E2EM1N, E2AB1N, E2US3N), 2.5 acres of estuarine subtidal waters (E1UB) and 0.9 acres of riverine lower perennial waters (R1). Implementation of the project will result in unavoidable permanent impacts to approximately 8.38 acres of PEM wetlands and 0.10 acre of estuarine intertidal emergent wetlands (E2EM) and temporary impacts to approximately 4.67 acres of PEM wetlands and 1.56 acres of riparian habitat (Table 1). Impacts to these wetlands are covered by both Section 404 of the Clean Water Act (CWA) under the jurisdiction of the U.S. Army of Engineers (USACE) and Section 401 of the Clean Water Act under the jurisdiction of the North Coast Regional Water Quality Control Board (NCRWQCB) and California Coastal Commission (CCC).

Implementation of the project will result in additional unavoidable impacts to California Coastal Act (CCA) coastal wetlands which includes permanent impacts to approximately 1.77 acres of PEM coastal wetlands and temporary impacts to approximately 0.12 acre of PEM coastal wetlands (Table 1). The CCA coastal wetlands are one to two parameters with a required hydrology component. The combined jurisdictional and coastal wetlands will have approximately 10.25 acres of permanent impacts and 4.79 acres of temporary impacts (Table 1).

In addition, a small population of Lyngbye's sedge (*Carex lyngbyei*), a special status plant with a California Rare Plant Rank (CRPR) of 2B.2 may be temporarily impacted during the replacement of the SB bridge. If it is determined that the sedge population is present at the time of construction, then protective measures such as transplanting, use of rubber mats or fencing as an environmentally sensitive area will be implemented followed by monitoring of the population.

The purpose of this On-site Mitigation and Monitoring Plan (On-site MMP) is to provide on-site in kind mitigation for all temporary and some permanent impacts through establishment, re-establishment, rehabilitation, and enhancement. This On-site MMP proposes to provide a total of 5.58 acres of on-site mitigation for all temporary impacts to wetlands and 3.93 acres of on-site mitigation for all impacts to riparian habitats (Table 2). In addition, this On-site MMP provides a total of approximately 0.88 acre of on-site offsets for permanent impacts to wetlands (Table 2). Overall, this On-site MMP provides a total of 10.39 acres of on-site mitigation and off-sets for temporary and permanent impacts to wetlands.

Caltrans proposes on-site wetland mitigation ratios of 1.16:1 for temporary and 1:1 for off-sets for permanent impacts (Table 2). Caltrans proposes to perform on-site mitigation of impacts to riparian trees and shrubs at a 2.5:1 ratio. Removal of a common reed invasive plant infestation and follow-up restoration of the coastal palustrine wetland in this area through revegetation is proposed to be a 2:1 offset for temporal loss of the wetland during eradication of the common reed occurrence. The average net on-site mitigation ratio (mitigation acres divided by project impact acres) for temporary PEM wetland impacts is 1.16:1 (i.e., 5.58 on-site mitigation acres/4.79 CCA wetland impact acres) (Table 2).

The goal of this On-site MMP is to meet the on-site mitigation and revegetation requirements for the following permitting agencies: USACE, CDFW, NCRWQCB, and CCC. On-site mitigation of temporary and some permanent impacts to wetlands and riparian habitat will be accomplished through restoration (rehabilitation and re-establishment), establishment (creation), and enhancement within the ESL by Caltrans Landscape Architects, Caltrans Revegetation Specialists and Caltrans project Biologists. All remaining permanent impacts that cannot be mitigated for on-site will be addressed in the off-site *Humboldt Bay Area Mitigation and Monitoring Plan (HBAM)*.

Table 1: Summary of Wetland and Riparian Impacts.

Habitat Types / Cowardin Code[1]	CCA[2] and CWA Section 404[3] (3-Parameter) Wetlands (acres)	CCA (1-or 2-Parameter Wetlands (acres)	Total Impacts (acres)	Mitigation Location
Permanent Impacts to Estuarine Intertidal Emergent Wetland / E2EM	0.10 acre	0.00 acre	0.10 acre	On-Site
Permanent Impacts to Palustrine Emergent Wetland / PEM	8.38 acres	1.77 acres	10.15 acres	Off-site and On-site
Total Permanent Wetland Impacts	**8.48 acres**	**1.77 acres**	**10.25 acres**	**On-site and Off-site**
Temporary Impacts to Palustrine Emergent Wetland / PEM	4.67 acres	0.12 acre	4.79 acres	On-site
Total Temporary Wetland Impacts	**4.67 acres**	**0.12 acre**	**4.79 acres**	**On-Site**
Riparian Impacts	1.56 acres	0.00 acre	1.56 acres	On-Site
Total Riparian Impacts	**1.56 acres**	**0.00 acre**	**1.56 acres**	**On-Site**

[1] Cowardin, L. M., 1979. Classification of Wetlands and Deepwater Habitats in the United States. U. S. Department of the Interior, Fish and Wildlife Service.

[2] California Coastal Act (CCA).

[3] Section 404 of the Clean Water Act (CWA).

Table 2: Summary of Proposed On-site Mitigation.[4]

Compensatory Mitigation Method	Mitigation Acreage
PEM Re-Establishment (permanent impact mitigation)	0.25 acre
E2EM Re-Establishment (permanent impact mitigation)	0.10 acre
E2SS Enhancement (permanent impact mitigation)	0.01 acre
PEM Establishment (permanent impact mitigation)	0.52 acre
PEM Rehabilitation (temporary impact mitigation)	5.02 acres
PEM Enhancement (temporary impact mitigation)	0.50 acre
Riparian Rehabilitation (temporary impact mitigation)	3.68 acres
Riparian Enhancement (temporary impact mitigation)	0.25 acre
E1UB Enhancement (temporary impact mitigation)	0.06 acre
Total Acres of On-site Compensatory Mitigation for Permanent Wetland Impacts	**0.88 acre**
Total Acres of On-site Compensatory Mitigation for Temporary Wetland Impacts	**5.58 acres**
Total Acres of On-site Compensatory Mitigation for Riparian Impacts	**3.93 acres**
Mitigation Ratio for Temporary Wetland Impacts ***(temp wetland mitigation acres divided by temp wetland impact acres)***	**1.16:1** ***(i.e., 5.58 mitigation acres/4.79 temporary CCA wetland impact acres)***
Mitigation Ratio for Riparian Impacts ***(riparian mitigation acres divided by riparian impact acres)***	**2.5:1** ***(i.e., 3.93 mitigation acres/1.56 riparian impact acres)***
Off-set Ratio for On-site Re-establishment & Establishment to Permanent Wetland Impacts	**1:1**
Total Acres of On-site Compensatory Mitigation for Permanent and Temporary Wetland Impacts	**10.39 acres**

[4] The proposed on-site compensatory mitigation strategy employs establishment (creation), restoration (re-establishment or rehabilitation), and enhancement of riparian, estuarine intertidal and subtidal, and palustrine aquatic resources.

1.3 Anticipated Agency Permits

It is anticipated the following agency permits will be required for on-site mitigation and revegetation:

i) California Department of Fish and Wildlife (CDFW) – 1600 Lake and Streambed Alteration Agreement

ii) California Coastal Commission (CCC) – Coastal Development Permit

iii) North Coast Regional Water Quality Control Board (NCRWQCB) – Section 401 Water Quality Certification

iv) U.S. Army Corps of Engineers (USACE) – Section 404 Individual Permit

Chapter 2. Environmental Setting

2.1 Study Area

The project ESL parallels the eastern margin of Humboldt Bay which consists of extensive mudflats interlaced with drainage channels and a few major shipping channels. The bay is part of the 223-square mile Humboldt Bay watershed which is within the Mad River-Redwood Hydrologic unit (HUC 10 Code 18010102). Fresh water enters the bay from Jacoby Creek, Elk River, Freshwater Creek, Eureka Slough, McDaniel Slough, Mad River Slough, Gannon Slough and other small sloughs and creeks. Tributaries of the bay within the project ESL include Jacoby Creek, Freshwater Creek/Eureka Slough, and the Gannon Slough drainage area (Beith, Campbell and Grotzman Creek watersheds). The US 101 Corridor parallels the eastern margin of Arcata Bay and crosses Gannon Slough, Jacoby Creek, Old Jacoby Creek, and Brainard Slough.

Floristically, the project ESL is situated within the North Coast sub-region of the Northwest Region of the California Floristic Province in coastal northern Humboldt County (Baldwin et al., 2012). The project ESL is within the US 101 right of way (ROW) between Eureka and Arcata from PM 79.9 to PM 86.3 (Appendix A: Figures A-2 to A-5).

2.2 Vegetation Communities

Vegetation communities within the project area are typical of the North Coast sub-region of Northern California and were classified based on the dominant plant species using *A Manual of California Vegetation*, 2nd edition (Sawyer et al., 2009). The following are vegetation communities found within the project ESL: the *Deschampsia cespitosa* (tufted hair grass) Herbaceous Alliance, the *Sarcocornia pacifica* (formerly *Salicornia depressa*) (pickleweed) Herbaceous Alliance, and the *Distichlis spicata* Herbaceous Alliance (salt grass flats).

2.3 Wetlands and Waters

Potential jurisdictional wetlands and other waters of the U.S. were delineated in the project ESL. Three wetland habitats based on the U.S. Fish and Wildlife Service (USFWS) Cowardin classification system (Cowardin et al., 1979) are present in, or immediately adjacent to, the project ESL along the edges of the sloughs and within drainage ditches adjacent to US 101.

These include:

- *Palustrine Emergent Persistent Wetland* (Palustrine Emergent Wetland) (PEM): all other intermittently or continually flooded wetlands along the shoulders and in the median, including the 101 Slough north of Mid-City Motor World, the Jacobs Avenue ditch, the California Redwood Company ditch, and the ditches in and around the Highway 255 interchange.

- *Estuarine Subtidal Unconsolidated Bottom Deepwater Habitat* (Estuarine Subtidal Waters) (E1UB): continually inundated part of the channel in the 101 Slough, Jacoby Creek, Gannon Slough, Old Jacoby Creek, and Brainard Slough.

- *Estuarine Intertidal Unconsolidated Shore Wetland* (Estuarine Intertidal Wetland) (E2EM): the banks of Jacoby Creek, Old Jacoby Creek, Gannon Slough, Brainard Slough, and the southern end of 101 Slough).

Chapter 3. Vegetation and Wetland Communities

3.1 Vegetation Communities

The dominant habitat within the project ESL consists of ruderal grassland along the shoulders and in portions of the median of US 101. An approximate 10-foot-wide area is mowed every spring and fall along the US 101 on both sides of the medians and shoulder. Dominant species in the ruderal grassland habitat include non-native species such as sweet vernal grass (*Anthoxanthum odoratum*), rattlesnake grass (*Briza maxima*), tall fescue (*Festuca arundinacea*), black mustard (*Brassica nigra)*, fennel (*Foeniculum vulgare*), wild radish (*Raphanus sativus*), bird's-foot trefoil (*Lotus corniculatus*), wild carrot (*Daucus carota*), and English plantain (*Plantago lanceolata*). Other non-native plant species that occur in the project area include Himalayan blackberry (*Rubus armeniacus*), jubata grass (*Cortaderia jubata*), sheep sorrel (*Rumex acetosella*) and dense-flowered cordgrass (*Spartina densiflora*).

Native salt marsh occurs along the banks of Gannon Slough and Jacoby Creek. The salt marsh comprises the *Deschampsia cespitosa* (tufted hair grass) Herbaceous Alliance and/or the *Salicornia pacifica* (pickleweed) Herbaceous Alliance as described in *A Manual of California Vegetation*, 2nd Edition (Sawyer et al., 2009). Pickleweed is found in brackish areas along the lower banks of Gannon Slough and Jacoby Creek, with tufted hair grass occurring along the uppermost banks of the channels. Additional salt marsh habitat occurs within the median south of Jacoby Creek, characteristic of salt grass flats—*Distichlis spicata* Herbaceous Alliance (Sawyer et al., 2009).

Riparian habitat occurs throughout the Eureka-Arcata Corridor and typically consists of patches of Monterrey pine (*Pinus radiata*), California wax-myrtle (*Morella californica*), beach pine (*Pinus contorta* var. *contorta*), willow (*Salix* spp.), and blue gum (*Eucalyptus globulus*) growing within a riparian setting (i.e., within 100 ft. from the edge of perennial streams or other water bodies). Riparian habitat on the upper banks of Gannon Slough and Jacoby Creek is dominated by wetland herbs and rushes (*Juncus* spp.), Monterey pines, willows (*Salix* spp.) and California wax-myrtle.

3.2 Palustrine Emergent Wetlands

Palustrine Emergent (PEM) wetlands are present within the highway median and along the shoulders on both sides of US 101. This habitat is saturated or intermittently inundated by rainwater runoff. There is no tidal influence. Within the project ESL, these wetlands are

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characterized by plant communities dominated by herbaceous vegetation adapted to seasonally or permanently saturated soils, including sedge or mixed communities containing rushes, silverweed (*Potentilla anserina* ssp. *pacifica*), and bentgrass (*Agrostis stolonifera*). Other species found in this area include arrow-grass (*Triglochin maritima*), bulrush (*Scirpus* sp.), and yarrow (*Achillea millefolium*).

Cattails may also make up this freshwater wetland community in monospecific stands, as it is often found in drainage ditches or shores of slow-moving creeks. Within the project ESL, cattail is abundant and can be found in water with salinities less than 0.5 parts per thousand (Thunhorst 1993). Testing of the water in the 101 Slough just north of Mid-City Motor World indicated a salinity level of less than 0.1 parts per thousand (North Coast Laboratories Ltd. 2005). Emergent vegetation cover (cattails and bulrushes) in these areas is between 5% and 90%. The water flow is stagnant or very slow and oxygen levels are low.

Additional plants that are found in this wetland community include water parsley (*Oenanthe sarmentosa*), marsh pennywort (*Hydrocotyle* sp.), rush (*Juncus* sp.), bulrush, slough sedge (*Carex obnupta*), and buttercup (*Ranunculus* sp.).

PEM wetlands are located within the California Redwood Company ditch, the Jacobs Avenue ditch, the northern section of the 101 Slough (Mid–City Motor World north to Bracut), and the watercourses at the US 101-Route 255 interchange. These areas are fed by rainwater and drain to the inland side of US 101 via many culverts. These areas are characterized by year-round standing water with minimal flushing flow and salinity less than 0.5 parts per thousand. The habitat is anaerobic and vegetated primarily by cattails and bulrushes.

3.3 Estuarine Intertidal Emergent/Unconsolidated Shore Wetlands

Estuarine Intertidal Emergent (E2EM) and Unconsolidated Shore (E2US) wetlands are subject to tidal inundation with some fresh water influence but are typically exposed during low tide. This wetland type contains herbaceous, salt-tolerant hydrophytes forming moderate to dense cover. This habitat is usually found in sheltered inland margins of bays, lagoons, and estuaries. The hydric soils are subject to regular tidal inundation by salt water for at least part of each year. Water salinity is greater than or equal to 0.5 parts per thousand.

Estuarine Intertidal Unconsolidated Shore wetland is present along the margins of Humboldt Bay, and the banks of Eureka Slough, Gannon Slough, Jacoby Creek, Brainard Slough, 101 Slough, and Old Jacoby Creek. In the project ESL, these wetlands have stands of pickleweed (*Salicornia pacifica*) and salt grass (*Distichlis spicata*). Common associate species include jaumea (*Jaumea carnosa*) and arrow-grass (*Triglochin maritima*). At slightly higher elevations, plant species diversity increases and, in addition to the species listed above, these areas may support salt marsh plantain (*Plantago maritima*), sea milkwort (*Glaux maritima*), salt rush (*Juncus lesueurii*), and western sand-spurrey (*Spergularia canadensis* and *S. macrotheca*).

Four special status plants—Humboldt Bay owl's-clover (*Castilleja ambigua* ssp. *humboldtiensis*), Lyngbye's sedge (*Carex lyngbyei*), western sand spurrey (*Spergularia canadensis* var. *occidentalis*) and Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*)—are also associated with the estuarine intertidal wetlands.

A portion of the median between Jacoby Creek and Gannon Slough consists of Estuarine Intertidal Unconsolidated Shore wetland.

3.4 Estuarine Subtidal Unconsolidated Bottom Deepwater Habitat

Estuarine Subtidal Unconsolidated Bottom deep water habitat is present in the deepest parts of the sloughs in and adjacent to the BSA (USDA-NRCS 2014). They are under water even at lowest tides, and are subject to both tidal and fresh water influence. These areas include parts of Gannon Slough, Brainard Slough, 101 Slough, Jacoby Creek and Old Jacoby Creek.

South of Airport Road in the 101 Slough, eelgrass (*Zostera marina*) grows between -1.5 ft and + 1 ft MLLW, in varying density depending on tidal velocity, turbidity, or other variables. Eelgrass beds are a component of Essential Fish Habitat (EFH), and recognized as important ecological communities because they provide nursery areas for many important finfish and shellfish species and are a major source of food in nearshore marine and estuarine systems, contributing at many trophic levels (NMFS 2014). Tidewater goby and salmonids can be found in these areas.

3.4 Project Impacts

Unavoidable permanent and temporary impacts to PEM and E2EM, coastal wetlands and riparian habitat will occur due to the construction of the five projects. A summary of permanent and temporary wetland impacts is shown below in Tables 3 and 4, respectively. Permanent and temporary project impacts for each location are shown in Appendix B: Table B-1. All temporary wetland impact sites are shown as on-site PEM or Estuarine wetland mitigation areas in Figures D-1 to D-8 of Appendix D.

Table 3: Project Permanent Wetland Impacts.

Permanent Wetland Impacts Eureka-Arcata Corridor Improvement Route 101 Projects					
EA #	**Project Name**	**Habitat Types / Cowardin Code**	**CCA and CWA Section 404 (3-Parameter) Wetlands (acres)**	**CCA (1-or 2-Parameter Wetlands (acres)**	**Total Wetland Impacts (acres)**
01-0E000	Jacoby Creek Bridge Replacement	Palustrine emergent wetland / PEM	0.28	0.01	0.29
01-0E000	Jacoby Creek Bridge Replacement	Estuarine intertidal emergent wetland / E2EM	0.10	0.00	0.10
01-0C970	Guard Rails Median Barriers	Palustrine emergent wetland / PEM	1.04	0.56	1.60
01-0F220	Accel/Decel Lanes and Lighting	Palustrine emergent wetland / PEM	0.84	0.12	0.96
01-36600	Interchange/Airport Rd Improvement	Palustrine emergent wetland / PEM	6.22	1.08	7.30
Total Permanent Impacts (acres)			**8.48**	**1.77**	**10.25**

Table 4: Project Temporary Wetland Impacts.

Temporary Wetland Impacts Eureka-Arcata Corridor Improvement Route 101 Projects					
EA #	**Project Name**	**Habitat Types / Cowardin Code**	**CCA and CWA Section 404 (3-Parameter) Wetlands (acres)**	**CCA (1-or 2 parameter wetlands (acres)**	**Total Wetland Impacts (acres)**
01-0E000	Jacoby Creek Bridge Replacement	Palustrine emergent wetland / PEM	0.42	0.00	0.42
01-0C970	Guard Rails Median Barriers	Palustrine emergent wetland / PEM	0.98	0.02	1.00
01-0F220	Accel/Decel Lanes and Lighting	Palustrine emergent wetland / PEM	1.14	0.06	1.20
01-36600	Indianola Interchange	Palustrine emergent wetland/ PEM	1.48	0.00	1.48
01-36600	Airport Road Improvement	Palustrine emergent wetland/ PEM	0.65	0.04	0.69
Total Temporary Impacts (acres)			**4.67**	**0.12**	**4.79**

3.5 Riparian Tree and Shrub Removal

Removal or limbing of trees and shrubs for construction activities such as placement of fill and for maintaining traffic safety within the clear recovery zone (CRZ) would impact a maximum of 1.56 acres of riparian trees and shrubs within the corridor (Table 5; Appendix B: Table B-1). A maximum of 106 trees and shrubs would either be removed or limbed which would include the following species: Monterrey pine, Monterrey cypress (*Hesperocyparis macrocarpa*), California wax-myrtle, beach pine, Bishop pine (*Pinus muricata*), Sitka spruce (*Picea sitchensis*), Hooker's willow (*Salix hookeriana*), red alder (*Alnus rubra*), red claws (*Escallonia rubra*), pittosporum (*Pittosporum* sp.), black cottonwood (*Populus trichocarpa*), and cotoneaster (*Cotoneaster* sp.) (Table 5). This total includes a maximum of 5 trees and shrubs proposed for removal and 10 trees and shrubs proposed for limbing within riparian impact site RP-2 located along the NB US 101 shoulder between the entrance to Mid-City Motors and the CDFW access road (Table 5). This total also includes one riparian shrub (Hooker's willow) that would be partially limbed within riparian impact site RP-5a located along the NB US 101 shoulder north of Bracut (Table 5). There would be no removal of riparian trees or shrubs at RP-5a (Table 5).

Since the actual number of riparian trees and shrubs removed during construction might potentially be lower than the maximum number proposed for removal indicated for each site in Table 5, a census of riparian trees and shrubs removed would be conducted during construction. All trees and shrubs designated for removal or limbing would be identified and marked during construction. All trees and shrubs within riparian habitats that are removed would be replaced through planting of regionally appropriate, native riparian trees and shrubs once construction is complete (see Section 4.1 below for details on the on-site mitigation planting areas). All riparian impact sites are shown as Riparian Impact and Rehabilitation Areas in Figures D-1 to D-8 of Appendix D.

Table 5: Project Riparian Impacts.

Riparian Impact Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Common Name	*Scientific Name*	Number of Individuals	Acres	Square Feet	Cowardin Code	Jurisdiction	Impact Type (i.e., limbing (% or height) or removal)	Reason for Impact (i.e., within construction fill zone, 10 ft. construction work limits, or within clear recovery zone (CRZ))
RP-1a	01-0F220	80.14	80.15	Along NB US 101 shoulder between Eureka Slough Bridge and Cole Ave	California wax-myrtle	*Morella californica*	1	0.006	265	RP	CWA & CCA	removal	within construction fill zone and 10 ft. construction work limits
RP-1b	01-0F220	80.14	80.15	Along NB US 101 shoulder between Eureka Slough Bridge and Cole Ave	California wax-myrtle	*Morella californica*	1	0.006	265	RP	CWA & CCA	removal	within construction fill zone and 10 ft. construction work limits
RP-2a	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	Monterey pine	*Pinus radiata*	1	0.01	611	RP	CWA & CCA	limb up to 7 ft.	within clear recovery zone (CRZ)
					shore pine	*Pinus contorta* var. *contorta*	1			RP	CWA & CCA	removal	within clear recovery zone (CRZ)
RP-2b	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	California wax-myrtle	*Morella californica*	1	0.01	517	RP	CWA & CCA	removal	within clear recovery zone (CRZ)
RP-2c	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	shore pine	*Pinus contorta* var. *contorta*	1	0.01	327	RP	CWA & CCA	removal	within clear recovery zone (CRZ)
					California wax-myrtle	*Morella californica*	1			RP	CWA & CCA	removal	within clear recovery zone (CRZ)
RP-2d	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	shore pine	*Pinus contorta* var. *contorta*	1	0.01	427	RP	CWA & CCA	removal	within clear recovery zone (CRZ)
RP-2e	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	California wax-myrtle	*Morella californica*	1	0.02	692	RP	CWA & CCA	limb dead branch up to 4 ft.	within clear recovery zone (CRZ)
					California wax-myrtle	*Morella californica*	1			RP	CWA & CCA	limb dead branch up to 4 ft.	within clear recovery zone (CRZ)
					shore pine	*Pinus contorta* var. *contorta*	1			RP	CWA & CCA	limb up to 6 ft.	within clear recovery zone (CRZ)
RP-2f	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	shore pine	*Pinus contorta* var. *contorta*	1	0.01	343	RP	CWA & CCA	limb up to 6 ft.	within clear recovery zone (CRZ)
					California wax-myrtle	*Morella californica*	1			RP	CWA & CCA	limb up to 6 ft.	within clear recovery zone (CRZ)
RP-2g	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	California wax-myrtle	*Morella californica*	1	0.02	1,077	RP	CWA & CCA	limb up to 4 ft.	within 10 ft. construction work limits
					California wax-myrtle	*Morella californica*	1			RP	CWA & CCA	limb up to 4 ft.	within 10 ft. construction work limits
					shore pine	*Pinus contorta* var. *contorta*	1			RP	CWA & CCA	limb up to 6 ft.	within clear recovery zone (CRZ)
RP-2h	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	California wax-myrtle	*Morella californica*	1	0.01	342	RP	CWA & CCA	limb up to 4 ft.	within clear recovery zone (CRZ)
RP-3	01-0F220	81.59	81.67	Along NB US 101 shoulder between Mid-City Motors and California Lumber Company entrance	escallonia	*Escallonia rubra*	not counted	0.24	10,529	RP	CWA & CCA	removal	within construction fill zone and 10 ft. construction work limits
RP-4a	01-36600	82.48	82.63	Along NB US 101 shoulder south of Indianola Cutoff	Monterey pine	*Pinus radiata*	2	0.03	1,285	RP	CWA & CCA	removal	within construction fill zone
RP-4b	01-36600	82.48	82.63	Along NB US 101 shoulder south of Indianola Cutoff	Monterey pine	*Pinus radiata*	3	0.12	5,327	RP	CWA & CCA	removal	within construction fill zone
RP-4c	01-36600	82.48	82.63	Along NB US 101 shoulder south of Indianola Cutoff	Monterey pine	*Pinus radiata*	23	0.20	8,798	RP	CWA & CCA	removal	within construction fill zone

Riparian Impact Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Common Name	*Scientific Name*	Number of Individuals	Acres	Square Feet	Cowardin Code	Jurisdiction	Impact Type (i.e., limbing (% or height) or removal)	Reason for Impact (i.e., within construction fill zone, 10 ft. construction work limits, or within clear recovery zone (CRZ))
RP-4d	01-36600	82.70	82.91	Along NB US 101 shoulder north of Indianola Cutoff	Monterey cypress	*Hesperocyparis macrocarpa*	3	0.08	3,630	RP	CWA & CCA	removal	within construction fill zone
					escallonia	*Escallonia rubra*	not counted			RP	CWA & CCA	removal	within construction fill zone
RP-4e	01-36600	82.70	82.91	Along NB US 101 shoulder north of Indianola Cutoff	Monterey cypress	*Hesperocyparis macrocarpa*	1	0.05	2,370	RP	CWA & CCA	removal	within construction fill zone
					California wax-myrtle	*Morella californica*	3			RP	CWA & CCA	removal	within construction fill zone
					shore pine	*Pinus contorta* var. *contorta*	5			RP	CWA & CCA	removal	within construction fill zone
					Sitka spruce	*Picea sitchensis*	2			RP	CWA & CCA	removal	within construction fill zone
RP-4f	01-36600	82.70	82.91	Along NB US 101 shoulder north of Indianola Cutoff	Monterey cypress	*Hesperocyparis macrocarpa*	6	0.36	15,700	RP	CWA & CCA	removal	within construction fill zone
					shore pine	*Pinus contorta* var. *contorta*	10			RP	CWA & CCA	removal	within construction fill zone
					Sitka spruce	*Picea sitchensis*	10			RP	CWA & CCA	removal	within construction fill zone
					California wax-myrtle	*Morella californica*	5			RP	CWA & CCA	removal	within construction fill zone
					black cottonwood	*Populus trichocarpa*	1			RP	CWA & CCA	removal	within construction fill zone
					pittosporum	*Pittosporum sp.*	1			RP	CWA & CCA	removal	within construction fill zone
					red alder	*Alnus rubra*	1			RP	CWA & CCA	removal	within construction fill zone
RP-4g	01-36600	82.70	82.91	Along NB US 101 shoulder north of Indianola Cutoff	Bishop pine	*Pinus muricata*	1	0.03	1,180	RP	CWA & CCA	removal	within construction fill zone
					shore pine	*Pinus contorta* var. *contorta*	4			RP	CWA & CCA	removal	within construction fill zone
					black cottonwood	*Populus trichocarpa*	3			RP	CWA & CCA	removal	within construction fill zone
RP-5a	01-0F220	83.51	83.82	Along NB US 101 shoulder between Bracut and Bayside Cutoff	Hooker's willow	*Salix hookeriana*	1	0.03	1,157	RP	CWA & CCA	approximately 8% of tree would have branches on west side of trunk limbed	within construction fill zone
RP-5b	01-0F220	83.51	83.82	Along NB US 101 shoulder between Bracut and Bayside Cutoff	pittosporum	*Pittosporum* sp.	not counted	0.03	1,246	RP	CWA & CCA	removal	within construction fill zone
RP-5c	01-0F220	83.51	83.82	Along NB US 101 shoulder between Bracut and Bayside Cutoff	pittosporum	*Pittosporum* sp.	not counted	0.05	2,217	RP	CWA & CCA	removal	within construction fill zone
RP-5d	01-0F220	83.51	83.82	Along NB US 101 shoulder between Bracut and Bayside Cutoff	pittosporum	*Pittosporum* sp.	not counted	0.02	1,061	RP	CWA & CCA	removal	within construction fill zone
RP-6a	01-0E000	84.49	84.52	Within US 101 median on south side of Jacoby Creek	Monterey pine	*Pinus radiata*	1	0.09	3,810	RP	CWA & CCA	removal	within construction fill zone
RP-6b	01-0E000	84.49	84.52	Within US 101 median on north side of Jacoby Creek	Monterey pine	*Pinus radiata*	3	0.12	5,038	RP	CWA & CCA	removal	within construction fill zone
SUBTOTAL BY PROJECT							**# of Individuals**	**Acres**	**Square Feet**				
01-0F220							**18**	**0.47**	**21,076**				

Riparian Impact Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Common Name	*Scientific Name*	Number of Individuals	Acres	Square Feet	Cowardin Code	Jurisdiction	Impact Type (i.e., limbing (% or height) or removal)	Reason for Impact (i.e., within construction fill zone, 10 ft. construction work limits, or within clear recovery zone (CRZ))
01-0E000							**4**	**0.20**	**8,848**				
01-36600							**84**	**0.88**	**38,290**				
TOTAL							**106**	**1.56**	**68,214**				
SUBTOTAL BY RIPARIAN SITE							**# of Individuals**	**Acres**	**Square Feet**				
RP-1							**2**	**0.01**	**530**				
RP-2							**15**	**0.10**	**4,336**				
RP-3							**not counted**	**0.24**	**10,529**				
RP-4							**84**	**0.88**	**38,290**				
RP-5							**1**	**0.13**	**5,681**				
RP-6							**4**	**0.20**	**8,848**				
TOTAL							**106**	**1.56**	**68,214**				

Chapter 4. On-site Mitigation Requirements

4.1 On-site Mitigation Goals

The primary goals of the On-site MMP are to restore, enhance, establish and re-establish a total of 10.39 acres of palustrine and estuarine wetlands and riparian habitat. These goals include the following mitigation activities: (1) restore (rehabilitate) approximately 5.02 acres of palustrine wetlands (PEM) and 3.68 acres of riparian (RP) habitat; (2) restore (re-establish) approximately 0.25 acre of PEM wetlands and 0.10 acre of estuarine (E2) wetlands; (3) establish 0.52 acre of PEM wetlands; and (4) enhance 0.50 acre of PEM wetlands, 0.25 acre of riparian habitat, 0.06 acre of estuarine (E1) wetlands, and 0.01 acre of estuarine (E2) wetlands within the project ESL. Caltrans has developed the following goals for the project which are summarized in Table 6 and detailed in Appendix B: Table B-1:

1) At PMs 80.00 to 85.75: Rehabilitate approximately 3.21 acres of Palustrine Emergent Persistent (PEM) wetlands;

2) At PMs 82.48 to 82.67, PMs 82.67 to 82.80, and PMs 83.88 to 83.91: Rehabilitate approximately 1.58 acre of PEM and coastal wetlands;

3) At PMs 84.39 to 84.57: Re-establish approximately 0.25 acre of PEM and re-establish 0.10 acre of E2EM wetlands within the US 101 median on both sides of Jacoby Creek;

4) At PMs 81.34 to 81.40, PMs 81.83 to 81.86, and PMs 83.89 to 83.97—*Palustrine Wetland Establishment Areas*: Establish approximately 0.52 acre of PEM wetlands within three of the existing median crossings proposed for closure;

5) Along Airport Road 101 Slough near US 101 PM 80.84—*Airport Road 101 Slough and Levee Enhancement and Restoration Area*: Restore and enhance a total of 1.02 acres of PEM wetlands, riparian (RP) habitat, and estuarine (E1 & E2) wetlands. These activities would include enhancement of approximately 0.50 acre of PEM wetlands, 0.25 acre of RP habitat, 0.06 acre of estuarine (E1) wetlands and 0.01 acre of estuarine (E2) wetlands by removing invasive, non-native plant species. Rehabilitate approximately 0.03 acre of PEM wetlands and 0.17 acre of RP habitat through revegetation with native trees, shrubs, and herbs.

Enhancement and rehabilitation activities at this location would (a) mitigate for 0.42 acre of impacts to riparian trees and shrubs removed from the project area during construction and (b) mitigate for temporal loss impacts to Essential Fish Habitat, riparian habitat and estuarine intertidal wetlands at Jacoby Creek Bridge.

6) At PMs 83.2 to 83.3—*Common Reed Eradication and Wetland Restoration Area*: Rehabilitate coastal palustrine wetland habitat within the Caltrans right of way along the northbound (NB) lane of US 101 at Bracut through eradication of an approximately 0.20-acre occurrence of common reed (*Phragmites australis*) followed by revegetation with native wetland plants. Rehabilitation of wetlands at this site will mitigate the temporal loss of the wetlands associated with project impacts at a 2:1 ratio.

7) At PMs 80.06 to PM 84.52—*Riparian Restoration Areas*: Rehabilitate approximately 1.56 acres of riparian habitat (RP) affected by construction and plant riparian trees and shrubs within an additional 1.95 acres of riparian habitat. Overall, rehabilitate a total of 3.51 acres of riparian habitat through highway planting of trees and shrubs.

4.2 On-site Mitigation Objectives

Caltrans has developed the following objectives to achieve the restoration goals identified above (see Table 6 for a summary of these goals):

1) Rehabilitate and restore temporarily affected palustrine wetlands to pre-project conditions;

2) Re-establish permanently affected palustrine and estuarine wetlands to pre-project conditions;

3) Establish palustrine wetlands to offset for permanent impacts to wetlands;

4) Enhance palustrine and estuarine wetlands and riparian habitat by removing invasive plants to allow native plants to establish in their place;

5) Rehabilitate palustrine wetland and riparian habitat to mitigate for temporary and temporal impacts.

Table 6: Summary of On-Site Mitigation Goals for the Eureka-Arcata Route 101 Corridor Improvement Project.

Project EA(s)	Post Mile(s) (approx.)	Location(s)	Wetland Type(s)	Mitigation Method	Acres (approx.)
01-36600 01-0C970 01-0F220 01-0E000	PM 80.00 to PM 85.75	Throughout project area	PEM	Rehabilitation	3.21 acres
01-36600 01-0F220	(a) PM 82.48 to PM 82.67 (b) PM 82.67 to PM 82.80 (c) PM 83.88 to PM 83.91	(a) NB US 101 shoulder starting south of Indianola Cutoff and ending along the southwest side of Indianola Cutoff; (b) NB US 101 shoulder starting on the northeast side of Indianola Cutoff; (c) NB US 101 shoulder to south side of Bayside Cutoff	PEM	Rehabilitation	1.58 acres
01-0E000	PM 84.39 to PM 84.57	US 101 median at Jacoby Creek Bridge	PEM	Re-establishment	0.25 acre
			E2EM	Re-establishment	0.10 acre
01-36600 01-0C970 01-0F220 01-0E000	(a) PM 81.34 to PM 81.40 (b) PM 81.83 to PM 81.86 (c) PM 83.89 to PM 83.97	US 101 median crossings at the following locations: (a) Mid-City Motor World, (b) California Lumber Company, and (c) Bayside Cutoff	PEM	Establishment	0.52 acre
01-0F220 01-0E000 01-36600	Near US 101 PM 80.84	Airport Road 101 Slough and Levee Enhancement and Restoration Area	E2SS	Enhancement	0.01 acre
			E1UB	Enhancement	0.06 acre
			RP	Enhancement	0.25 acre
			RP	Rehabilitation	0.17 acre
			PEM	Enhancement	0.50 acre
			PEM	Rehabilitation	0.03 acre
01-0F220 01-0E000	PM 83.2 to PM 83.3	Common Reed Eradication and Wetland Restoration Area within ditch along NB US 101 shoulder by Bracut	PEM	Rehabilitation	0.20 acre
01-0F220 01-0E000	PM 80.06 to PM 84.52	Riparian Restoration Areas	RP	Rehabilitation	3.51 acres

01-36600					
		Total Acres of PEM Rehabilitation	**5.02 acres**		
		Total Acres of PEM Enhancement	**0.50 acre**		
		Total Acres of PEM Establishment	**0.52 acre**		
		Total Acres of PEM Re-establishment	**0.25 acre**		
		Total Acres of E1UB Enhancement	**0.06 acre**		
		Total Acres of E2SS Enhancement	**0.01 acre**		
		Total Acres of E2EM Re-establishment	**0.10 acre**		
		Total Acres of RP Enhancement	**0.25 acre**		
		Total acres of RP Rehabilitation	**3.68 acres**		
		Total Acres of On-site Mitigation	**10.39 acres**		

Chapter 5. Implementation Plan

The implementation of on-site mitigation activities will include site preparation, invasive plant removal and eradication, highway planting and revegetation, wetland establishment, and mitigation site maintenance. Implementation of on-site mitigation activities will occur during or immediately after construction of each project. Highway planting will be conducted by a Contractor and overseen by a Caltrans Landscape Architect. Revegetation will be conducted by the California Conservation Corps (CCC) and overseen by a Caltrans Revegetation Specialist or project Biologist. Due to safety concerns, weeding within the highway median will only occur while highway construction is taking place.

5.1 Site Preparation

Soil De-Compaction and Conditioning: Site preparation for areas that will be hydroseeded and planted by the Landscape Contractor may include tilling and de-compaction to promote native plant growth (see the *Caltrans Eureka-Arcata Corridor Project Highway Planting and Erosion Control Plan* (Caltrans 2018)). The de-compaction soil depth will be a minimum of 18" with soil clods no larger than 4". Site preparation will also include the addition of soil amendments such as compost, incorporate materials such as sand where appropriate, and placement of imported and/or local topsoil. In areas where tilling or the natural slope do not provide an adequate growth medium, topsoil or compost may be incorporated with the native soil.

Erosion Control: Soil stabilization measures will be implemented during construction to reduce sediment discharge from areas of disturbed soil. A permanent erosion control seed mix composed of regionally appropriate native wetland and upland species and a non-persistent annual grass (e.g., common barley, *Hordeum vulgare*) will be hydroseeded in bare soil areas towards the end of construction. Erosion control performs the function of providing immediate protection of disturbed soil and is not part of the revegetation success criteria. For additional information on proposed erosion control work, see the *Caltrans Eureka-Arcata Corridor Project Highway Planting and Erosion Control Plan*.

Invasive Plant Control: As part of site preparation prior to installing plants within each highway planting or revegetation area, invasive plant species will be removed and/or controlled to the extent feasible (see the *Caltrans Eureka-Arcata Corridor Project Highway Planting and Erosion Control Plan* (Caltrans 2018)). Any invasive plant removal conducted during site preparation for highway planting or revegetation will utilize physical control methods only and no application of herbicides will be authorized, except for the Common Reed Eradication and Wetland Restoration Area at Bracut.

Target species will include, but not necessarily be limited to, the most problematic and invasive species identified during the project's botanical surveys, such as French broom (*Genista monspessulana*), poison hemlock (*Conium maculatum*), jubata grass (*Cortaderia jubata*), fennel (*Foeniculum vulgare*), black mustard (*Brassica nigra*), and wild radish (*Raphanus sativus*) (see Appendix E of the *Caltrans 2016 Natural Environment Study*). Additional invasive species will be removed from the highway planting and revegetation areas prior to planting when feasible.

5.2 Highway Planting and Revegetation Methods

5.2.1 Highway Planting and Hydroseeding Methods

Highway planting and hydroseeding would be undertaken by Landscape Architecture implemented by a Contractor according to Highway Planting Plans (see *Caltrans Eureka-Arcata Corridor Project Highway Planting and Erosion Control Plan* (Caltrans 2018)). A planting palette for highway planting and hydroseeding was derived from the plant list compiled during botanical surveys and subsequent site visits made by a Caltrans Revegetation Specialist (see Highway Planting Palette in Appendix C: Table C-1). Highway planting and hydroseeding will utilize this species listed in this palette in addition to species listed in the *Highway Planting and Erosion Control Plan*. If necessary, species listed on the Highway Planting Palette may be substituted with regionally appropriate species at the discretion of the Landscape Architect.

As part of highway planting, native trees, shrubs and dense clusters of native wetland plant plugs will be installed where appropriate within areas proposed for wetland re-establishment and establishment. High-density planting of plugs where possible will ensure the success of wetland restoration and establishment efforts by excluding non-native and invasive species that might outcompete native wetland plants when grown at lower densities.

5.2.2 Revegetation Methods

Revegetation will be directed by a Caltrans Revegetation Specialist and will utilize a combination of plant material that may include locally collected and outgrown bare root stock, container stock, and salvaged material collected on-site when feasible. If not collected on-site, the plant material will be sourced from as close to the project site as feasible. The planting palette species for revegetation were derived from the plant list compiled during botanical surveys and subsequent site visits made by a Caltrans Revegetation Specialist (see *Revegetation Planting Palette* in Appendix C: Table C-2).

Since natural vegetation recruitment is likely, any native volunteer plants observed growing within the revegetation area will be incorporated into planting considerations and revegetation goals. Actual species and quantities to be used for initial planting and replanting will be determined by commercial availability, natural recruitment, site conditions at the time of planting, and other factors. If necessary, species listed on the Revegetation Planting Palette may be substituted with regionally appropriate species at the discretion of the Revegetation Specialist.

Exact locations of each plant within the revegetation area will be determined at the time of planting by a Caltrans Revegetation Specialist. Bare root and/or container plants will be planted in holes twice as wide as and slightly deeper than root or container size, with compost incorporated into the hole and soil. Plants will be watered deeply immediately after planting (soils will be saturated beyond the first several inches) and mulched. Cages may be used to protect plants from herbivory until the plants are large enough to withstand some herbivory; typically, cages are removed when plants fill the cage.

5.3 Proposed On-site Mitigation Areas

5.3.1 Highway Planting and Hydroseeding Areas

To mitigate the temporal loss of wetland and riparian function due to construction activities, Caltrans proposes to enhance and restore wetland and riparian vegetation through highway planting and hydroseeding, as directed by Caltrans Landscape Architects.

Hydroseeding within Temporary Wetland Impact Rehabilitation Areas W-1 through W-19a,b and W-21 through W-24

To mitigate the temporal loss of wetland function due to ground-disturbing construction activities, Caltrans proposes to rehabilitate (restore) wetland vegetation through hydroseeding, as directed by Caltrans Landscape Architects. Hydroseeding is proposed for temporary wetland impact areas W-1 through W-19a,b and W-21 through W-24. Rehabilitation would also include installation of native wetland plant plugs, shrubs and trees within temporary wetland impact areas at Indianola Interchange and Bayside Cutoff (Appendix B: Table B-1). Maps of the temporary wetland impact areas that would be rehabilitated are shown in Appendix D: Figures D-1 to D-8.

<u>Highway Planting within Riparian Restoration Areas (PM 80.06 to PM 84.52)</u>

To mitigate the loss of riparian function due to the removal of trees and shrubs within riparian habitats in the project area, Caltrans proposes to restore riparian vegetation through highway planting, as directed by Caltrans Landscape Architects. Highway planting of native trees and shrubs is proposed throughout all riparian habitats that would be affected by construction as well on the newly constructed side slopes of the overcrossing at the Indianola Interchange. Additional highway planting is proposed for the southeast side of a new fill slope that would be constructed along northbound US 101 adjacent to the Resale Lumber property. Regionally appropriate native riparian trees would be planted within the highway median by Jacoby Creek as replacement for the four Monterey pine trees that will be removed during construction. Maps of the riparian impact areas that would be rehabilitated are shown in Appendix D: Figures D-1 to D-8.

5.3.2 Invasive Plant Removal, Eradication and Restoration Areas

To mitigate the temporal loss of wetland function due to ground-disturbing construction activities, Caltrans proposes to enhance and restore wetland and riparian vegetation through invasive plant removal and eradication and revegetation, as directed by Caltrans Revegetation Specialists. Invasive plant removal and revegetation are proposed at the following locations:

<u>Airport Road 101 Slough and Levee Enhancement and Restoration Area (near PM 80.84 on US 101)</u>

At the Airport Road 101 Slough and Levee: enhance approximately 0.50 acre of PEM wetlands, 0.25 acre of riparian (RP) habitat, 0.06 acre of estuarine (E1UB) wetlands, and 0.01 acre of estuarine (U2SS) wetlands through the manual removal of invasive plants; rehabilitate approximately 0.03 acre of PEM wetlands and 0.17 acre of riparian (RP) habitat through invasive plant removal and planting with native plants.

A map of the Airport Road 101 Slough and Levee Enhancement and Restoration Area is shown in Appendix D: Figure D-3.

This restoration and enhancement proposal will mitigate the temporal loss of riparian and estuarine wetland function due to ground-disturbing construction activities within the median at Jacoby Creek Bridge and the removal of riparian trees throughout three of the project areas. Since the enhancement and restoration area is also essential fish habitat, the proposed mitigation work would enhance habitat for salmonids and tidewater goby by providing a source of insects and leaf litter from the installed riparian vegetation.

Proposed revegetation activities within the Airport Road 101 Slough and Levee Enhancement and Restoration Area will include initial site preparation through weeding of invasive species, salvaging of native plants for replanting on site, followed by planting of regionally appropriate riparian trees, shrubs, and herbs. Species potentially considered for planting at this location include shrubs such as Hooker's willow (*Salix hookeriana*), cascara (*Frangula purshiana*), red elderberry (*Sambucus racemosa* var. *racemosa*), twinberry (*Lonicera involucrata* var. *ledebourii*), California wax myrtle, thimbleberry (*Rubus parviflorus*), and other species (see Revegetation Planting Palette in Appendix C: Table C-2).

In addition to the target invasive species listed in Section 5.1, dense-flowered cordgrass plants will be removed to the extent feasible from the coastal estuarine intertidal wetland along the slough. Pre-construction photographs of the Airport Road 101 Slough and Levee Enhancement and Restoration Area are shown in Appendix E: Figures E-1 to E-7.

As required by the County of Humboldt Permission to Enter permit, Coastal Stewardship staff would contact the Murray Field Airport Operations and Maintenance Department and the Director of the Humboldt County aviation Department at least 7 calendar days prior to entering and conducting any revegetation or monitoring work at this location.

Common Reed Eradication and Wetland Restoration Area (US 101 PM 83.2 to PM 83.3)

An approximately 0.20-acre occurrence of common reed within the Caltrans right of way along the northbound lane of US 101 between PM 83.2 and PM 83.3 at Bracut will be eradicated by qualified Caltrans personnel or consultants during or after construction of the deceleration lane. Eradication and restoration work would only occur within the Caltrans right of way at this location. A map of this proposed restoration area is shown in Appendix D: Figure D-5. Pre-construction photographs of this proposed restoration area are shown in Appendix E: Figures E-8 to E-10.

Proposed restoration activities at this location will include initial site preparation through weeding of invasive species, salvaging of native plants for replanting on site, followed by planting of regionally appropriate wetland herbs. Species potentially considered for planting at this location include those already growing adjacent to the site such as broadleaf cattail (*Typha latifolia*), panicled bulrush (*Scirpus microcarpus*), Pacific water parsley (*Oenanthe sarmentosa*), California figwort (*Scrophularia californica*), cow parsnip (*Heracleum maximum*), rushes, and other wetland-rated species appropriate for the site (see *Revegetation Planting Palette* in Appendix C: Table C-2). Actual species and quantities to be used for initial planting and replanting will be determined by commercial availability, natural recruitment, site conditions at the time of planting, and other factors.

5.3.3 Wetland Establishment and Re-Establishment Areas

To mitigate for permanent wetland impacts, Caltrans proposes to establish (create) on-site palustrine (PEM) wetlands at three locations and re-establish on-site PEM and E2EM wetlands at one location within the US 101 median. Wetlands will be established through closure of existing highway median crossings, removal of the median pavement, excavation of fill to approved wetland depth followed by hydroseeding and planting with site-appropriate wetland plant plugs. This work will be included in the Indianola Interchange project. The medians will be removed once there is enough traffic flow along US 101 and will occur while the Indianola Interchange is being constructed. Approximately 0.52 acre of palustrine wetlands are proposed for establishment at the following locations: at PMs 81.34 to 81.40 near Mid-City Motor World, at PMs 81.83 to 81.86 adjacent to the California Redwood Company, and at PMs 83.89 to 83.97 near Bayside Cutoff (Appendix B: Table B-1). Maps of the wetland establishment and re-establishment areas are shown in Appendix D: Figures D-3, D-4 and D-6.

Caltrans proposes to re-establish 0.25 acre of PEM wetlands and 0.10 acre of E2EM wetlands within the US 101 median on both sides of Jacoby Creek between PMs 84.39 and 84.57. The wetlands will be re-established through removal of the asphalt and fill associated with the detour bridge followed by hydroseeding and planting with site-appropriate wetland plant plugs and riparian trees. This work will be included in the Jacoby Creek Bridge Replacement project.

Planting and maintenance of the wetland establishment and re-establishment sites will be conducted by the Landscape Contractor. The wetland establishment areas within the three median sites and the wetland re-establishment area at Jacoby Creek Bridge will be designated as Environmentally Sensitive Areas (ESAs) in the Caltrans Maintenance database and the boundaries marked with ESA paddles or by other means to prevent mowing of the wetlands during the monitoring period.

To ensure the recovery of any Lyngbye's sedge plants that might be affected within estuarine wetlands due to construction of the detour bridge within the US 101 median at Jacoby Creek, any Lyngbye's sedge plants permanently affected by construction activities would be collected prior to construction and transplanted back at Jacoby Creek following accepted transplanting protocols for this or similar species (i.e., Stevens and Hoag 2006 protocol for transplanting slough sedge).

In areas with safety concerns due to a lack of safe parking and site access (such as within the highway median), maintenance of highway planting, such as weeding and watering, will be conducted only while the Landscape Contractor completes their work.

5.3.4 Clear Recovery Zone (CRZ) Setback

US 101 includes a Clear Recovery Zone (CRZ) of a minimum of 30 feet. Planting within the CRZ is limited due to traffic safety and requires a tree-planting setback from the traveled road surface for safety and maintenance purposes. Plantings within the CRZ will generally consist of low growing herbaceous species and shrub species that meet safety and CRZ requirements. Planting of trees will only occur outside the CRZ along the shoulders of US 101, within the restoration area along the Airport Road 101 Slough and Levee, or behind the median guardrail on the north and south sides of Jacoby Creek Bridge. Except for the Jacoby Creek Bridge location, only native rushes, sedges, bunchgrasses, and herbs will be planted within the median.

5.4 Implementation and Maintenance Schedules for the Invasive Plant Removal, Eradication and Restoration Areas

For the 5-year maintenance and monitoring period, the revegetation and maintenance of the Airport Road 101 Slough and Levee Enhancement and Restoration Area and the Common Reed Eradication and Wetland Restoration Area will be contracted out with oversight by a Caltrans Revegetation Specialist.

5.4.1 Revegetation

Planting will occur during construction of the five projects (if feasible) or within approximately one year from completion of construction. To minimize plant stress, container plants will be installed when plants are dormant (November through February). Replacement planting, if needed, will occur during the dormant season, generally a year after the initial planting.

5.4.2 Watering

Watering will be conducted approximately every other week during the first two dry seasons or any extensive dry period during the first two years following initial planting and replanting. The dry season on the North Coast typically occurs between mid-May through October or November. The last two years of the monitoring period will not have supplemental watering.

In cases where a minimal percentage of plants (i.e., generally up to 20%) need to be installed in Year 3 or 4 of monitoring to ensure the success criteria are met, watering will occur for two years after planting for the supplemental plants only. Because the supplemental planting is a minimal percentage of plants (i.e., generally up to 20%), Caltrans will not maintain and monitor the site for two additional years beyond the last watering of the supplemental plants if the site has met the success criteria at the end of the monitoring period and the supplemental plants appear healthy and established.

5.4.3 Weeding

Vegetation removal and ground disturbance creates the potential for invasive plants to establish within the planting areas. Control and removal of invasive plants will be removed to the extent feasible using hand tools and/or weed-eaters during each year of the five-year maintenance and monitoring period within both restoration areas.

5.4.4 Common Reed Eradication

The infestation of common reed within the Caltrans right of way between PM 83.2 to PM 83.3 at Bracut will be eradicated prior to revegetation and during or after construction of the deceleration lane that is planned for this location.

Current research indicates the most effective method of eradicating common reed is through the targeted use of specific herbicides in combination with other management and restoration techniques (DiTomaso et al., 2013; Hazelton et al., 2014; John Madsen, personal communication, July 23, 2018; Mozdzer et al., 2008; Saltonstall 2005; Tilley and St. John 2012). Therefore, Caltrans is proposing to use Integrated Pest Management (IPM) methods to eradicate the common reed infestation within the Caltrans right of way at this location. Proposed IPM methods include chemical control through the targeted application of herbicides, mechanical control through mowing, and restoration through revegetation with native plants as described in the following proposed protocol[5]:

Proposed Common Reed IPM Eradication Protocol:

A. Pre-Treatment:

1. Evaluate landscape for potential improvements to drainage to discourage common reed re-colonization.

2. Identify any local seed sources of common reed that might re-invade.

B. Treatment:

1. Mow with a mechanical mower or cut with weed-eaters or other tools from 6 to 12 inches above the surface of the ground. Remove and dispose of cut material off-site to reduce mass in late winter to early spring.

2. Apply 1% Imazapyr aquatic formulation (Habitat or Polaris) with appropriate surfactant for aquatic usage (Competitor or Liberate) using handheld, backpack or other herbicide sprayer outside of the wet season (between June 15 and October 15, except for during rainstorm events during this period) after allowing the mowed plants the opportunity to resprout.

3. Repeat herbicide application and spray re-sprouts in late summer (July through August).

4. If necessary, repeat mowing and herbicide application for one additional year (apply herbicide treatment for up to a total of two years).

5. Manually remove seedlings and resprouts using hand-tools for five years after the initial two years of herbicide treatment.

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[5] Any equipment used to remove common reed grass, such as hand tools, should be properly disinfected with bleach and cleaned using Best Management Practices (BMPs) to avoid transporting plant parts to new locations. Boots and clothes should be brushed off and cleaned of any dirt before leaving the treatment area.

C. Restoration:

1. The area where common reed is eradicated, along with the adjacent disturbed soil area (DSA), will be restored (rehabilitated) through on-site revegetation under the direction of a Revegetation Specialist using site-appropriate native wetland container plants after the completion of the herbicide treatment. Due to the potential for the herbicides to injure or kill native plants, revegetation will not occur until one or two full growing seasons after the last application of herbicide. Replanting will be determined by the project Biologist or Revegetation Specialist. Since natural vegetation recruitment is likely, any native volunteer plants observed growing within the revegetation area will be incorporated into planting considerations and revegetation goals.

   Follow-up planting will take place one year after initial planting to replace plants that died the previous year and to fill in the planting area. Planting will be conducted according to the revegetation methods and the revegetation planting palette described above. The restoration area will be maintained for a total of five years, which will include watering and weeding as described above.

Chapter 6. Success Criteria and Monitoring Requirements

6.1 Performance and Success Criteria

The on-site mitigation activities will be evaluated annually using the performance and success criteria described below. For this On-site MMP, a "performance criterion" is a measure that indicates whether the restoration and mitigation goals are on a trajectory to being attained at a given point in time which will be used to guide site maintenance activities. A "success criterion" is a measure that indicates whether the restoration and mitigation goals have been achieved at the end of the monitoring period. The performance and success criteria for the wetland and riparian restoration and establishment areas are summarized in Table 7.

Performance Criteria

Year 1:

- *Airport Road 101 Slough and Levee Enhancement and Restoration Area*:
    a. The total number of living installed woody plants (trees and shrubs) or native volunteer woody plants must meet or exceed 80% of the original number of installed woody plants.
    b. At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.
- *Common Reed Eradication and Wetland Restoration Area:* The absolute percent cover of native wetland-rated (i.e., OBL, FAC, FACW) herbs will be at least 30% of the cover of native wetland-rated herbs in an adjacent reference wetland site.
- *Wetland Establishment and Re-Establishment Areas*: No performance criteria for Year 1.
- *Lyngbye's Sedge Impact Area at Jacoby Creek Bridge*: The absolute percent cover of Lyngbye's sedge within the estuarine wetlands affected during construction is at least 50% of the baseline (pre-construction) cover of this species at this location.
- *Riparian Restoration Areas*:

a. The total number of living installed woody plants (trees and shrubs) or native volunteer woody plants must meet or exceed 80% of the original number of installed woody plants.

b. At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.

Year 3:

- *Airport Road 101 Slough and Levee Enhancement and Restoration Area:*

  a. The total number of living installed woody plants (trees and shrubs) or native volunteer woody plants must meet or exceed 75% of the original number of installed woody plants.

  b. At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.

- *Common Reed Eradication and Wetland Restoration Area:* The absolute percent cover of native wetland-rated (i.e., OBL, FAC, FACW) herbs will be at least 50% of the cover of native wetland-rated herbs in an adjacent reference wetland site.

- *Wetland Establishment and Re-Establishment Areas:* No performance criteria for Year 3.

- *Lyngbye's Sedge Impact Area at Jacoby Creek Bridge*: The absolute percent cover of Lyngbye's sedge within the estuarine wetlands affected during construction is at least 60% of the baseline (pre-construction) cover of this species at this location.

- *Riparian Restoration Areas*:

  a. The total number of living installed woody plants (trees and shrubs) or native volunteer woody plants must meet or exceed 75% of the original number of installed woody plants.

  b. At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.

Success Criteria

Year 1 (for Temporary Wetland Impact Rehabilitation Areas only):

- *Temporary Wetland Impact Rehabilitation Areas W-1 through W-19a,b and W-21 through W-24*: The absolute percent cover of vegetation (i.e., native and non-native species) within each temporary wetland impact area will be 100% of the baseline (pre-construction) cover within one year after the date of impact.[6]

Year 5:

- *Airport Road 101 Slough and Levee Enhancement and Restoration Area:*
    a. The total number of living installed woody plants (trees and shrubs) or native volunteer woody plants must meet or exceed 70% of the original number of installed woody plants.
    b. At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.
- *Common Reed Eradication and Wetland Restoration Area:* The absolute percent cover of native wetland-rated (i.e., OBL, FAC, FACW) herbs will be at least 70% of the cover of native wetland-rated herbs in an adjacent reference wetland site.
- *Wetland Establishment and Re-Establishment Areas:* The absolute percent cover of native wetland-rated (i.e., OBL, FAC, FACW) herbs within each of the three wetland establishment areas will be at least 70% of the cover of native wetland-rated herbs in an adjacent reference wetland site. In addition, species of native wetland-rated (i.e., OBL, FAC, FACW) herbs will comprise more than 50% of the total number of species within each wetland establishment area.
- *Lyngbye's Sedge Impact Area at Jacoby Creek Bridge*: The absolute percent cover of Lyngbye's sedge within the estuarine wetlands affected during construction is at least 70% of the baseline (pre-construction) cover of this species at this location.
- *Riparian Restoration Areas*:

[6] Those temporary wetland impact areas not meeting the 100% of baseline vegetation cover within one year after the date of impact would be considered permanent impacts by the California Coastal Commission (CCC) as described in the following CCC definition of temporary wetland impacts: (1) If no impacts are apparent after 90 days, no action is required; (2) If impacts persist 90 days after the impact, the habitat shall be restored within 30 days; (3) If no impact is apparent after one year, no additional mitigation is required; (4) If, after one year from the date of impact, the habitat has not recovered, the impact is, by definition "permanent."

a. The total number of living installed woody plants (trees and shrubs) or native volunteer woody plants must meet or exceed 70% of the original number of installed woody plants.

b. At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.

Table 7: Monitoring Performance and Success Criteria for the Eureka-Arcata Route 101 Corridor Improvement Project.

Location: Airport Road 101 Slough and Levee Enhancement and Restoration Area		
Monitored Characteristic	**Monitoring Year**	**Success Criteria Standards**
Plant survival	1	a) Demonstrate 80% or greater survival of all installed woody plants (trees and shrubs) or native volunteer woody plants. b) At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.
	3	a) Demonstrate 75% or greater survival of all installed woody plants (trees and shrubs) or native volunteer woody plants. b) At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.
	5	a) Demonstrate 70% or greater survival of all installed woody plants (trees and shrubs) or native volunteer woody plants. b) At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.
Location: Common Reed Eradication and Wetland Restoration Area		
Monitored Characteristic	**Monitoring Year**	**Success Criteria Standards**
Absolute percent vegetative cover by native wetland-rated herbaceous species (i.e., OBL, FAC, FACW)	1	Demonstrate absolute percent cover of native wetland-rated herbs is at least 30% of the cover of native wetland-rated herbs in an adjacent reference wetland site. Estimate of percent cover to be based on ocular estimates using standardized percent cover charts.
	3	Demonstrate absolute percent cover of native wetland-rated herbs is at least 50% of the cover of native wetland-rated herbs in an adjacent reference wetland site. Estimate of percent cover to be based on ocular estimates using standardized percent cover charts.
	5	Demonstrate absolute percent cover of native wetland-rated herbs is at least 70% of the cover of native wetland-rated herbs in an adjacent reference wetland site. Estimate of percent cover to be based on ocular estimates using standardized percent cover charts.

Location: Median Wetland Establishment Areas and Jacoby Creek Bridge Wetland Re-Establishment Area		
Monitored Characteristic	**Monitoring Year**	**Success Criteria Standards**
Absolute percent vegetative cover by native wetland-rated herbaceous species (i.e., OBL, FAC, FACW)	5	Demonstrate absolute percent cover of native wetland-rated herbs is at least 70% of the cover of native wetland-rated herbs in an adjacent reference wetland site. Estimate of percent cover to be based on ocular estimates using standardized percent cover charts.
Number of native wetland-rated herbaceous species (i.e., OBL, FAC, FACW)	5	Demonstrate the number of species of native wetland-rated (i.e., OBL, FAC, FACW) herbs is more than 50% of the total number of species within each wetland establishment area. Calculation of percent of wetland-rated herb species to be based on counts of species within each area.
Locations: Temporary Wetland Impact Rehabilitation Areas W-1 through W-19a,b and W-21 through W-24		
Monitored Characteristic	**Monitoring Year**	**Success Criteria Standards**
Absolute percent vegetative cover (i.e., trees, shrubs and herbs)	1	Demonstrate absolute percent cover of vegetation (i.e., native and non-native species) within each temporary wetland impact area is 100% of the baseline (pre-construction) cover within one year after the date of impact. Estimate of absolute percent cover within the nine wetland impact sites <0.05 acre or located within the median to be based on ocular estimates for each site made using standardized percent cover charts. Estimate of absolute percent cover within the 14 shoulder wetland impact sites to be based on 30 one-square meter sampling units (quadrats) distributed throughout these designated shoulder sites.
Location: Lyngbye's Sedge Impact Area at Jacoby Creek Bridge		
Monitored Characteristic	**Monitoring Year**	**Success Criteria Standards**
Absolute percent cover of Lyngbye's sedge	5	Demonstrate absolute percent cover of Lyngbye's sedge within the estuarine wetlands affected during construction is at least 70% of the baseline (pre-construction) cover of this species at this location. Estimate of absolute percent cover to be based on ocular estimates made using standardized percent cover charts.

Location: Riparian Restoration Areas Between PM 80.06 to PM 84.52		
Monitored Characteristic	**Monitoring Year**	**Success Criteria Standards**
Plant survival	1	a) Demonstrate 80% or greater survival of all installed woody plants (trees and shrubs) or native volunteer woody plants. b) At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.
	3	a) Demonstrate 75% or greater survival of all installed woody plants (trees and shrubs) or native volunteer woody plants. b) At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.
	5	a) Demonstrate 70% or greater survival of all installed woody plants (trees and shrubs) or native volunteer woody plants. b) At least 85% of the number of woody plants (trees and shrubs) that were cut for construction activities will be replaced by surviving installed and/or native volunteer woody plants.

6.2 Monitoring Methods and Schedule

Monitoring of the on-site mitigation areas will be performed to ensure the mitigation goals and objectives are met and to implement adaptive management if necessary.

Monitoring will characterize extant conditions in the field, and data collection will be reproducible and collected in a consistent manner. Monitoring will be conducted during the 5-year maintenance and monitoring period by a Caltrans Revegetation Specialist or project Biologist with appropriate field survey experience (see monitoring timelines in Tables 8 through 13).

6.2.1 Airport Road 101 Slough and Levee Enhancement and Restoration Area

Monitoring at this site will consist of the following:

Evaluating survival of native trees and shrubs by census: Census monitoring will be conducted annually for five years after planting is implemented. The number of each species of installed or volunteer native trees and shrubs that are alive during monitoring will be counted. Establishment of volunteer native trees and shrubs will be included in the total plant count, since volunteers indicate that revegetation is successfully occurring, and a site is self-sustaining.

Establishing reproducible photo points: Vegetation establishment will be documented through photo monitoring conducted prior to plant installation and during annual monitoring. Photos of the results of weeding and initial planting in Year 1 will be provided with the Year 1 monitoring report. Additional or alternate photo points may need to be installed if the original photo points fail to capture enough visual data.

Monitoring schedule: Monitoring will be conducted annually to assess progress toward the success criteria and identify and implement any needed remedial or adaptive management measures. The first year of monitoring will take place in the same calendar year as the planting as long as planting was conducted before March 1st. If the first monitoring occurs in the same calendar year, it would occur at the end of summer to allow establishment of plants during the growing season.

The fifth and final year of monitoring will assess whether the success criteria have been met. See anticipated restoration implementation, maintenance, monitoring and reporting timeline for the Airport Road 101 Slough and Levee Enhancement and Restoration Area in Table 8.

Table 8: Anticipated Implementation, Maintenance, Monitoring, and Reporting Timeline for the Airport Road 101 Slough and Levee Enhancement and Wetland Restoration Area.

Mitigation Task	Year				
	1	2	3	4	5
Initial Planting (IP)	X				
IP Watering Year 1	X				
Replanting (RP) (if necessary)		X			
IP Watering Year 2		X			
RP Watering Year 1 (if necessary)		X			
RP Watering Year 2 (if necessary)			X		
Weeding[7]	X	X	X	X	X
Monitoring[8]	X	X	X	X	X
Reporting	X		X		X

6.2.2 Common Reed Eradication and Wetland Restoration Area

Monitoring at this site will consist of the following:

Estimating absolute percent cover of native herbaceous wetland plants: Percent cover estimates of native herbs with a U.S. Army Corps of Engineers wetland plant rating of obligate (OBL), facultative (FAC), and facultative wet (FACW) will be conducted annually for five years after the common reed plants are eradicated through IPM methods[9].

Establishing reproducible photo points: Common reed eradication and vegetation establishment will be documented through annual photo monitoring. Qualitative photo monitoring will occur prior to, during, and after the eradication of the common reed infestation and during the restoration period. Additional or alternate photo points will be taken as needed. Pre-construction photographs of the proposed wetland reference site for Common Reed Eradication and Wetland Restoration Area are shown in Appendix E: Figures E-11 and E-12.

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[7] Initial weeding will take place prior to initial plant installation in Year 1.

[8] The first year of monitoring may take place in the same calendar year as long as planting has taken place before March 1st.

[9] The wetland plant ratings for native herbaceous species will be based on the most current US Army Corps of Engineers National Wetland Plant List for the Western Mountains, Valleys & Coast (see Lichvar et al. 2016).

Reference site monitoring: To gauge the trajectory of the restoration site success, a reference site of high-quality PEM wetland adjacent to or within the project area will be monitored in Year 1 through Year 5. Reference site monitoring will include estimating percent cover of native herbaceous wetland plants and photo monitoring. The proposed reference site for the Common Reed Eradication and Wetland Restoration Area is an approximately 0.20-acre wetland located immediately adjacent to this on-site mitigation area (see Appendix D: Figure D-5). Pre-construction photographs of the proposed wetland reference site are shown in Appendix E: Figures E-11 and E-12.

Monitoring schedule: Monitoring will be conducted annually to assess progress toward the success criteria and identify and implement any needed remedial or adaptive management measures. The first year of monitoring will take place in the same calendar year as the planting as long as planting was conducted before March 1st. If the first monitoring occurs in the same calendar year, it would occur at the end of summer to allow establishment of plants during the growing season. The fifth and final year of monitoring will assess whether the success criteria have been met. See anticipated restoration implementation, maintenance, monitoring and reporting timeline for the Common Reed Eradication and Wetland Restoration Area in Table 9.

Table 9: Anticipated Implementation, Maintenance, Monitoring, and Reporting Timeline for the Common Reed Eradication and Wetland Restoration Area.

Mitigation Task	Year							
	1	2[10]	3[11] [12]	4[13]	5	6	7	8
Common Reed Mowing	X	X						
Common Reed Spraying	X	X						
Initial Planting (IP)				X				
IP Watering Year 1				X				
Replanting (RP) (if necessary)					X			
IP Watering Year 2					X			
RP Watering Year 1 (if necessary)					X			
RP Watering Year 2 (if necessary)						X		
Weeding			X	X	X	X	X	X
Monitoring[14] [15]	X	X	X	X	X	X	X	X
Reference Site Monitoring				X	X	X	X	X
Reporting				X		X		X

[10] If deemed necessary by the Landscape Architect or project Biologist, a second year of mowing and herbicide spraying may be conducted.

[11] Due to the potential for the herbicides to injure or kill native plants, revegetation may occur one full growing season after the last application of herbicide if deemed necessary by the project Biologist or Revegetation Specialist.

[12] Initial hand weeding by the CCC may begin one year prior to initial plant installation if deemed necessary by the project Biologist or Revegetation Specialist.

[13] Year 1 of the 5-year maintenance and monitoring period would begin in Year 4 if this year was preceded by two years of mowing and spraying and one year of hand weeding and monitoring only.

[14] The first year of monitoring may take place in the same calendar year as long as planting has taken place before March 1st.

[15] Photo monitoring only will be conducted prior to, during, and after eradication of the common reed infestation.

6.2.3 Wetland Establishment and Re-establishment Areas

Monitoring at the three wetland establishment areas within the median crossings and one wetland re-establishment area at Jacoby Creek will consist of the following:

Estimating absolute percent cover of native herbaceous wetland plants: To ensure wetland establishment trajectory, a wetland delineation will be conducted over all or a portion of the establishment and re-establishment areas in Year 5[16].

Establishing reproducible photo points: Vegetation establishment will be documented through photo monitoring conducted prior to plant installation and annually through Year 5. Additional or alternate photo points may need to be installed if the original photo points fail to capture enough visual data.

Reference site monitoring: One reference site of high-quality PEM wetland adjacent to or within the project area will be identified and monitored prior to wetland establishment in Year 1, Year 3 and Year 5. Monitoring data will be used for comparison with the established wetlands to gauge the trajectory of wetland establishment site success. Reference site monitoring will include estimating percent cover of native herbaceous wetland plants and photo monitoring. The proposed reference site for the wetland establishment areas is an approximately 0.25-acre wetland located immediately adjacent to the wetland establishment area within the median by PM 81.86 (see Appendix D: Figure D-4). Pre-construction photographs of the proposed wetland reference site are shown in Appendix E: Figures E-13 and E-14.

Monitoring schedule: Quantitative monitoring will be conducted in Year 5 to determine whether success criteria have been satisfied and to identify any needed remedial or adaptive management measures. See anticipated wetland establishment implementation, maintenance, monitoring and reporting timeline for the Wetland Establishment and Re-establishment Areas in Table 10.

[16] The wetland plant ratings for native herbaceous species will be based on the most current US Army Corps of Engineers National Wetland Plant List for the Western Mountains, Valleys & Coast (see Lichvar et al. 2016).

Table 10: Anticipated Implementation, Maintenance, Monitoring and Reporting Timeline for the Wetland Establishment and Re-establishment Areas.

Mitigation Task	Year				
	1	2	3	4	5
Initial Planting and Weeding	X				
Photo Monitoring	X	X	X	X	X
Reference Site Monitoring	X		X		X
Wetland Delineation					X
Reporting	X		X		X

6.2.4 Temporary Wetland Impact Rehabilitation Areas W-1 through W-19a,b and W-21 through W-24

Monitoring at these sites will consist of the following:

Estimating absolute percent cover of vegetation: The absolute percent cover of vegetation (i.e., native and non-native species) within each temporary wetland impact area would be estimated as follows. Estimate of absolute percent cover within the nine wetland impact sites <0.05 acre or located within the median would be based on ocular estimates for each site made using standardized percent cover charts. Estimate of absolute percent cover within the 14 shoulder wetland impact sites would be based on 30 one-square meter sampling units (quadrats) distributed throughout these designated shoulder sites.

Establishing reproducible photo points: Vegetation establishment will be documented through photo monitoring conducted prior to construction (baseline), within 90 days after construction impacts, and within 1 year after construction impacts. Photos of the results of hydroseeding within these sites in Year 1 will be provided with the Year 1 monitoring report. Additional or alternate photo points may need to be installed if the original photo points fail to capture enough visual data.

Monitoring schedule: Monitoring will be conducted prior to construction (baseline), within 90 days after construction impacts, and within 1 year after construction impacts to assess progress toward the success criteria and identify and implement any needed remedial or adaptive management measures. The first year of monitoring will assess whether the Year 1 success criteria have been met. See anticipated rehabilitation implementation, maintenance, monitoring and reporting timeline for the Temporary Wetland Impact Rehabilitation Areas in Table 11.

Table 11: Anticipated Implementation, Monitoring and Reporting Timeline for the Temporary Wetland Impact Rehabilitation Areas.

Mitigation Tasks	Timeline		
	Pre-Construction[17] & During Construction	Within 90 Days After Impacts (Year 1)	Within 1 Year After Impacts (Year 1)
Hydroseeding	X		
Photo Monitoring	X	X	X
Quadrat Sampling	X	X	X
Reporting			X

[17] Baseline photo monitoring and quadrat sampling would take place during the spring or early summer (March-June period) immediately prior to construction of any of the Eureka-Arcata Corridor Projects.

6.2.5 Lyngbye's Sedge Impact Area

To ensure the recovery of any Lyngbye's sedge plants that might be affected within estuarine wetlands due to construction of the detour bridge within the US 101 median at Jacoby Creek, the following baseline and 5-year monitoring of any Lyngbye's sedge plants is proposed:

Estimating absolute percent cover of Lyngbye's sedge: The absolute percent cover of Lyngbye's sedge would be estimated within estuarine wetlands affected during construction at Jacoby Creek prior to construction (baseline) and annually for five years after construction. Monitoring would include any Lyngbye's sedge plants that were collected prior to construction and subsequently transplanted back at this location after construction.

Establishing reproducible photo points: The recovery of Lyngbye's sedge would be documented through photo monitoring conducted prior to construction (baseline) and annually through Year 5. Additional or alternate photo points may need to be installed if the original photo points fail to capture enough visual data.

Monitoring schedule: Monitoring will be conducted annually to assess progress toward the success criteria and identify and implement any needed remedial or adaptive management measures. The fifth and final year of monitoring will assess whether the success criteria have been met. See anticipated monitoring and reporting timeline for the Lyngbye's Sedge Impact Area in Table 12.

Table 12: Anticipated Monitoring and Reporting Timeline for the Lyngbye's Sedge Impact Area.

Mitigation Tasks	Timeline					
	Pre-Construction[18]	Year 1	Year 2	Year 3	Year 4	Year 5
Photo Monitoring	X	X	X	X	X	X
Lyngbye's Sedge Cover Monitoring	X	X	X	X	X	X
Reporting		X		X		X

[18] Baseline photo monitoring and cover monitoring would take place during the spring or early summer (March-June period) immediately prior to construction of the Jacoby Creek Bridge Replacement Project.

6.2.6 Riparian Restoration Areas Between PM 80.06 and PM 84.52

Monitoring within the Riparian Restoration Areas will consist of the following:

Evaluating survival of native trees and shrubs by census: Census monitoring of plants will be conducted during construction and annually for five years after planting is implemented. The number of each species of tree and shrub removed would be censused during construction. The number of each species of installed or volunteer native tree and shrub that are alive during monitoring will be counted. Establishment of volunteer native trees and shrubs will be included in the total plant count, since volunteers indicate that revegetation is successfully occurring, and a site is self-sustaining.

Establishing reproducible photo points: Vegetation establishment will be documented through photo monitoring conducted prior to plant installation and during annual monitoring. Additional or alternate photo points may need to be installed if the original photo points fail to capture enough visual data.

Monitoring schedule: Monitoring will be conducted annually to assess progress toward the success criteria and identify and implement any needed remedial or adaptive management measures. The first year of monitoring will take place in the same calendar year as the planting as long as planting was conducted before March 1st. If the first monitoring occurs in the same calendar year, it would occur at the end of summer to allow establishment of plants during the growing season. The fifth and final year of monitoring will assess whether the success criteria have been met. See anticipated implementation, monitoring and reporting timeline for the Riparian Restoration Areas in Table 13.

Table 13: Anticipated Implementation, Monitoring and Reporting Timeline for the Riparian Restoration Areas.

Mitigation Tasks	Timeline					
	Pre-Construction[19] & During Construction	Year 1	Year 2	Year 3	Year 4	Year 5
Highway Planting	X					
Tree Removal Census	X					
Annual Tree Census		X	X	X	X	X
Photo Monitoring	X	X	X	X	X	X
Reporting		X		X		X

[19] Baseline photo monitoring would take place during the spring or early summer (March-June period) immediately prior to construction of any of the Eureka-Arcata Corridor Projects. A census of trees and shrubs removed would be undertaken during construction.

Chapter 7. Reporting

7.1 Reporting

Airport Road 101 Slough and Levee, Common Reed Eradication, and Riparian Restoration Areas: Caltrans will prepare monitoring reports for the on-site mitigation activities at the Airport Road 101 Slough and Levee Enhancement and Restoration Area, the Common Reed Eradication and Wetland Restoration Area, and the Riparian Restoration Areas in accordance with USACE 2015 Compensatory Mitigation and Monitoring Guidelines or the most recent version of these guidelines[20]. Monitoring reports documenting mitigation activities at all restoration sites will be prepared and submitted to the permitting agencies that require submission of monitoring reports by January 31 following Year 1, Year 3 and Year 5 monitoring. The monitoring reports would document any monitoring conducted during the current year and during the previous monitoring year (e.g., the Year 3 report would include all monitoring data and photos for Year 2 and Year 3). Depending on the timing of the restoration activities within each area, either a single monitoring report to include all areas or separate monitoring reports for each area may be prepared in Years 1, 3, and 5.

Wetland Establishment and Re-establishment Areas and Lyngbye's Sedge Impact Area: Caltrans will prepare monitoring reports for the Wetland Establishment and Re-establishment Areas in accordance with USACE 2015 Compensatory Mitigation and Monitoring Guidelines or the most recent version of these guidelines. The monitoring results of the Lyngbye's Sedge Impact Area at Jacoby Creek Bridge would also be included in these reports. Monitoring reports documenting mitigation activities within the three wetland establishment areas and one wetland re-establishment area will be prepared and submitted to the permitting agencies that require submission of monitoring reports by January 31 following Year 1, Year 3 and Year 5 monitoring. The monitoring reports would document monitoring conducted during the current year and during the previous monitoring year (e.g., the Year 5 report would include all monitoring data and photos for Year 4 and Year 5). The Year 5 monitoring report will include the results of the Year 5 wetland delineation in addition to the results of photo monitoring and vegetation cover monitoring. Depending on the timing of the mitigation activities within each area, either a single monitoring report to include all mitigation areas or separate monitoring reports for each area may be prepared in Years 1, 3, and 5. The final monitoring report will document whether the success criteria

[20] Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division USACE.

were met and on-site wetland establishment requirements were completed or if remedial actions are needed.

Temporary Wetland Impact Rehabilitation Areas: Caltrans will prepare a single monitoring report at the end of Year 1 for the Temporary Wetland Impact Rehabilitation areas in accordance with USACE 2015 Compensatory Mitigation and Monitoring Guidelines or the most recent version of these guidelines. A monitoring report documenting the mitigation activities within all temporary wetland impact areas will be prepared and submitted to the permitting agencies that require submission of monitoring reports by January 31 following Year 1 monitoring. The monitoring report would document pre-construction baseline monitoring, monitoring conducted within 90 days after impacts and within 1 year after impacts. The Year 1 monitoring report will document whether the success criterion was met or if remedial actions are needed.

All monitoring reports will be prepared by a qualified Biologist or Revegetation Specialist and will evaluate whether the on-site mitigation activities for each area have achieved the goals and success criteria set forth in the approved On-site MMP. Each monitoring report will include the following information:

- A summary of the project location and description.
- Maps of the general project location and on-site mitigation areas.
- A summary of the monitoring methods.
- A list of the names, titles, and companies of the people who prepared the content of the annual report or participated in monitoring activities that year.
- A reference of the resource agency permits and any subsequent letters of modification, as an appendix.
- A summary and analysis of the monitoring results for the previous and current monitoring year (e.g., Year 2 and Year 3 results would be included in the Year 3 report), including an evaluation of site conditions in the context of the performance standards and success criteria.
- A discussion of the monitoring results.
- Management recommendations, including discussion of areas with inadequate performance and recommendations for remedial action.
- A discussion of modifications made to the monitoring methods.

- A discussion of the previous year's monitoring and maintenance efforts.
- Photo documentation of the on-site mitigation areas for the previous and current monitoring years (e.g., Year 4 and Year 5 photos would be included in the Year 5 report).

7.2 Remedial Actions and Adaptive Management

If the monitoring results for the Airport Road 101 Slough and Levee, Common Reed, and Riparian Restoration Areas in Year 1 and Year 3 indicate the performance criteria are not being met, the Revegetation Specialist or project Biologist will assess the potential reasons for the criteria not being met and will develop adaptive management strategies. If the success criteria are not met in Year 5 for the Airport Road 101 Slough and Levee, Common Reed, and Riparian Restoration Areas, Caltrans will coordinate with the permitting agencies to discuss the success criteria issues and develop a plan to resolve the issues.

If the results of the wetland delineation for the Wetland Establishment and Re-establishment Areas and final annual monitoring of the Lyngbye's Sedge Impact Area in Year 5 indicate the success criteria were not met, Caltrans will coordinate with the permitting agencies to discuss the success criteria issues and develop a plan to resolve the issues.

If the monitoring results for the Temporary Wetland Impact Rehabilitation Areas in Year 1 indicate the success criteria were not met, Caltrans will coordinate with the permitting agencies to discuss the success criteria issues and develop a plan to resolve the issues.

All remedial or adaptive management measures will be documented in the monitoring reports.

Chapter 8. References

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Appendix A: Project Maps

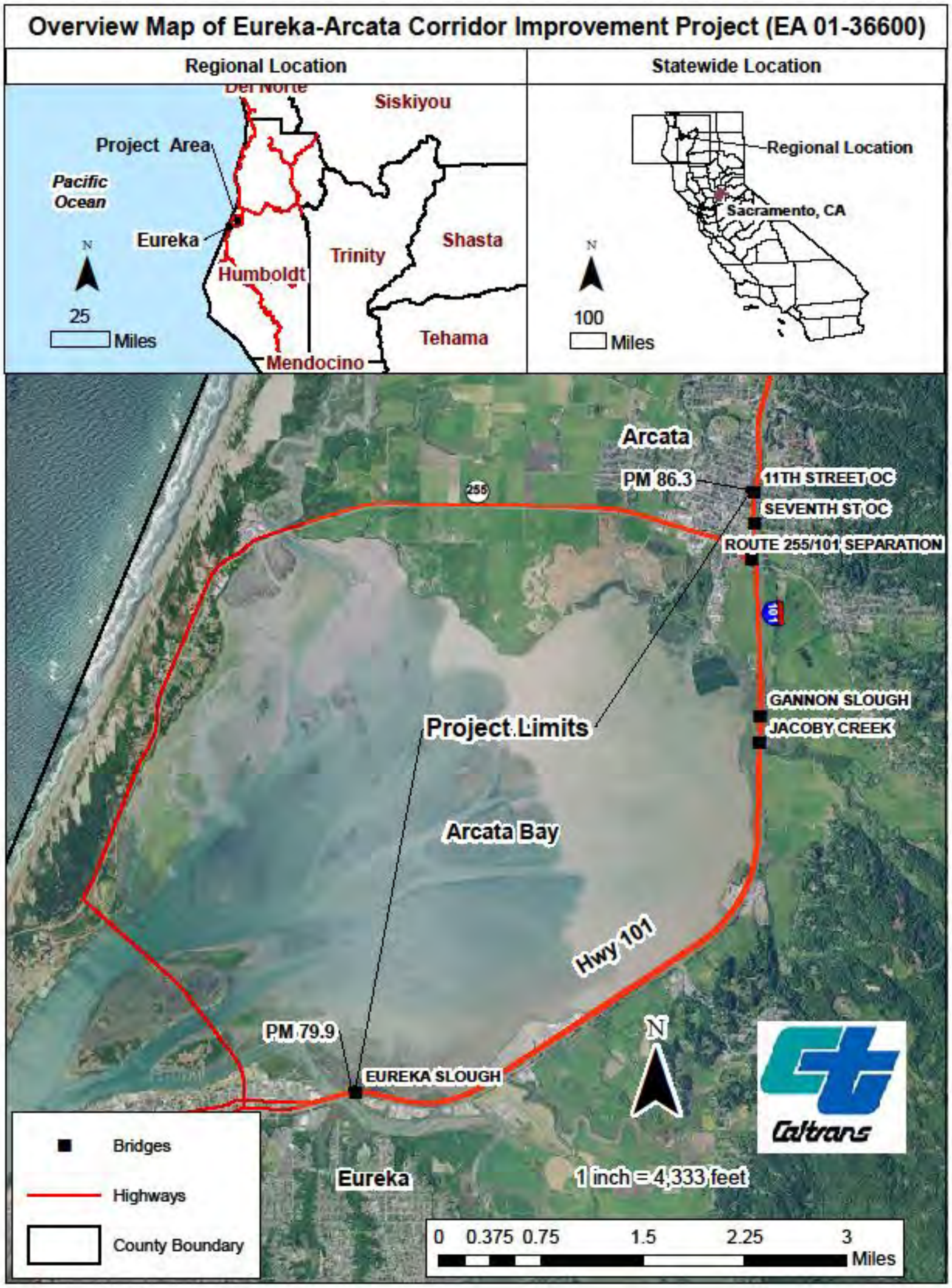

Figure A-1: Overview Map of the Project Area.

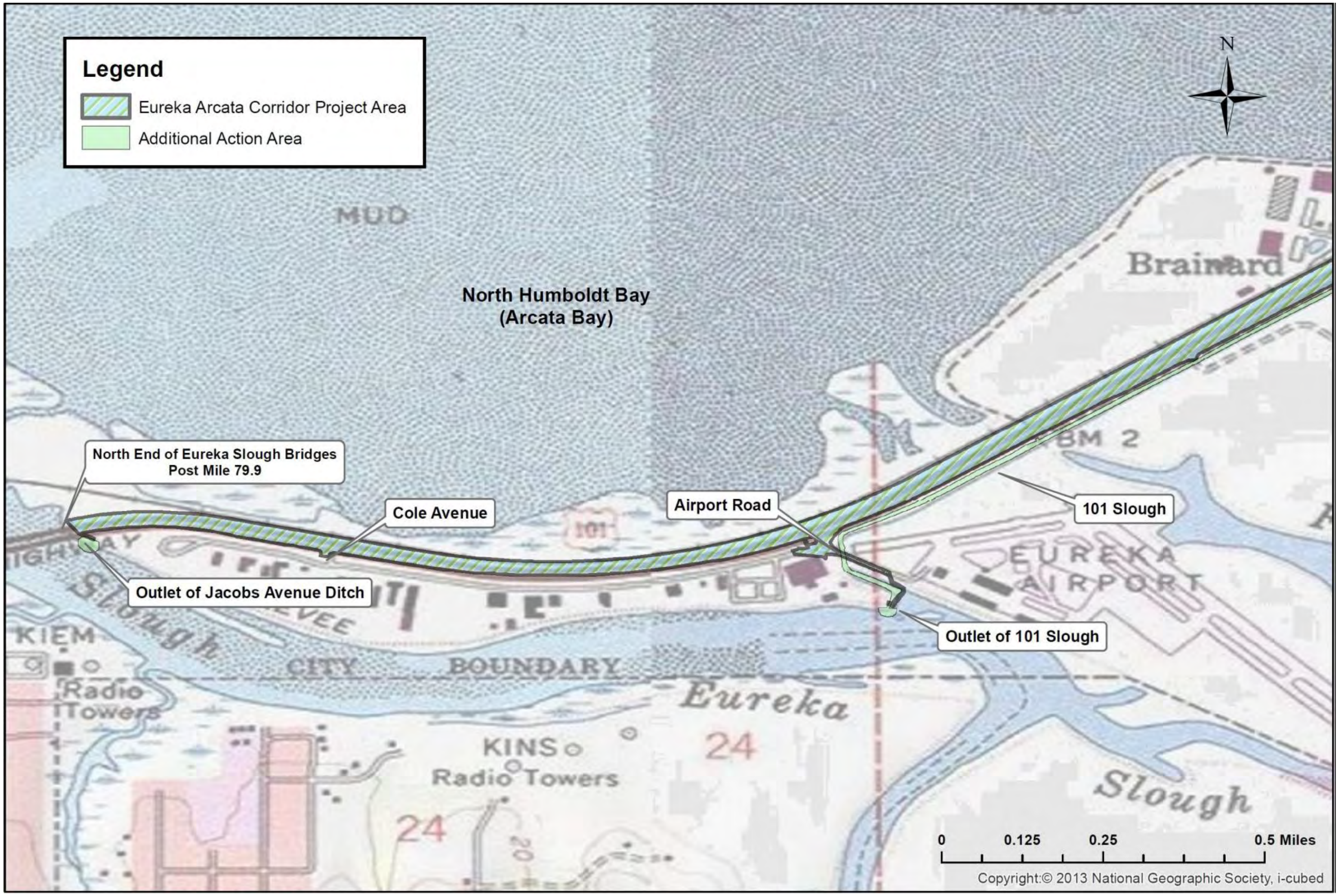

Figure A-2: Map of the Eureka-Arcata Route 101 Corridor Improvement Project Area Between the Eureka Slough Bridge (PM 79.9) and Brainard (~PM 81.4).

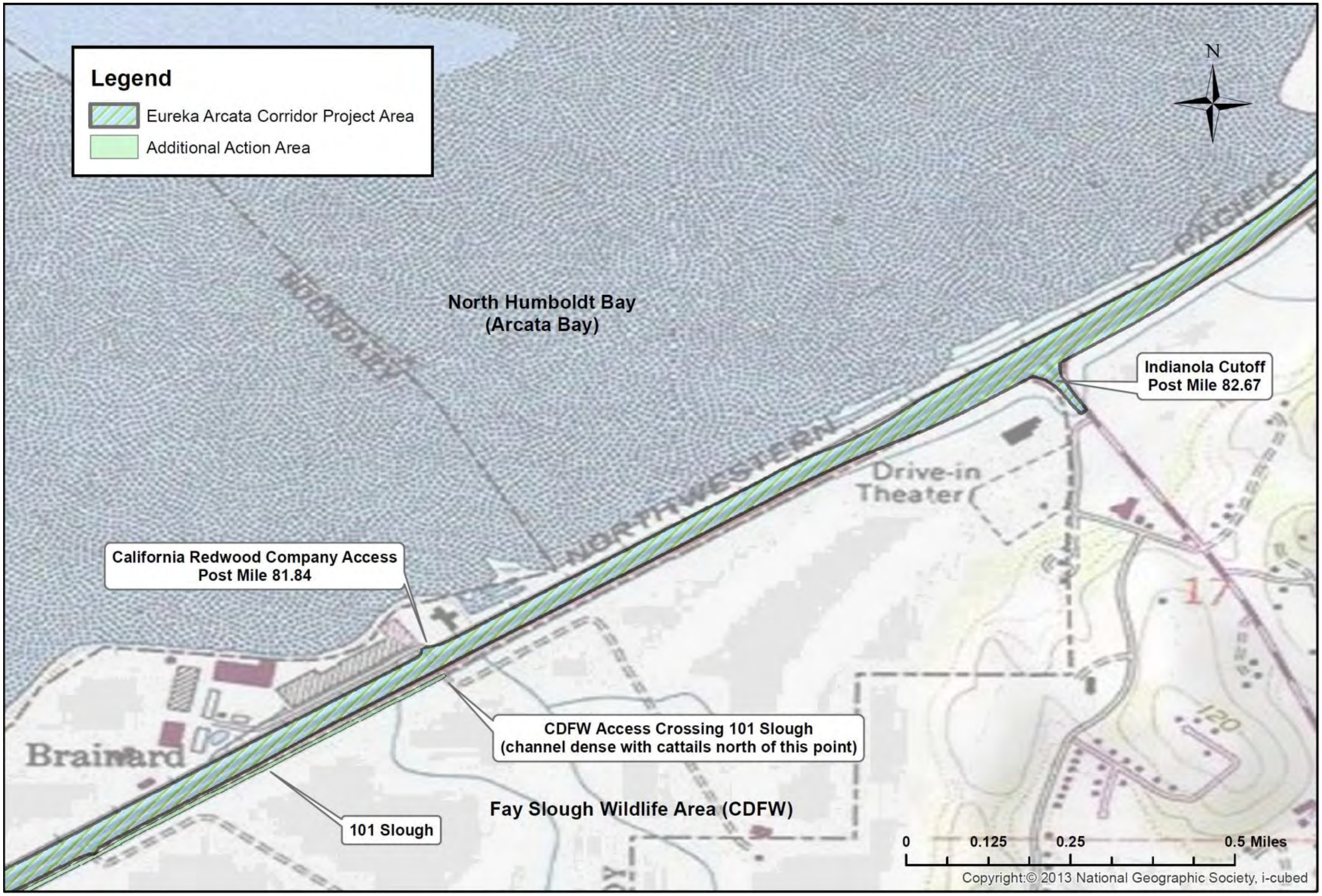

Figure A-3: Map of the Eureka-Arcata Route 101 Corridor Improvement Project Area from Brainard (~PM 81.4) to Bracut (~PM 83.0).

Figure A-4: Map of the Eureka-Arcata Route 101 Corridor Improvement Project Area from Bracut (~PM 83.0) to South G Street (~PM 85.2).

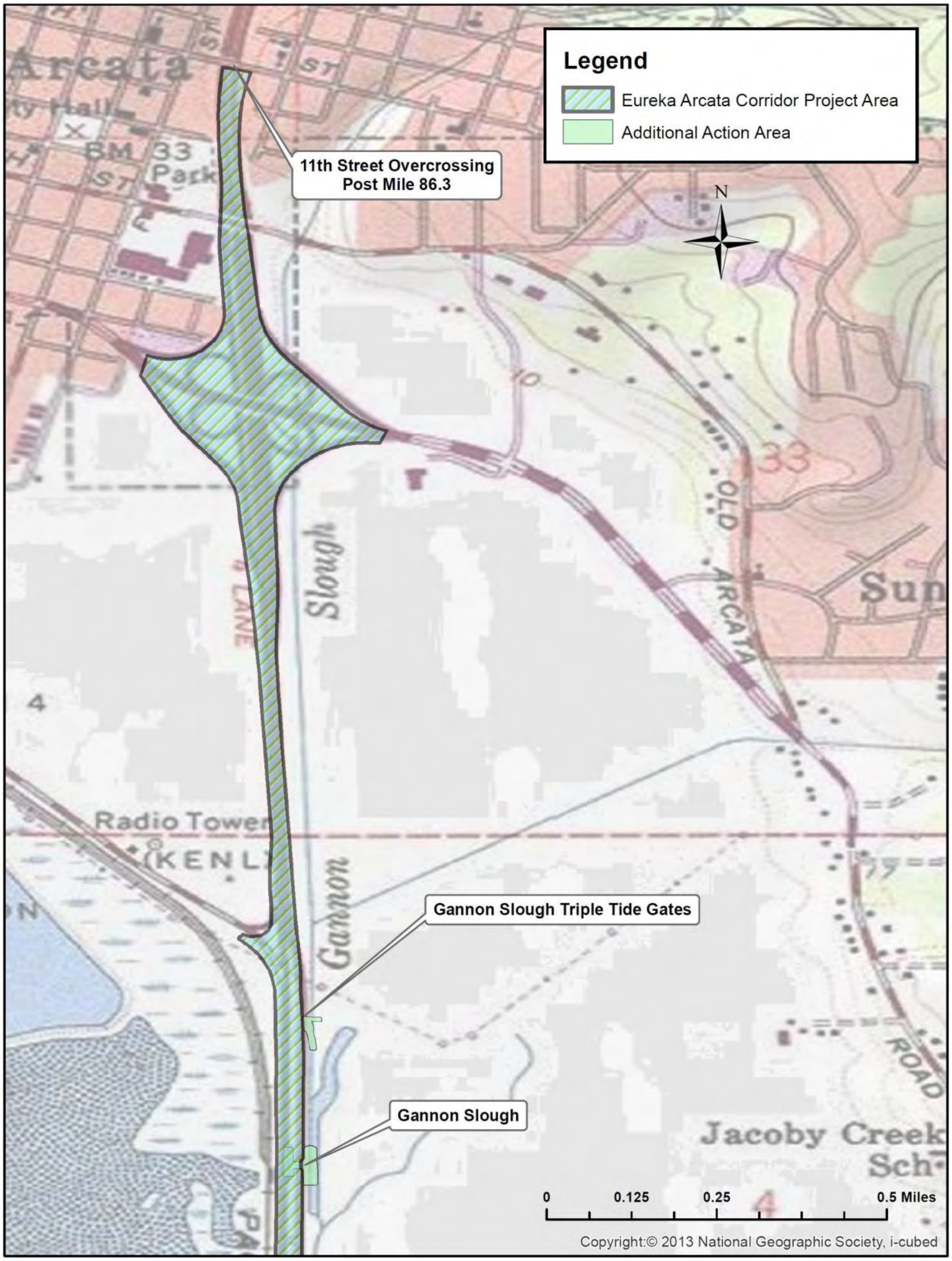

Figure A-5: Map of the Eureka-Arcata Route 101 Corridor Improvement Project Area from Gannon Slough (~PM 84.3) to the 11th Street Overcrossing (PM 86.3).

Appendix B: On-site Wetland and Riparian Mitigation Areas Proposed for Rehabilitation, Enhancement, Re-establishment, and Establishment

Table B-1: On-site Wetland and Riparian Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project.

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
Temporary Wetland Impact Rehabilitation Areas											
W-1	01-0C970	80	80.15	Median	PEM	CWA and CCA	Temporary	0.13	Rehabilitation through hydroseeding	Installing thrie-beam median barrier to Airport Road	1-year monitoring period
W-2	01-0C970	80.2	80.74	SB US 101 Shoulder	PEM	CWA and CCA	Temporary	0.32	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-3a	01-0C970	80.3	80.75	Median	PEM	CWA and CCA	Temporary	0.27	Rehabilitation through hydroseeding	Installing thrie-beam median barrier to Airport Road	1-year monitoring period
W-3b	01-0C970	0.57	80.8	Median	PEM	CWA and CCA	Temporary	0.16	Rehabilitation through hydroseeding	Installing thrie-beam median barrier to Airport Road	1-year monitoring period
W-4	01-0C970	80.85	80.88	Median	PEM	CCA	Temporary	0.02	Rehabilitation through hydroseeding	Installing thrie-beam median barrier to Airport Road	1-year monitoring period
W-5a	01-36600	80.82	80.85	Median	PEM	CCA	Temporary	0.04	Rehabilitation through hydroseeding	Installing thrie-beam median barrier to Airport Road	1-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
W-5b	01-36600	80.86	81.2	NB US 101 Shoulder just north of Airport Rd.	PEM	CWA and CCA	Temporary	0.25	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-6a	01-36600	80.87	81.28	Median (along NB and SB US 101)	PEM	CWA and CCA	Temporary	0.16	Rehabilitation through hydroseeding	Project Construction Activities; three NB lanes from Airport Rd to Mid-City with median widening	1-year monitoring period
W-6b	01-36600	80.87	81.28	Median (along NB and SB US 101)	PEM	CWA and CCA	Temporary	0.17	Rehabilitation through hydroseeding	Project Construction Activities; three NB lanes from Airport Rd to Mid-City with median widening	1-year monitoring period
W-7	01-36600	81.25	81.34	NB US 101 shoulder south of road to Mid-City Motors	PEM	CWA and CCA	Temporary	0.07	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-8	01-0F220	81.36	81.48	NB US 101 shoulder northeast of road to Mid-City Motors	PEM	CWA and CCA	Temporary	0.08	Rehabilitation through hydroseeding	Project Construction Activities; replace/ relocate guardrail and terminal	1-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
W-9	01-0F220	81.49	81.58	NB US 101 shoulder northeast of road to Mid-City Motors	PEM	CWA and CCA	Temporary	0.06	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-10a	01-0F220	81.55	81.83	Median (along SB lane extending past median crossing at California Redwood Company)	PEM	CWA and CCA	Temporary	0.25	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-10b	01-0F220	81.86	82.01	Median (along SB lane extending past median crossing at California Redwood Company)	PEM	CWA and CCA	Temporary	0.16	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-11	01-36600	82.48	82.67	NB US 101 shoulder starting south of Indianola Cutoff and ending along the southwest side of Indianola Cutoff	PEM	CWA and CCA	Temporary	0.84	Rehabilitation through hydroseeding and highway planting by Landscape Contractor for one year	Project Construction Activities for route realignment and Interchange	3-year plant establishment period for highway planting; 1-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
W-12	01-36600	82.67	82.8	NB US 101 shoulder starting on the northeast side of Indianola Cutoff	PEM	CWA and CCA	Temporary	0.64	Rehabilitation through hydroseeding and highway planting by Landscape Contractor for one year	Project Construction Activities for route realignment and Interchange	3-year plant establishment period for highway planting; 1-year monitoring period
W-13	01-0F220	83.51	83.55	NB US 101 shoulder just north of Caltrans Bracut Maintenance Yard	PEM	CWA and CCA	Temporary	0.03	Rehabilitation through hydroseeding	Project Construction Activities for road widening for extended acceleration lane	1-year monitoring period
W-14	01-0F220	83.51	83.64	SB US 101 shoulder at north end of Bracut Industrial Park	PEM	CWA and CCA	Temporary	0.06	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-15	01-0F220	83.75	83.85	NB US 101 shoulder north of Caltrans Bracut Maintenance Yard	PEM	CCA	Temporary	0.06	Rehabilitation through hydroseeding	Project Construction Activities for road widening for deceleration lane improvements at Bayside Cutoff	1-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
W-16	01-0F220	83.8	83.81	NB US 101 shoulder north of Caltrans Bracut Maintenance Yard	PEM	CWA and CCA	Temporary	0.01	Rehabilitation through hydroseeding	Project Construction Activities for road widening for deceleration lane improvements at Bayside Cutoff	1-year monitoring period
W-17	01-0F220	83.88	83.91	NB US 101 shoulder and along south side of Bayside Cutoff	PEM	CWA and CCA	Temporary	0.10	Rehabilitation through hydroseeding and highway planting by Landscape Contractor	Project Construction Activities	3-year plant establishment period for highway planting;1-year monitoring period
W-18	01-0F220	84.16	84.28	Median (along SB lane north of Bayside Cutoff)	PEM	CWA and CCA	Temporary	0.09	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-19a	01-0E000	84.47	84.5	NB US 101 shoulder along the south and north sides of Jacoby Creek Bridge	PEM	CWA and CCA	Temporary	0.05	Rehabilitation through hydroseeding	Impacts associated with NB JC Bridge rail replacement	1-year monitoring period
W-19b	01-0E000	84.51	84.53	NB US 101 shoulder along the south and north sides of Jacoby Creek Bridge	PEM	CWA and CCA	Temporary	0.07	Rehabilitation through hydroseeding	Impacts associated with NB JC Bridge rail replacement	1-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
W-21	01-0E000	84.65	84.68	Median (along NB US 101 south of Gannon Slough Bridge)	PEM	CWA and CCA	Temporary	0.07	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-22a	01-0E000	84.66	84.72	NB US 101 shoulder on both the south and north sides of Gannon Slough Bridge	PEM	CWA and CCA	Temporary	0.11	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-22b	01-0E000	84.73	84.77	NB US 101 shoulder on both the south and north sides of Gannon Slough Bridge	PEM	CWA and CCA	Temporary	0.10	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
W-23a	01-0E000	84.69	84.72	Median (along SB US 101 south of Gannon Slough Bridge)	PEM	CWA and CCA	Temporary	0.02	Rehabilitation through hydroseeding	Bridge rail replacement along SB side of bridge	1-year monitoring period
W-23b	01-0C970	84.83	84.95	Median (along SB US 101 south of Gannon Slough Bridge)	PEM	CWA and CCA	Temporary	0.10	Rehabilitation through hydroseeding	Work at weed barrier for existing thrie-beam median barrier	1-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
W-24	01-0F220	85.47	85.75	NB US 101 shoulder starts south of Highway 255 overpass and extends along eastbound Highway 101 offramp	PEM	CWA and CCA	Temporary	0.30	Rehabilitation through hydroseeding	Project Construction Activities	1-year monitoring period
Wetland Re-Establishment Areas within Permanent Impact Areas											
W-20a,b	01-0E000	84.39	84.57	Along SB US 101 on both the north and south sides of Jacoby Creek Bridge	PEM	CWA and CCA	Permanent	0.25	Re-establishment through hydroseeding and highway planting by Landscape Contractor	Temporary paving for SB Jacoby Creek Bridge replacement and detour for traffic	1-year plant establishment period; wetland delineation in Year 5; reporting in Year 1, 3 & 5
W-20c	01-0E000	84.47	84.48	NB US 101 shoulder along the south and north sides of Jacoby Creek Bridge	E2	CWA and CCA	Permanent	0.03	Re-establishment through hydroseeding	Impacts associated with temporary SB JC Bridge	1-year plant establishment period; wetland delineation in Year 5; reporting in Year 1, 3 & 5
W-20d	01-0E000	80.52	80.53	NB US 101 shoulder along the south and north sides of Jacoby Creek Bridge	E2	CWA and CCA	Permanent	0.07	Re-establishment through hydroseeding	Impacts associated with temporary SB JC Bridge	1-year plant establishment period; wetland delineation in Year 5; reporting in Year 1, 3 & 5
Wetland Establishment Areas											

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
WC-1	01-36600	81.34	81.4	Median crossing proposed for closing at Mid-City Motors	PEM	CWA and CCA	No Project Impacts	0.14	Establishment through hydroseeding and highway planting by Landscape Contractor under direction of Caltrans Landscape Architect	Remove Median Paving	1-year plant establishment period; wetland delineation in Year 5; reporting in Year 1, 3 & 5
WC-2	01-36600	81.83	81.86	Median crossing proposed for closing at California Redwood Company/ CDFW access road	PEM	CWA and CCA	No Project Impacts	0.14	Establishment through hydroseeding and highway planting by Landscape Contractor under direction of Caltrans Landscape Architect	Remove Median Paving	1-year plant establishment period; wetland delineation in Year 5; reporting in Year 1, 3 & 5

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
WC-3	01-36600	83.89	83.97	Median crossing proposed for closing at Bayside Cutoff; wetland extends along existing wetlands in the median on both NB and SB US 101	PEM	CWA and CCA	No Project Impacts	0.24	Establishment through hydroseeding and highway planting by Landscape Contractor under direction of Caltrans Landscape Architect	Remove paving and route realignment	1-year plant establishment period; wetland delineation in Year 5; reporting in Year 1, 3 & 5
Airport Road 101 Slough and Levee Enhancement and Restoration Area											
R-1a	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	PEM	CWA & CCA	No Project Impacts	0.145	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1
R-1b	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	E1	CWA & CCA	No Project Impacts	0.064	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
R-1c	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	PEM	CWA & CCA	No Project Impacts	0.238	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1
R-1d	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	RP	CWA & CCA	No Project Impacts	0.170	Rehabilitation	No construction work; On-site Restoration	Weeding & planting & 5 years of monitoring by Stewardship at Airport Rd Slough/Levee Reveg Site 1
R-1e	01-0F22001-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	PEM	CWA & CCA	No Project Impacts	0.030	Rehabilitation	No construction work; On-site Restoration	Weeding & planting & 5 years of monitoring by Stewardship at Airport Rd Slough/Levee Reveg Site 1
R-1f	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	PEM	CWA & CCA	No Project Impacts	0.012	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
R-1g	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	PEM	CWA & CCA	No Project Impacts	0.020	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1
R-1h	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	RP	CWA & CCA	No Project Impacts	0.228	Enhancement	Temporary Access for Tidegate Replacement Project	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1
R-1i	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	PEM	CWA & CCA	No Project Impacts	0.083	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1
R-1j	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	E2	CWA & CCA	No Project Impacts	0.009	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
R-1k	01-0F22001-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	RP	CWA & CCA	No Project Impacts	0.002	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1
R-1l	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	RP	CWA & CCA	No Project Impacts	0.016	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1
R-1m	01-0F220 01-0E000 01-36600	80.85	80.85	Airport Road 101 Slough and Levee Enhancement and Restoration Area	RP	CWA & CCA	No Project Impacts	0.004	Enhancement	No construction work; On-site Restoration	Weeding by Stewardship for 5 years at Airport Rd 101 Slough and Levee Reveg Site 1
Common Reed Eradication and Wetland Restoration Area											
R-2	01-0F220 01-0E000	83.22	83.26	Common Reed Eradication and Wetland Restoration Area within ditch along NB US 101 shoulder by Bracut	PEM	CWA & CCA	No Project Impacts	0.203	Rehabilitation	No construction work; On-site Restoration	IPM reed eradication & planting by Landscape/Stewardship for up to 8 years at Bracut Reveg Site 2

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
Riparian Impact and Rehabilitation Areas											
RP-1a,b	01-0F220	80.14	80.15	Along NB US 101 shoulder between Eureka Slough Bridge and Cole Ave	RP	CWA & CCA	Temporary	0.01	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-2a	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.01	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-2b	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.01	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-2c	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.01	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
RP-2d	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.01	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-2e	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.02	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-2f	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.01	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-2g	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.02	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
RP-2h	01-0F220	81.48	81.57	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.01	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-3	01-0F220	81.59	81.67	Along NB US 101 shoulder between Mid-city Motors and California Lumber Company entrance	RP	CWA & CCA	Temporary	0.24	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-4a	01-36600	82.48	82.63	Along NB US 101 shoulder south of Indianola Cutoff	RP	CWA & CCA	Temporary	0.03	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-4b	01-36600	82.48	82.63	Along NB US 101 shoulder south of Indianola Cutoff	RP	CWA & CCA	Temporary	0.12	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
RP-4c	01-36600	82.48	82.63	Along NB US 101 shoulder south of Indianola Cutoff	RP	CWA & CCA	Temporary	0.20	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-4d	01-36600	82.70	82.63	Along NB US 101 shoulder north of Indianola Cutoff	RP	CWA & CCA	Temporary	0.08	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-4e	01-36600	82.70	82.91	Along NB US 101 shoulder north of Indianola Cutoff	RP	CWA & CCA	Temporary	0.05	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-4f	01-36600	82.70	82.91	Along NB US 101 shoulder north of Indianola Cutoff	RP	CWA & CCA	Temporary	0.36	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-4g	01-36600	82.70	82.91	Along NB US 101 shoulder north of Indianola Cutoff	RP	CWA & CCA	Temporary	0.03	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
RP-5a	01-0F220	83.51	83.82	Along NB US 101 houlder between Bracut and Bayside Cutoff	RP	CWA & CCA	Temporary	0.03	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-5b	01-0F220	83.51	83.82	Along NB US 101 shoulder between Bracut and Bayside Cutoff	RP	CWA & CCA	Temporary	0.03	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-5c	01-0F220	83.51	83.82	Along NB US 101 shoulder between Bracut and Bayside Cutoff	RP	CWA & CCA	Temporary	0.05	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-5d	01-0F220	83.51	83.82	Along NB US 101 shoulder between Bracut and Bayside Cutoff	RP	CWA & CCA	Temporary	0.02	Rehabilitation	Project Construction Activities	1-year plant establishment period for highway planting; 5-year monitoring period
RP-6a	01-0E000	84.49	84.52	Median and NB US 101 shoulder at Jacoby Creek Bridge	RP	CWA & CCA	Temporary	0.09	Rehabilitation	Impacts associated with temporary SB JC Bridge	1-year plant establishment period for highway planting; 5-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
RP-6b	01-0E000	84.49	84.52	Median and NB US 101 shoulder at Jacoby Creek Bridge	RP	CWA & CCA	Temporary	0.12	Rehabilitation	Impacts associated with temporary SB JC Bridge	1-year plant establishment period for highway planting; 5-year monitoring period
Additional Riparian Planting (Rehabilitation) Areas Not Affected by Construction											
RP-6c (not shown on maps)	01-0E000	84.49	84.52	US 101 at Jacoby Creek Bridge	RP	CWA & CCA	No Project Impacts	0.03	Rehabilitation	No construction work; On-site Restoration	1-year plant establishment period for highway planting; 5-year monitoring period
RP-7 (not shown on maps)	01-0F220	80.06	80.24	NB US 101 shoulder between Eureka Slough Bridge and Cole Ave	RP	CWA & CCA	No Project Impacts	0.41	Rehabilitation	No construction work; On-site Restoration	1-year plant establishment period for highway planting; 5-year monitoring period
RP-8 (not shown on maps)	01-0F220	80.24	80.80	NB US 101 shoulder between Cole Ave and Airport Rd	RP	CWA & CCA	No Project Impacts	0.36	Rehabilitation	No construction work; On-site Restoration	1-year plant establishment period for highway planting; 5-year monitoring period

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
RP-9 (not shown on maps)	01-0F220	81.50	81.83	NB US 101 shoulder between Mid-City Motors and California Redwood Company	RP	CWA & CCA	No Project Impacts	0.41	Rehabilitation	No construction work; On-site Restoration	1-year plant establishment period for highway planting; 5-year monitoring period
RP-10 (not shown on maps)	01-36600	82.48	82.63	Indianola Cutoff	RP	CWA & CCA	No Project Impacts	0.31	Rehabilitation	No construction work; On-site Restoration	1-year plant establishment period for highway planting; 5-year monitoring period
RP-11 (not shown on maps)	01-0F220	83.25	83.35	South Bracut	RP	CWA & CCA	No Project Impacts	0.11	Rehabilitation	No construction work; On-site Restoration	1-year plant establishment period for highway planting; 5-year monitoring period
RP-12 (not shown on maps)	01-0F220	83.52	83.83	North Bracut to Bayside	RP	CWA & CCA	No Project Impacts	0.32	Rehabilitation	No construction work; On-site Restoration	1-year plant establishment period for highway planting; 5-year monitoring period
Total Acres of PEM Rehabilitation						**5.02 acres**					
Total Acres of PEM Establishment						**0.52 acres**					
Total Acres of PEM Re-establishment						**0.25 acre**					
Total Acres of PEM Enhancement						**0.50 acre**					
Total Acres of E1 Enhancement						**0.06 acre**					
Total Acres of E2 Re-establishment						**0.10 acre**					
Total Acres of E2 Enhancement						**0.01 acre**					

Wetland/ Riparian Mitigation Site #	Project EA#	Starting PM (approx.)	Ending PM (approx.)	Location	Cowardin Code	Juris-diction	Impact Type	Acres	Proposed Method of On-Site Mitigation	Description of Project Work	Timing and Duration of Planting, Monitoring and Reporting Period
Total Acres of RP Rehabilitation									**3.68 acre**		
Total Acres of RP Enhancement									**0.25 acre**		
Total Acres of On-site Mitigation									**10.39 acre**		

Exhibit 17
CDP Application No. 1-18-1078
(Caltrans)
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Appendix C: Highway Planting and Revegetation Planting Palettes

Table C-1: Anticipated Highway Planting Palette for the Wetland Establishment Areas and Highway Planting Areas.

Common Name (*Scientific Name*)	Estimated maximum quantity of plants needed for initial planting	Estimated maximum quantity of plants needed for replanting	Planting Densities (ft. on center)
Proposed Locations: Wetland Establishment Areas[21]			
Herbs			
alkali bulrush (*Bolboschoenus* (*Scirpus*) *maritimus*)	**To Be Determined**	**To Be Determined**	**0.5 ft. to 1 ft. on center depending on location and species (see Landscape Highway Planting and Erosion Control Plan)**
slough sedge (*Carex obnupta*)			
tall flatsedge (*Cyperus eragrostis*)			
California hair grass (*Deschampsia cespitosa* ssp. *holciformis*)			
common spikerush (*Eleocharis macrostachya*)			
Pacific rush (*Juncus effusus* ssp. *pacificus*)			
Western rush (*Juncus occidentalis*)			
brownhead rush (*Juncus phaeocephalus*)			
iris-leaved rush (*Juncus xiphioides*)			
panicled bulrush (*Scirpus microcarpus*)			
broadleaf cattail (*Typha latifolia*)			

[21] Only non-woody, wetland herbs that are fast-growing, require little maintenance after planting, and are suitable for planting within the Clear Recovery Zone are proposed for planting within the median wetlands.

Common Name (*Scientific Name*)	Estimated maximum quantity of plants needed for initial planting	Estimated maximum quantity of plants needed for replanting	Planting Densities (ft. on center)
Locations: Highway Planting Areas with Riparian Rehabilitation Areas and at Indianola Interchange, Bracut, Bayside Cutoff, and Jacoby Creek Bridge			
Shrubs and Trees			
red alder (*Alnus rubra*)	**To Be Determined**	**To Be Determined**	**8 ft. to 12 ft. on center depending on location and species (see Landscape Highway Planting and Erosion Control Plan)**
coyote brush (*Baccharis pilularis*)			
cascara (*Frangula purshiana*)			
twinberry (*Lonicera involucrata* ssp. *ledbourii*)*			
wax myrtle (*Morella californica*)			
Sitka spruce (*Picea sitchensis*)			
shore pine (*Pinus contorta* ssp. *contorta*)			
Bishop pine (*Pinus muricata*)			
pink flowering currant (*Ribes sanguineum* var. *glutinosum*)*			
thimbleberry (*Rubus parviflorus*)			
salmonberry (*Rubus spectabilis*)*			
California blackberry (*Rubus ursinus*)			
Hooker's willow (*Salix hookeriana*)			
shining willow (*Salix lasiandra* var. *lasiandra*)			
arroyo willow (*Salix lasiolepis*)			
Scouler's willow (*Salix scouleriana*)			
Sitka willow (*Salix sitchensis*)			

Common Name (*Scientific Name*)	Estimated maximum quantity of plants needed for initial planting	Estimated maximum quantity of plants needed for replanting	Planting Densities (ft. on center)
red elderberry (*Sambucus racemosa* var. *racemosa*)*			
Locations: Highway Planting Areas within Temporary Wetland Impact Rehabilitation Areas and at Indianola Interchange, Bracut, Bayside Cutoff, and Jacoby Creek Bridge			
Herbs[22]			
common yarrow (*Achillea millefolium*)	**To Be Determined**	**To Be Determined**	**0.5 ft. to 5 ft. on center depending on species and location (see Landscape Highway Planting and Erosion Control Plan)**
mugwort (*Artemisia douglasiana*)			
lady fern (*Athyrium filix-femina*)			
alkali bulrush (*Bolboschoenus* (*Scirpus*) *maritimus*)			
slough sedge (*Carex obnupta*)			
tall flatsedge (*Cyperus eragrostis*)			
California hair grass (*Deschampsia cespitosa* ssp. *holciformis*)			
Salt grass (*Distichlis spicata*)			
common spikerush (*Eleocharis macrostachya*)			
Pacific gum plant (*Grindelia stricta* var. *platyphylla*)			
cow parsnip (*Heracleum maximum*)			
Douglas iris (*Iris douglasiana*)			
Pacific rush (*Juncus effusus* ssp. *pacificus*)			
brownhead rush (*Juncus phaeocephalus*)			
Western rush (*Juncus occidentalis*)			
brownhead rush (*Juncus phaeocephalus*)			
iris-leaved rush (*Juncus xiphioides*)			

[22] All herb species listed are suitable for planting within the 30 ft. Clear Recovery Zone (CRZ).

Common Name (***Scientific Name***)	Estimated maximum quantity of plants needed for initial planting	Estimated maximum quantity of plants needed for replanting	Planting Densities (ft. on center)
Western marsh rosemary (*Limonium californicum*)	**To Be Determined**	**To Be Determined**	**0.5 ft. to 5 ft. on center depending on species and location (see Landscape Highway Planting and Erosion Control Plan)**
Pacific water parsley (*Oenanthe sarmentosa*)			
sword fern (*Polystichum munitum*)			
California blackberry (*Rubus ursinus*)			
pickleweed (*Salicornia pacifica*)			
panicled bulrush (*Scirpus microcarpus*)			
California figwort (*Scrophularia californica*)			
common aster (*Symphyotrichum chilense*)			
seaside arrowgrass (*Triglochin maritima*)			
broadleaf cattail (*Typha latifolia*)			

Table C-2: Revegetation Planting Palette for the Airport Road 101 Slough and Levee Enhancement and Restoration Area and Common Reed Eradication and Wetland Restoration Area.

Common Name	*Scientific Name*	Estimated maximum quantity of plants needed for initial planting	Estimated maximum quantity of plants needed for replanting	Planting Densities (ft. on center)
Location: Airport Road 101 Slough and Levee Enhancement and Restoration Area				
Shrubs and Trees[23]				
cascara*[24]	*Frangula purshiana* ssp. *purshiana*	117	35	8 ft.
twinberry**	*Lonicera involucrata* ssp. *ledbourii*			
wax myrtle*[25]	*Morella californica*			
pink flowering currant**	*Ribes sanguineum* var. *glutinosum*			
thimbleberry**	*Rubus parviflorus*			
Hooker's willow*[26]	*Salix hookeriana*			
red elderberry**	*Sambucus racemosa* var. *racemosa*			
Herbs				
cow parsnip	*Heracleum maximum*	49	15	5 ft.
Douglas iris	*Iris douglasiana*			
sword fern	*Polystichum munitum*			
California figwort	*Scrophularia californica*			
common aster	*Symphyotrichum chilense*			
Pacific reed grass	*Calamagrostis nutkaensis*			
marsh baccharis	*Baccharis glutinosa*			
	Total	**166**	**50**	**N/A**

[23] Riparian trees are designated with a single asterisk while shrubs are designated with a double asterisk.

[24] Cascara is considered by Habeck (1992) to be a riparian shrub or small tree that grows with red alder in moist bottomlands.

[25] California wax myrtle can be considered a riparian shrub or small tree depending on the source (see Bornstein 2012, CNPS 2018).

[26] Hooker's willow is considered by Argus (2012) to be a shrub or small tree that grows in coastal dunes, floodplains, and meadows.

Common Name	*Scientific Name*	Estimated maximum quantity of plants needed for initial planting	Estimated maximum quantity of plants needed for replanting	Planting Densities (ft. on center)
Location: Common Reed Eradication and Wetland Restoration Area				
Herbs				
mugwort	*Artemisia douglasiana*			
lady fern	*Athyrium filix-femina*			
slough sedge	*Carex obnupta*			
tall flatsedge	*Cyperus eragrostis*			
California hair grass	*Deschampsia cespitosa* ssp. *holciformis*			
cow parsnip	*Heracleum maximum*			
Pacific rush	*Juncus effusus* ssp. *pacificus*			
Western rush	*Juncus occidentalis*	968	290	3 ft.
brownhead rush	*Juncus phaeocephalus*			
iris-leaved rush	*Juncus xiphioides*			
Pacific water parsley	*Oenanthe sarmentosa*			
panicled bulrush	*Scirpus microcarpus*			
California figwort	*Scrophularia californica*			
common aster	*Symphyotrichum chilense*			
broadleaf cattail	*Typha latifolia*			
	Total	**968**	**290**	**N/A**

Appendix D: Maps of Proposed On-site Mitigation Areas

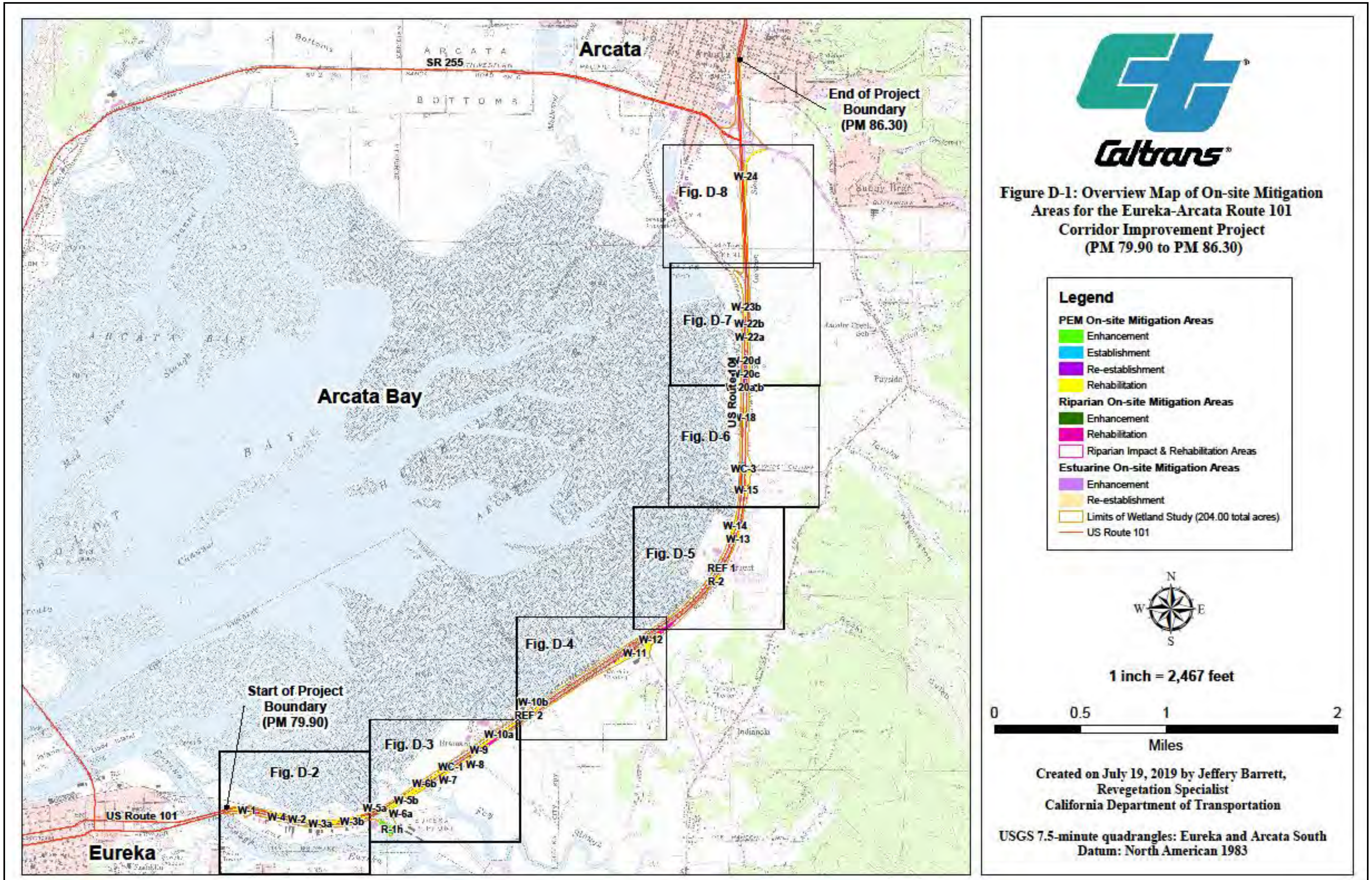

Figure D-1: Overview Map of On-Site Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project.

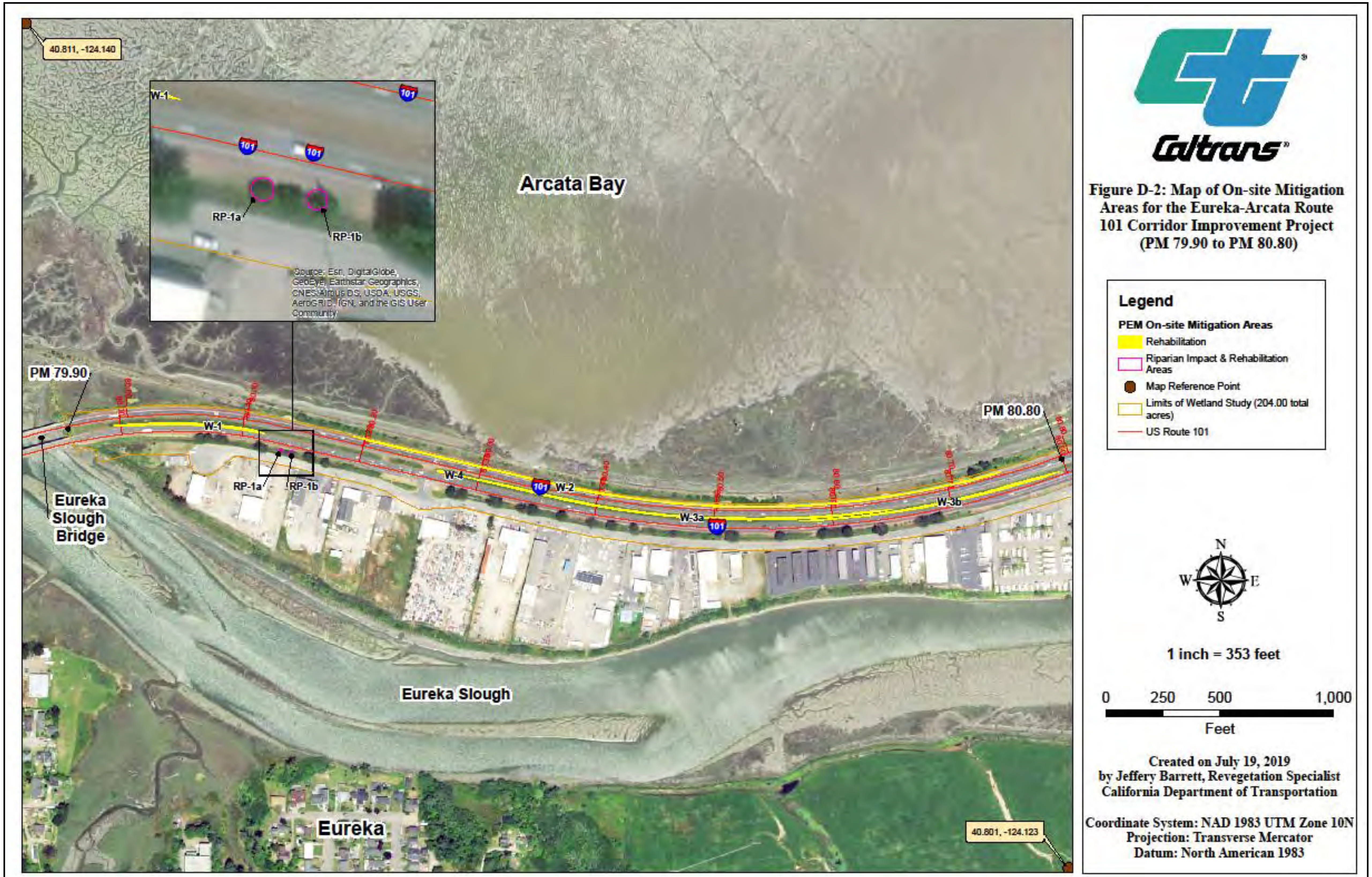

Figure D-2: Map of On-Site Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project Area between the Eureka Slough Bridge (PM 79.90) and Airport Road (~PM 80.80).

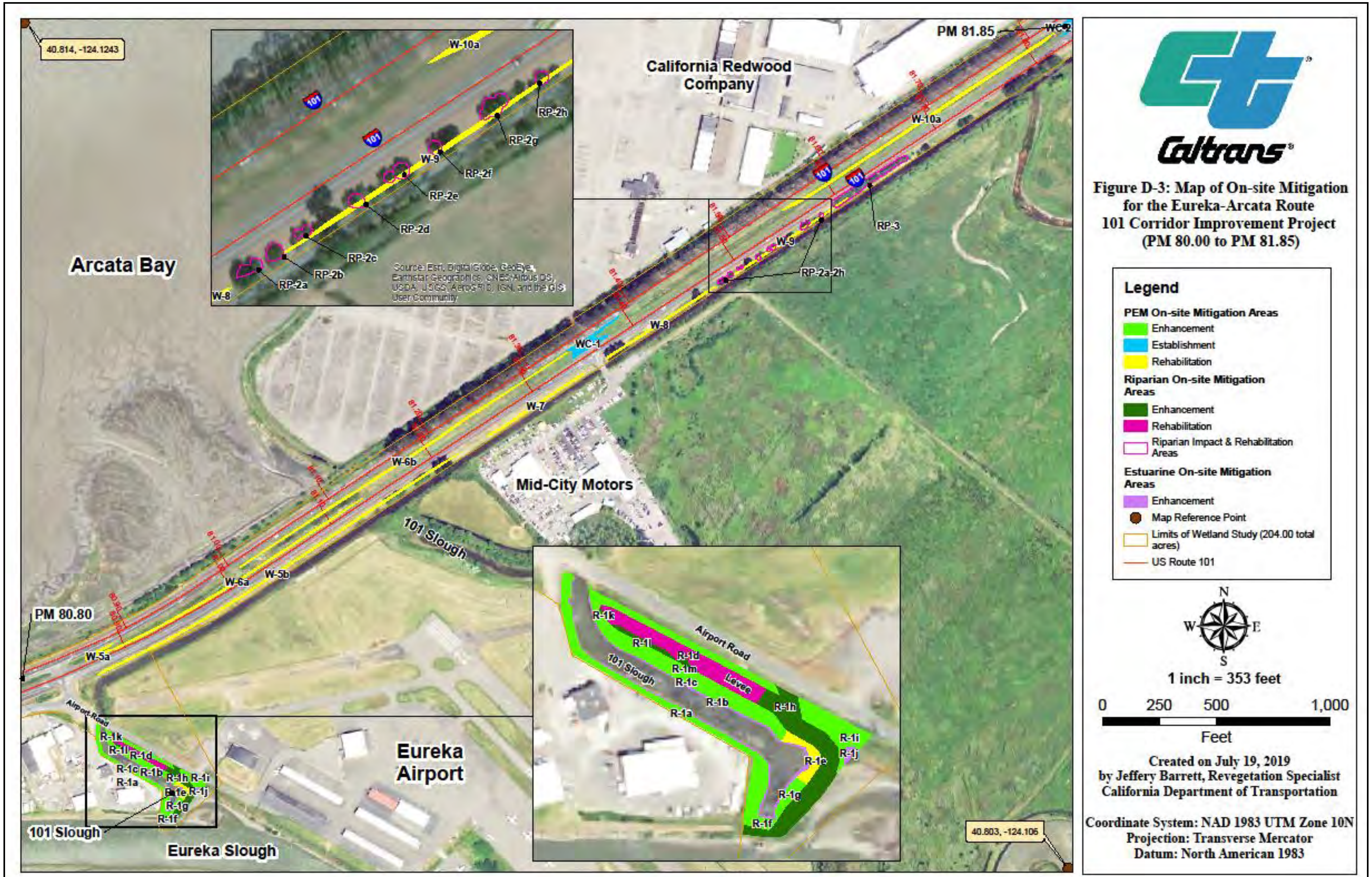

Figure D-3: Map of On-Site Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project Area between Airport Road (~PM 80.80) and California Redwood Company (~PM 81.85).

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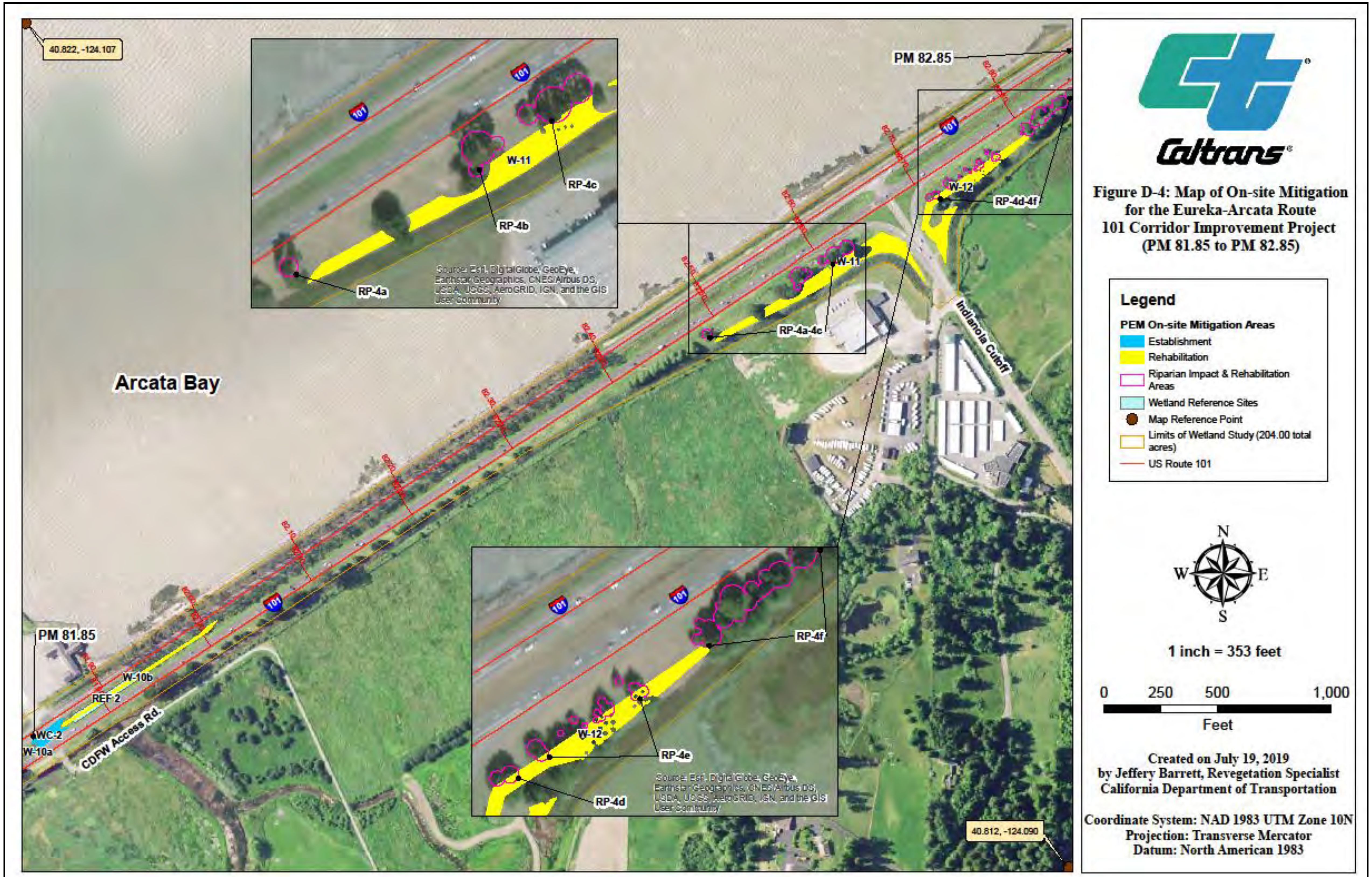

Figure D-4: Map of On-Site Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project Area between California Redwood Company (~PM 81.85) and Indianola Cutoff (~PM 82.85).

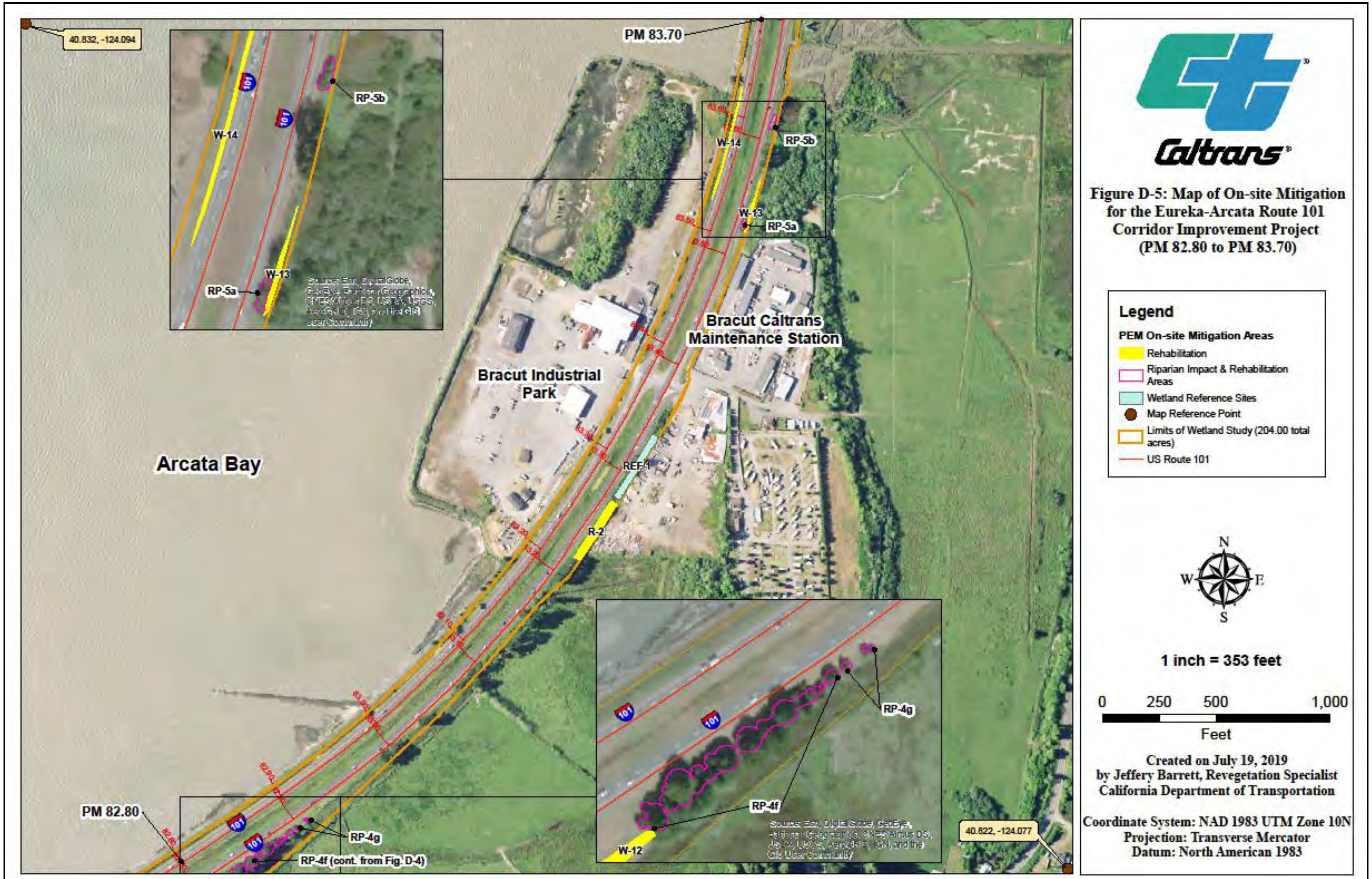

Figure D-5: Map of On-Site Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project Area between Indianola Cutoff (~PM 82.80) and Bracut (~PM 83.70).

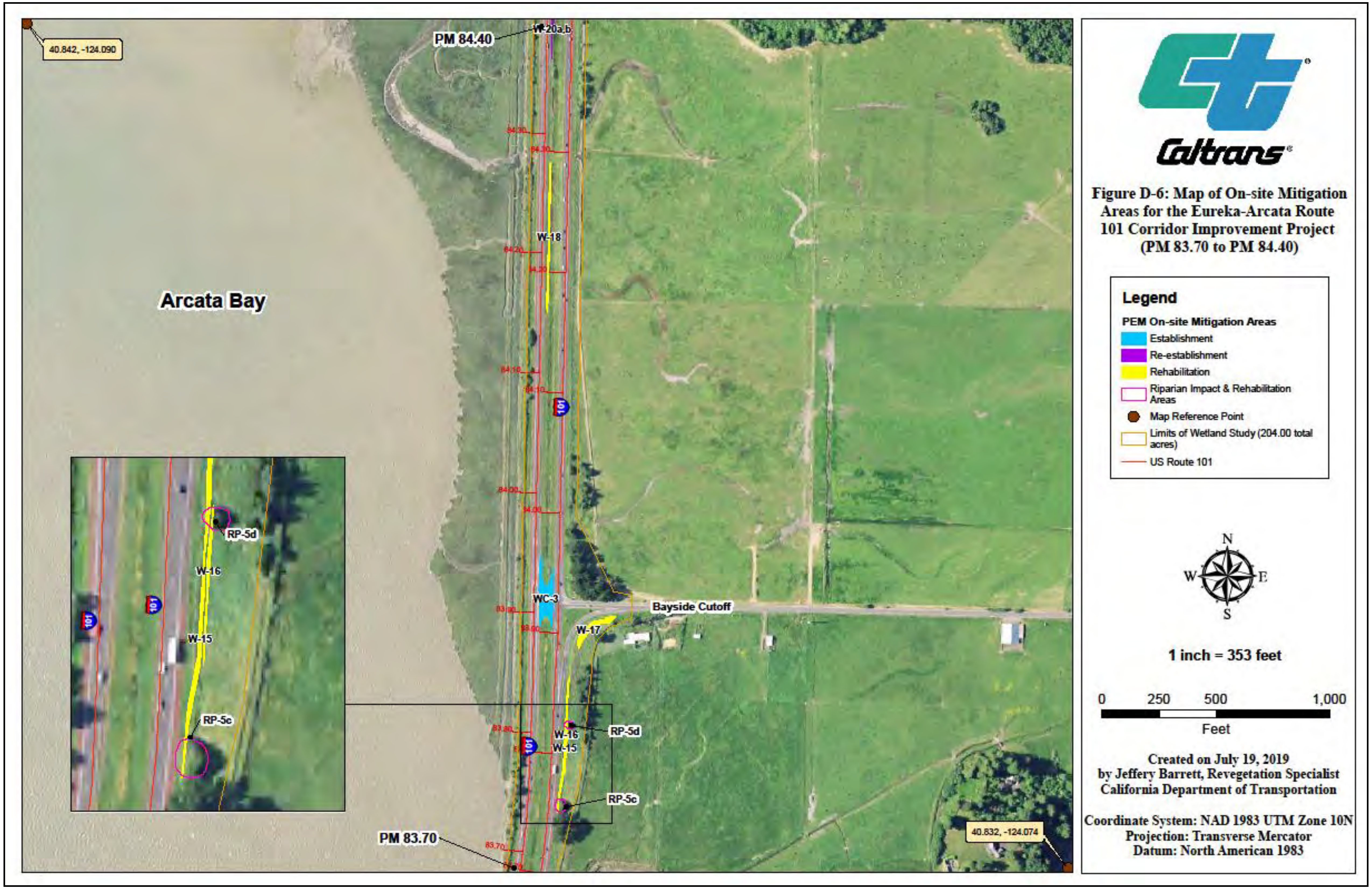

Figure D-6: Map of On-Site Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project Area between Bracut (~PM 83.70) and Jacoby Creek (~PM 84.40).

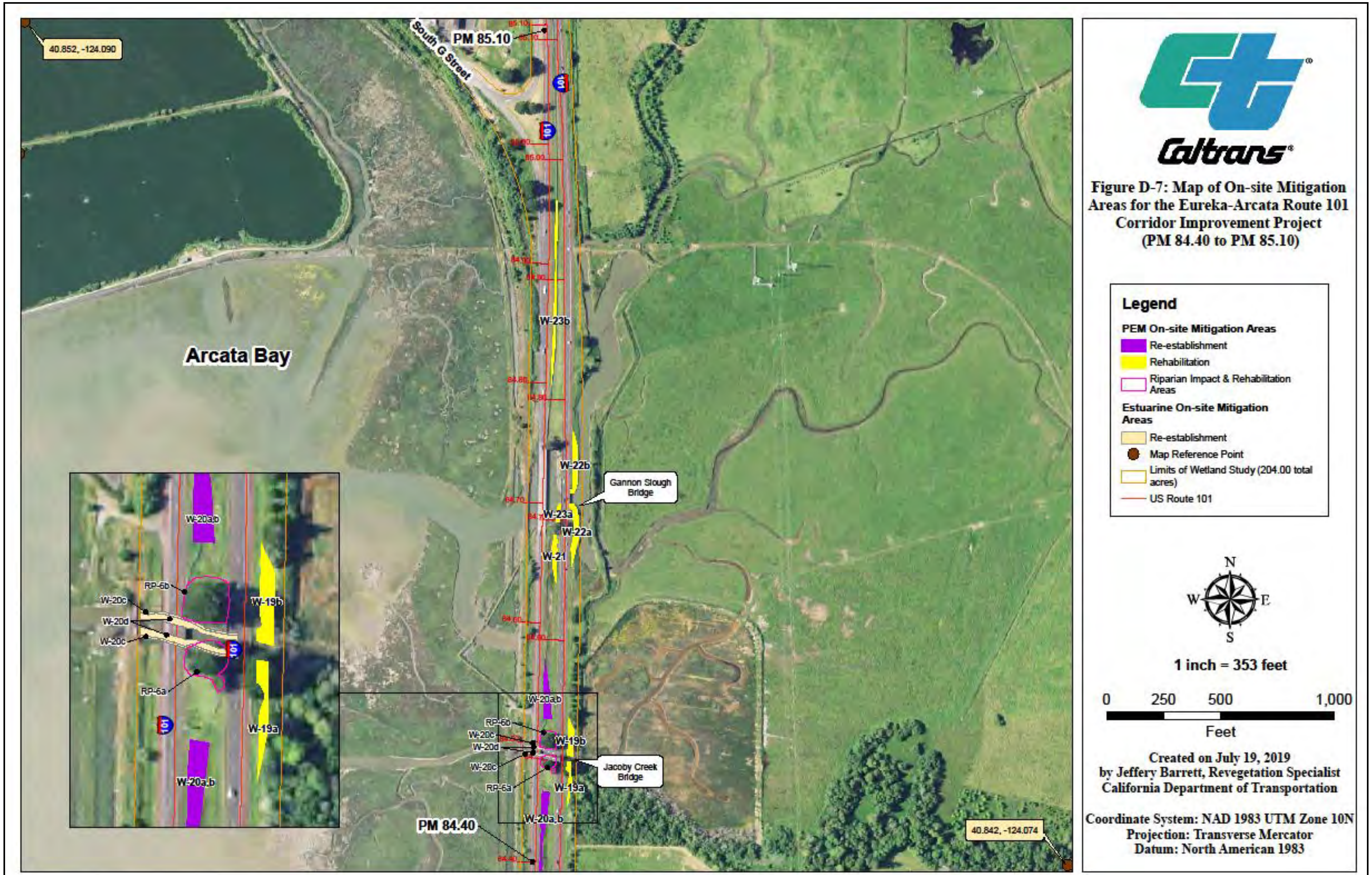

Figure D-7: Map of On-Site Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project Area between Jacoby Creek (~PM 84.40) and South G Street (~PM 85.10).

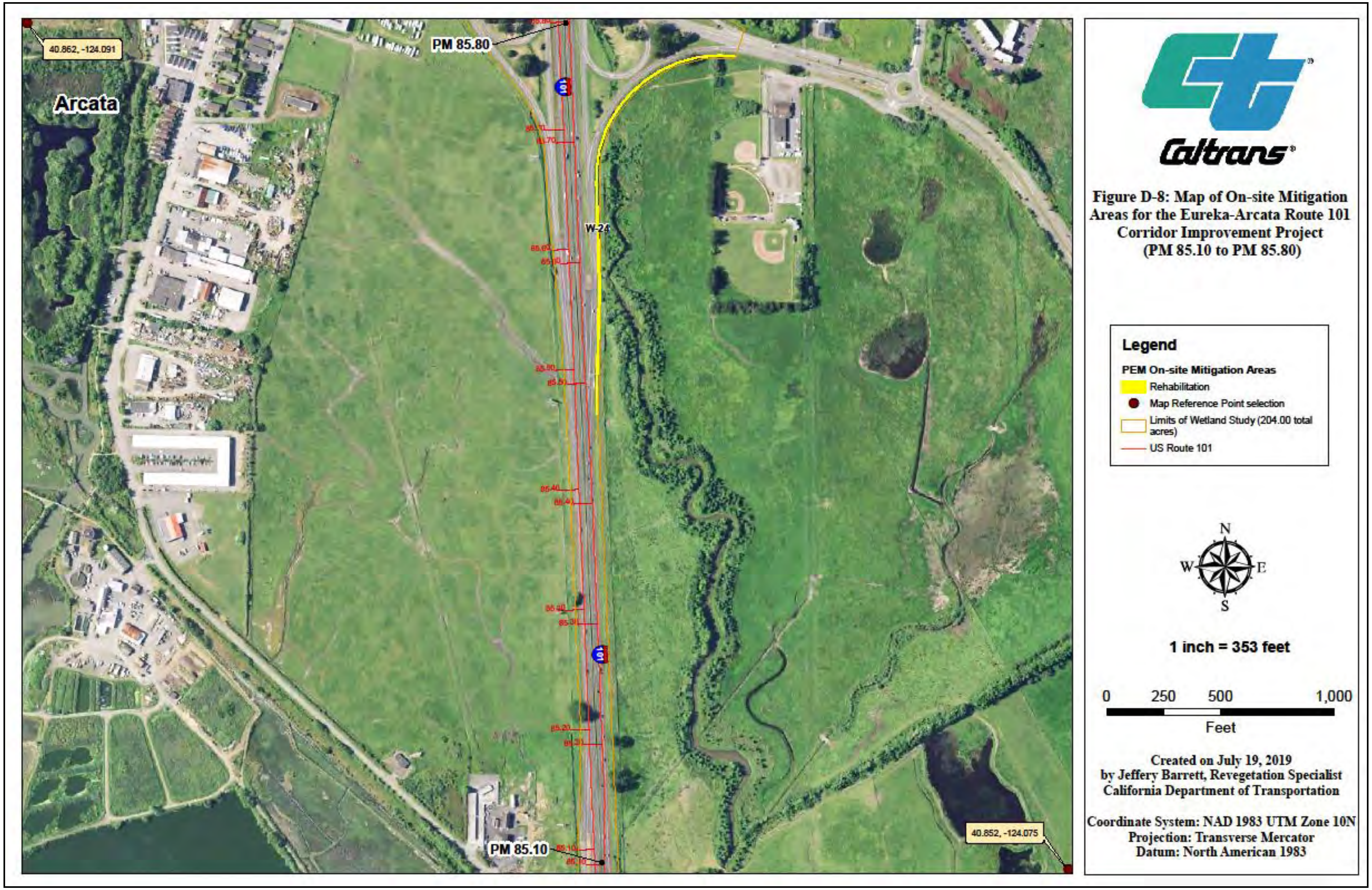

Figure D-8: Map of On-Site Mitigation Areas for the Eureka-Arcata Route 101 Corridor Improvement Project Area between South G Street (~PM 85.10) and US 101-SR 255 Interchange (~PM 85.80).

Appendix E: Project Pre-Construction Photos

Photo E-1. View of the Estuarine Intertidal Wetlands within the Proposed Revegetation Area at the Airport Road 101 Slough and Levee Looking Southeast Towards the Tide Gates. Date of Photo: September 4, 2018.

Photo E-2. View of the Estuarine Intertidal Wetlands within the Proposed Revegetation Area at the Airport Road 101 Slough and Levee Looking Northeast Towards Airport Road. Date of Photo: September 4, 2018.

Photo E-3. View of the Estuarine Intertidal Wetlands within the Proposed Revegetation Area at the Airport Road 101 Slough and Levee Looking Southeast Towards the 101 Slough. Date of Photo: September 4, 2018.

Photo E-4. View of the Riparian Planting Area at the Airport Road 101 Slough and Levee Looking Southeast Towards Airport Road.
Date of Photo: October 22, 2018.

Photo E-5. View of the Riparian Planting Area at the Airport Road 101 Slough and Levee Looking Northwest Towards US 101.
Date of Photo: October 22, 2018.

Photo E-6. View of the Riparian Planting Area at the Airport Road 101 Slough and Levee Looking Southeast Towards Airport Road.
Date of Photo: October 22, 2018.

Photo E-7. View of the Riparian Planting and Weeding Area at the Airport Road 101 Slough and Levee Looking South Towards the Tide Gates. Date of Photo: October 22, 2018.

Photo E-8. View of the North End of the Common Reed Eradication and Wetland Restoration Area at Bracut Looking South Along Route 101 at PM 83.3. Date of Photo: June 26, 2018.

Photo E-9. View of the Middle of the Common Reed Eradication and Wetland Restoration Area at Bracut Looking South Between PM 83.2 and 83.3. Date of Photo: June 26, 2018.

Photo E-10. View of the South End of the Common Reed Eradication and Wetland Restoration Area at Bracut Looking North Along Route 101 at PM 83.2. Date of Photo: June 26, 2018.

Photo E-11. View of the South End of the Proposed Wetland Reference Site for the Common Reed Eradication and Wetland Restoration Area at Bracut Looking North Along Route 101 at ~PM 83.3. Date of Photo: June 26, 2018.

Photo E-12. View of the Middle of the Proposed Wetland Reference Site for the Common Reed Eradication and Wetland Restoration Area at Bracut Looking South Along Route 101 at ~PM 83.3. Date of Photo: June 26, 2018.

Photo E-13. View of the Proposed Wetland Reference Site for the Wetland Establishment Areas Looking Northwest Across NB Route 101 at ~PM 81.86. Date of Photo: Dec. 13, 2018.

Photo E-14. View of the Proposed Wetland Reference Site for the Wetland Establishment Areas Looking North Across NB Route 101 at ~PM 81.86. Date of Photo: Dec. 13, 2018.

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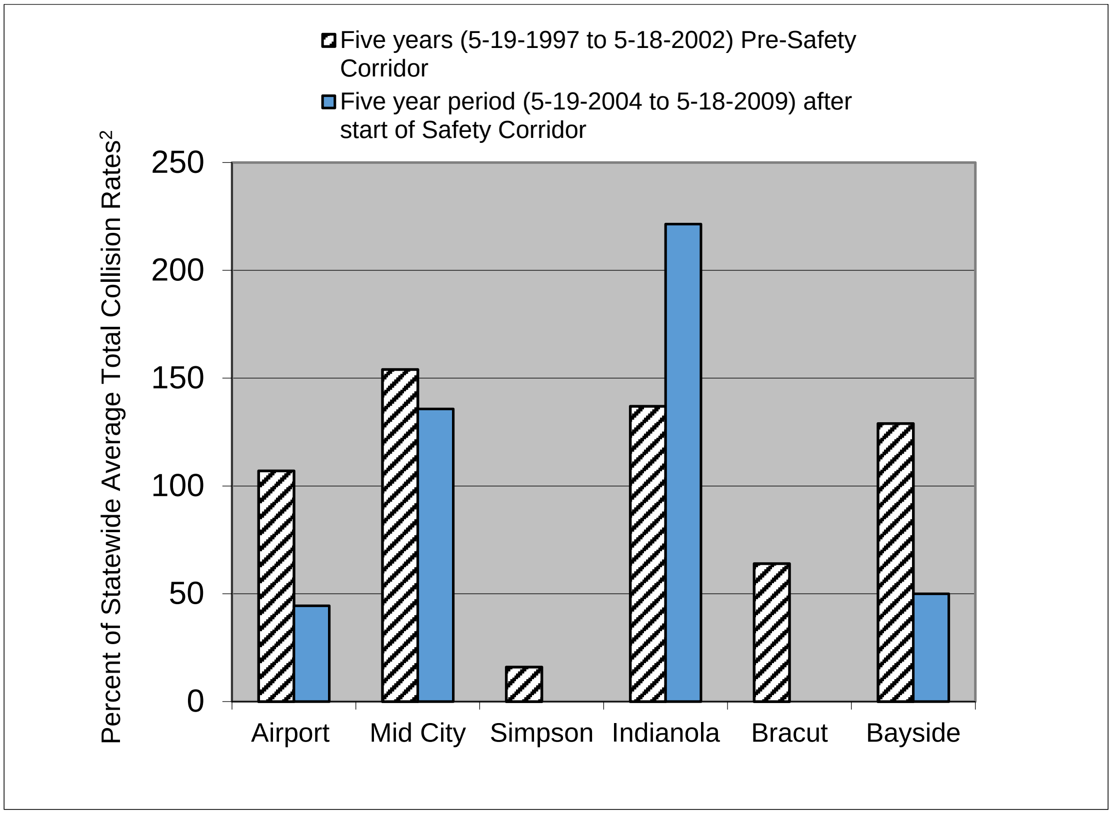
Figure 1-1 Average Total Collision Rates at Route 101 Intersections as a Percentage of Statewide Average Rates[1, 3]



Note 1: Total collisions consist of all types of collisions: fatal, injury and property damage

Note 2: For intersections, collision rates are a measure of the number of collisions per million vehicles. One hundred represents the percentage of the statewide average collision rate for similar highway intersections.

Note 3: The Safety Corridor was started on May 19, 2002.

Source: Collision Data obtained from Caltrans Transportation System Network (TSN) by District 1 Traffic Safety

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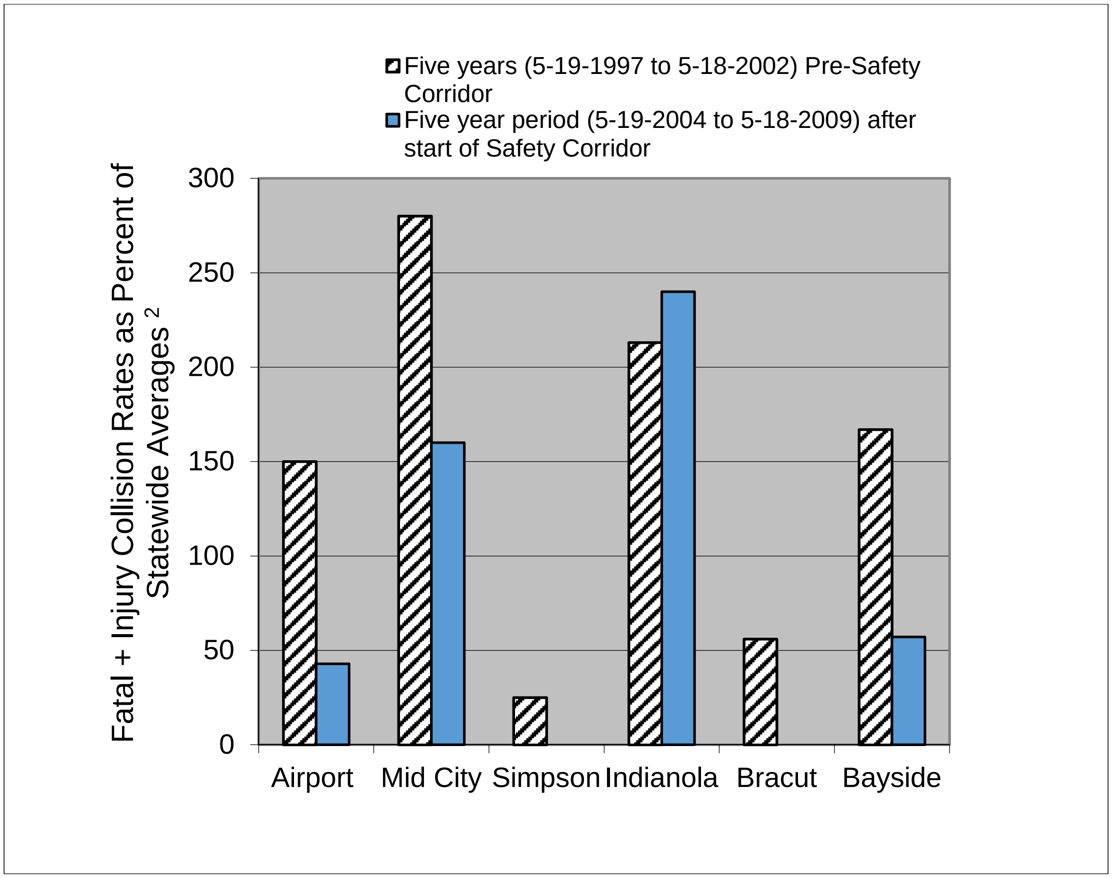
Figure 1-2 Average Severe Collision Rates at Route 101 Intersections as a Percentage of Statewide Average Rates[1, 3]



Note 1: Severe collisions consist of fatal and injury collisions.

Note 2: For intersections, collision rates are a measure of the number of collisions per million vehicles. One hundred represents the percentage of the statewide average collision rate for similar highway intersections.

Note 3: The Safety Corridor was started on May 19, 2002.

Source: Collision Data obtained from Caltrans Transportation System Network (TSN) by District 1 Traffic Safety

TRANSPORTATION MANAGEMENT PLAN

To:	KATHY WICKAM PE-Dokken Engineering North Region Design E2	Date: File: EA: EFIS:	November 7, 2018 HUM-101 PM 80.8/85.0 01-0C9301 01 1300 0078 Tide Gates
	As Signed By PWH for SMR		
From:	SHERI RODRIGUEZ, Chief District 1 Office of Traffic Operations		

Project Information

Location:	In Humboldt County, in and near Eureka and Arcata, at 5 locations from 0.1 miles north of the Eureka Slough Bridge (#04-0022) to 0.9 miles south of the 255/101 Separation (#04-0049).	
Type of Work:	Replacing 5 tide gates.	
Anticipated Traffic Control:	Lane reduction traffic control on Route 101 Shoulder closure	
Estimated Maximum Delay:	Minimal	
Peak Hour Traffic Volumes:	NB: 2,300 vph SB: 1,800 vph	
Lane Requirement Charts Included:	Yes	
Closure During Night Hours:	Required	
Number of Working Days:	30 days (10 TTC working days)	
PS&E to DOE Date:	January 4, 2019	
RTL Date:	March 1, 2019	
District Traffic Mgr/ TMP Mgr:	Sheri Rodriguez	(707) 445-6377
TMP Contact:	Jamie Lusk	(707) 445-6419

Anticipated Traffic Impacts

Significant traffic impacts are not anticipated provided the following recommendations and requirements are incorporated into the project. In conformance with Deputy Directive-60, District Lane Closure Review Committee approval is not required for projects with anticipated traffic delay less than 30 min.

Hours of Work

- See Chart no. 1 "Expressway Lane Requirements" for work hour restrictions.

- The full width of the traveled way must be open for use by public traffic for the following Special Days:

Event	Event Date	Special Days
Humboldt State University Graduation	Second Weekend in May	Friday through Sunday
Humboldt Bay Marathon	Second Sunday in August	Sunday

The contractor must verify the actual dates for these Special Events. See Chart no. 2 "Lane Closure Restrictions for Designated Holidays and Special Days" for work day restrictions.

Public Notice

- Upon receipt of notice that the total roadway width, including paved shoulder, will be narrowed to less than 16 ft or there is a change in vertical clearance, the Resident Engineer must promptly notify the HQ District 1 Construction Liaison at (916) 322-4822 so annual permit holders can be notified of restrictions.

- The District Public Information Office, (707) 445-6444, must be contacted two weeks in advance of the start of construction.

- Each closure must be entered in the Lane Closure System (LCS; http://lcs.dot.ca.gov/lcsprod/).

    - To access the LCS you will need an account. Contact Jeannette Candalot at (707) 445-7807 to get set up with an account.

    - Every Monday by noon, submit a schedule of planned closures for the next week period. The next week period is defined as Friday midnight through the following Friday midnight.

    - Closures must be statused daily. Status closures before the first advance warning sign is placed (1097) and after the last advance warning sign is picked up (1098) or if cancelled (1022). Statusing can be accomplished through:

Status With	Day	Time	URL/Contact Number
LCS Web Page	Any	Any	https://lcs.dot.ca.gov
LCS Mobile Web Page	Any	Any	https://lcsmobile.dot.ca.gov
District 1 Dispatch	Monday-Friday	6:30am-6:30pm	(707) 441-5747
District 3 Dispatch	Monday-Friday	6:30pm-6:30am	(916) 859-7900
District 3 Dispatch	Saturday and Sunday	Any	(916) 859-7900

- The Resident Engineer must provide information to residents and businesses before and during project work that may represent a negative impact on commerce and travel surrounding the zone of construction.

Bicyclist Accommodation

- This section of Route 101 is part of the Pacific Coast Bike Route. Bicyclists must be accommodated through the work zone. Signage must be used to alert vehicles of the possible presence of bicyclists.
  - During lane reduction traffic control, when shoulders are closed, bicyclists must be provided adequate space adjacent to the open traffic lane to safely traverse through the work zone.

Traffic Control

- One traffic control lane closure is allowed in each direction of travel within the project limits.
- If stationary mounted construction area signs are used, the W11-1 vehicular traffic sign (bicycle symbol) and the W16-1 supplemental plaque (SHARE THE ROAD) must be placed prior to the construction zone.
- Work that requires a lane and shoulder closure on an expressway must be in conformance with the Caltrans Standard Plan T10, "TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS."
  - A minimum of 16 ft of paved roadway in each direction of travel must be open for use by public traffic.
- A minimum of one PCMS in advance of the construction site must be required to notify the public of the closures related to this project.
  - Start displaying the message on the PCMS 15 minutes before closing the lane.
  - The minimum height of the PCMS must be 7 ft.
- Access to businesses, side roads and residences must be maintained at all times. When work or traffic queues extend through an intersection, additional traffic control will be required at the intersection.
- COZEEP is recommended for this project based on risk factors associated with this project and the COZEEP Guidelines (CA DOT Construction Manual Section 2-215C). The associated risk factors include: workers exposed to traffic, night construction activities, and speed management.

- The following table lists projects that are anticipated to have closures within this project's work limits and must be added to section 5-1.20A of the 2018 Standard Specifications:

Contract No.	Co-Rte-PM	Location	Type of Work	Est. Delay
01-0C9704	HUM-101-79.9/86.3	In Arcata/Eureka	Upgrade Guardrail	Minimal*
01-0E0004	HUM-101-84.4/84.8	Near Arcata	Replace Bridge Rails/Bridge	Minimal*
01-0E0404	HUM-101-78.0/79.8	In Eureka	Overlay	Minimal*
01-0E6804	HUM-101-78.0/79.6	In Eureka	Upgrading Drainage/Installing Traffic Calming Features	Minimal
01-0F2004	HUM-101-79.8	In Eureka	Seismic Retrofit or Replace Bridge	TBD
01-0F2204	HUM-101-80.2/85.8	In Arcata/Eureka	Extending/Constructing Accel/Decel Lanes	Minimal*
01-0J0604	HUM-101-79.4/86.0	In Arcata/Eureka	Replace Markers	Minimal*

*Night Closures

TMP Elements Needed for Cost Estimate

Item Code	Item	Unit	Cost
066062	COZEEP Contract	LS	$22,400*
066070	Maintain Traffic	LS	$2,400*
120100	Traffic Control System	LS	$9,600*
128651	Portable Changeable Message Sign	EA	$2,000**

*Used 8 TTC Working Days
**Used 10 TTC Working Days

Contingency Plan

The contractor must prepare a contingency plan for reopening closures to public traffic. The Contractor must submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request. Contingencies for unanticipated delays, emergencies, etc. must be coordinated between the RE and the Contractor.

SMR/jnl

CC: 1)SMRodriguez, 2)JCandalot
JShipp
JPimentel
JMcGee
Traffic Safety
PIO

Chart no. 1
Expressway Lane Requirements

County: Humboldt	Route/Direction: 101 NB	PM: 81.1, 83.7 and 84.9
County: Humboldt	Route/Direction: 101 SB	PM: 84.3

Closure limits:

From hour to hour	24-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
Mondays through Thursdays	1	1	1	1	1	1															1	1	1	1
Fridays	1	1	1	1	1	1															1	1	1	1
Saturdays	1	1	1	1	1	1															1	1	1	1
Sundays	1	1	1	1	1	1															1	1	1	1

Legend:

1	Provide at least one 16 ft through expressway lane open in direction of travel.
	No lane and/or shoulder closures allowed.

REMARKS: Keep the full width of the traveled way open to traffic when no active construction activities are occurring in the traveled way or within 6 ft of the traveled way.

Chart no. 2: Lane Closure Restrictions for Designated Holidays and Special Days

Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
xx	**H** xx									
	SD xx									
	xx	**H** xx								
		SD xx								
	xx		**H** xx	xx						
			SD xx							
	xx			**H** xx						
				xx	**H** xx					
					xx	**H** xx				
						xx	**H** xx	xx		

Legend:

	Refer to lane requirement charts
xx	The full width of the traveled way must be open for use by traffic.
H	Designated Holiday
SD	Special Day

TRANSPORTATION MANAGEMENT PLAN UPDATE

To:	ERIC SHADA Project Engineer North Region Design E2	Date: File: EA: EFIS:	September 17, 2018 HUM-101 PM 80.0/87.8 01-0C9701 01 1300 0094 1 Eureka/Arcata Corridor MBGR
	As signed by:		
From:	SHERI RODRIGUEZ, Chief District 1 Office of Traffic Operations		

Project Information

Location:	In Humboldt County near Eureka from Eureka Slough Bridge to Arcata Overhead.	
Type of Work:	Install median barrier, upgrade MBGR, and shoulder widening.	
Anticipated Traffic Control:	Lane reduction traffic control Shoulder closure	
Estimated Maximum Delay:	Minimal	
Peak Hour Traffic Volumes:	4500 vph	
Lane Requirement Charts Included:	Yes	
Closure During Night Hours:	Required	
Number of Working Days:	75 days	
PS&E to DOE Date:	February 4, 2019	
RTL Date:	April 1, 2019	
District Traffic Mgr/ TMP Mgr:	Sheri Rodriguez	(707) 445-6377
TMP Coordinator:	Jamie Lusk	(707) 445-6419
TMP Author:	Paul Hailey	(707) 445-5213

Anticipated Traffic Impacts

Significant traffic impacts are not anticipated provided the following recommendations and requirements are incorporated into the project. In conformance with Deputy Directive-60, District Lane Closure Review Committee approval is not required for projects with anticipated traffic delay less than 30 min.

Hours of Work

- See Chart no. 1 "Freeway/Expressway Lane Requirements" for work hour restrictions.

- See Chart no. 2 "Lane Closure Restrictions for Designated Holidays" for work day restrictions.

Public Notice

- Upon receipt of notice that the total roadway width, including paved shoulder, will be narrowed to less than 16 ft or there is a change in vertical clearance, the Resident Engineer must promptly notify the HQ District 1 Construction Liaison at (916) 322-4822 so annual permit holders can be notified of restrictions.

- The District Public Information Office, (707) 445-6444, must be contacted two weeks in advance of the start of construction.

- Each closure must be entered in the Lane Closure System (LCS; http://lcs.dot.ca.gov/lcsprod/).

  - To access the LCS you will need an account. Contact Jeannette Candalot at (707) 445-7807 to get set up with an account.

  - Every Monday by noon, submit a schedule of planned closures for the next week period. The next week period is defined as Friday midnight through the following Friday midnight.

  - Closures must be statused daily. Status closures before the first advance warning sign is placed (1097) and after the last advance warning sign is picked up (1098) or if cancelled (1022). Statusing can be accomplished through:

Status With	Day	Time	Contact Number
LCS	Any	Any	-
District 1 Dispatch	Monday-Friday	6:30am-6:30pm	(707) 441-5747
District 3 Dispatch	Monday-Friday	6:30pm-6:30am	(916) 859-7900
District 3 Dispatch	Saturday and Sunday	Any	(916) 859-7900

- Any emergency service agency whose ability to respond to incidents will be affected by any lane closure must be notified prior to that closure.

- The Resident Engineer must provide information to residents and businesses before and during project work that may represent a negative impact on commerce and travel surrounding the zone of construction. Funding must be included in supplemental funds for public information (Item 066063 Traffic Management Plan – Public Information; consider $2,000).

- The following Transportation Management System (TMS) elements exist within the project limits:

TMS Element	Co-Rte-PM
EMS	HUM-101-80.2R
EMS	HUM-101-80.2L
Census	HUM-101-82.4
Census	HUM-101-83.95
EMS	HUM-101-87.48R
CCTV	HUM-101-87.67L
CMS	HUM-101-87.7R

<u>Bicyclist and Pedestrian Accommodation</u>

- This section of Route 101 is part of the Pacific Coast Bike Route. Bicyclists must be accommodated through the work zone. Signage must be used to alert vehicles of the possible presence of bicyclists.

  - During lane reduction traffic control, bicyclists and pedestrians must:

    a) Be provided adequate space adjacent to the open traffic lane to safely traverse through the work zone (e.g. 4 ft of delineated space) or

    b) Be safely transported through the work zone in a vehicle equipped for passengers with storage for the bicycle. Staging areas for the loading/unloading of bicycles and their equipment must be outside of the clear zone or protected with a physical barrier. The bicycle transport must ensure no damage occurs to the bicyclists' equipment. Signage must be used to direct bicycle traffic to the required staging area.

<u>Traffic Control</u>

- One lane closure is permitted in each direction of travel within the project limits. During concrete curing, a separate shoulder closure is permitted concurrently with a lane closure.

- The W11-1 vehicular traffic sign (bicycle symbol) and the W16-1 supplemental plaque (SHARE THE ROAD) must be placed prior to the construction zone.

- Work that requires a lane and/or shoulder closure on a freeway/expressway must be in conformance with the Caltrans Revised Standard Plan RSP T10, "TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS."

  - A minimum of 16 ft of paved roadway in each direction of travel must be open for use by public traffic.

- A minimum of one PCMS in advance of each end of the construction site must be required to notify the public of the closures related to this project.

  - Start displaying the message on the PCMS 15 minutes before closing the lane.

  - The minimum height of the PCMS must be 7 ft.

- The following table lists projects that are anticipated to have closures within this project's work limits and must be added to section 5-1.20A of the 2015 Standard Specifications:

Contract No.	Co-Rte-PM	Location	Type of Work	Est. Delay
01-0E7704	HUM-101-17.9/87.8	VAR	Bridge	Minimal
01-0G3504	HUM-101-68.2/93.0	VAR	Bridge	Minimal
01-0F2204	HUM-101-79.9/86.1	Eureka	Widening	Minimal
01-0C9304	HUM-101-79.9/84.9	Eureka	Drainage	TBD
01-0E0004	HUM-101-79.9/84.7	Eureka	Bridge Rail	Minimal
01-0G5104	HUM-101-87.8/91.5	Arcata	HFST/MGS	Minimal
01-0E6504	HUM-101-88.2/88.3	Arcata	Ramp	Minimal
01-0G7404	VAR	Eureka	Overlay	Minimal
01-0H7304	VAR	Eureka	Striping	Minimal
01-0J060	VAR	Eureka	Markers	Minimal

- Access to businesses, side roads and residences must be maintained at all times. When work or traffic queues extend through an intersection, additional traffic control will be required at the intersection.

- COZEEP is recommended for this project based on risk factors associated with this project and the COZEEP Guidelines (CA DOT Construction Manual

Section 2-215C). The associated risk factors include: workers exposed to traffic, night construction activities, and speed management.

<u>Contingency Plan</u>

The contractor must prepare a contingency plan for reopening closures to public traffic. The Contractor must submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request. Contingencies for unanticipated delays, emergencies, etc. must be coordinated between the RE and the Contractor.

SMR/pwh

CC: 1)SMRodriguez, 2)JCandalot
CCoonrod
JPimentel
JMcGee
Traffic Safety
PIO

Chart no. 1
Freeway/Expressway Lane Requirements

County: HUM | Route/Direction: 101 NB/SB | PM: 80.0/87.8

Closure limits:

From hour to hour	24-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
Mondays through Thursdays	1	1	1	1	1	1															1	1	1	1
Fridays	1	1	1	1	1	1															1	1	1	1
Saturdays	1	1	1	1	1	1															1	1	1	1
Sundays	1	1	1	1	1	1															1	1	1	1

Legend:

1	Provide at least one through freeway lane open in direction of travel. The maximum closure length is one mile.
	No lane and/or shoulder closures allowed.

REMARKS: Keep the full width of the traveled way open to traffic when no active construction activities are occurring in the traveled way or within 6 ft of the traveled way.

Chart no. 2: Lane Closure Restrictions for Designated Holidays										
Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
xx	H xx									
	xx	H xx								
	xx		H xx	xx						
	xx			H xx						
				xx	H xx					
					xx	H xx				
						xx	H xx	xx		

Legend:	
	Refer to lane requirement charts
xx	One lane in each direction must be open for use by traffic.
H	Designated Holiday

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

TRANSPORTATION MANAGEMENT PLAN UPDATE #2

To:	TODD LARK Project Engineer North Region Design E3 As signed by:	Date:	January 28, 2019
		File:	HUM-101 PM 84.4/84.8
		EA:	01-0E0001 EFIS: 0113000091 Upgrade Bridge Rails & Replace Bridge
From:	SHERI RODRIGUEZ, Chief District 1 Office of Traffic Operations		

Project Information

Location:	In Humboldt County, near Arcata, at the Jacoby Creek Bridge (#04-0023L; #04-0023R) and the Gannon Slough Bridge (#04-0024R).
Type of Work:	1. Replace the SB Jacoby Creek Bridge (#04-0023L). The new bridge will be constructed on a temporary alignment and moved to the existing alignment once the existing bridge is removed. 2. Replace bridge rails at the NB Jacoby Creek Bridge (#04-0023R) and the NB Gannon Slough Bridge (#04-0024R). Additional work includes replacing the bridge deck surfaces with reinforced concrete to support the new bridge rails.
Anticipated Traffic Control:	Lane reduction traffic control on Route 101 at night Lane reduction traffic control on NB Route 101 during the day (4 weekend occurrences max) Short-term closure of SB Route 101 at night with detour onto Route 255 (2 occurrences; 6-hr and 10-hr closure) SB Route 101 onramp closures Moving lane closure for striping
Estimated Maximum Delay:	NB/SB Route 101 Typical: Minimal NB Route 101 Weekend Lane Reduction: 10 min. SB Route 101 Detour to Route 255: 10 min. Route 255: Minimal
Peak Hour Traffic Volumes:	NB Route 101: 2,300 vph SB Route 101: 1,800 vph Route 255: 1,700 vph
Lane Requirement Charts Included:	Yes
Closure During Night Hours:	Required
Number of Working Days:	260 days; 2 seasons required at the SB Jacoby Creek Bridge (#04-0023L)
PS&E to DOE Date:	February 1, 2019
RTL Date:	April 1, 2019
District Traffic Mgr/ TMP Mgr:	Sheri Rodriguez (707) 445-6377
TMP Contact:	Jamie Lusk (707) 445-6419

Anticipated Traffic Impacts

Significant traffic impacts are not anticipated provided the following recommendations and requirements are incorporated into the project. In conformance with Deputy Directive-60, District Lane Closure Review Committee (DLCRC) approval is not required for projects with anticipated traffic delay less than 30 min. However, due to anticipated inconveniences to the public, the DLCRC was consulted and their approval was provided.

Hours of Work

- See Chart nos. 1 through 5 for work hour restrictions.
- At least two adjacent through lanes in each direction of travel must be open for use by public traffic for the following Special Days:

Event	Event Date	Special Days
Humboldt State University Graduation	Second Weekend in May	Friday through Sunday
Kinetic Grand Championship Race	Last Weekend in May	Friday through Monday
Humboldt Bay Marathon	Second Sunday in August	Sunday

The contractor must verify the actual dates for these Special Events. See Chart no. 6 "Lane Closure Restrictions for Designated Holidays and Special Days" for work day restrictions.

Public Notice

- Upon receipt of notice that the total roadway width, including paved shoulder, will be narrowed to less than 16 ft or there is a change in vertical clearance, the Resident Engineer must promptly notify the HQ District 1 Construction Liaison at (916) 322-4822 so annual permit holders can be notified of restrictions.
- The District Public Information Office, (707) 445-6444, must be contacted two weeks in advance of the start of construction.
- Each closure must be entered in the Lane Closure System (LCS; http://lcs.dot.ca.gov/lcsprod/).
    - To access the LCS you will need an account. Contact Jeannette Candalot at (707) 445-7807 to get set up with an account.
    - Every Monday by noon, submit a schedule of planned closures for the next week period. The next week period is defined as Friday midnight through the following Friday midnight.

- Closures must be statused daily. Status closures before the first advance warning sign is placed (1097) and after the last advance warning sign is picked up (1098) or if cancelled (1022). Statusing can be accomplished through:

Status With	Day	Time	URL/Contact Number
LCS Web Page	Any	Any	https://lcs.dot.ca.gov
LCS Mobile Web Page	Any	Any	https://lcsmobile.dot.ca.gov
District 1 Dispatch	Monday-Friday	6:30am-6:30pm	(707) 441-5747
District 3 Dispatch	Monday-Friday	6:30pm-6:30am	(916) 859-7900
District 3 Dispatch	Saturday and Sunday	Any	(916) 859-7900

- Any emergency service agency whose ability to respond to incidents will be affected by any lane closure must be notified prior to that closure.

- Work must be coordinated with the local busing system to minimize impact on their bus schedules. A minimum of two weeks in advance of SB Route 101 being closed, contact the Humboldt Transit Authority at (707) 443-0826 regarding the Redwood Transit Authority (RTS) SB Route 101 bus route. Hours of service are approximately 6:30am-9:30pm.

- The Resident Engineer must provide information to residents and businesses before and during project work that may represent a negative impact on commerce and travel surrounding the zone of construction.

<u>Bicyclist Accommodation</u>

- This section of Route 101 is part of the Pacific Coast Bike Route. Bicyclists must be accommodated through the work zone. Signage must be used to alert vehicles of the possible presence of bicyclists.

  - During lane reduction traffic control, bicyclists must:

    a) Be provided adequate space adjacent to the open traffic lane to safely traverse through the work zone (e.g. 4 ft of delineated space) or

    b) Be safely transported through the work zone in a vehicle equipped for passengers with storage for the bicycle. Staging areas for the loading/unloading of bicycles and their equipment must be outside of the clear zone or protected with a physical barrier. The bicycle transport must ensure no damage occurs to the bicyclists' equipment. Signage must be used to direct bicycle traffic to the required staging area.

Traffic Control

- One lane closure is allowed in each direction of travel within the project limits. Additionally, SB Route 101 will be closed for portions of 2 nights (detouring traffic onto Route 255) when the new Jacoby Creek Bridge (#04-0023L) is moved from its temporary to final alignment.

- The W11-1 vehicular traffic sign (bicycle symbol) and the W16-1 supplemental plaque (SHARE THE ROAD) must be placed prior to the construction zone.

- Work that requires a lane and/or shoulder closure on a freeway or expressway must be in conformance with the Caltrans Standard Plan T10, "TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS."
    - Regarding the weekend lane reduction closures (4 occurrences) to reinforce bridge decks at the NB Jacoby Creek Bridge (#04-0023R) and the NB Gannon Slough Bridge (#04-0024R), the designer must provide a traffic handling plan.

- Work that requires a complete closure on a freeway or expressway must be in conformance with the Caltrans Standard Plan T10A, "TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS."
    - Regarding the complete SB Route 101 closures (2 occurrences) to move the new SB Jacoby Creek Bridge (#04-0023L) to its final alignment, the designer must provide a traffic handling plan or detour plan detailing the SB Route 255 detour.

- Work that requires a ramp closure must be in conformance with the Caltrans Standard Plan T14, "TRAFFIC CONTROL SYSTEM FOR RAMP CLOSURE."
    - Advance warning signs advising the hours of closure must be required 7 days prior to the ramp closure.
    - The SB Route 101 onramps from G Street, NB Route 255 and SB Route 255 will need to be closed when SB Route 101 is closed. These ramp closures must be incorporated into the traffic handling plan or detour plan describing the SB Route 255 detour.

- Work that requires a moving lane closure on a multilane facility must be in conformance with the Caltrans Standard Plan T15, "TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURES ON MULTILANE HIGHWAYS."

- A minimum of one PCMS in advance of the construction site must be required to notify the public of the closures related to this project.

- Start displaying the message on the PCMS 15 minutes before closing the lane.

- The minimum height of the PCMS must be 7 ft.

- Access to businesses, side roads and residences must be maintained at all times. When work or traffic queues extend through an intersection, additional traffic control will be required at the intersection.

- COZEEP is required for this project based on risk factors associated with this project and the COZEEP Guidelines (CA DOT Construction Manual Section 2-215C). The associated risk factors include: workers exposed to traffic, night construction activities, end of queue management, speed management and significant truck volumes.

- An advisory speed limit sign (black on orange) and 2 radar feedback signs (located in the median and the shoulder) must be displayed/installed prior to when SB Route 101 traffic will be placed on a temporary alignment.

- The following table lists projects that are anticipated to have closures within this project's work limits and must be added to section 5-1.20A of the 2015 Standard Specifications:

Contract No.	Co-Rte-PM	Location	Type of Work	Est. Delay
01-0C9304	HUM-101-80.8/85.0	Near Arcata	Improve Drainage	TBD
01-0C9704	HUM-101-79.9/86.3	In/Near Arcata	Upgrade Guardrail	Minimal
01-0F2204	HUM-101-80.2/85.8	In/Near Arcata	Upgrade Accel/Decel Lanes	Minimal
01-366004	HUM-101-80.6/84.0	Near Arcata	Upgrade 4-Lane Facility	Minimal

TMP Elements Needed for Cost Estimate

Item Code	Item	Unit	Minimum Unit Price
066062	COZEEP Contract	LS	$2,800/night*
066070	Maintain Traffic	LS	$400/working day
120100	Traffic Control System	LS	$1,600/working day
128652	Portable Changeable Message Sign	LS	$15,000
066063	Traffic Management Plan – Public Information	LS	$5,000

*Consult Construction for number of nights

Delay Damages

Consider deducting delay damages for each 10-minute interval ($1,000/10-minutes) or fraction thereof past the time specified to open the following closures:

- SB Route 101 complete closure for the Jacoby Creek Bridge (#04-0023L) trial slide (6-hr)

- SB Route 101 complete closure for the Jacoby Creek Bridge (#04-0023L) final slide (10-hr)

- NB 101 weekend lane reduction closures (4 total weekends) to reinforce bridge decks at the Jacoby Creek Bridge (#04-0023R) and the Gannon Slough Bridge (#04-0024R).

<u>Contingency Plan</u>

The contractor must prepare a contingency plan for reopening closures to public traffic. The Contractor must submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request. Contingencies for unanticipated delays, emergencies, etc. must be coordinated between the RE and the Contractor.

SMR/jnl

CC: 1)SMRodriguez, 2)JCandalot
LAshley
JPimentel
JMcGee
Traffic Safety
PIO

Chart no. 1
Freeway/Expressway Lane Requirements

County: Humboldt | Route/Direction: 101 NB/SB | PM: 84.4/84.8

Closure limits: At the NB & SB Jacoby Creek Bridges (#04-0023) and NB Gannon Slough Bridge (#04-0024R)

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23 24
Mondays through Thursdays	1	1	1	1	1	1															1	1	1	1
Fridays	1	1	1	1	1	1																		
Saturdays																								
Sundays																					1	1	1	1

Legend:

1	Provide at least one 16 ft through freeway/expressway lane open in direction of travel. The maximum closure length is 4,000 ft.
	No lane and/or shoulder closures allowed.

REMARKS: Keep the full width of the traveled way open to traffic when no active construction activities are occurring in the traveled way or within 6 ft of the traveled way.

Chart no. 2
Freeway/Expressway Lane Requirements

County: Humboldt	Route/Direction:101 NB	PM: 84.4/84.8

Closure limits: At the NB Jacoby Creek Bridge (#04-0023R) and NB Gannon Slough Bridge (#04-0024R)

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23 24
Mondays through Thursdays	1	1	1	1	1	1																		
Fridays																					1	1	1	1
Saturdays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sundays	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Legend:

1	Provide at least one 16 ft through freeway/expressway lane open in direction of travel. The maximum closure length is 4,000 ft.
	No lane and/or shoulder closures allowed.

REMARKS:
1. This chart to be used when the existing AC bridge deck surface is removed and replaced with a reinforced concrete bridge deck.
2. This chart is valid for 4 occurrences only.

Chart no. 3
Complete Freeway/Expressway Closure Hours

County: Humboldt	Route/Direction: SB 101	PM: 83.9/86.2

Closure limits:

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23 24
Mondays through Thursdays																								
Fridays																								C
Saturdays	C	C	C	C	C																			
Sundays																								

Legend:

C	Freeway/expressway may be closed completely
	No complete closure is allowed

REMARKS:
1. SB Route 101 traffic will be detoured to SB Route 255 for access to Eureka.
2. This chart is valid during the one, 6-hr SB 101 complete closure for the Jacoby Creek Bridge (#04-0023L) trial bridge slide. It is anticipated that this closure will happen 1 week prior to the final SB 101 Jacoby Creek Bridge (#04-0023L) slide.

Chart no. 4
Complete Freeway/Expressway Closure Hours

County: Humboldt	Route/Direction: SB 101	PM: 83.9/86.2
Closure limits:		

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23 24
Mondays through Thursdays																								
Fridays																					C	C	C	C
Saturdays	C	C	C	C	C	C																		
Sundays																								

Legend:

C	Freeway/expressway may be closed completely
	No complete closure is allowed

REMARKS:

3. SB Route 101 traffic will be detoured to SB Route 255 for access to Eureka.
4. This chart is valid for one, 10-hr closure, when the new SB 101 Jacoby Creek Bridge (#04-0023L) is being moved from its temporary to final alignment.

Chart no. 5
Complete Ramp Closure Hours

County: Humboldt	Route/Direction: 101 SB	PM: 84.975, 85.706 & 85.707
Closure limits: SB Route 101 onramps from G Street, NB Route 255 and SB Route 255		

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23 24
Mondays through Thursdays																								
Fridays																					C	C	C	C
Saturdays	C	C	C	C	C	C																		
Sundays																								

Legend:

C	Ramp may be closed completely
	No ramp closures allowed.

REMARKS:

1. This chart is valid during the one, 6-hr SB 101 complete closure for the Jacoby Creek Bridge (#04-0023L) trial bridge slide and the one, 10-hr SB 101 complete closure for the Jacoby Creek Bridge (#04-0023L) final bridge slide.
2. A ramp detour plan must be approved prior to the closure of any ramps.

Chart no. 6: Lane Closure Restrictions for Designated Holidays and Special Days

Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
xx	**H** xx									
	SD xx									
	xx	**H** xx								
		SD xx								
	xx		**H** xx	xx						
			SD xx							
	xx			**H** xx						
				SD xx						
				xx	**H** xx					
					xx	**H** xx				
						xx	**H** xx	xx		

Legend:

	Refer to lane requirement charts
xx	At least two adjacent through lanes in each direction of travel must be open for use by traffic.
H	Designated Holiday
SD	Special Day

TRANSPORTATION MANAGEMENT PLAN

To: JIM WARE
PE Dokken Engineering
District 1 Design E2

As Signed By TAA

Date: November 20, 2017
File: HUM-101 PM 80.2/85.8
EA: 01-0F220
EFIS: 01 1500 0092
Arcata Acceleration/Deceleration Lanes

From: TROY ARSENEAU, Chief
District 1 Office of Traffic Operations

<u>Project Information</u>

Location:	In Humboldt County, in and near Eureka, from Cole Avenue to the Route 101/255 Separation (#04-0049).	
Type of Work:	Work includes extending/constructing new acceleration/deceleration lanes, upgrading lighting and removing median crossings.	
Anticipated Traffic Control:	Lane reduction traffic control on Route 101 Moving lane closures for striping Ramp closures at South G Street and the Route 101/255 junction Shoulder closures	
Estimated Maximum Delay:	Minimal on Route 101 5 minutes during ramp closure detour	
Peak Hour Traffic Volumes:	NB Route 101: 2,200 vph SB Route 101: 1,800 vph	
Lane Requirement Charts Included:	Yes	
Closure During Night Hours:	Required	
Number of Working Days:	TBD	
PS&E to DOE Date:	November 9, 2018	
RTL Date:	February 15, 2019	
District Traffic Manager/ TMP Manager:	Troy Arseneau	(707) 445-6377
TMP Coordinator:	Jamie Lusk	(707) 445-6419

<u>Anticipated Traffic Impacts</u>

Significant traffic impacts are not anticipated provided the following recommendations and requirements are incorporated into the project. In conformance with Deputy Directive-60, District Lane Closure Review Committee approval is not required for projects with anticipated traffic delay less than 30 min.

Hours of Work

- See Chart nos. 1 and 2 for work hour restrictions.

- See Chart no. 3 "Lane Closure Restrictions for Designated Holidays" for work day restrictions.

Public Notice

- Upon receipt of notice that the total roadway width, including paved shoulder, will be narrowed to less than 16 ft or there is a change in vertical clearance, the Resident Engineer must promptly notify the HQ District 1 Construction Liaison at (916) 322-4822 so annual permit holders can be notified of restrictions.

- The District Public Information Office, (707) 445-6444, must be contacted two weeks in advance of the start of construction.

- South G Street ramp closures and any detours through Arcata must be coordinated with the City of Arcata's Engineering Office at (707) 822-5957 two weeks in advance of any ramp closures/detours.

- Each closure must be entered in the Lane Closure System (LCS; http://lcs.dot.ca.gov/lcsprod/).

    - To access the LCS you will need an account. Contact Jeannette Candalot at (707) 445-7807 to get set up with an account.

    - Every Monday by noon, submit a schedule of planned closures for the next week period. The next week period is defined as Friday midnight through the following Friday midnight.

    - Closures must be statused daily. Status closures before the first advance warning sign is placed (1097) and after the last advance warning sign is picked up (1098) or if cancelled (1022). Statusing can be accomplished through:

Status With	Day	Time	Contact Number
LCS	Any	Any	-
District 1 Dispatch	Monday-Friday	6am-6pm	(707) 441-5747
District 3 Dispatch	Monday-Friday	6pm-6am	(916) 859-7900
District 3 Dispatch	Saturday and Sunday	Any	(916) 859-7900

- Any emergency service agency whose ability to respond to incidents will be affected by any lane closure must be notified prior to that closure.

- Work must be coordinated with the local busing system to minimize impact on their bus schedules. Contact the Humboldt Transit Authority at (707) 443-0826 regarding the Redwood Transit Authority (RTS) Route 101 bus route. Hours of service are approximately 6am-10:30pm.

- The Resident Engineer must provide information to residents and businesses before and during project work that may represent a negative impact on commerce and travel surrounding the zone of construction.

- Traffic Census Stations 11070 and 18030 are located at post mile 81.135 and 85.030, respectively. Provide Traffic Census representatives 14 days' notice before the pre-construction and post-construction operational status checks. Contact Traffic Census at (707) 496-0553.

Traffic Control

- One lane closure is allowed in each direction of travel within the project limits.

- The W11-1 vehicular traffic sign (bicycle symbol) and the W16-1 supplemental plaque (SHARE THE ROAD) must be placed prior to the construction zone.

- Work that requires a lane and/or shoulder closure on a freeway or expressway must be in conformance with the Caltrans Revised Standard Plan RSP T10, "TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON FREEWAYS AND EXPRESSWAYS."

  - A minimum of 14 ft of paved roadway in each direction of travel must be open for use by public traffic.

- Work that requires a moving lane closure on a multilane facility must be in conformance with the Caltrans Standard Plan T15, "TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURES ON MULTILANE HIGHWAYS."

- Work that requires a ramp closure must be in conformance with the Caltrans Standard Plan T14, "TRAFFIC CONTROL SYSTEM FOR RAMP CLOSURE."

  - Advance warning signs advising the hours of closure must be required 7 days prior to the ramp closure.

  - No two consecutive off or on-ramps in the same direction can be closed at the same time.

  - No two off or on-ramps in the same interchange can be closed at the same time.

  - In the event a ramp is closed, a traffic handling/detour plan must be provided.

- A minimum of one PCMS in advance of the construction site must be required to notify the public of the closures related to this project.

- Start displaying the message on the PCMS 15 minutes before closing the lane.

- Access to businesses, side roads and residences must be maintained at all times. When work or traffic queues extend through an intersection, additional traffic control will be required at the intersection.

- This section of Route 101 is part of the Pacific Coast Bike Route. Bicyclists must be accommodated through the work zone. Signage must be used to alert vehicles of the possible presence of bicyclists. During lane reduction traffic control, bicyclists must be provided space adjacent to the open traffic lane to traverse through the work zone.

- COZEEP is recommended for this project based on risk factors associated with this project and the COZEEP Guidelines (CA DOT Construction Manual Section 2-215C). The associated risk factors include: workers exposed to traffic, night construction activities and speed management.

- The following table lists projects that are anticipated to have closures within this project's work limits and must be added to section 5-1.20A of the 2015 Standard Specifications:

Contract No.	Co-Rte-PM	Location	Type of Work	Est. Delay
01-0C9304	HUM-101-80.8/85.0	In Arcata and Eureka	Replace Tide Gates	TBD
01-0C9704	HUM-101-79.9/86.3	In Arcata and Eureka	Guardrail Upgrade	Minimal
01-0E0004	HUM-101-84.4/84.8	In Arcata	Replace Bridges	Minimal
01-0E0404	HUM-101-78.0/79.8	In Eureka	Overlay	Minimal
01-0E6804	HUM-101-78.0/79.6	In Eureka	Traffic Calming	Minimal
01-0F2004	HUM-101-79.8	In Eureka	Seismic Retrofit Bridge	TBD

TMP Elements Needed for Cost Estimate

Item Code	Item	Unit	Minimum Unit Price
066062	COZEEP Contract	LS	$2,800/night
066063	Traffic Management Plan – Public Information	LS	$2,000
066070	Maintain Traffic	LS	$400/night
120100	Traffic Control System	LS	$1,600/night
128652	Portable Changeable Message Sign	LS	$15,000

Contingency Plan

The contractor must prepare a contingency plan for reopening closures to public traffic. The Contractor must submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request. Contingencies for unanticipated delays, emergencies, etc. must be coordinated between the RE and the Contractor.

TAA/jnl

CC: 1)TAArseneau, 2)JCandalot
JPimentel
JMcGee
Traffic Safety
PIO

Chart no. 1
Freeway/Expressway Lane Requirements

County: Humboldt	Route/Direction: 101 NB/SB	PM: 80.2/85.8
Closure limits:		

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	1	1	1															1	1	1	1	
Fridays	1	1	1	1	1	1																			
Saturdays																									
Sundays																					1	1	1	1	

Legend:

1	Provide at least one 14 ft through freeway/expressway lane open in direction of travel. The maximum closure length is 2 miles
	No lane and/or shoulder closures allowed.

REMARKS:

Chart no. 2
Complete Ramp Closure Hours

County: Humboldt	Route/Direction: 101 NB/SB	PM: 84.9/86.2
Closure limits: Ramps at South G Street and the Route 101/299 Separation (#04-0049)		

From hour to hour	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23 24
Mondays through Thursdays	C	C	C	C	C	C															C	C	C	C
Fridays	C	C	C	C	C	C																		
Saturdays																								
Sundays																					C	C	C	C

Legend:

C	Ramp may be closed completely
	No ramp closures allowed.

REMARKS: A ramp detour plan must be approved prior to the closure of any ramps.

Chart no. 3: Lane Closure Restrictions for Designated Holidays

Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
xx	**H** xx									
	xx	**H** xx								
	xx		**H** xx	xx						
	xx			**H** xx						
				xx	**H** xx					
					xx	**H** xx				
						xx	**H** xx	xx		

Legend:

	Refer to lane requirement charts
xx	The full width of the traveled way must be open for use by traffic.
H	Designated Holiday

STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY
EDMUND G. BROWN, JR., *GOVERNOR*

CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
1385 EIGHTH STREET • SUITE 130
ARCATA, CA 95521
VOICE (707) 826-8950
FACSIMILE (707) 826-8960

December 14, 2018

Joe Mateer, Senior Planner
City of Arcata – Community Development Dept.
736 F Street
Arcata, CA 95501

RE: Consolidated Permitting for the Caltrans Eureka-Arcata Route 101 Corridor Improvement Project

Dear Mr. Meyer,

Coastal Commission staff has received your letter of August 21, 2018 confirming your agreement to a consolidated coastal development permit (CDP) process, pursuant to Coastal Act section 30601.3, for the above-referenced proposed development. We also received a copy of the applicant's letter to you, dated August 17, 2018, requesting the consolidated CDP process. We agree that consolidated permit review by the Commission will not substantially impair local public participation, given the considerable opportunities for public input that Caltrans has provided thus far in the project planning process and will offer in the future phases of this process.

Therefore, in response to the applicant's request and your agreement, and pursuant to Coastal Act Section 30601.3, the Executive Director agrees to process and act upon a consolidated CDP application for this project. The standard of review for a consolidated CDP application submitted pursuant to this request is the Chapter 3 policies of the Coastal Act; the certified LCP may be used as guidance.

Should you have any questions, please contact me at (415) 904-5236 or by email at peter.allen@coastal.ca.gov.

Sincerely,

Peter Allen
Senior Coastal Program Analyst

Cc: Jeff Pimentel, Project Manager, Caltrans District 1
Jason Meyer, Associate Environmental Planner, Caltrans District 1
Melissa Kraemer, Supervising Analyst, North Coast District CCC

October 3, 2018

John Ford, Director
Humboldt County Planning and Building Department
3015 H Street
Eureka, CA 95501

RE: Consolidated Permitting for the Caltrans Eureka-Arcata Route 101 Corridor Improvement Project

Dear Mr. Ford,

Coastal Commission staff has received your October 1, 2018 request for a consolidated coastal development permit (CDP) process, pursuant to Coastal Act section 30601.3, for the above-referenced proposed development. As noted in your letter, only a small portion (less than 5%) of the overall project area occurs in the LCP jurisdiction of Humboldt County, with the majority of the project area located within Commission's retained CDP jurisdiction (portions of the project area also extend into the LCP jurisdictions of both the City of Arcata and the City of Eureka). We agree that consolidated permit review by the Commission will not substantially impair local public participation, given the considerable opportunities for public input that Caltrans has provided thus far in the project planning process. The standard of review for a consolidated CDP application submitted pursuant to this request is the Chapter 3 policies of the Coastal Act; the certified LCP may be used as guidance.

In response to your request, and pursuant to Coastal Act Section 30601.3, the executive director agrees to process and act upon a consolidated CDP application for this project.

Please contact me at 826-8650 or Melissa.Kraemer@coastal.ca.gov if you have any questions.

Sincerely,

Melissa B. Kraemer

Melissa B. Kraemer
Supervising Analyst

ec: Jeff Pimentel, Project Manager, Caltrans District 1

December 13, 2018

Rob Holmlund
Development Services Director
City of Eureka
531 K Street
Eureka, CA 95501

RE: Consolidated Permitting for the Caltrans Eureka-Arcata Route 101 Corridor Improvement Project

Dear Mr. Holmlund,

Coastal Commission staff has received your December 6, 2018 request for a consolidated coastal development permit (CDP) process, pursuant to Coastal Act section 30601.3, for the above-referenced proposed development. Only a small portion of the overall project area occurs in the LCP jurisdiction of the City, with the majority of the project area located within Commission's retained CDP jurisdiction (portions of the project area also extend into the LCP jurisdictions of both the County and the City of Arcata). We agree that consolidated permit review by the Commission will not substantially impair local public participation, given the considerable opportunities for public input that Caltrans has provided thus far in the project planning process and the City's offer to "remain engaged as needed in the Coastal Commission's permit process as may be required." The standard of review for a consolidated CDP application submitted pursuant to this request is the Chapter 3 policies of the Coastal Act; the certified LCP may be used as guidance.

In response to your request, and pursuant to Coastal Act Section 30601.3, the executive director agrees to process and act upon a consolidated CDP application for this project.

Please contact me at 826-8650 or Melissa.Kraemer@coastal.ca.gov if you have any questions.

Sincerely,

Melissa B. Kraemer
Supervising Analyst

ec: Jeff Pimentel, Project Manager, Caltrans District 1
Peter Allen, Senior Coastal Analyst, San Francisco

Memorandum

Making Conservation
a California Way of Life

To: Jeff Pimentel
Project Manager

Date: July 8, 2019

File: Eureka Arcata Corridor Improvement Project

From: Jason Meyer
Senior Environmental Planner
North Region Environmental

SUBJECT: Eureka-Arcata 101 Corridor Seismic and Tsunami Concerns

This memo discusses Caltrans' design considerations and analysis in regards to seismic and tsunami concerns.

Seismic

Coastal Staff had questions about the design criteria used for Jacoby Creek Bridge and the Indianola Underpass. Most Caltrans bridges are classified as Ordinary, and very few are classified as "Important" or "Recovery". Both Jacoby Creek Bridge and Indianola Underpass are classified as "Ordinary" bridges. Ordinary Caltrans bridges are designed per Caltrans Seismic Design Criteria (SDC) 2.0 (Caltrans 2109). The SDC specifies the minimum seismic design requirements that are necessary to meet the performance goals for Ordinary bridges**.** When the Design Seismic Hazards (DSH) occur, Ordinary bridges designed per DSC 2.0 are expected to remain standing but may suffer significant damage requiring closure.

The Design Seismic Hazards (DSH) include ground shaking (defined as ground motion time histories or response spectrum), liquefaction, lateral spreading, surface fault rupture, and tsunami. The response spectrum used in the design is called Design Spectrum (DS) as defined in Section 2.1 and Appendix B.

> *The Design Spectrum is based on the envelope of a deterministic and probabilistic spectrum.*
> *(1) A probabilistic spectrum based on a 5% in 50 years probability of exceedance (or 975-year return period).*
>
> *(2) A deterministic spectrum based on the largest median response resulting from the maximum rupture (corresponding to **M**Max) of any fault in the vicinity of the bridge site. This method is similar the Maximum Credible Earthquake.*
>
> *(3) A statewide minimum spectrum defined as the median spectrum generated by a Magnitude 6.5 earthquake on a strike-slip fault located 12 kilometers from the bridge site.*

The seismic energy of earthquakes is quantified as acceleration or g-force vs fundamental period, not as magnitudes on the Richter scale that most people are familiar with. Acceleration or g-force vs fundamental period is an response spectrum. Response spectrum and the fundamental period of the structure will determine the horizontal acceleration. The acceleration and the stiffness of the structure will determine the seismic displacement demand. The structure is designed with ductile displacement capacity greater than seismic displacement demand. (The Cascadia Subduction Zone was on the list of local fault lines considered in this analysis.)

The Jacoby Creek Bridge (Left) Replacement is a single span pre-cast box girders that is supported on seat type abutments. The abutments are founded on 3 foot diameter CISS piles. The Jacoby Creek Bridge (Left) Replacement is an Ordinary Standard bridge and all elements of this bridge are designed to satisfy SDC 2.0. Due to the fact this bridge has no ductile elements, it is unlikely this bridge will suffer significant damage requiring closure.

The Indianola Cutoff Undercrossing is a single span, Cast In Place/Pre-Stressed voided slab structure with a depth of two feet and a span of 69 feet. The foundation of three foot diameter Cast In Steel Sleave piles driven to a depth of about 90 feet. The undercrossing will have a clearance of 15 feet.

These structures were designed following the Caltrans Seismic Design Criteria 2.0 (2019), and will meet all guidelines for designing structures within areas of seismic activity.

The SDC apply only to structures, it does not apply to other components of the project such as the guardrails and fills for the acceleration and deceleration lanes. Design guidance states that under seismic conditions, only those portions of the new embankment that could impact an adjacent structure such as bridge abutments and foundations or nearby buildings require an overall minimum factor of safety of 1.1. The other portions of the project are not supporting structures and therefore are not analyzed for seismic loads.

Tsunami

There is some preliminary conceptual guidance (Memo 20-13, Caltrans 2010) that recommends developing structural mitigation for bridges below 40 feet, and within ½ mile of the ocean or other locations considered vulnerable to tsunami hazards. The Jacoby Creek Bridge is approximately 4.5 miles from the ocean, and almost 10 miles from the mouth of the Bay, however it is below 40 feet, and within the tsunami evacuation zone. The guidance states that many of the current design details addressing seismic ground motions will provide a relatively high level of protection from tsunami impacts, and the proposed design meets our seismic standards.

The guidance closes stating that there are a number of issues regarding design of bridges for tsunamis hazards that still need to be addressed by the engineering community. This shows that this is a developing science, and we may see future guidance on this issue.

While there are no design criteria for tsunami events for bridge design, the SB Jacoby Creek bridge does meet most of the recommended features listed in the Memo 20-13.

- The superstructure is continuous.
- The precast box girders are securely tied together.
- Abutments are supported on deep 3 foot diameter CISS piles, which will be structurally resistant to scour.
- The abutments are securely attached to the piles making the structure monolithic.
- The weight of the superstructure is greater than the buoyant force should the bridge become submerged.
- It uses open barrier rails.

Scour depths are provided in the Final Hydraulics Report (FHR). The bridge substructure/piles are designed assuming there is no support/capacity from the soil in the scour layers. The FHR addresses the 50 and 100 year storm events in combination with Max/Min Tide.

The FHR Summary of Scour and Channel Degradation found:

- Long Term Degradation is 0.75 feet for 75 year design life of the structure.
- There is no contraction scour.
- There is no local pier scour due to proposed abutments are outside on Q100 flow.

Although not specifically designed to resist the effects of a tsunami, the abutment substructure/piles elements of the proposed bridge will provide resistance to the impacts of a tsunami. The replacement bridge is a simple span bridge that is supported at two abutments (see Figure 1). The in-creek supports of the existing bridge will be removed. Each permanent abutment is supported by six Cast in Steel Shell (CISS) piles (Figure 2).

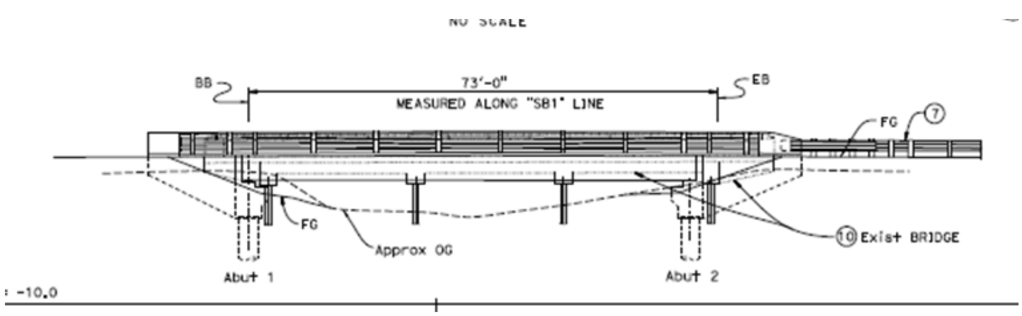


Figure 1. Design plans for bridge showing piles to be removed and new abutments outside of the channel.

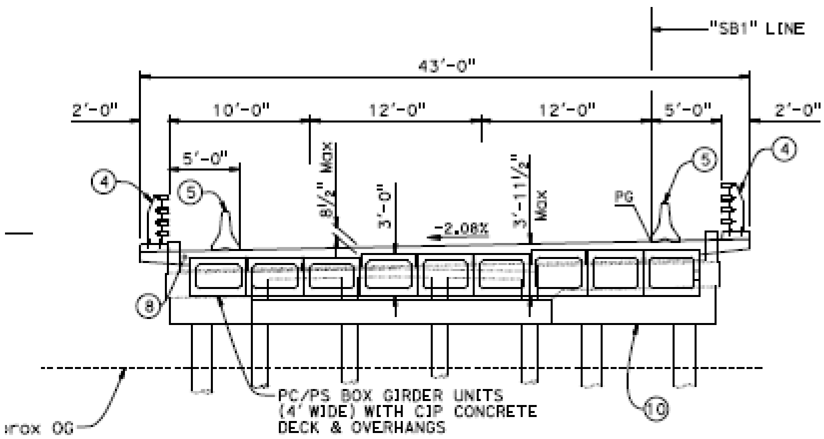


Figure 2. Cross section of Jacoby Creek Bridge showing locations of CISS piles.

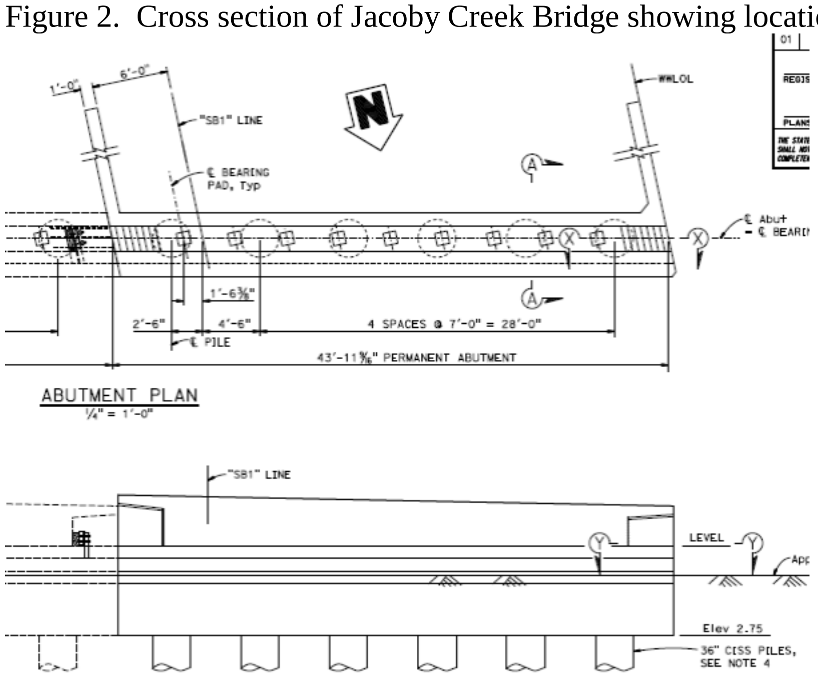


Figure 3. Design plans showing the abutments to Jacoby Ck Bridge.

The Jacoby Creek Bridge CISS piles are 36 inches in diameter, with a ¾ inches thickness of structural steel shell for the full length of the CISS pile. The top part of CISS pile will be filled with reinforced concrete to provide connection to abutment cap, and rebars for main reinforcing. Abutment piles are 74-77 feet long, providing structural support far deeper than any potential scour.

The abutments and CISS piles will provide substantial resistance to water velocity and scour impacts of a tsunami. The weight of the span is greater than the buoyant force.

The Indianola Undercrossing (bridge) does meet most of the recommended features found in the Tsunami Design Memo 20-13:

- • The superstructure is continuous
- • The abutments are supported by deep piles
- • The abutments are securely attached to the piles making the structure monolithic

The bridge structure of the overpass will be well outside of the tsunami run up zone, at approximately 27 feet high.

Emergency Procedures

Caltrans does not designate Tsunami Evacuation Routes. During major emergency events Caltrans plays a supportive role to the County, with the Governor's Office of Emergency Services playing a major coordinating role. Caltrans is the lead on maintaining access on the highways, both emergency access and permanent restoration. Much of the response depends on the particular impacts of the emergency, and Caltrans focuses more on being flexible and ready to respond, than having explicit plans for potential emergency situations.

References

Caltrans 2019. Caltrans Seismic Dsign Criteria Ver. 2.0. April 2019. Available online: http://www.dot.ca.gov/hq/esc/earthquake_engineering/sdc/documents/SDC2.0_April-2019_final.pdf

Caltrans 2010. Caltrans Memo to Designers 20-13. Tsunami Hazard Guildlines. Available online: http://www.dot.ca.gov/des/techpubs/manuals/bridge-memo-to-designer/page/section-20/20-13.pdf

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Making Conservation a California Way of Life.

To: STRUCTURE POLICY BOARD

Date: April 29, 2019

From: RUTH FERNANDES RCF
Deputy Division Chief (A)
Structure Policy & Innovation
Division of Engineering Services

Subject: IMPLEMENTATION OF *SEISMIC DESIGN CRITERIA VERSION 2.0*

Effective September 1, 2019, all ordinary bridges without a previous Type Selection approval shall be designed in accordance with Caltrans Seismic Design Criteria Version 2.0 (SDC 2.0). All projects with a Type Selection approval before September 1, 2019, shall have the option to either continue using the SDC version approved at the time of Type Selection or may use SDC 2.0 at the discretion of the Project Engineer.

SDC Version 2.0 incorporates technical revisions, clarifications, additional design provisions, and editorial enhancements to SDC Version 1.7, including a code-and-commentary format. A summary of changes for SDC 2.0 and the unformatted comprehensive document (SDC 2.0 Full Version, OEE Release) may be found at:

http://www.dot.ca.gov/hq/esc/earthquake_engineering/sdc/index.php#SDC.

To achieve timely updates of the SDC, the Office of Earthquake Engineering, Analysis and Research (OEEAR) is posting the comprehensive document, which is technically complete, prior to final formatting by Caltrans Division of Engineering Services, Technical Publications Unit. Upon completion, the formatted version will be posted at:

http://www.dot.ca.gov/hq/esc/techpubs/

This memo should be forwarded to all staff, as applicable. For questions or concerns regarding the technical content of the SDC, Consultants and Local Agencies should contact the Caltrans Structure Liaison Engineer. Caltrans staff may contact the Office Chief of OEEAR, Mark Mahan, at (916) 227-8404 or mark.mahan@dot.ca.gov.

c: Janice Benton, Chief, Division of Design
Ray Zhang, Chief, Division of Local Assistance
Dennis Agar, Chief, Division of Maintenance
Thomas A. Ostrom, Chief, Division of Engineering Services
Chris Mooring, Branch Chief, DES Administration

20-13 TSUNAMI HAZARD GUIDELINES

Introduction

While not as common as the hazards associated with earthquake induced ground shaking, tsunamis are capable of producing high levels of damage and pose a potential risk to life safety. Tsunamis are most typically associated with offshore subduction zone earthquakes, but can also be caused by submarine landslides, volcanic activity, and other sources. In California, sources of tsunami hazards may be due to local tsunami-generating activity occurring along the California coast, or from sources hundreds or thousands of miles away across the Pacific Ocean.

Bridge Vulnerabilities to Tsunami Hazards

Bridges and other structures may be susceptible to several types of vulnerabilities associated with tsunamis. The large flow of water over and around foundations as the water rushes in and then recedes can lead to significant scour. Scour effects may be intensified if the bridge is located over a creek, river or other site where the return flow from a watershed area is concentrated due to local topography. Depending on the speed of the water as the tsunami rushes in, it may create a substantial surge and/or drag force as it contacts and then flows past the bridge. The forces associated with the backflow of water returning to the coast may be significantly higher than the initial surge and drag forces, particularly if it includes large amounts of debris. If the height of the tsunami reaches the superstructure, in addition to lateral forces, it may be subject to buoyant forces, particularly affecting box girder bridges. After the water recedes, the saturated soil may cause large hydrostatic forces on bridge wingwalls and abutments, as well as on retaining walls.

Currently there are no approved tsunami runup maps to be used for assessing the tsunami hazard to transportation structures. Assessment of the tsunami hazard shall be made on a project specific basis. Tsunami runup may be affected by many factors including topography of the land, bathometry of the sea floor, incidence of the tsunami waves relative to the coast, natural and manmade barriers, and other factors. Historically the tsunami hazard is significantly reduced at locations beyond one-half mile of the coast or at elevations greater than 40 feet above mean sea level.

Mitigating Tsunami Hazards

Many of the most effective steps that can be taken to protect life safety in the event of a large tsunami, such as early warning systems, emergency evacuation plans, education, and training, are outside the primary responsibility of the bridge engineer. While bridge design details typically required to address seismic ground motions will provide a relatively high level of protection, there are other common-sense measures that may be considered to mitigate the effects of tsunamis on bridges. These include providing:

- Continuity of the superstructure
- Deep foundations less vulnerable to the potential effects of scour
- Monolithic connections
- Tie downs or open vents to alleviate buoyancy effects

In some situations, it may be prudent to take additional measures to protect a bridge from tsunami hazards. This may include bridges identified as part of an official Tsunami Evacuation Route or local emergency response plan, or due to the importance and purpose of the bridge. While not required for most bridges, these more extensive measures requiring project-specific approval may include:

- Raising the elevation of the bridge
- Using open barrier rails
- Placing fenders as protection
- Explicit tsunami design (contact the Office of Earthquake Engineering)

Superstructure mitigation measures will not generally be required if the minimum soffit elevation exceeds an elevation of 40 feet above mean sea level. Consideration of tsunami hazards will generally not be required if it is assessed that all vulnerable bridge components are above an elevation of 40 feet.

Responsibilities

The tsunami hazard shall be considered for bridge components below 40 feet above mean sea level for all new bridges and widenings within ½ mile of the Pacific Ocean coastline or other locations considered vulnerable to tsunami hazards. The Project Engineer is responsible for presenting information considered necessary to determine the need to mitigate for the tsunami hazard during the Type Selection Meeting. Type Selection attendees for projects designed by Caltrans should include the Project Engineer, Project Geologist/Geotechnical

Engineer, representatives from Structure Hydraulics and Earthquake Engineering, and the District Project Manager. For projects designed by external entities for Caltrans, additional attendees should include the Oversight Engineer and the Oversight Geologist/Geotechnical Engineer. Information to be presented during the Type Selection Meeting may include both local and regional topography, manmade and natural barriers between the coast and site, foundation types being considered, site geology, and any identified locally determined emergency plans affecting the bridge. Several communities have completed emergency plans to address tsunami hazards, and more are under development. The Project Engineer shall contact the District Project Manager to determine whether the bridge is included in a locally determined evacuation or emergency response plan.

The extent to which tsunami mitigation measures are to be taken shall be documented and approved through the process identified in *Memo to Designers 20-11*.

Project Impact

Once the need to consider tsunami hazards has been established for a project, the impact on project scope, schedule, and cost shall be determined and appropriate action taken as established elsewhere in Caltrans guidance material.

There remain a number of issues that still need to be addressed by the engineering community with regard to the design of bridges for tsunami hazards. This memo provides general guidance on prudent measures that can be considered during the planning and design phase of new projects to mitigate the effects of tsunami hazards.

Original signed by Kevin J. Thompson

Kevin J. Thompson
Deputy Chief, Division of Engineering Services,
Structure Design

M e m o r a n d u m

Serious drought.
Help save water!

To: Jeff Pimentel
Project Management
Caltrans District 1

Date: March 2, 2017

File: Eureka-Arcata Route 101 Corridor
Improvement Project
101 / Post Mile 79.8-85.8
EA 01-0E000 / 0113000091

From: Todd Lark
Design Engineer
North Region Design

Jason Meyer
Associate Environmental Planner
North Region Environmental Services Branch, E3

Subject: **SEA LEVEL RISE DESIGN HEIGHT AT JACOBY CREEK BRIDGE SOUTH**

To fulfill the consistency conditions set forth in the November 2013 federal consistency determination of the California Coastal Commission, Caltrans completed its "Climate Change Adaptation Pilot Strategy for Critically Vulnerable Assets in Northwest California" in December 2014. The following memo reflects design features incorporated into project, which are appropriate for Sea Level Rise related adaptation strategies presented in the above-mentioned document as well other guidance available at this time and the best available science. The strategy presented has the Least Environmentally Damaging Feasible Alternative Under Section 30233 of the Coastal Act. The California Department of Transportation (Caltrans) is proceeding with the design of the Jacoby Creek Bridge South, located along Highway 101 at post mile 84.5. This memorandum includes the current projections for sea level rise and identifies a design elevation. The design is a pro-active, phased accommodation strategy that balances multiple resources and stakeholder needs.

The current king tide elevation at the North Spit tide gaging station, is 8.78 feet NAVD 88 (Laird, 2016). Northern Hydrology and Engineering (2015; Table 2-9) estimates local sea level rise for 2100, adjusted for Vertical Land Movement to be the following:

Relative 2100 Sea Level Rise Projection in Humboldt Bay (NAVD 88)			
	Centimeters	Feet	Plus a High Tide of 8.8 feet (Mean Annual Maximum Water)
Mad River Slough	86.2	2.8	11.6
North Spit	98.4	3.2	12.0

The current top of deck on the Bridge is approximately 11.8 feet elevation (NAVD 88). Caltrans proposes to increase the elevation of the bridge to 13.7 feet (Figure 1). The highway has a low of 11.1 feet elevation approximately 450 feet South of the bridge. North of the bridge, the highway varies between 11.9 and 12.4 feet elevation before reaching the Gannon Slough bridge, which has a top of deck elevation of 12.3 feet. To maintain standard geometry and sight distances, changes in elevation of the roadway need to be gradual, and raising the elevation of Jacoby Creek Bridge requires raising the grade for 100's of feet in both directions. Further raising the highway would be feasible to the south; however, to the north the highway prism is bound by the fixed elevation of the Gannon Slough Bridge.

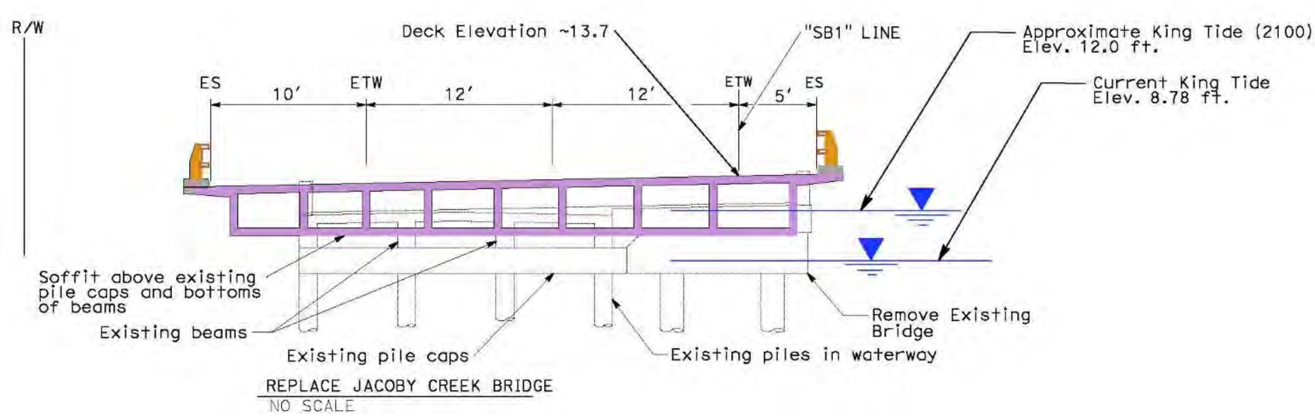


Figure 1. Jacoby Creek Bridge design cross section.

Environmental considerations and design rationale for 13.7 feet elevation at Jacoby Creek Bridge includes the following:

- The Jacoby Creek southbound bridge replacement will be a deeper (thicker) structure to span the creek with no intermediate supports in the channel. To avoid impinging on the waterway, the soffit of the bridge will be constructed higher than the original bridges' bent caps and deck support beams. This places the entire finished bridge deck above 13.1 feet elevation. As this elevation is sufficiently above the anticipated year 2100 King Tide elevation of 12.0 feet, the replaced bridge should not require elevating within its 75-year design life.
- The structure is designed to be relocated between construction stages, and it could readily be raised in the future should the need arise. In essence, the structure design incorporates Sea Level Rise adaptability.
- Currently, the highway elevation north and south of the Jacoby Creek Bridge is approximately 12 feet, and will be addressed in future projects, whether with defense or grade raise. Regardless, the bridge will have longevity.
- Cascadia Geosciences (2014) shows uplift near the Jacoby Creek Bridge, rather than the subsidence represented in the table above. Thus, Sea Level Rise may be at a slower rate at this location.

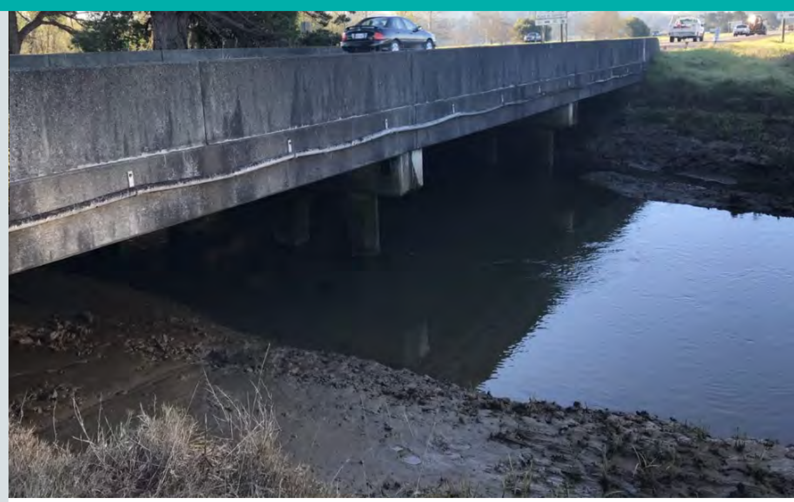
Reference

Laird, Aldaron. 2016. City of Eureka-Sea Level Rise Assets Vulnerability and Risk Assessment. Trinity Associates. June 2016.

Cascadia Geosciences. 2014. Tectonic land level changes and their contribution to sea-level rise, Humboldt Bay region, Northern California.

Northern Hydrology & Engineering. 2015. Humboldt Bay: Sea Level Rise, Hydrodynamic Modeling, and Inundation Vulnerability Mapping, Final Report. Prepared for State Coastal Conservancy and Coastal Ecosystems Institute of Northern California.

Caltrans Eureka-Arcata Corridor: Sea Level Rise Vulnerabilities and Adaptation Solutions



May 21, 2019

Caltrans District 1
1656 Union St.
Eureka, CA, 95501

ICF
201 Mission St., Suite 1500
San Francisco, CA 94105

Exhibit 26
CDP Application No. 1-18-1078
(Caltrans)
CT/ICF SLR Assessment

INTRODUCTION

Caltrans is proposing to improve unsafe portions of the Highway 101 Eureka-Arcata Corridor (the Corridor). This includes the Indianola Road / Highway 101 Intersection, Jacoby Creek Bridge, and four tide gates. Further details on the Corridor project can be referenced in the Caltrans Project Information document as part of the Coastal Development Permit application. Figure 1 shows the location of the proposed developments analyzed in this report within the project area.[1]

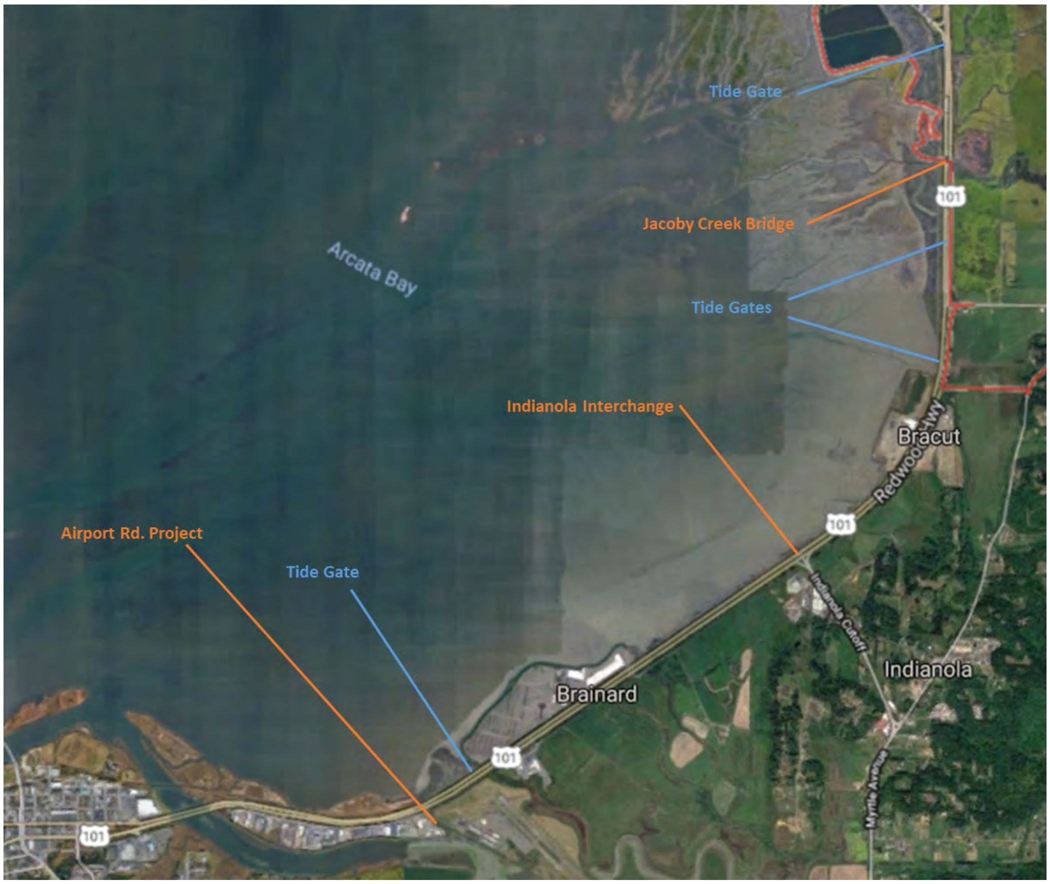


Figure 1. Locations of the proposed developments analyzed in this report within Highway 101 Eureka-Arcata Corridor.

Recent studies in the Humboldt Bay region have found this specific area is potentially vulnerable to inundation from projected sea level rise (SLR) (Anderson and Laird 2018, Laird 2018). California Coastal Commission (CCC) staff has recommended that Caltrans consider vulnerabilities and potential adaptation measures for new developments in accordance with the most recent CCC SLR guidance for Coastal Development Permits (CCC 2018).

In this report, the vulnerability of the proposed Caltrans projects to SLR and other coastal hazards is analyzed. The analysis enables identification of a range of adaptation options for the proposed projects. The analysis addresses the following planning needs.

[1] Note that not all assets in the CDP package are included in this assessment. We only assess the proposed developments that will be significantly impacted by SLR in the future.

- Projected SLR range for the project site area.
- Projected SLR hazard impacts to Corridor service, incorporating storm surge, wave run up, and erosion.
- Projected impacts from the combination of the proposed Corridor projects and SLR hazards to local coastal resources.
- Project adaptation solutions that avoid these impacts and minimize risks to the projects and coastal resources.
- Considerations for long-term Caltrans adaptation planning efforts for the project area and broader Humboldt Bay region.

In the SLR and adaptation assessment, the research team only considered impacts directly related to the proposed developments using the CCC guidance. Beyond those project elements, the report cursorily discusses potential impacts and adaptation needs for other community and Caltrans assets (e.g., lower-lying adjacent roads leading to the project elements) as part of the broader regional adaptation effort, but does not explicitly address risks and adaptation needs for those assets outside the development scope. As a result, the proposed projects analyzed in this assessment represent an initial stage in Caltrans's overall rehabilitation and adaptation goals for the Corridor and Humboldt Bay region at large. Throughout this document, and particularly in the Adaptation Planning section, the findings fit within this ongoing long-term adaptation strategy development. The following sections detail the approach and results from the SLR vulnerability and adaptation solution assessments.

SEA LEVEL RISE VULNERABILITY ANALYSIS

Sea Level Rise Projections from Existing Reports

This analysis uses the previously mentioned guidance from the CCC's Sea Level Rise Policy Guidance, adopted in 2018. Based on that guidance and CCC staff feedback to Caltrans (CCC 2019), this report evaluated vulnerabilities under the CCC low, medium-high, and extreme risk aversion scenarios for the project lifetimes out to 2100 (end of century).

The analysis draws on several recent reports that provide detailed analyses of risks and vulnerabilities for the Corridor and are based on local SLR projections that are drawn from CCC guidance published prior to the latest 2018 CCC report. All of these previous SLR studies evaluated scenarios lower than the latest CCC medium-high and extreme risk aversion scenarios, but nonetheless provide useful information in the context of higher SLR projections. These three previous assessments include the following.

- **Humboldt Bay Area Plan – Sea Level Rise Vulnerability Assessment (Laird 2018):** Using a 5.4-feet of SLR by 2100 scenario at the Mad River Slough to Hookton Slough tide gauge, this assessment projects significant inundation of the Highway 101 Corridor segments.
- **City of Arcata Sea Level Rise Risk Assessment (Anderson and Laird 2018):** This assessment uses a 6.5-feet of SLR by 2100 scenario at the Arcata Wharf tide gauge. The report's vulnerability assessment is limited to risks to local groundwater resources from SLR.

- **District 1 Climate Change Vulnerability Assessment and Pilot Studies (Caltrans 2014):** This report assesses infrastructure vulnerabilities to climate hazards along the Highway 101 Corridor in the Humboldt Bay region. The SLR assessment includes vulnerability scores and potential adaptation solutions for local transportation assets and uses a SLR scenario of 5.8 feet by 2100 at the Mad River Slough to Hookton Slough tide gauges.

Based on the 2018 CCC SLR guidance and using the North Spit tide gauge, the analysis in this report uses a low risk SLR scenario of 4.1 feet by 2100, a medium-high of 7.6 feet, and an extreme risk of 10.9 feet.

Table 1 compares the SLR scenarios of the three local studies and the CCC guidance scenarios considered in this study.

Table 1. SLR scenario comparison for this study and local vulnerability studies.

Study	SLR Scenarios (2100 Reference Year)	Tide Gauge Scope	Geographic Scope
Highway 101 Corridor Vulnerability and Adaptation Solutions (this Report)	Low: 4.1 ft Medium-High: 7.6 ft Extreme: 10.9 ft	Mad River Slough to Arcata Wharf	Highway 101 Corridor
Humboldt Bay Area Plan	5.4 ft	Mad River Slough to Hookton Slough	Humboldt Bay
City of Arcata Vulnerability Study - NHE SLR Report	6.5 ft	Arcata Wharf	City of Arcata - Groundwater Supply
City of Arcata Vulnerability Study - Trinity Consultants Report	4.9 ft	Mad River Slough, Arcata Wharf	City of Arcata
Caltrans District 1 Climate Change Vulnerability	5.8 ft	Mad River Slough to Hookton Slough	Highway 101 Corridor

Figure 2. Local tide gauges used in this study and other vulnerability studies adjacent to the Highway 101 Corridor Project Area (NOAA 2019)[2].

While the studies previous undertaken in area do not meet the CCC guidance scenarios for total SLR by 2100, those studies offer key insights for "trigger levels" where the Corridor may experience significant impacts from SLR hazards.

The recent Humboldt Bay Area Plan's vulnerability assessment scope is similar to this assessment. The author modeled the Corridor's current vulnerability to projected SLR (Laird 2018). shows the tidal inundation resulting from 4.9 ft of SLR by 2100 combined with the mean monthly maximum water level (MMMW), where both north and south lanes of the Corridor are inundated. The study does not consider adaptation options for Corridor to prevent service disruptions from SLR.

[2] Map key for tide gauges:

- Red and yellow – water level, meteorological, and harmonic tide prediction data available
- Red only – water level and harmonic tide prediction data available
- White only – subordinate tide prediction data available

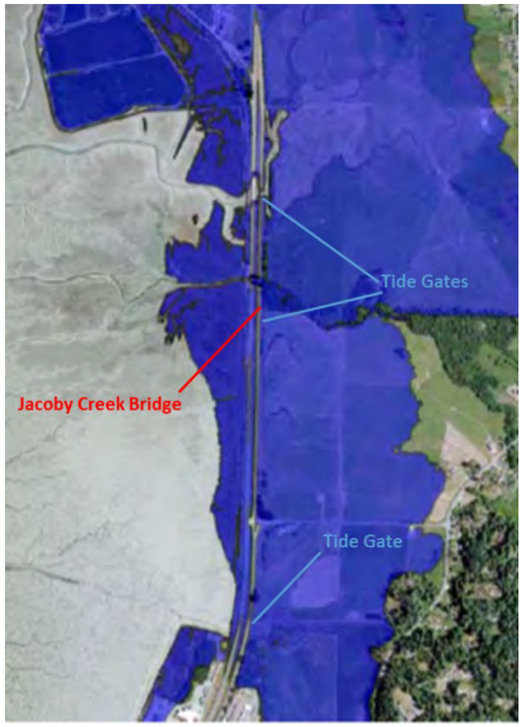


Figure 3. Tidal inundation in the northern portion of the Corridor with 4.9 ft of SLR by 2100 (Laird 2018).

Existing Conditions

The previously discussed reports have documented the existing vulnerabilities and coastal protection measures associated with SLR and other coastal hazards. Anderson and Laird (2018) documented the historical increase in annual maximum high tide elevations (i.e., king tides) at the North Spit gauge (Figure 4). The 2005 high tide event shown in Figure 4 was coupled with storm surge to create the highest recorded tidal elevation in Humboldt Bay at over 9.5 ft.

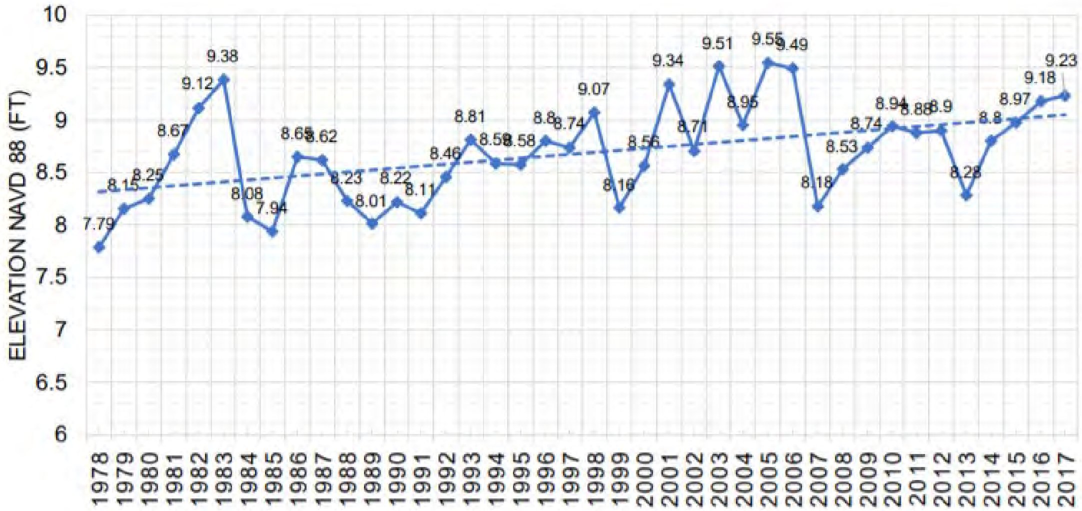


Figure 4. Annual maximum high tide elevations (Laird 2018).

Dikes protect much of the project area, most of which were built over 100 years ago (Laird 2018). However, these structures can be susceptible to overtopping, as occurred in the 2005 event. Along the Corridor, these dikes and the Highway 101 road grade provide protection for the community and Caltrans assets against high tide, storm surge, and wave impacts. Figure 5 shows an existing dike (in the form of a railroad grade) adjacent to the proposed Indianola Interchange.

Figure 5. Existing dike (as a railroad grade) near proposed Indianola Interchange.

Many of the dikes in the project area are controlled by private land owners, such as the North Coast Rail Authority (NCRA) and the California Department of Fish and Wildlife (CDFW). These dikes are not of uniform height and, as a result, there will likely be different levels of flooding along the Corridor, given that some locations will experience overtopping first. Figure 6 and Figure 7 show the recent Humboldt Bay Area Plan's vulnerability ratings for the shoreline segments along the Corridor. The most vulnerable segments have the lowest elevation dikes in red, which are less two feet higher than MMMW (Laird 2019).

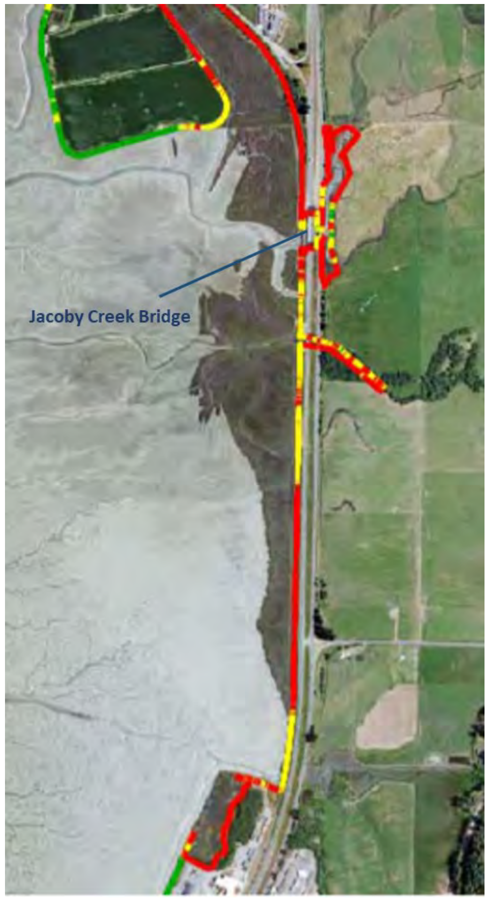


Figure 6. Vulnerability ratings for the upper portion of the Corridor shoreline: high (red), moderate (yellow), and low (green) (Laird 2018).

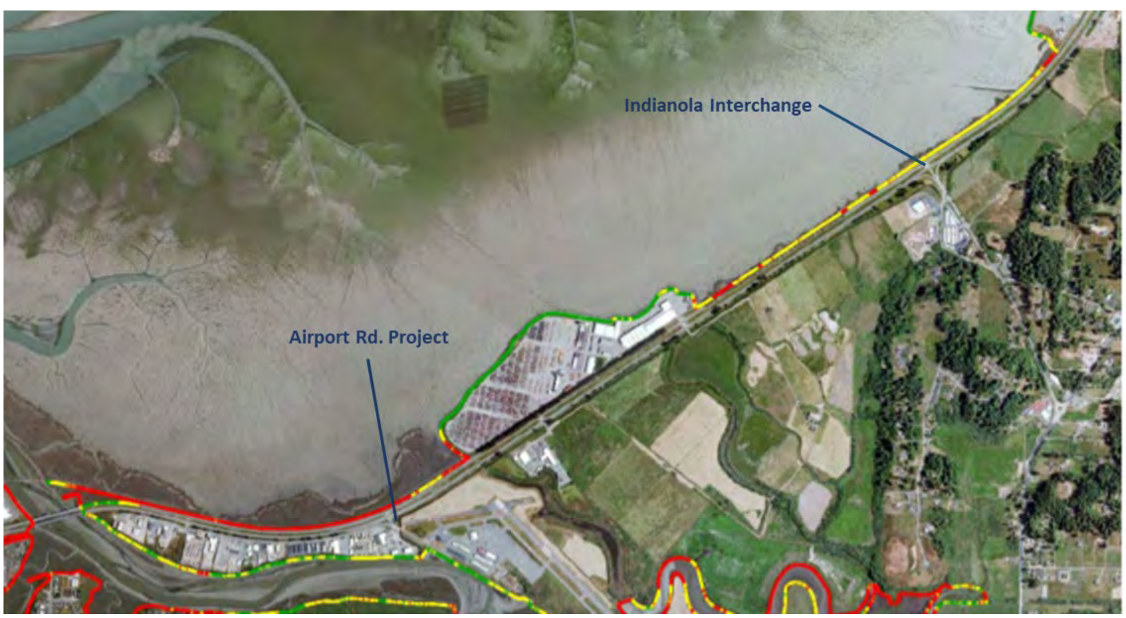


Figure 7. Vulnerability ratings for the lower portion of the Corridor shoreline (Laird 2018).

Note that in the previous Figures the Jacoby Creek Bridge does not have a dike providing protection from overtopping, but the Indianola Interchange does have moderate protection. For the proposed Corridor developments, we assess scenarios for SLR creating overtopping events in the following section.

Highway 101 Corridor Proposed Development Vulnerability

For this proposed project, the research team assessed the vulnerabilities for tide gate replacements, the Jacoby Creek Bridge rehabilitation, and the construction of the Indianola interchange. The impacts of SLR and other coastal hazards to each proposed project are examined using results from existing local vulnerability studies, CCC guidance, and design specifications.

Analysis Timelines

SLR vulnerabilities to the proposed project are evaluated over each asset's design lifetime. Table 2 shows these asset design lifetimes, and includes a general timeline for Caltrans's broader, long-term adaptation planning effort for the project area and broader Humboldt Bay region.

Table 2. Timelines considered in this analysis.

Asset/Planning Effort	Design Lifetime/ Analysis Period
Tide Gates (four in total)	25 years (2045)
Guardrails[3]	30 years (2050)
Indianola Interchange	80 years (2100)
Jacoby Creek Bridge	
Long-Term Regional Caltrans Adaptation Planning	Beyond 2100

Sea Level Rise Thresholds

Caltrans has proposed to adopt an adaptive management approach to integrate SLR risk into the project design and operations. For both the proposed Highway 101 Indianola Interchange and Jacoby Creek Bridge, the structures will be raised to protect against future inundation from SLR and other hazards. In the current design, the Highway 101 grade separation at Indianola Cut-off will be raised 2.4 feet to 12 feet (currently 9.6 feet) in the construction of the Interchange, and Jacoby Creek Bridge will be raised to 2.3 feet to 13.8 feet (currently 11.5 feet).[4] These new design elevations are higher than the existing dike protections (see Table 6). The bottom elevations for the new bridges are only slightly higher (less than 0.5 feet) than the current bridge bottom elevations. However, Caltrans designed the new bridges to

[3] Guardrails are not explicitly considered in this assessment, but will be incorporated into any future adaptation plans in the proposed developments or Corridor as a whole.
[4] Elevations in NAVD88 vertical datum (Lark 2019).

have a greater weight than buoyant forces to prevent any potential damage from uplift. Additional measures are integrated into the design to allow future adaptation in the long term that are outlined in the Adaptation Planning section.

In Table 3 methods from the Adapting to Rising Tides program are applied to identify when these design elevations will be overtopped in CCC's current scenario guidance (ART 2019). These elevations add the risk aversion scenario SLR values from the CCC guidance scenarios to the North Spit tide gauge mean annual maximum water (MAMW) height of 8.8 feet (Laird 2018).[5] MAMW occurs approximately four times per year in Humboldt Bay (Laird 2019). To adjust for local tidal elevations at the project site, 0.89 ft has been added to the MAMW based on feedback from Caltrans design engineers (Lark 2019). The following equation details how each elevation relative to NAVD88 was calculated using North Spit MAMW levels.

$$E_{Corridor} = MAMW_{NS} + SLR_{NS} + E_{Adj}$$

Where:

- $E_{Corridor}$ = Projected water level at Highway 101 Corridor for a given year relative to NAVD88
- $MAMW_{NS}$ = Mean annual maximum water level at North Spit tide gauge (8.8 ft)
- SLR_{NS} = Projected SLR using the risk aversion scenarios from CCC for a given year
- E_{adj} = Elevation adjustment from North Spit tide gauge to Corridor (0.89 ft)

Table 3 shows the proposed elevations of the Highway 101 Indianola Interchange and Jacoby Creek Bridge against expected tidal elevations under the risk aversion scenarios to identify when these structures might be overtopped under each water-level scenario.

[5] Elevations in NAVD88 vertical datum.

Table 3. Projected MAMW, MHHW, and MMMW elevations in project area (ft. above NAVD88) under the CCC risk aversion SLR scenarios, versus critical infrastructure thresholds for the Highway 101 Indianola Interchange and Jacoby Creek Bridge.

	Low Risk Aversion (ft.)				Medium-High Risk Aversion (ft.)				Extreme Risk Aversion (ft.)			
Year	SLR Value	MAMW	MMMW	MHHW	SLR Value	MAMW	MMMW	MHHW	SLR Value	MAMW	MMMW	MHHW
2030	0.7	10.4	9.3	8.1	1.0	10.7	9.6	8.4	1.2	10.9	9.8	8.6
2040	1.1	10.8	9.7	8.5	1.6	11.3	10.2	9.0	2.0	11.7	10.6	9.4
2050	1.5	11.2	10.1	8.9	2.3	12.0	10.9	9.7	3.1	12.8	11.7	10.5
2060	1.9	11.6	10.5	9.3	3.1	12.8	11.7	10.5	4.3	14.0	12.9	11.7
2070	2.4	12.1	11.0	9.8	4.0	13.7	12.6	11.4	5.6	15.3	14.2	13.0
2080	2.9	12.6	11.5	10.3	5.1	14.8	13.7	12.5	7.2	16.9	15.8	14.6
2090	3.5	13.2	12.1	10.9	6.2	15.9	14.8	13.6	8.9	18.6	17.5	16.3
2100	4.1	13.8	12.7	11.5	7.6	17.3	16.2	15.0	10.9	20.6	19.5	18.3
2110	4.3	14.0	12.9	11.7	8.0	17.7	16.6	15.4	12.7	22.4	21.3	20.1
2120	4.9	14.6	13.5	12.3	9.4	19.1	18.0	16.8	15.0	24.7	23.6	22.4

(red)	Indianola Interchange design elevation (12 ft. NAVD88)
(orange)	Jacoby Creek Bridge design elevation (13.8 ft. NAVD88)
(grey)	Assets' design lifetime

While the proposed structures will reduce risks to inundation under current conditions and in the next few decades, Table 3 shows that with MAMW the proposed Highway 101 Indianola Interchange would experience tidal inundation several times per year by 2050 under the medium-high and extreme risk aversion scenarios (MAMW elevations). The Jacoby Creek Bridge may experience inundation within its proposed lifetime by 2070 under these same scenarios and MAMW elevations. For both the Interchange and the Bridge, annual high tides will overtop each structure before the end of the design lifetimes, expected around 2100.

This report's analysis of projected MAMW risks to the proposed developments in Table 3 only shows inundation risks for approximately four times each year. Table 3 also shows the North Spit mean high-higher water (MHHW) elevation (6.5 ft, NAVD88) to determine inundation risks on a more frequent basis, occurring approximately every other day (Anderson and Laird 2018). MHHW from North Spit to the project area has been adjusted using the same method as with MAMW. We have elected to expand on those assessments by examining higher (MAMW) and more frequent (MHHW) water levels. Both proposed structures will experience inundation at MHHW every other day within their lifetimes, although this is not projected until at least 2070 under CCC's scenarios. Adaptation options for these structures are discussed in the Adaptation Planning section over the analysis period and beyond.

The most recent Humboldt Bay vulnerability assessment used the mean monthly maximum water level (MMMW) in examining inundation vulnerabilities. The MMMW is a monthly datum (7.7 at North Spit, above NAVD88), and does not reflect tidal events like MAMW (i.e., king tides). Local researchers have found MMMW useful as it correlates well with the vegetative boundary between local salt and freshwater environments (Laird 2018). The MMMW also provides an elevation frequency between the

MAMW and MHHW to further inform adaptation needs. Table 3 shows MMMW elevation thresholds for inundation of the proposed developments. Under the medium-high risk aversion scenario, overtopping occurs by 2070 and 2080 for the proposed developments.

SLR projections are uncertain due to potential changes in global greenhouse gas emissions, local vertical land motion, and other factors. The elevations in Table 3 could be reached sooner or later, but CCC's scenario-based approach allows Caltrans to account for this uncertainty in adaptation planning.

In Table 3 and this sea level rise vulnerability assessment, the proposed tide gate elevations were not considered. Tide gate elevations will not change, and they are currently below MAMW. The tide gates are critical in maintaining the hydraulic connectivity of the local watersheds and ecosystems. Increasing the elevations of tide gates currently would disrupt this continued connectivity. Caltrans plans to redesign and replace the culverts that house the tide gates in 2050 and will reevaluate the tide gate elevations and impacts of sea level rise at that time. The Adaptation Planning section discusses further potential adaptation needs for the tide gates for Caltrans to continually monitor and evaluate the risks to tide gates.

Inundation Impacts to the Proposed Developments

The SLR inundation timelines determined in the analysis above will have varying impacts depending on the depth and duration of inundation. For the time periods in Table 3 where the tidal elevation is only slightly higher than the Interchange or Jacoby Creek Bridge design elevations (such as 2050 for MAMW), inundation may last several hours creating a closure of the 101 Corridor for those areas. Those closures would occur four times a year with MAMW, but would occur every month with MMMW and every other day with MHHW, potentially permanently closing portions of the Corridor. As SLR progresses, inundation will last longer unless adaptation planning is put into action. For the Jacoby Creek Bridge, inundation can also create uplift forces and corrosion risks. Determining the critical threshold whereby the number of inundations per year are acceptable to Caltrans and the community will be an important step in the long-range planning necessary to adapt to SLR along Humboldt Bay.

Impacts from Sea Level Rise and Other Coastal Hazards

Tidal inundation from the SLR projections used in this report, would create road closures for the proposed structures and the Corridor as a whole in the second half of the 21st Century. In the past, road closures from inundation has only occurred once in 2005 (this event is described below). Rising tidal elevations at tide gates will prevent the gates from opening with increasing frequency. This will prevent the gates from allowing upstream freshwater areas to drain, increasing the frequency and duration of local flooding events (Walsh and Miskewitz 2013).

Storm Surge

The SLR impacts to the proposed developments will be compounded by other coastal hazards. Storm surge can increase inundation levels in the project area through rising freshwater levels in groundwater basins and surface water resources (i.e., creeks, rivers) combining with tidal elevations. To model this, the *Humboldt Bay Area Plan – Sea Level Rise Vulnerability Assessment* examined the Corridor's exposure to the 100-year flooding event with different levels of projected SLR (Laird 2018). The report found that the southern portion of the Corridor (Bracut to Eureka) will be fully inundated (north and southbound lanes) in a 100-year storm event if such an event occurred today. As evidence, the 2005 storm and king tide event inundated the southbound Corridor lanes. This has been the only recorded event of road closure from inundation on the Corridor.

Figure 8. 2005 storm impacts to the Corridor just north of proposed Indianola Interchange (Caltrans 2016).

This southern portion of the Corridor is also exposed to wave action during winter storms. Dikes currently protect the Corridor from wave impacts (Figure 5), but the dikes are vulnerable to wave-induced erosion. See the *Erosion* section below for more detail.

For the northern portion of the Corridor (Arcata to Bracut), the Humboldt Bay Area Plan found that storm surge in the 100-year flood event (surge depth of 1.3 ft.) combined with 1.6 ft. of SLR (0.5 m) would fully inundate the Corridor (Laird 2018). Table 4 and Table 5 show when inundation may occur for the Highway 101 Indianola Interchange and Jacoby Creek Bridge for 10-year (surge depth of 0.6 ft.) and 100-year flooding events using elevation estimates from Anderson and Laird (2018) near Arcata Wharf. The 10- and 100-year events have 10% (1 in 10) and 1% (1 in 100) probability of occurring annually, respectively.

Table 4. 10-year flood event elevation (raising tidal elevations from Table 3 by 0.6 ft.) estimates for the CCC scenarios.

Year	Low Risk Aversion	Medium-High Risk Aversion	Extreme Risk Aversion
2030	10.7	11.0	11.2
2040	11.1	11.6	12.0
2050	11.5	12.3	13.1
2060	11.9	13.1	14.3
2070	12.4	14.0	15.6
2080	12.9	15.1	17.2
2090	13.5	16.2	18.9
2100	14.1	17.6	20.9

Table 5. 100-year flood event elevation (raising tidal elevations from Table 3 by 1.3 ft.) estimates for the CCC scenarios.

Year	Low Risk Aversion	Medium-High Risk Aversion	Extreme Risk Aversion
2030	11.4	11.7	11.9
2040	11.8	12.3	12.7
2050	12.2	13.0	13.8
2060	12.6	13.8	15.0
2070	13.1	14.7	16.3
2080	13.6	15.8	17.9
2090	14.2	16.9	19.6
2100	14.8	18.3	21.6

	Indianola Interchange design elevation (12 ft. NAVD88)
	Jacoby Creek Bridge design elevation (13.8 ft. NAVD88)
	Assets' design lifetime

In both 10- and 100-year events, the Interchange and Bridge will be exposed to temporary inundation from flooding before the end of the design lifetimes. Since the analyses in Table 4 and Table 5 use MAMW (frequency of four times per year), the estimates are conservative given they assume that the storm coincides with MAMW levels. However, recent research has shown that in the California North Coast region, these intense storms may occur with increasing frequency in the future due to climate change (Grantham 2018). This conservative approach is warranted as a result.

Erosion

Dikes currently provide protection to the Corridor from SLR, storm surge, wave impacts, and other coastal hazards (Figure 5). However, wave-induced erosion from tides and storm surge can damage and weaken these embankments over time (Laird 2018). In addition, erosion of sediments adjacent to dikes could increase the incident energy of waves along these dikes. With higher tides and more frequent storms in the future from climate change, these dikes will face greater risks from erosion in the future.

If the dikes are not regularly maintained against erosion impacts, they could risk structural failure and expose the road grades, bridge structures, and culverts to tides, storm surge, and erosion. If the dikes are raised in the future (see the Adaptation Planning section for more details on this action), dike failure from erosion would risk inundation to the proposed developments. These risks are considered in the assessment of adaptation solutions (see Adaptation Planning).

Groundwater Changes

Sea level rise will impact local aquifers by raising elevations and creating salt-water intrusion to freshwater resources. Higher groundwater levels will reduce the local area's ability to capture and store freshwater flows during precipitation events. This will increase the risk of impacts to the proposed development and Corridor from inland flooding. The rise in groundwater levels from SLR will be compounded by an increase in the severity and frequency of extreme precipitation events from climate change (Grantham 2018).

Highway 101 Corridor Vulnerability

This report's SLR vulnerability assessment above considered only the proposed Caltrans developments and not impacts to the Corridor as a whole. We assess the Corridor's vulnerability to SLR as a whole in the following section.

Sea Level Rise Thresholds

Figure 9 shows where the segment post miles (PMs) are located related to the proposed Indianola Interchange and Jacoby Creek Bridge for the Corridor. We used the same vulnerability approach to analyze the impacts to 101 Corridor shown in Table 6.

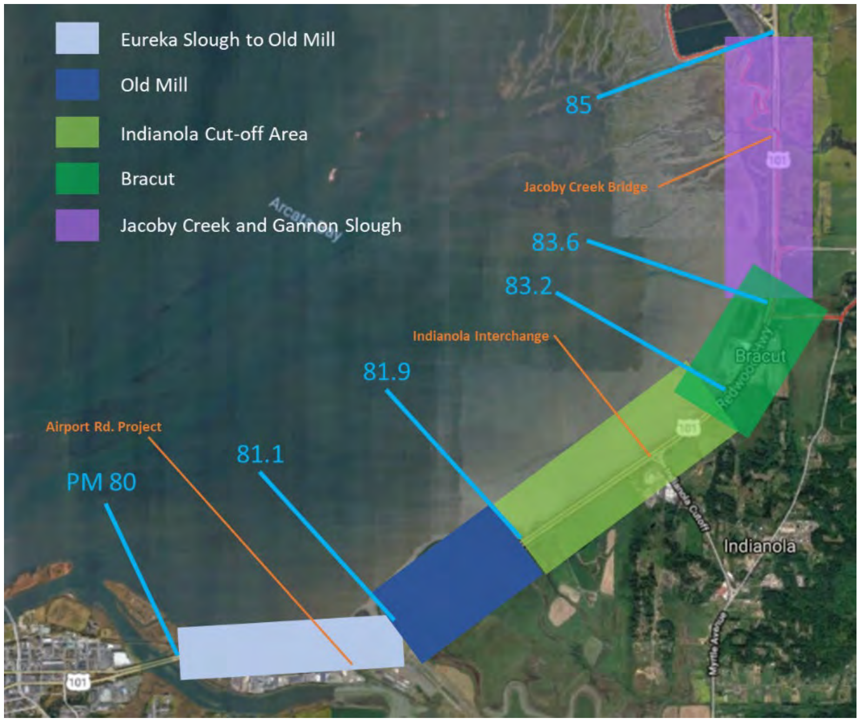


Figure 9. PM locations (in blue) and Corridor segment names from Table 6 in relation to the Indianola Interchange and the Jacoby Creek Bridge.

Table 6. Highway 101 Corridor segments with corresponding PM, elevation ranges, and dike elevation ranges.

Segment	Post Mile Range	Elevation Range (ft. above NAVD88)	Dike Elevation Range (ft. above NAVD88)
Eureka Slough to the Old Mill	80 - 81.1	9.1 - 14.5	9.4 – 10.8
Old Mill	81.1 - 81.9	9.0 - 11.4	11 – 12
Indianola Cut-off Area	81.9 - 83.2	9.1 - 10.8	10.5 – 10.6
Bracut	83.2 - 83.6	21.9	N/A
Jacoby Creek and Gannon Slough	83.6 - 85	10.8 - 13.0	10.6 – 11.1

Using the elevations ranges for each section, this analysis took the same approach for the 101 Corridor as the proposed development SLR assessment. Table 7 shows the projected inundation scenarios for the Corridor segments from the CCC SLR risk aversion scenarios, using existing road and dike elevations as thresholds for the different Corridor segments. Whereas the proposed developments (101 Indianola Interchange and Jacoby Creek Bridge) were higher than the adjacent dikes, almost all of the Corridor segments (outside of Bracut) have elevations below the dike elevations. For reference, MAMW elevations are reached approximately four times per year, and MHHW elevations are reached every other day (Laird 2018, Anderson and Laird 2018).

Table 7. Projected MAMW, MHHW, and MMMW elevations in project area (above NAVD88) under the CCC SLR scenarios, versus Highway 101 Corridor segment thresholds. Note that in MAMW elevations the Eureka Slough to Old Mill segment dike and road will be inundated before 2030.

	Low Risk Aversion				Medium-High Risk Aversion				Extreme Risk Aversion			
Year	SLR Value	MAMW	MMMW	MHHW	SLR Value	MAMW	MMMW	MHHW	SLR Value	MAMW	MMMW	MHHW
2030	0.7	10.4	9.3	8.1	1.0	10.7	9.6	8.4	1.2	10.9	9.8	8.6
2040	1.1	10.8	9.7	8.5	1.6	11.3	10.2	9.0	2.0	11.7	10.6	9.4
2050	1.5	11.2	10.1	8.9	2.3	12.0	10.9	9.7	3.1	12.8	11.7	10.5
2060	1.9	11.6	10.5	9.3	3.1	12.8	11.7	10.5	4.3	14.0	12.9	11.7
2070	2.4	12.1	11.0	9.8	4.0	13.7	12.6	11.4	5.6	15.3	14.2	13.0
2080	2.9	12.6	11.5	10.3	5.1	14.8	13.7	12.5	7.2	16.9	15.8	14.6
2090	3.5	13.2	12.1	10.9	6.2	15.9	14.8	13.6	8.9	18.6	17.5	16.3
2100	4.1	13.8	12.7	11.5	7.6	17.3	16.2	15.0	10.9	20.6	19.5	18.3
2110	4.3	14.0	12.9	11.7	8.0	17.7	16.6	15.4	12.7	22.4	21.3	20.1
2120	4.9	14.6	13.5	12.3	9.4	19.1	18.0	16.8	15.0	24.7	23.6	22.4

(red)	Eureka Slough segment dike low point (9.4 ft. above NAVD88)
(orange)	Jacoby Creek and Indianola segments dike low points (10.5 ft)
(yellow)	Old Mill segment dike low point (11.0 ft)
(green)	Bracut segment road low point (21.9 ft)

In all CCC scenarios, all Corridor segments outside of the Bracut segment will have dike protections and roadways inundated by 2050 during MAMW events, creating roadway closures multiple times per year. By 2070 in the medium-high and extreme risk aversion scenarios, these segments will be inundated every other day at MHHW elevations. Inundation will occur monthly by 2060 during MMMW events in the medium-high and extreme scenarios.

Figure 10 shows a visualization of the Table 7 results. The Figure shows when the CCC's medium-high risk aversion scenario projects inundation for the different Corridor segments using the MMMW elevation (NAVD88). The Figure shows that the majority of the Corridor will experience inundation every other day by 2070 in the medium-high risk aversion scenario, with the southernmost segment (Eureka Slough) inundated by 2050.

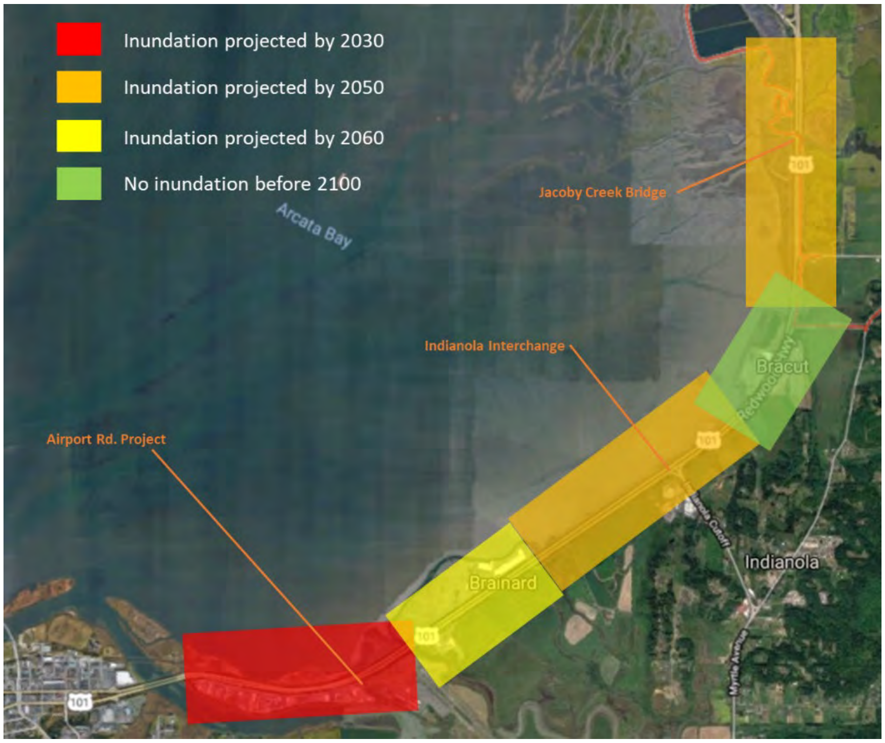


Figure 10. Projected inundation timelines for Highway 101 Corridor segments based on Table 7 results for the medium-high risk aversion scenario and MMMW elevation (NAVD88).

Inundation Impacts to the Corridor

The SLR inundation impacts to the Corridor as a whole will have the same implications on highway closure as the proposed developments (see Inundation Impacts to the Proposed Developments). Closures may only last several hours for the years where elevations are projected to be slightly higher than the Corridor segments (such as 2030 for the Jacoby Creek and Indianola segments in Table 7 MAMW), but closures will become longer as SLR progresses over time and inundation depth increases. This could result in permanent closure for some segments if adaptation actions are not taken.

Impacts from Sea Level Rise and Other Coastal Hazards

The Corridor will also be vulnerable to the same coastal hazards as the proposed developments. While impacts from erosion will be the same as detailed for the proposed development, storm surge combined with SLR will create different timelines for inundation than the proposed developments. Using the same methodology for assessing storm surge as the proposed developments, we found in the medium-high risk aversion scenario that all Corridor segments (outside of Bracut) will experience flooding in both the 10 and 100-year events. Bracut will not experience flooding from storm surge combined with SLR before 2100. The risk of closure from inundation to both the proposed developments and the Corridor as a whole are considered in the Adaptation Planning section below.

ADAPTATION PLANNING

The proposed developments on the 101 Corridor are designed to address the immediate highway safety needs of the Corridor. While the proposed developments may be exposed to climate hazards in the future based on the CCC SLR scenario, we have crafted a tailored adaptation plan for the proposed developments using the results from the SLR vulnerability assessment.

This adaptation planning builds on the previous adaptation assessment performed by Caltrans as part of the original SLR analysis required by the consistency certification. That report created two primary categories for adaptation: protect in place, and relocation/retreat. The protect in place options included raising the Corridor structures as a causeway or a levee, raising the existing levee, and increasing maintenance and inspection intervals. The relocation/retreat option was rejected due to extensive costs, environmental impacts, and community impacts. We expanded on the protect in place options in this section by assessing the implications of uncertainty, and how the different adaptation options can work in conjunction to address SLR vulnerabilities.

Climate change impacts often unfold over a long period of time and can be difficult to predict with certainty. Because of this, implementing a suite of adaptation options that respond to all inundation scenarios can end up being very costly if they go beyond the necessary level of protection. However, under-adapting could also become an issue as this may leave assets vulnerable to risk, while waiting to adapt can result in difficult and expensive changes in the future.

For these reasons, flexible adaptation pathways have been developed to assess adaptation options for the Corridor. This method, which includes multiple adaptation actions that can be switched out for other viable actions when sea levels reach pre-determined thresholds, keeps options open throughout the project timeline.

Five actions were applied to the three locations assessed: the Indianola Interchange, Jacoby Creek Bridge, and the four tide gates. These five actions include:

Short-term adaptation actions: The following adaptation actions can be implemented in the short-term (10-20 years).

A. **Address low points in dikes**. Some of the dikes currently in place have low points that allow for higher rates of overtopping. Caltrans can work with local partners to address these specific sections and raise them to the same height as the rest of the dikes. To achieve this, Caltrans and local partners may need to conduct a detailed survey of dike heights beyond what is publicly available from the Humboldt Bay Area Plan (Laird 2018). This action may encroach on existing wetlands when raising dike sections, and may impact tidal ecosystems. This action and Action C will also protect against increased inland flooding risks from higher groundwater levels from SLR and increased severity and frequency of precipitation events.

B. **Increase maintenance and inspection intervals**. By enhancing maintenance and inspection for both the Corridor and dike protections, Caltrans can enhance its monitoring capabilities. This will allow Caltrans to determine at what point in the timeline it becomes necessary to implement more robust adaptation actions. Caltrans can work with its staff to ensure crews are aware of climate hazards that will impact assets. Maintenance and inspection of dikes may require collaboration with local partners. While this adaptation action can be implemented in the short term, this is ongoing throughout the adaptation timeline in the figures below.

C. **Raise dikes.** Caltrans can work with local partners to raise dikes. Higher dikes will better protect the Corridor from inundation due to overtopping from additional sea level rise and storm surge in the future. This action may encroach on existing wetlands when raising dike sections, and may impact tidal ecosystems.

Longer-term adaptation actions: The following adaptation actions can be implemented in the longer-term (20+ years).

D. **Raise elevation of structures.** Raising the structures themselves can also protect from inundation. The Jacoby Creek Bridge's foundation and drainage structures are designed to accommodate for future increases in bridge height. The Interchange utilizes a prism design and can be raised in the future as needed. The culverts that house the tide gates will need to be replaced in 2050, and Caltrans will reevaluate the tide gate performance and design elevation needs during inspection intervals. Raising the elevation of structures will also protect against increased inland flooding risks from higher groundwater levels from SLR and increased severity and frequency of precipitation events.

E. **Integrate project adaptation planning into long-term adaptation planning.** In this action, Caltrans would integrate adaptation needs for the proposed project into upcoming long-term adaptation planning for the Humboldt Bay region. This action would align the adaptation needs of the proposed project with other vulnerabilities the Corridor is experience at lower-lying highway segments. To achieve this, Caltrans would need to closely collaborate with local government agencies and other partners (e.g., private land owners). Local partnerships would ensure that Caltrans does not generate its plan in isolation, and integrates the long-term plan with other local adaptation plans and the Local Coastal Plan. This option reflects a holistic approach for the Corridor that includes all segments and proposed developments. Caltrans anticipates to have this plan completed by 2030. Caltrans has already initiated local collaboration through a grant awarded to Humboldt County for studying SLR impacts and adaptation options for the southern Corridor, and is encouraging the county to apply for a grant to assess the northern Corridor.

Figure 11, Figure 12, and Figure 13 illustrate these five actions as adaptation pathways under the medium-high risk aversion scenario. The three pathways differ in their timelines based on the asset lifetime. The tide gates have a lifetime of 25 years, while the design lifetimes for the Indianola Interchange and Jacoby Creek Bridge are 80 years (2100). The timelines used for Actions C and D for the interchange and bridge (shown in Figure 11 and Figure 12) on the inundation thresholds determined in Table 3. After the project lifespan ends, sea levels may surpass new inundation thresholds created by adaptation actions, so further adaptation beyond that point will be required.

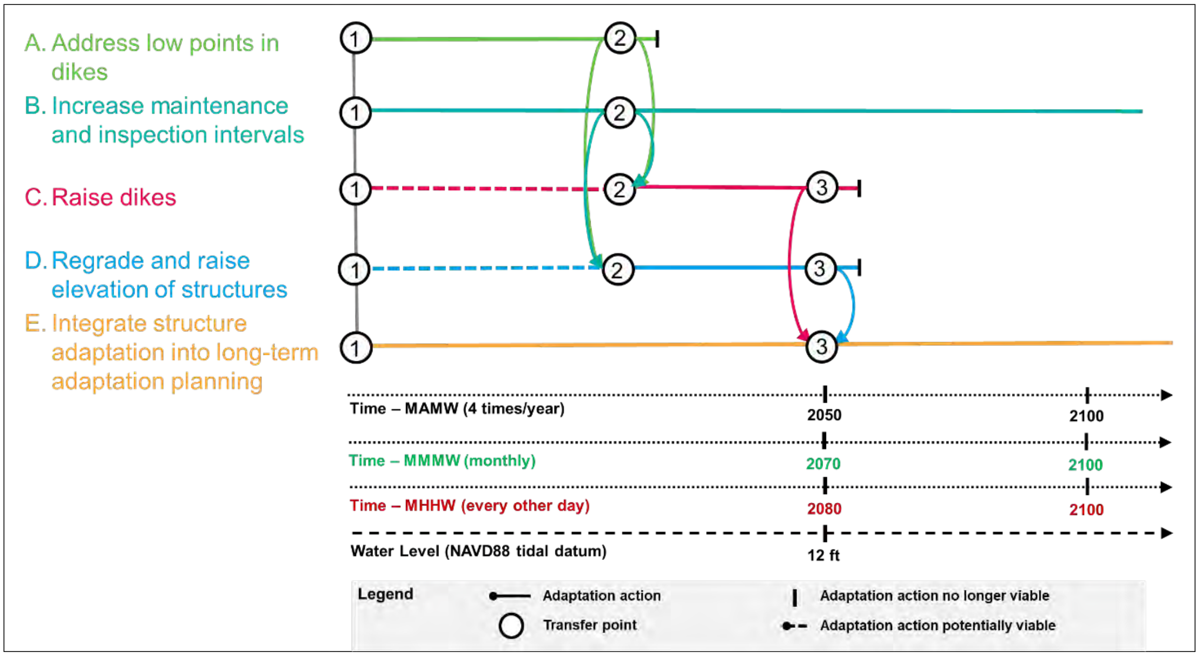


Figure 11: Adaptation pathway for Highway 101 Indianola Interchange using the medium-high risk aversion scenario

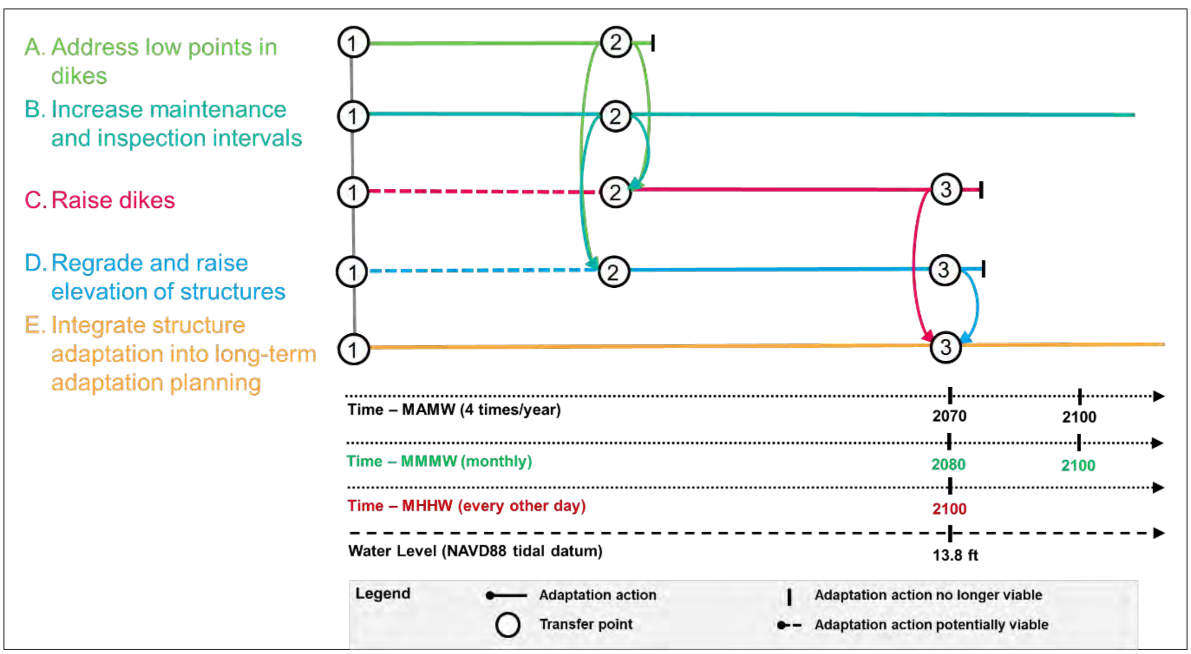


Figure 12: Adaptation pathway for Jacoby Creek Bridge using the medium-high risk aversion scenario

The Interchange (Figure 11) and Bridge (Figure 12) would follow similar flows for adaptation decision-making over time. The different elevations axes (MAMW, MMMW, MHHW) show different timelines for when Caltrans can expect varying frequencies of inundation, and how that impacts adaptation decision making. For example, under the medium-high risk aversion scenario, if Caltrans wants to avoid inundation four times a year at MAMW elevations (2050), they would need to regrade and raise the proposed structures 20 years before MMMW elevations (2070), and 30 years before MHHW elevations (2080).

Caltrans's first priority will be to carry out Action A and Action B. After those actions have been in place for some time, Caltrans will observe through monitoring whether existing dike protections have become insufficient and increasing protections or raising structures is necessary (e.g., Transfer Point #2 in the figures). Caltrans can determine a year for this Transfer Point by monitoring and projecting when projected SLR will surpass current dike heights. Thus, Caltrans will reevaluate project needs and risks, and will choose to implement either Action C or Action D. The Jacoby Creek Bridge's drainage system and foundation are currently designed to accommodate for additional height, and the Indianola Interchange can be raised by adding height to the prism structure in the future.

For tide gates (shown in Figure 13), Caltrans will again prioritize Actions A and B, but increasing protections or raising the structures will not be considered until the end of the culverts' lifetime. As part of that culvert design process, Caltrans will reevaluate needs for increasing the elevation of tide gates. Action B may also inform Caltrans that actions in culvert replacement are needed ahead of the current 2050 timeline.

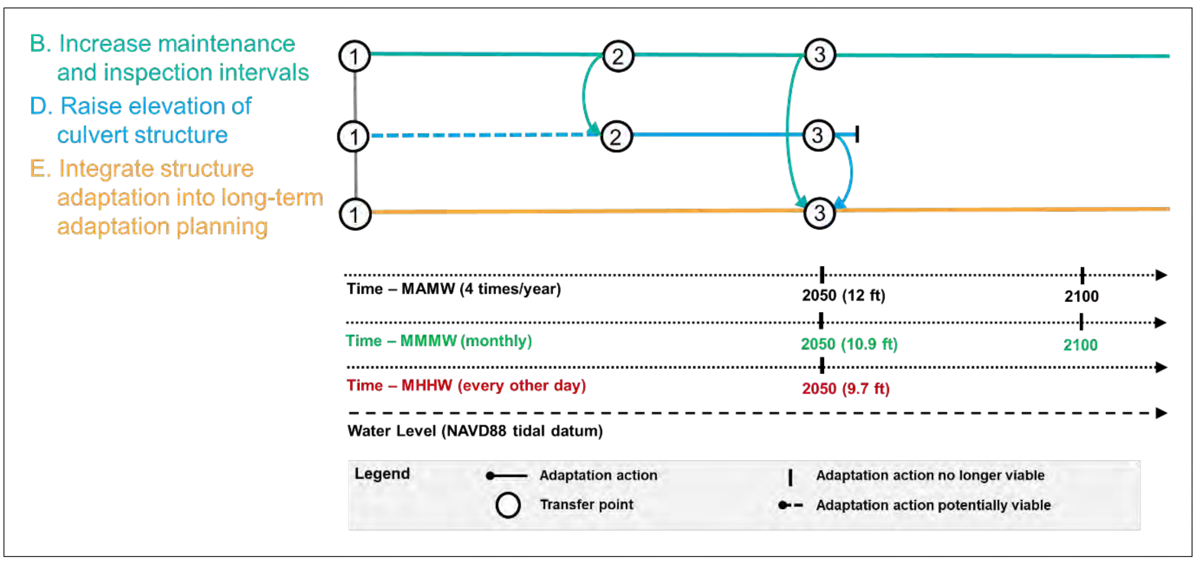


Figure 13: Adaptation pathway for tide gates using the medium-high risk aversion scenario

Raising the tide gates could also bring about ecological problems; if the gates are too high, they may interrupt the hydraulic connectivity of local watersheds. If Caltrans decides to implement this adaptation action, they will closely consider impacts to coastal resources and local ecosystems as part of the design process.

Impacts and Challenges from Adaptation Actions

Each adaptation action presents its own unique benefits and challenges in design and implementation. For example, raising dikes will encroach on adjacent tidal or freshwater wetlands and will require collaboration with multiple authorities, agencies, private landowners, and municipalities as the existing dikes occur outside of Caltrans ROW. Thus, a concerted community-wide effort will be necessary to meet these challenges in the coming decades.

Raising the road will also requires regrading and expanding of the road prism to allow for greater elevations; factors that can also encroach on adjacent wetlands. Caltrans can cause minimal disruption by raising the highway during regular maintenance periods (e.g., re-pavement cycles), but expanding he road footprint would be required. As a reference point, raising the Jacoby Creek Bridge currently requires 1,000 feet of regrading and raising it to 15 feet would require one mile of regrading (however, currently the bridge will only be raised to 13.8 feet). These additional construction needs will add future costs to Caltrans, including that potentially required for mitigation, and may temporarily impact local traffic patterns.

CONCLUSIONS

For all proposed developments and the entire 101 Corridor, these adaptation solutions and future adaptation needs will be integrated into Caltrans's long-term regional adaptation planning (Action E). Caltrans anticipates completed this long-term plan by 2030. Should further SLR by 2050-2080 make the other adaptation solutions presented in this section no longer viable, Caltrans's long-term planning effort will become the primary planning mechanism for achieving climate resilience (Transfer Point #3).

Since Caltrans has not formally initiated its long-term resilience planning effort, these projects and adaptation solutions have been designed with future adaptation needs in mind. These proposed projects and adaptation solutions have been designed as to not interfere or limit opportunities for future adaptation for the Corridor as a whole. This development proposal also incorporates flexibility in design so the structures can be retrofitted to align with future infrastructure improvements in the Corridor as needed over time. For example, if other lower-lying portions of the Corridor are elevated to reduce inundation risks, the Jacoby Creek Bridge or Highway 101 Indianola Interchange can be raised to as well to accommodate those new elevations.

Providing flexibility to accommodate long-term planning will allow the proposed developments to align with other upcoming regional planning and SLR vulnerability efforts. Humboldt County is planning to release an adaptation plan in 2020, and local USGS CoSMoS models will become available in 2021. Both of these resources will be critical for informing Caltrans's long-term planning.

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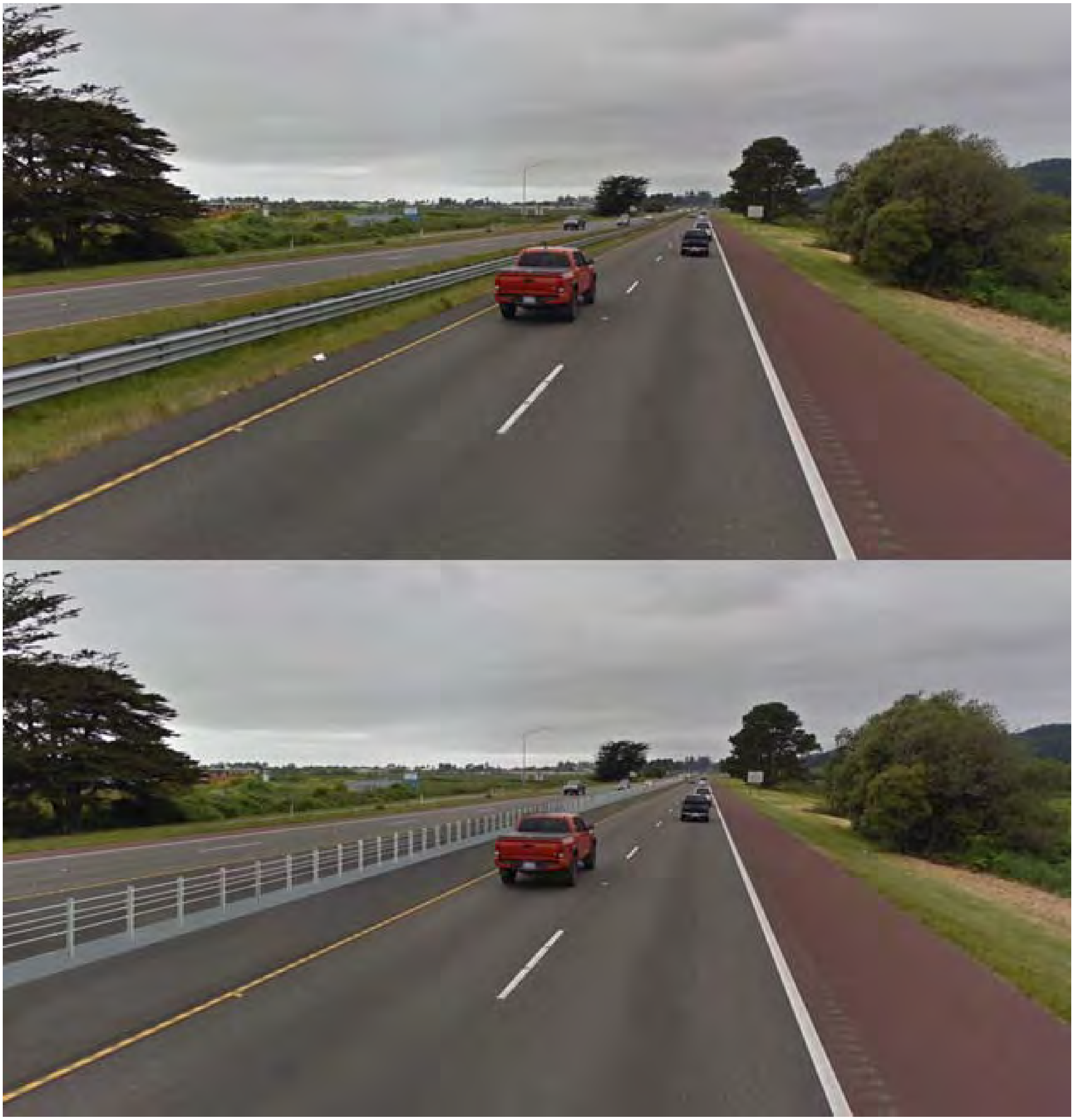


The current metal guardrail and proposed cable median barrier with paving and colored concrete below cable. (Caltrans.)

Signs to be Removed along HUM 101 for Northbound Traveling Traffic

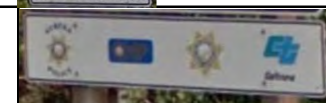
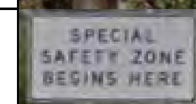
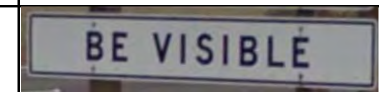
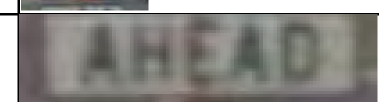
SIGN POST MILE	LOCATION	DESCRIPTION	SIGN CODE	SIZE (INCHES)	SQ IN	SIGN NO.	IMAGE
79.63	MEDIAN	SPEED CHECKED BY RADAR	R48 (CA)	48X48	2304	32391	
79.7	MEDIAN	SAFETY CORRIDOR/ R2-50 / PLEASE BE COURTEOUS	SR (CA)	96X66	6336	38929	
79.7	RIGHT	SAFETY CORRIDOR/ R2-50 / PLEASE BE COURTEOUS	SR (CA)	96X66	6336	38930	
79.7	MEDIAN	EUREKA POLICE / CHP / ARCARTA POLICE / CALTRANS	SR (CA)	96X18	1728	40984	
79.7	RIGHT	EUREKA POLICE / CHP / ARCARTA POLICE / CALTRANS	SR (CA)	96X18	1728	41108	
79.9	RIGHT	SPECIAL /SAFETY ZONE / BEGINS HERE	SR53 (CA)	72X42	3024	38452	
79.9	MEDIAN	SPECIAL /SAFETY ZONE / BEGINS HERE	SR53 (CA)	72X42	3024	38453	
79.96	RIGHT	DAYLIGHT / HEADLIGHT / SECTION	S30-1 (CA)	84X54	4536	36473	
79.96	MEDIAN	DAYLIGHT / HEADLIGHT / SECTION	S30-1 (CA)	84X54	4536	36721	
80.02	RIGHT	CROSS / TRAFFIC / AHEAD	W70 (CA)	60X60	3600	16958	
80.02	MEDIAN	CROSS / TRAFFIC / AHEAD	W70 (CA)	60X60	3600	38427	
80.09	RIGHT	TURN ON / HEADLIGHTS / NEXT 5 MILES / W SOLAR FLASH	S30-2 (CA)	108X54	5832	36474	

Exhibit 28
CDP Application No. 1-18-1078
(Caltrans)
101 Corridor Signs to be Removed

80.09	MEDIAN	TURN ON / HEADLIGHTS / NEXT 5 MILES / W SOLAR FLASH	S30-2 (CA)	108X54	5832	36722	
80.09	MEDIAN	BE VISIBLE	S30-2-A (CA)	108X18	1944	38355	
80.09	RIGHT	BE VISIBLE	S30-2-A (CA)	108X18	1944	38356	
80.5	RIGHT	W/ RADAR + "YOUR SPEED" PANEL	R02 (CA) / R2-1	48X60	2880	35505	
80.5	MEDIAN	W/ RADAR + "YOUR SPEED" PANEL	R02 (CA) / R2-1	48X60	2880	38443	
80.65	MEDIAN	CROSS / TRAFFIC / AHEAD WITH SOLAR FLASHERS	W70 (CA)	60X60	3600	38430	
80.65	RIGHT	CROSS / TRAFFIC / AHEAD WITH SOLAR FLASHERS	W70 (CA)	60X60	3600	38431	
80.18	RIGHT	AIRPORT SYMBOL	G94-1 (CA)	30X30	900	27242	
80.77	RIGHT	AIRPORT	G08 (CA)	120X30	3600	?	
80.8	MEDIAN		R3-4	24X24	576	42486	
80.80	MEDIAN	AHEAD	SR	24X8	192	42490	
80.83	MEDIAN		R34 (CA) / R3-4	24X24	576	37845	
81.21	RIGHT	SIDE ROAD RT	W7A (CA) / W2-2	48X48	2304	29150	

81.21	MEDIAN	SIDE ROAD RT	W7A (CA) / W2-2	48X48	2304	?	
81.7	RIGHT	LT	W10-3	48X48	2304	25693	
81.7	MEDIAN	LT	W10-3	48X48	2304	25694	
82.11	RIGHT	INDIANOLA CUTOFF / RIGHT LANE	G20 (CA)	126X42	5292	33438	
82.29	MEDIAN	W/ RADAR + "YOUR SPEED" PANEL	R02 (CA) / R2-1	48X60	2880	38444	
82.29	RIGHT	W/ RADAR + "YOUR SPEED" PANEL	R02 (CA) / R2-1	48X60	2880	38445	
82.44	RIGHT	CROSS / TRAFFIC / AHEAD WITH SOLAR FLASHERS	W70 (CA)	60X60	3600	38432	
82.44	MEDIAN	CROSS / TRAFFIC / AHEAD WITH SOLAR FLASHERS	W70 (CA)	60X60	3600	38433	
82.58	RIGHT	INDIANOLA / CUTOFF	G85 (CA)	132X54	7128	3209	
82.9	RIGHT		R02 (CA) / R2-1	48X60	2880	35287	
83.18	MEDIAN	CROSS / TRAFFIC / AHEAD	W70 (CA)	60X60	3600	38428	
83.18	RIGHT	CROSS / TRAFFIC / AHEAD	W70 (CA)	60X60	3600	38429	
83.54	RIGHT	W/ RADAR + "YOUR SPEED" PANEL	R02 (CA) / R2-1	48X60	2880	38446	

Exhibit 28
CDP Application No. 1-18-1078
(Caltrans)
101 Corridor Signs to be Removed

83.54	MEDIAN	W/ RADAR + "YOUR SPEED" PANEL	R02 (CA) / R2-1	48X60	2880	38447	
83.68	MEDIAN	CROSS / TRAFFIC / AHEAD WITH SOLAR FLASHERS	W70 (CA)	60X60	3600	38434	
83.68	RIGHT	CROSS / TRAFFIC / AHEAD WITH SOLAR FLASHERS	W70 (CA)	60X60	3600	41678	
84.4	RIGHT	SPECIAL / SAFETY ZONE / ENDS HERE	SR55 (CA)	72X42	3024	42026	
84.67	RIGHT	BEGIN FREEWAY	R57 (CA)	48X26	1248	3243	
85.12	RIGHT	END / DAYLIGHT / HEADLIGHT / SECTION	S30-3 (CA)	84X66	5544	36475	
85.25	RIGHT	CHECK / HEADLIGHTS	S30-5 (CA)	84X42	3528	36476	
				Total NB sq in	**146088**		
				Total NB sq ft	**1014.5**		
		ASSUMING HEADLIGHT ZONE OMITTED					
		SIGNALS AT AIRPORT RD, INTERCHANGE AT INDIANOLA		**TOTAL SQ FT**	**2441.94**		
		ASSUMING SPEED LIMIT CHANGED					
		ASSUMING NO CROSS OVERS BEISDES AIRPORT AND INDIANOLA					

M e m o r a n d u m

Making Conservation
a California Way of Life

To: Jeff Pimentel
Project Manager

Date: July 3, 2019

File: Eureka Arcata 101 Corridor Improvement Project

From: Jason Meyer
Senior Environmental Planner
North Region Environmental

SUBJECT: Eureka-Arcata 101 Corridor Billboards

This memo discusses Caltrans' success removing billboards along the 101 Corridor, and the difficulties encountered trying to remove all the billboards.

To date, 17 billboards have been removed. This includes 15 within the project limits of the Eureka/Arcata Corridor Improvement Project (Corridor), and 2 billboards along Route 255 near Arcata. (See Figure 1 and Table 1.)

Caltrans inventoried and reviewed the billboards for any nexus for Caltrans removal. We reviewed whether they were within the ROW, had a permit with Caltrans, or were within compliance with ordinances regulating billboards, or were standing in the way of the project. The clearest way for Caltrans to remove billboards is if they are in our ROW. While none of the billboards within the 101 Corridor were within our ROW, there were two billboards along State Route 255 on state lands, and Caltrans removed these.

The Caltrans Office of Outdoor Advertising (ODA) cannot just revoke these permits, as there is a legal process and legal precedence regulating billboards. Display owners (the permittees) have a valuable and vested property right and the State cannot extinguish that right without due process. Here this means condemnation proceedings at which the CTC would have to go on record as to the necessity and requirement for the land where the display is placed. It also means paying just compensation for each display that is removed, including its fair market and goodwill values. Without display owner consent, it is therefore infeasible to revoke permits for billboards in the corridor beyond those that have already been removed.

The District Permit Engineer (DPE) worked with ODA and was unable to find a clear avenue to summarily revoke permits. However, Caltrans District staff, Caltrans Legal, and ODA worked with Outfront Media and came to an agreement in August 2016 to remove 10 billboards within the 101 Corridor. This agreement spanned multiple Caltrans Districts, focusing on removing billboards from scenic highways, and without the efforts of this office, the agreement would not have included the billboards within the 101 Corridor.

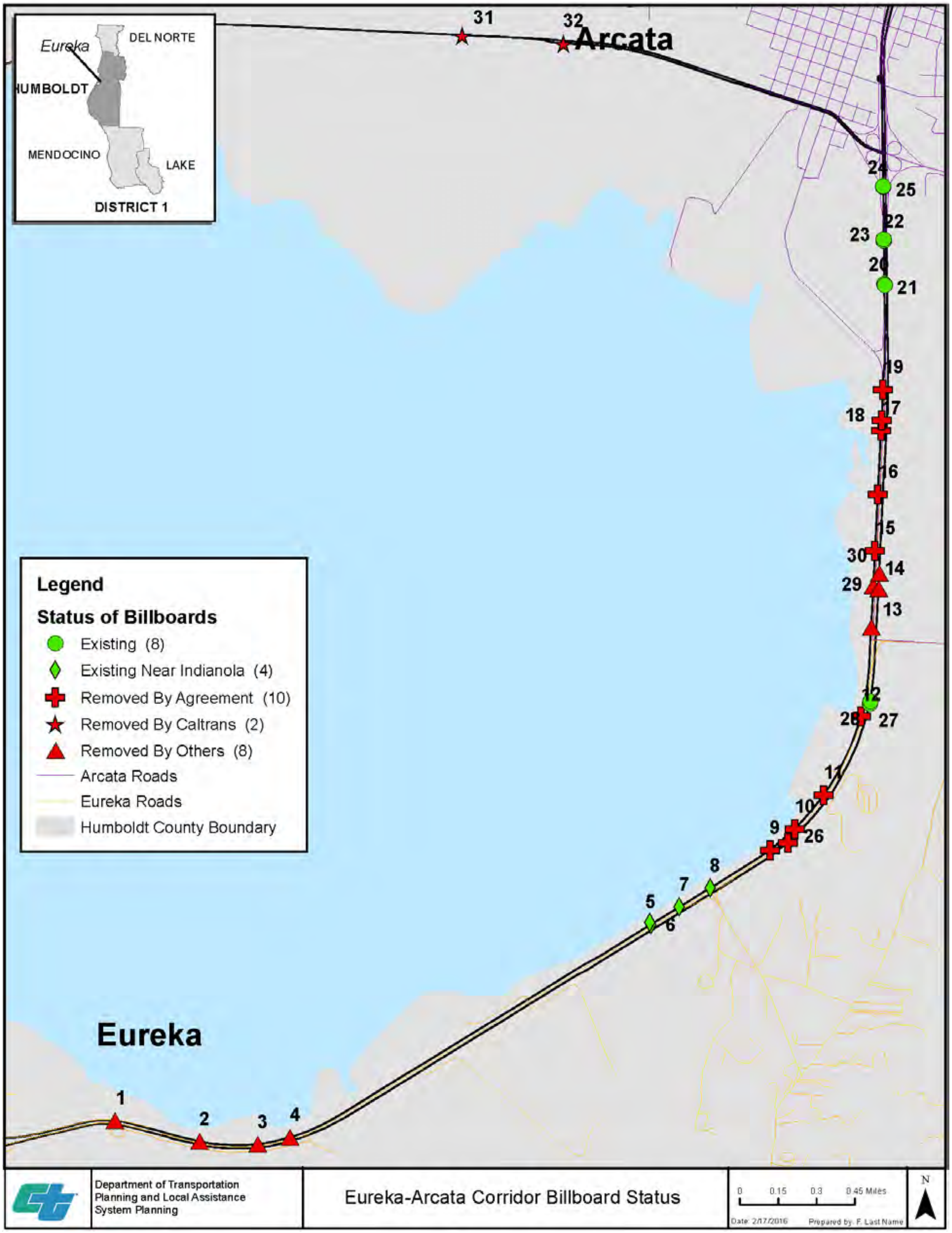


Figure 1. Map of billboard locations and removals within the 101 Corridor.

Table 1. Index of billboard locations from Figure 1.

#	Status	Notes	Permit Holder	APN	APN Owner
1	Removed	No Billboard at this Location. Billboard was last standing in 2003.	CBS Outdoor, Inc.		NCRA
2	Removed	Removed by the North Coast Rail Authority	Moser Outdoor Advertising	14-061-02	NCRA
3	Removed	Removed by the North Coast Rail Authority	Lopez, Barbara and Hector	14-101-02	NCRA
4	Removed	Removed by the North Coast Rail Authority	Moser Outdoor Advertising	14-111-03	NCRA
5	Existing	Existing near Indianola. Caltrans has no nexus to remove.	CBS Outdoor, Inc.	501-241-05	HOFF/McMURRAY-NCRA EASEMENT
6	Existing	Existing near Indianola. Caltrans has no nexus to remove.	CBS Outdoor, Inc.	501-241-27	HOFF/McMURRAY-NCRA EASEMENT
7	Existing	Existing near Indianola. Caltrans has no nexus to remove.	CBS Outdoor, Inc.	501-241-05	NCRA
8	Existing	Existing near Indianola. Caltrans has no nexus to remove.	CBS Outdoor, Inc.	501-241-05	HOFF/McMURRAY-NCRA EASEMENT
9	Removed	Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-241-27	BRACUT LUMBER -NCRA EASEMENT
10	Removed	Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-241-27	BRACUT LUMBER -NCRA EASEMENT
11	Removed	Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-241-27	BRACUT LUMBER -NCRA EASEMENT
12	Removed	Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-241-27	BRACUT LUMBER -NCRA EASEMENT
13	Removed	Cut down by vandals and not reconstructed.	CBS Outdoor, Inc.	501-061-14	USFW
14	Removed	Cut down by vandals and not reconstructed.	CBS Outdoor, Inc.	501-061-14	USFW
15	Removed	Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-043-10	NCRA

#	Status	Notes	Permit Holder	APN	APN Owner
16	Removed	Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.		NCRA
17	Removed	Originally, cut down and rebuilt. Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-043-05	NCRA
18	Removed	Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-043-05	NCRA
19	Removed	South G Street Onramp Terminus. Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-043-05	NCRA
20	Existing	Between G Street & 255. Existing as of May 2018.	CBS Outdoor, Inc.	503-211-32	CHRISTIE
21	Existing	Between G Street & 255. Existing as of May 2018.	CBS Outdoor, Inc.	503-211-32	CHRISTIE
22	Existing	Between G Street & 255. Existing as of May 2018.	CBS Outdoor, Inc.	503-211-32	CHRISTIE
23	Existing	Between G Street & 255. Existing as of May 2018.	CBS Outdoor, Inc.	503-211-32	CHRISTIE
24	Existing	Between G Street & 255. Existing as of May 2018.	CBS Outdoor, Inc.	503-211-34	CHRISTIE
25	Existing	Between G Street & 255. Existing as of May 2018.	CBS Outdoor, Inc.	503-211-34	CHRISTIE
26	Removed	Fallen Display, 60-Day letter sent from ODA Oct-29-2013, No Billboard at this Location. Removed by Agreement in the Fall of 2016.	CBS Outdoor, Inc.	501-261-39	SLACK FAMILY LLC
27	Existing	Existing as of May 2018.	CBS Outdoor, Inc.	501-091-14	BRUNDY & FURTADO
28	Existing	Existing as of May 2018.	CBS Outdoor, Inc.	501-091-14	BRUNDY & FURTADO
29	Removed	No Billboard at this Location	CBS Outdoor, Inc.	501-061-02	CITY OF ARCATA
30	Removed	No Billboard at this Location	CBS Outdoor, Inc.	501-061-01	CITY OF ARCATA
31	Removed	Along SR 255. Within right of way. Removed by Caltrans			CALTRANS
32	Removed	Along SR 255. Within right of way. Removed by Caltrans			CALTRANS

Some billboards are out of compliance with current local regulations, but the permits cannot be revoked as a result. These displays are considered non-conforming and they are generally "grandfathered" in and allowed to continue. There were no billboards that Caltrans was able to recommend revocation of a permit due to non-compliance with ordinances.

Three of the billboards along the bay were within the NCRA's fee ROW and the NCRA had previously been unsuccessful in attempts to remove these. The Caltrans District Permit Engineer worked with NCRA to provide clear information to ODA to remove these, and the NCRA was successful in removing these billboards.

Figure 2. Before and after picture from Lost Coast Outpost of billboard removed by NCRA with efforts by Caltrans District 1. https://lostcoastoutpost.com/2015/mar/3/three-those-safety-corridors-billboards-have-been/

Two billboards cut down by vandals were refused approval to repair/rebuild by the City of Arcata. While Caltrans was not directly responsible for this refusal to issue permits to rebuild, the attention on billboards through the Consistency Condition, as well as longstanding efforts, likely weighed into the political decisions to deny those permits. The debris was ultimately removed during a local coastal clean up event by the Northcoast Environmental Center, with Caltrans approving an encroachment permit through state ROW for the removal. Granting the encroachment permit for this work was not standard practice for Caltrans, but under the circumstances it was granted.

Caltrans cannot condemn properties unless they stand in the direct path of the project, and none of the billboards were within the path of the proposed project. Thus Caltrans cannot pursue an eminent domain right of passage or condemnation approach to removing the remaining billboards.

To perform due diligence for removal of all billboards within the project limits as feasible, in 2018 Caltrans issued offers for purchase on the remaining 12 billboards. This approach proved to be unsuccessful, mostly because the owner, Outfront Media, was not interested in selling. The purchase offers were based on a “cost approach”, which is the total construction cost for replacement of the billboard. The value of the billboards is likely higher if an “income approach” is utilized for the appraised value. For Caltrans to legally offer anything more than a “cost approach” based offer, Caltrans would need to receive the current billboard lease agreements from Outfront Media to perform an “income approach” appraisal. Caltrans met with Outfront Media’s attorney on June 7, 2018, with the purpose of discussing Caltrans desire to perform an “income approach” appraisal and subsequent offer. Outfront Media’s attorney stated that Outfront Media had no interest in selling any of the remaining billboards and said they would not supply current lease agreements to Caltrans. Because of Outfront Media’s unwillingness to provide billboard income information Caltrans is legally obligated to only submit offers based on the previously mentioned “cost approach”.

Caltrans submitted 30 day offers to Outfront Media on May 3, 2018, for the following billboards located near Indianola:

- Permit #6278 PM 82.41L
- Permit #15335 PM 82.41L
- Permit #6269 PM 82.54L
- Permit #6277 PM 82.68L

Caltrans submitted 30 day offers to Outfront Media on August 14, 2018, for the following billboards, also within the 101 Corridor:

- Permit #016082 PM 83.71R
- Permit #16082A PM 83.71R
- Permit #016334 PM 85.69L
- Permit #16334C PM 85.69L
- Permit #16334B PM 85.48L
- Permit #16334D PM 85.48L
- Permit #65939A PM 85.31L
- Permit #65939B PM 85.31L

Humboldt County Association of Governments (HCAOG) had allocated and programmed $2,000,000 in funds for billboard removal for the Corridor Project. Fortunately, 17 billboards were removed through staff efforts, not requiring these funds. After meeting with local Coastal Commission staff to update them on billboard removal status and discuss why Caltrans was legally unable to seek removal of the remaining billboards, it was decided the $2,000,000 in billboard removal funds would be best utilized by the County of Humboldt as part of their Bay Trail South project. Alignment for the Bay Trail South project conflicted with at least one of the remaining billboards. Due to this conflict, the County would then have the legal authority to proceed with the eminent domain process should Outfront Media not be willing to sell the billboard. Caltrans collaborated with HCAOG and County of Humboldt and submitted a request to the CTC for a change in implementing agency requesting the billboard removal funds be utilized for right of way requirements for Humboldt County's Bay Trail South. The County of Humboldt currently has access to these funds and plans to utilize them for right of way needs on their trail project, which may result in additional billboard removal.

A map of the billboards around Humboldt Bay that identifies that there were 32 billboards around the bay. Of these 32 billboards, 20 billboards that have been removed since 2014. There are 12 existing billboards remaining, four of which are near Indianola Cutoff. Billboards identified as existing on the map would remain and would not be removed as part of the proposed project. These billboards cannot be removed by Caltrans because the land owners and billboard lessors do not want to sell the billboards so that they can be removed, and the eminent domain right-of-way process is not an option for billboard removal since the billboards are not in conflict with the project corridor. However, the remaining billboards could be removed by eminent domain if the billboards conflict with a future project. The four billboards near Indianola Cutoff, indicated by green diamonds on the map, are not in conflict with any of the proposed improvements for this project and that is why they will remain in place.

In summary, within the corridor, 10 billboards were removed through a relocation agreement, five billboards were removed by outside sources (some with assistance from Caltrans), and two billboards were removed along Route 255 as a result of a mitigation site purchase by Caltrans. In addition to the 15 billboards within the Corridor and two billboards along Route 255, Caltrans proposes to remove approximately 2,400 square feet of existing signage within the Corridor that is related to the Safety Corridor and/or signage needed for the current configuration of the roadway. For comparison purposes, there are four signs comprising 1,564 square feet that remain near the proposed Indianola interchange.

0 0.5 1 Miles

Update: November 9, 2017; Imagery: USDA NAIP 2016; All locations are approximate.

HUMBOLDT BAY TRAIL
Projects Overview

Exhibit 30
CDP Application No. 1-18-1078
(Caltrans)
Humboldt Bay Trail Network

➢ *Sea Level Rise of 0.9 Feet*

The tidal inundation vulnerability and flood mapping indicates areas that are vulnerable if the protective shoreline structures are breached or overtopped, not areas that are currently inundated (NHE 2014b). Sea level rise of 0.9 ft. was modeled using MAMW (8.8 ft.), with the assumption that current shoreline protection was no longer functioning. The inundation vulnerability maps show that much of the former tidal lands that are currently protected, especially lands to the east of Highway 101, could be inundated if the current diked shoreline is overtopped or breached. Highway 101 would be tidally inundated from the east (Figure 27 - Figure 30). In the HBAP planning area north of Eureka, approximately 0.73 miles of the north bound lanes could become tidally inundated if the diked shoreline on Fay Slough is overtopped or breached. An additional 1.1 miles of both lanes in the South segment could also be inundated if the dikes on South Bay are overtopped or breached.

However, under current conditions, the south bank of lower Jacoby Creek is the shoreline most vulnerable to overtopping, often leading to inundation of the highway road prism on the east side of the upper reach of the North segment. The dikes on Fay Slough currently hold MAMW of 8.8 ft. and prevent the lower reach of the North segment from being tidally inundated. The railroad on the west side of the North segment also appears to be able to contain MAMW of 8.8 ft.

The road prism of the Middle segment south of Elk River on the east side is tidally inundated by MAMW of 8.8 ft. On the South segment, the dikes in the Humboldt Bay National Wildlife Refuge (HBNWR) in the Salmon Creek unit are not overtopped under current conditions. Therefore, the South segment has not become tidally inundated by MAMW of 8.8 ft.

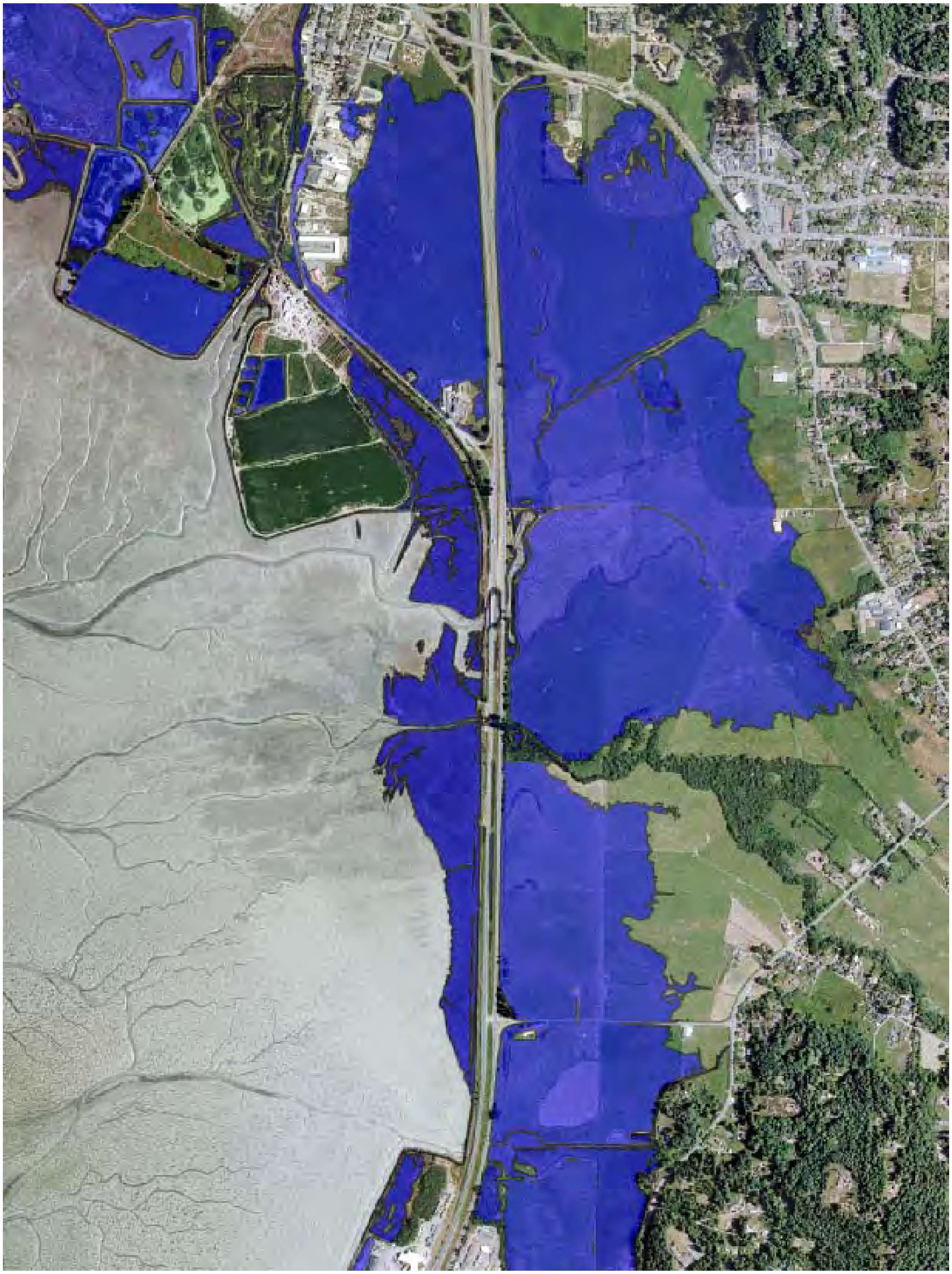


Figure 27. Upper reach of North segment with 0.9 ft. of sea level rise with a tidal elevation of 8.8 feet. (MAMW). Should the protective shoreline structures be compromised, the land adjacent to the road prism could be inundated to the east of Highway 101.

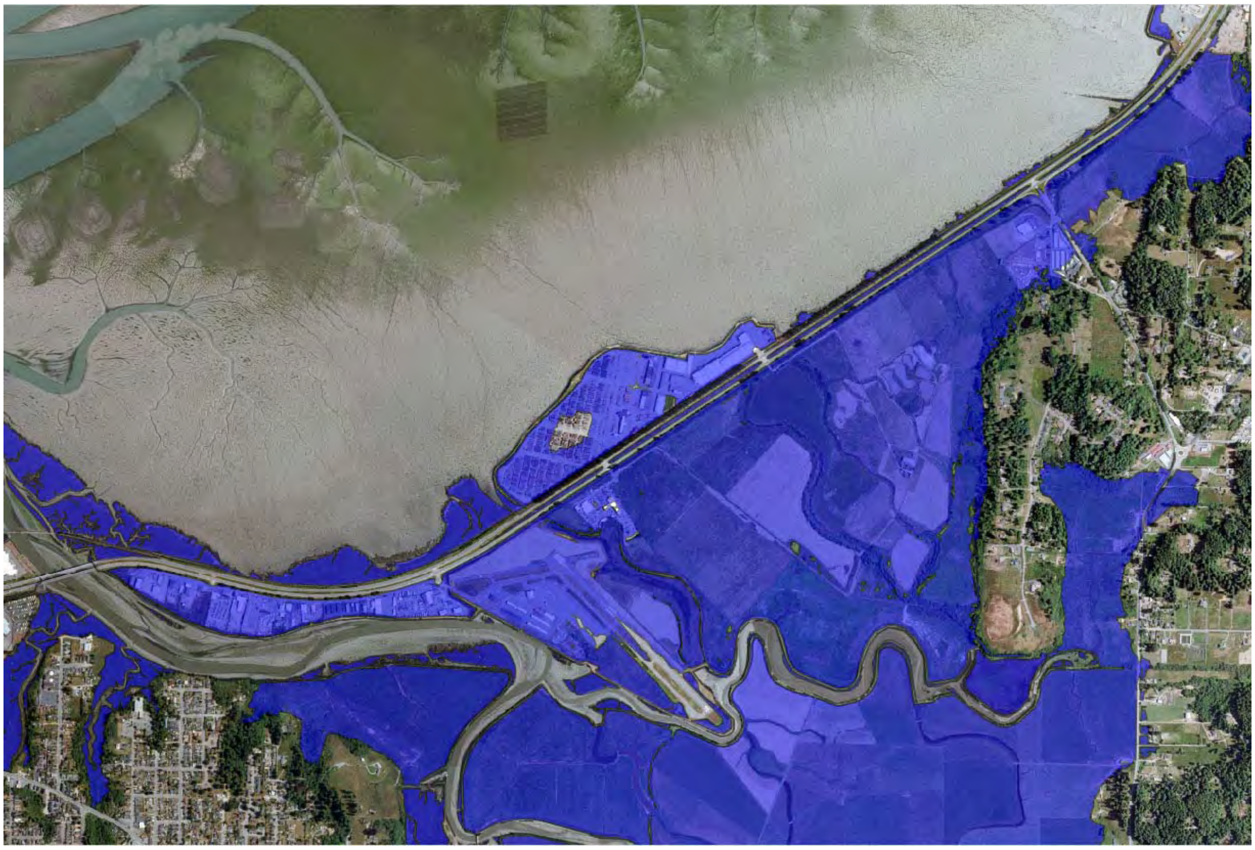


Figure 28. Lower reach of North segment with 0.9 ft. of sea level rise with a tidal elevation of 8.8 feet (MAMW). Should the protective shoreline structures be compromised, the land adjacent to the road prism could be inundated from the east of Highway 101. In the HBAP planning area, approximately 0.73 miles of the north bound lanes of the lower reach could become tidally inundated.

Figure 29. Middle segment with 0.9 ft. of sea level rise with a tidal elevation of 8.8 feet (MAMW). The protective shoreline structures to the east have been compromised. The land adjacent to the road prism is inundated from east of Highway 101, but no lanes become tidally inundated.

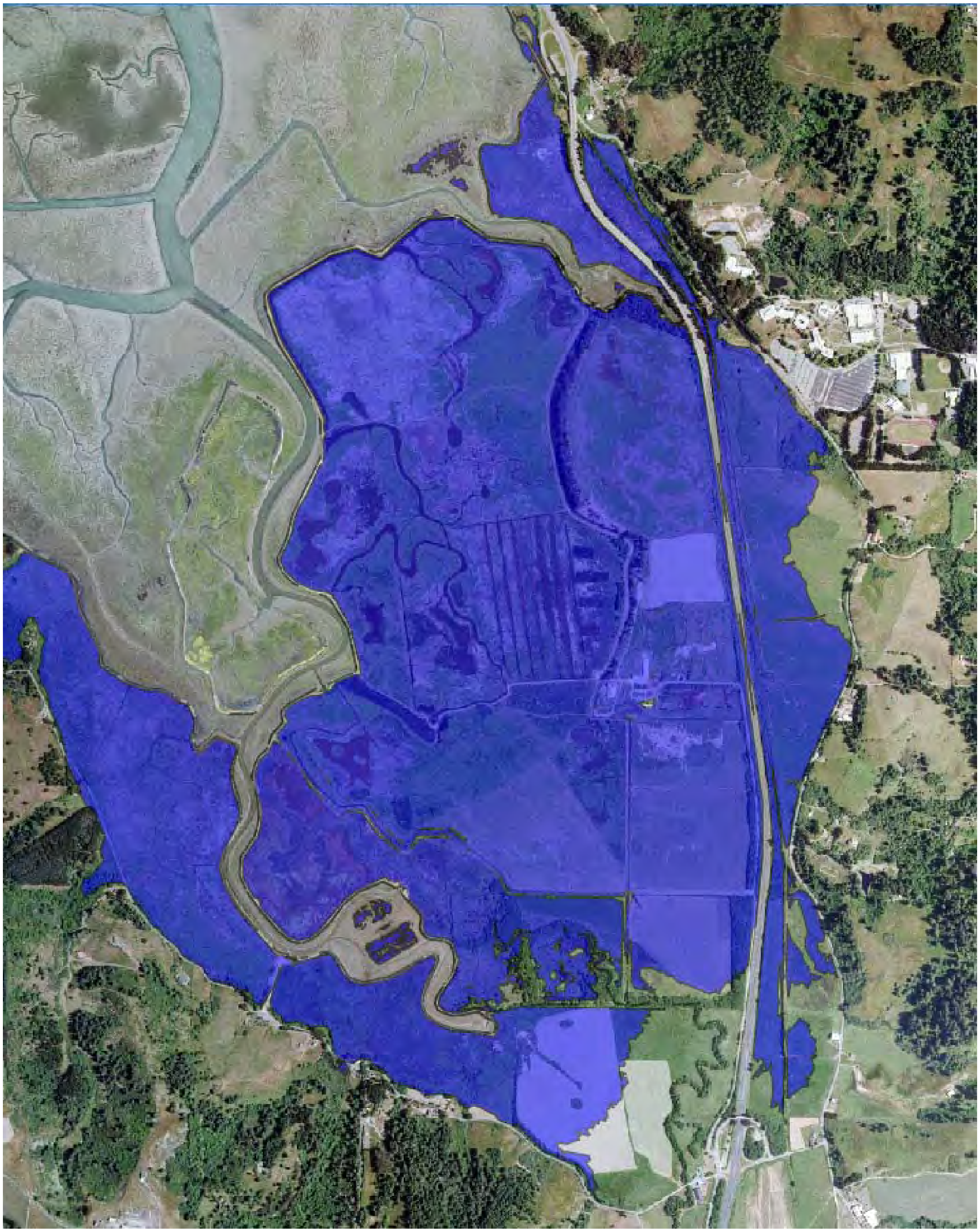


Figure 30. South Bay segment with 0.9 ft. sea level rise with a tidal elevation of 8.8 feet (MAMW). Scenario assumes that protective shoreline structures are compromised, and the land adjacent to the road prism is inundated from west of Highway 101. Approximately 1.1 miles of the north and south bound lanes could become tidally inundated.

➢ *Sea Level Rise of 1.6 Feet*

Sea level rise of 1.9 ft., the high projection for 2050, would result in a MMMW elevation of 9.6 ft. The elevation of MMMW, plus 1.9 ft. of sea level rise, is a half foot lower than the elevation of the 100-year event (1% probability of occurring any year) of 10.2 ft. Areas that would be infrequently flooded by the 100-year extreme storm event could be tidally inundated by MMMW in 2050.

Two miles of both north and south bound lanes in the lower reach of the North segment of Highway 101 could be tidally inundated by 1.6 ft. (0.5 M) of sea level rise if the protective dikes on Fay Slough are breached or overtopped, and 1.2 miles of both north and south bound lanes in the Highway 101 South segment could also be tidally inundated if the protective dikes on South Bay are breached or overtopped (Figure 31 and Figure 32).

Sea level rise of 1.6 ft. (0.5 M) would lead to overtopping of 20.9 miles of artificial shoreline, including 11.4 miles of dikes and 1.5 miles of railroad grade (Table 7). In the upper reach of the North segment, the dikes on Gannon Slough and Washington Gulch could be overtopped. This would inundate the highway road prism from the east but not the highway surface.

In the lower reach of the North segment, the railroad would be overtopped by 1.6 ft. (0.5 M) of sea level rise and tidal inundation of the highway road prism would occur, as would portions of the south bound lanes. The dikes on Fay Slough would be overtopped and north bound lanes would become tidally inundated.

The middle segment road prism would be tidally inundated by 1.6 ft. (0.5 M) of sea level rise from the east, but the highway surface would not be inundated. The dikes on the HBNWR in the Salmon Creek unit would be overtopped and lead to tidal inundation of both south and north bound lanes of the south segment.

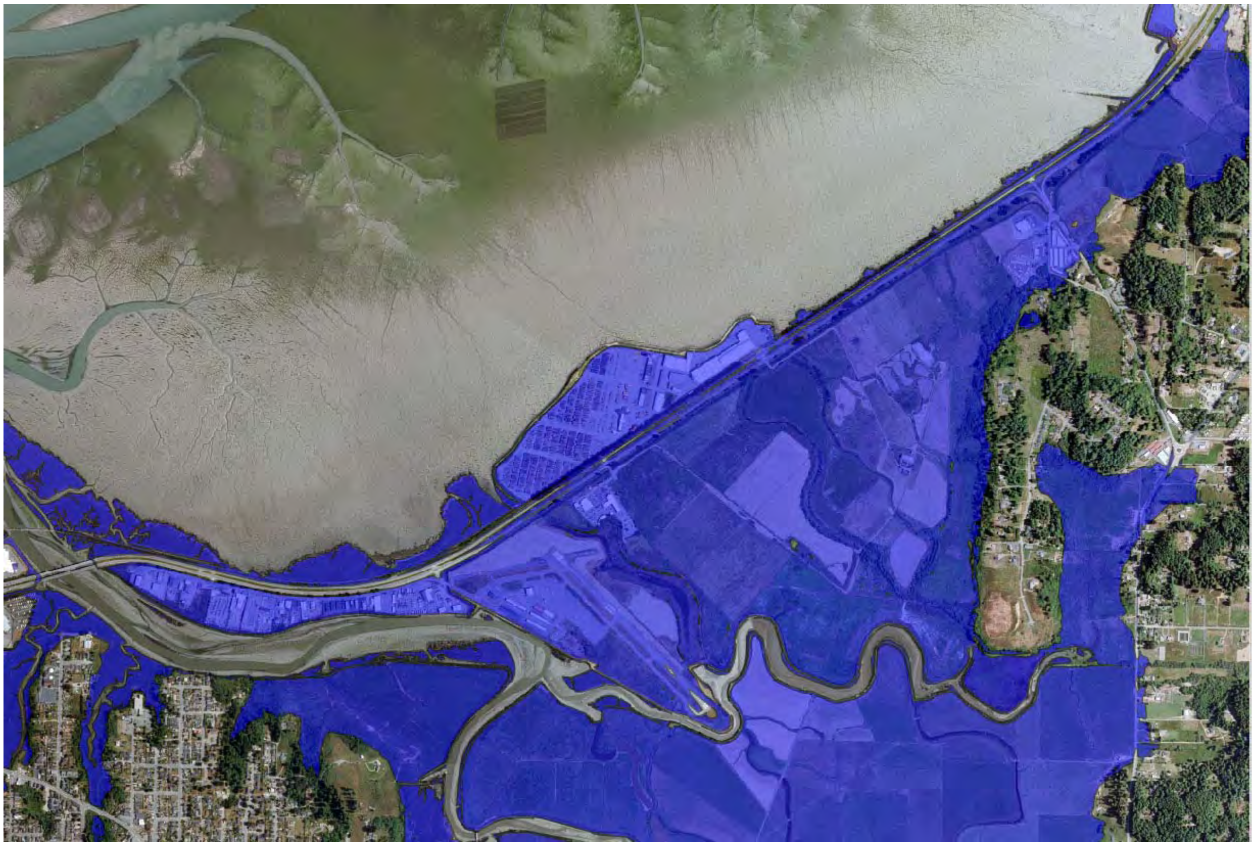


Figure 31. Lower reach of the Arcata Bay segment with 1.6 ft. (0.5 M) of sea level rise and a tidal elevation of 9.3 feet. Protective shoreline structures are overtopped on both sides of the highway, and the road prism is inundated. Approximately 2.0 miles of the north and south bound lanes of the lower reach could become tidally inundated.

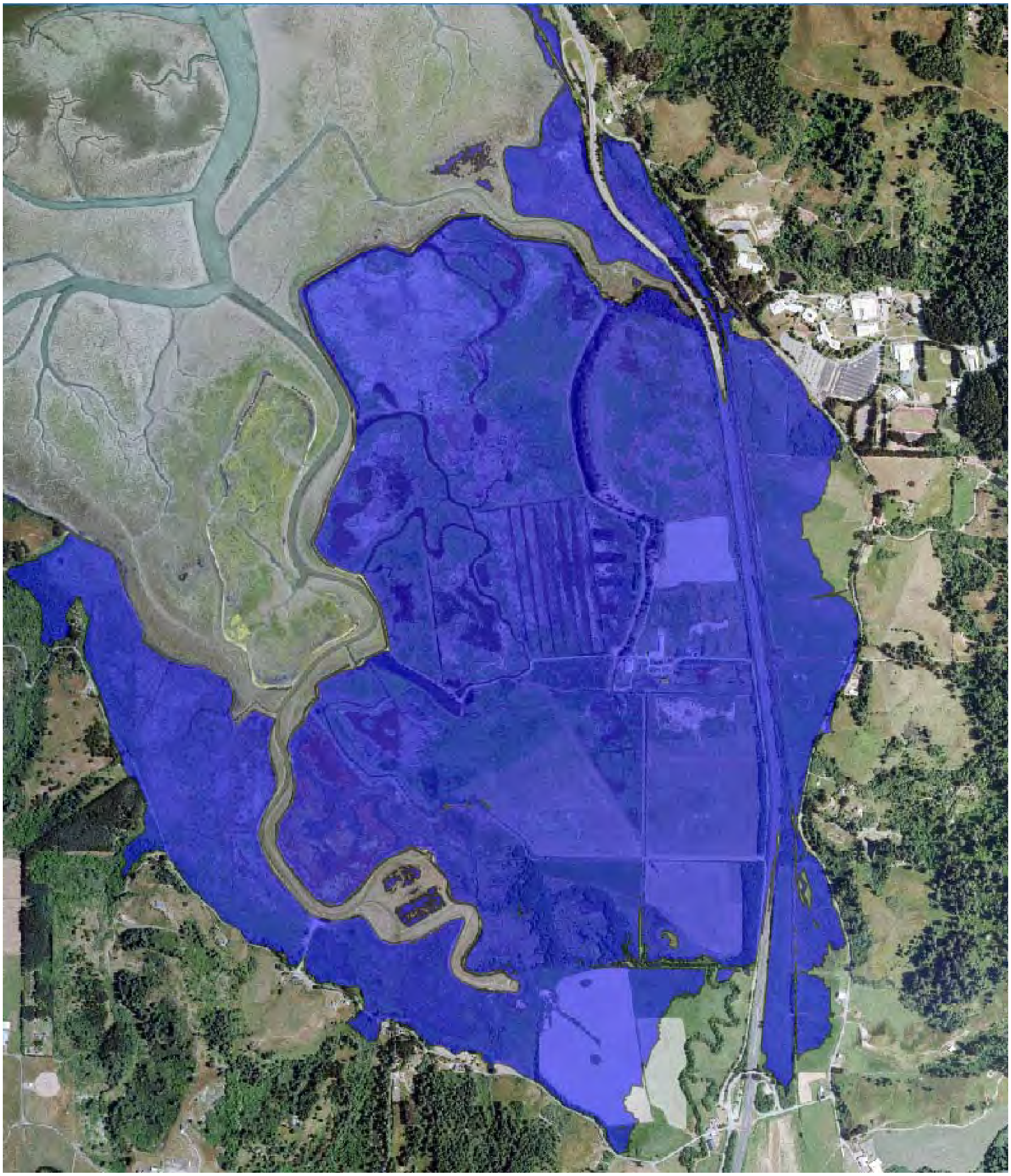


Figure 32. South Bay segment. With 1.6 ft. (0.5 M) of sea level rise and a tidal elevation of 9.3 feet. Protective dike shoreline structures are compromised, and 1.2 miles of the south and north bound lanes of Highway 101 are tidally inundated.

➢ *Sea Level Rise of 3.3 Feet*

Sea level rise of 3.2 ft. (1.0 M) is the high projection for 2070, and would result in a MMMW elevation of 10.9 ft. All protective shoreline structures of Highway 101 would have already been overtopped with 1.6 ft. (0.5 M) of sea level rise. In the HBAP planning area, 0.8 miles of the south bound lanes in the upper reach of the North segment would become tidally inundated from the west. Two miles of both north and south bound lanes in the lower reach could be tidally inundated from both the west and east. The middle segment would become tidally inundated from the east on 0.3 miles south of Elk River and another 0.3 miles from the west near King Salmon. Roughly 1.6 miles of both north and south bound lanes in South Bay would also be tidally inundated, (Figure 33 and Figure 34).

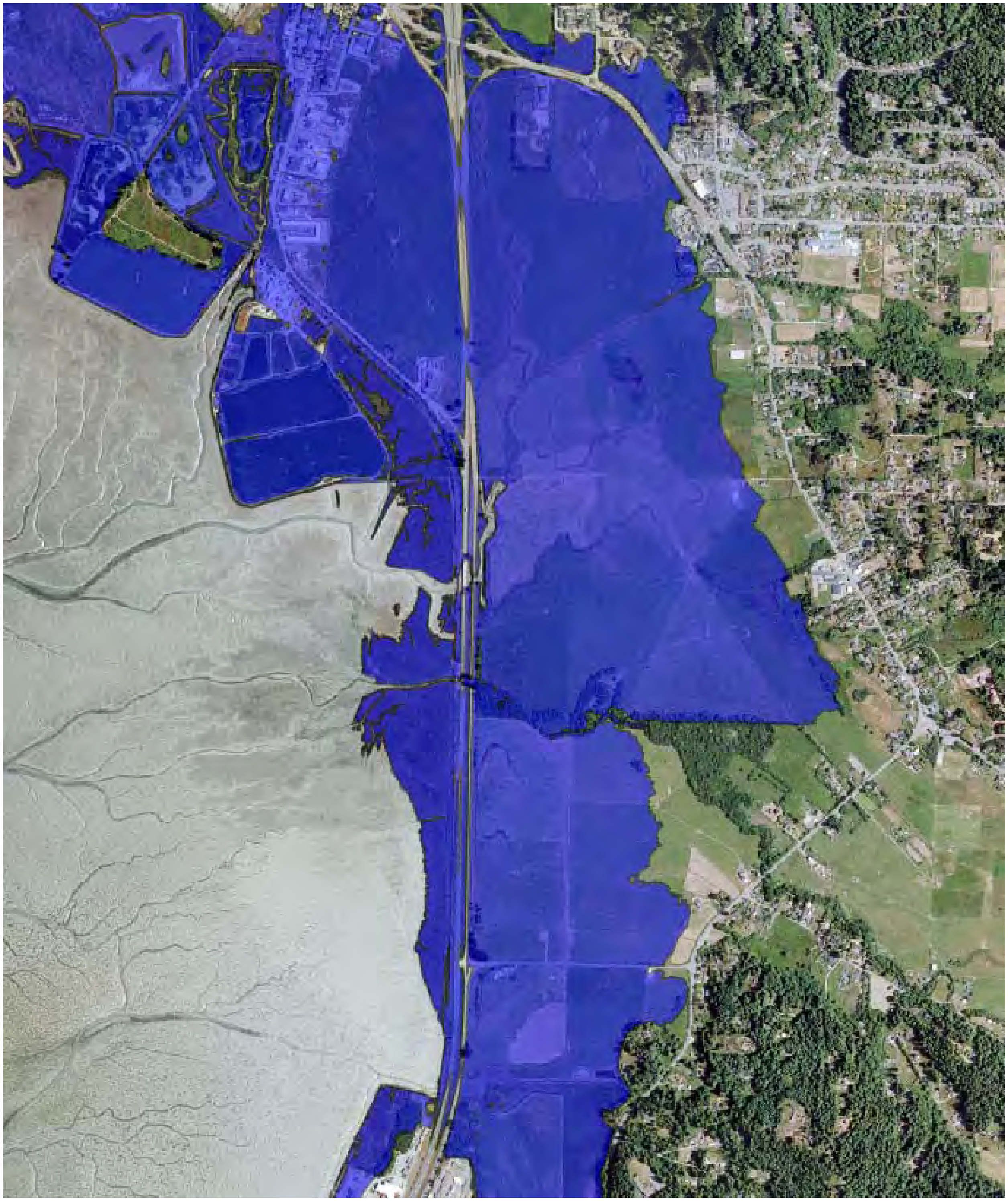


Figure 33. Portions of the upper reach of the North segment in 2070 could be tidally inundated by 3.3 ft. (1.0 M) of sea level rise as protective shoreline structures are compromised and portions of the south and north bound lanes are inundated.

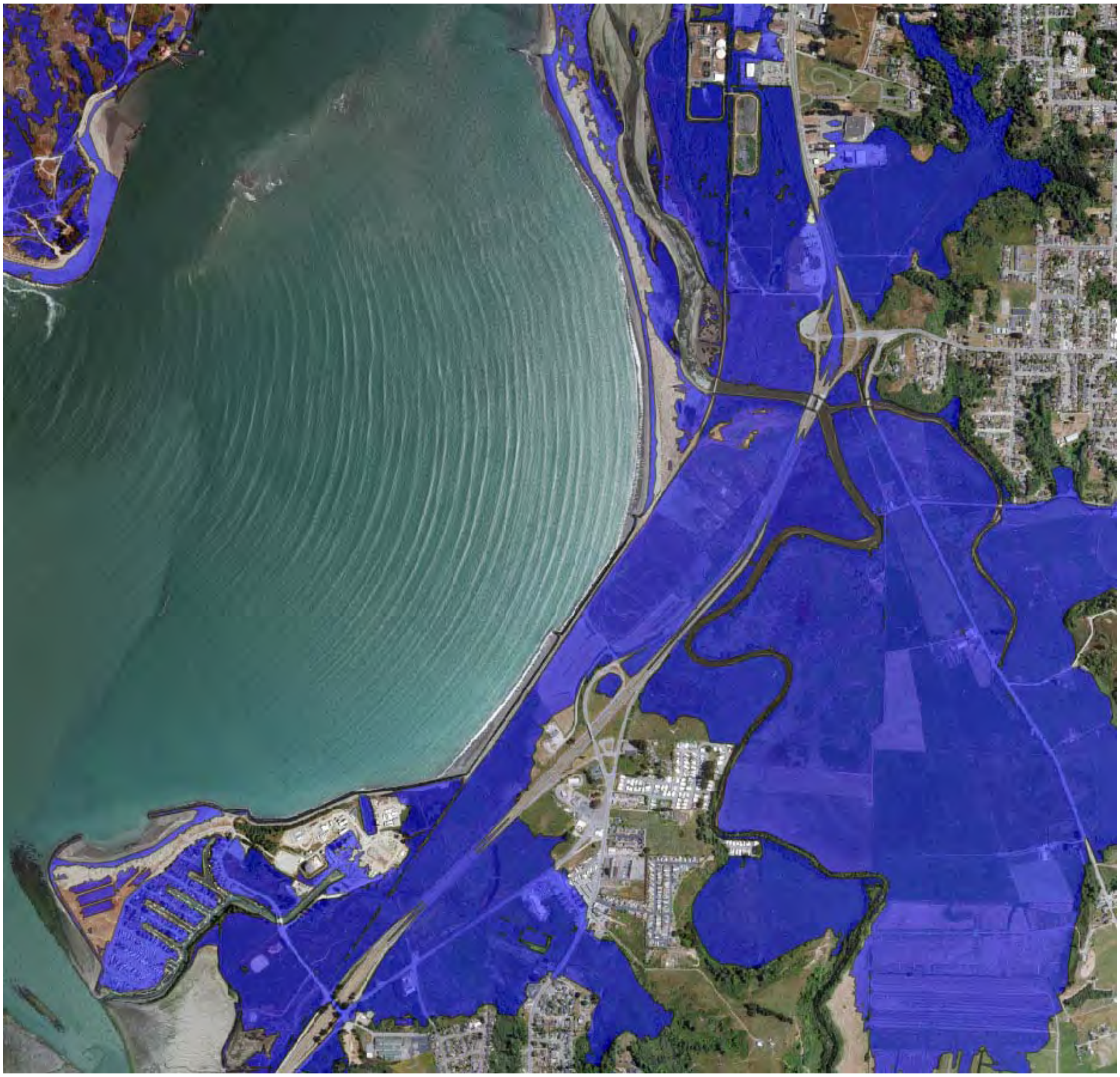


Figure 34. . Portions of the Middle segment in 2070 could be tidally inundated by 3.3 ft. (1.0 M) of sea level rise.

➢ *Sea Level Rise of 4.9 Feet*

Sea level rise of 5.4 ft. is the high projection for 2100, and would result in a MMMW elevation of 13.1 ft. Most reaches of the highway that would be inundated by 3.3 ft. (1.0 M) of sea level rise would be tidally inundated much more frequently and to greater depths if the projected 4.9 ft. (1.5 M) of sea level rise occurs. The inundation areas for 4.9 ft. (1.5 M) of sea level rise are very similar in areal extent to the 3.3 ft. (1.0 M) sea level rise inundation areas (Figure 35 and Figure 36). A notable difference is that both south and north bound lanes would be completely inundated.

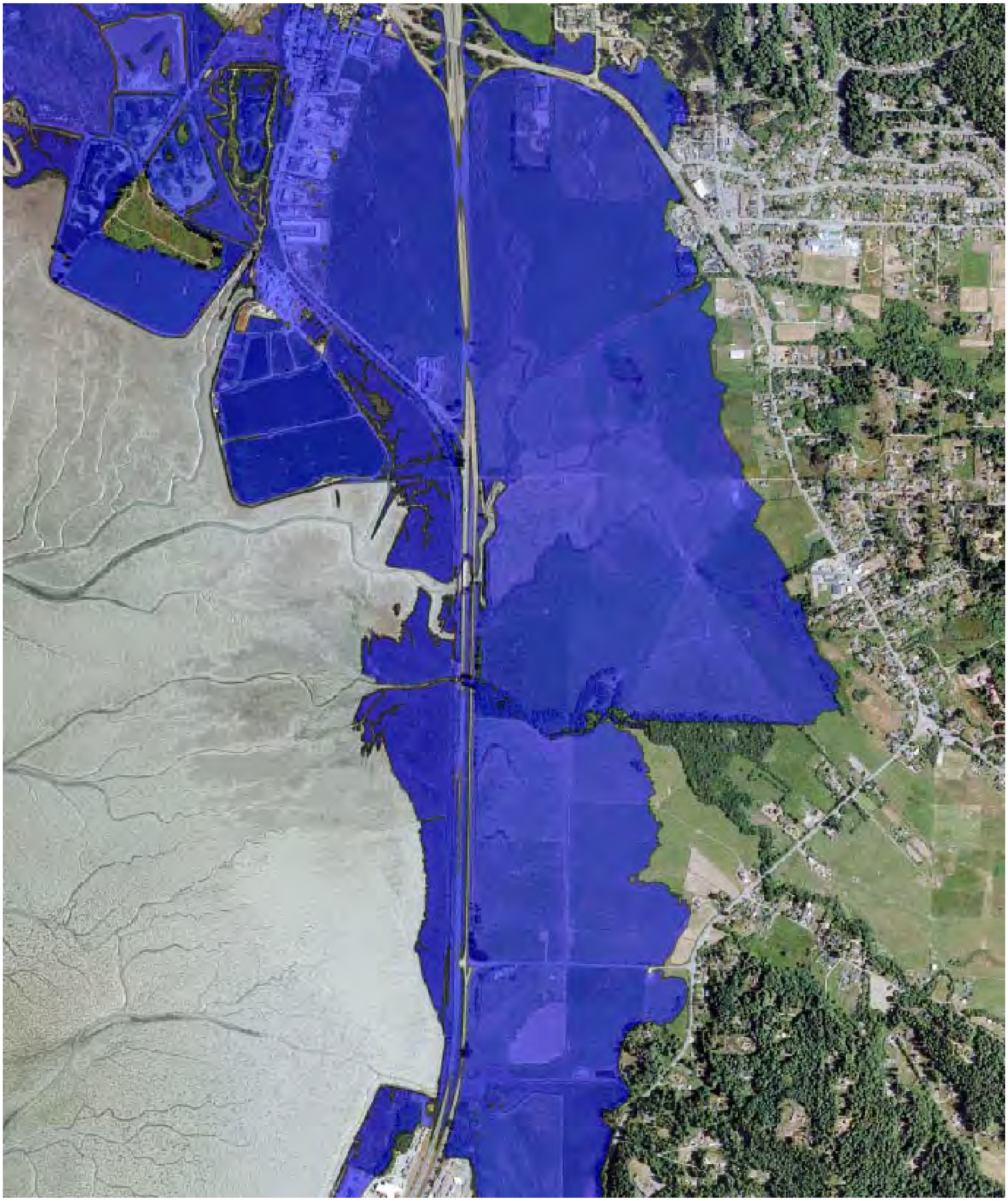


Figure 35. Upper reach of North segment by 2100, could be tidally inundated by 4.9 ft. (1.5 M) of sea level rise. Both north and south bound lanes are almost entirely inundated.

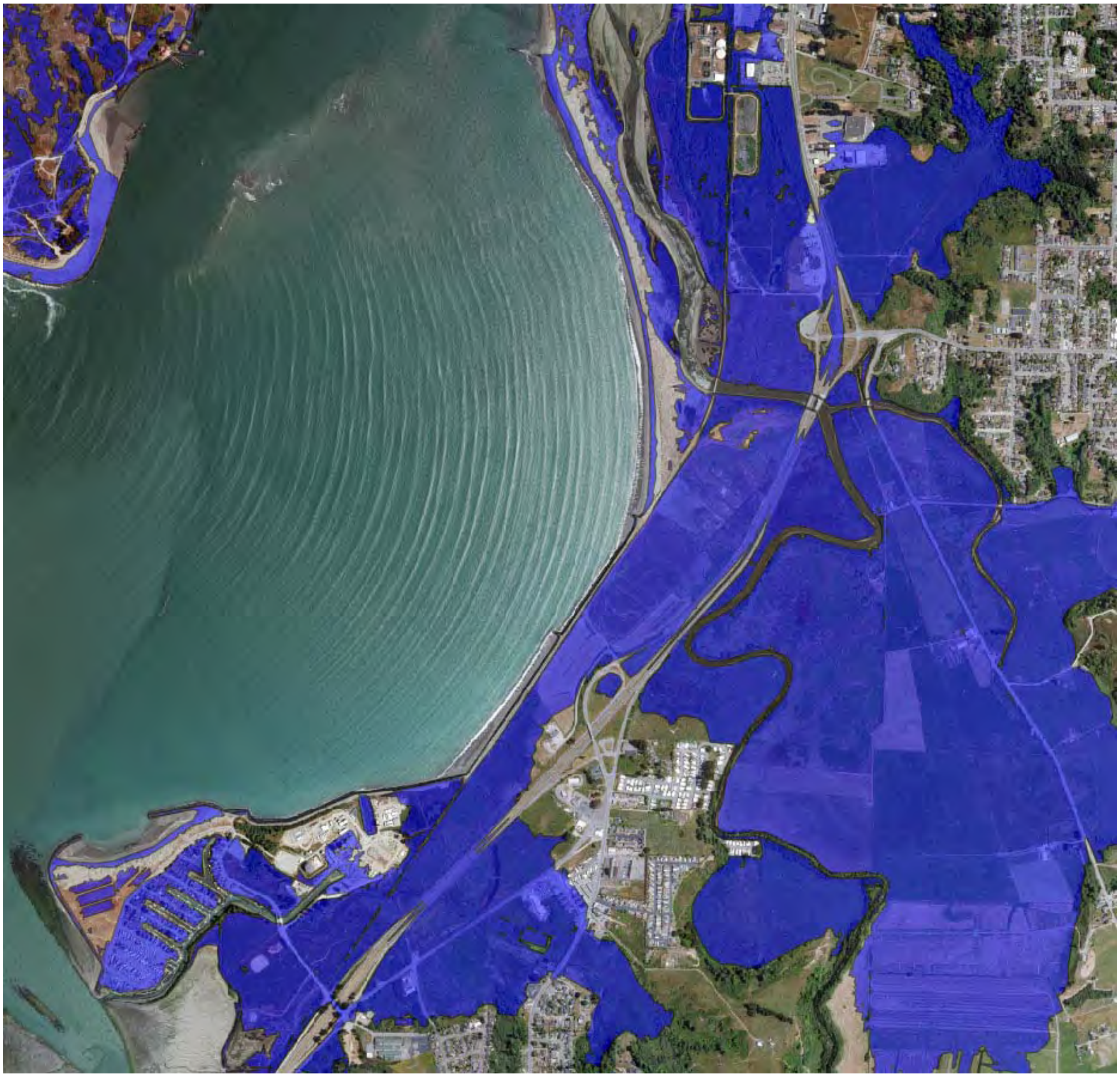


Figure 36. Middle segment by 2100, south of Eureka by 2100, could be tidally inundated by 4.9 ft. (1.5 M) of sea level rise. Both north and south bound lanes are almost entirely inundated.

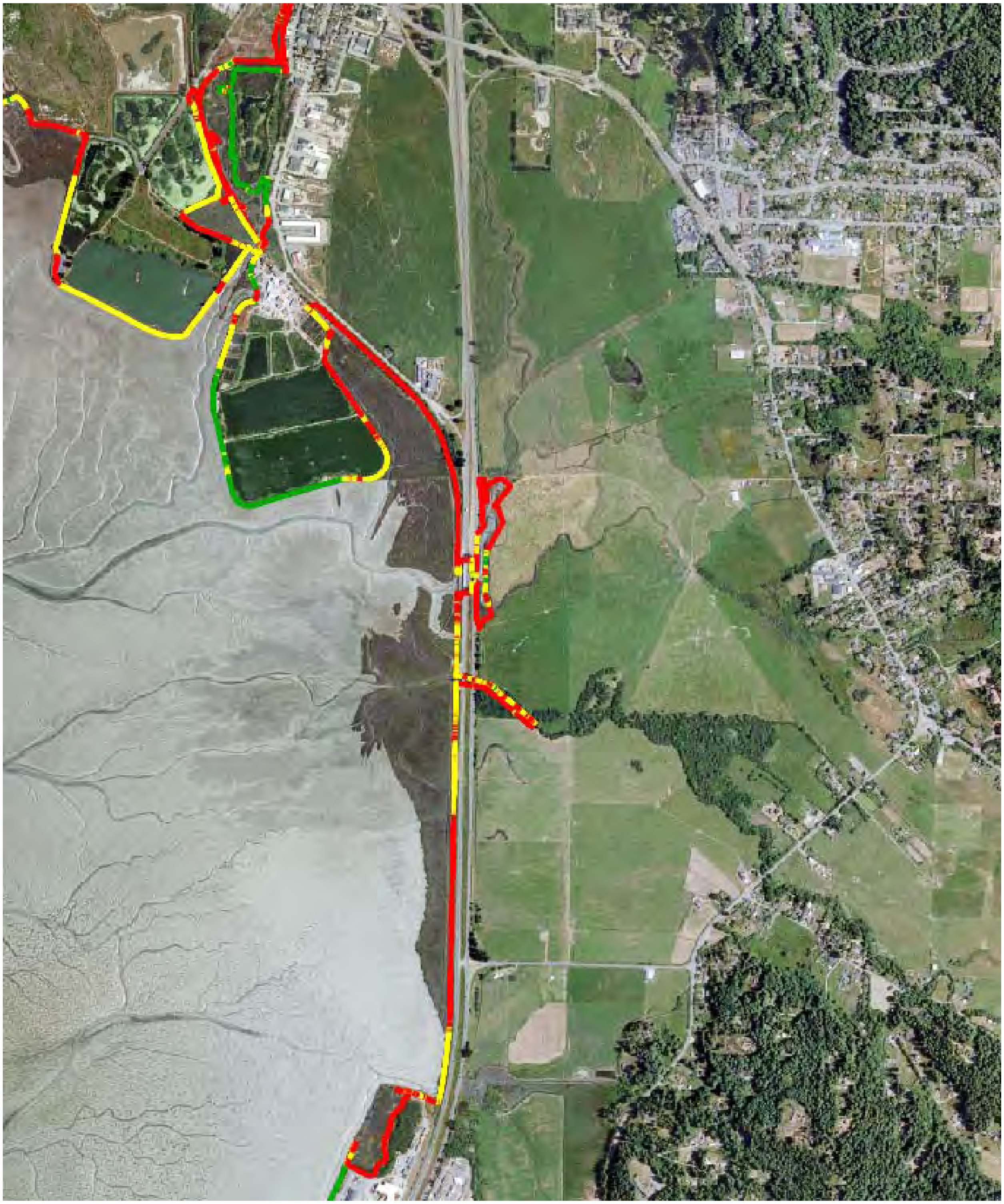


Figure 22. North segment, shoreline vulnerability rating of the upper reach of Highway 101 on Arcata Bay: high (red), moderate (yellow), and low (green) (Laird and Powell 2013).

Exhibit 32
CDP Application No. 1-18-1078
(Caltrans)
Vulnerbility of Dikes and Corridor (Laird 2013)
1 of 2

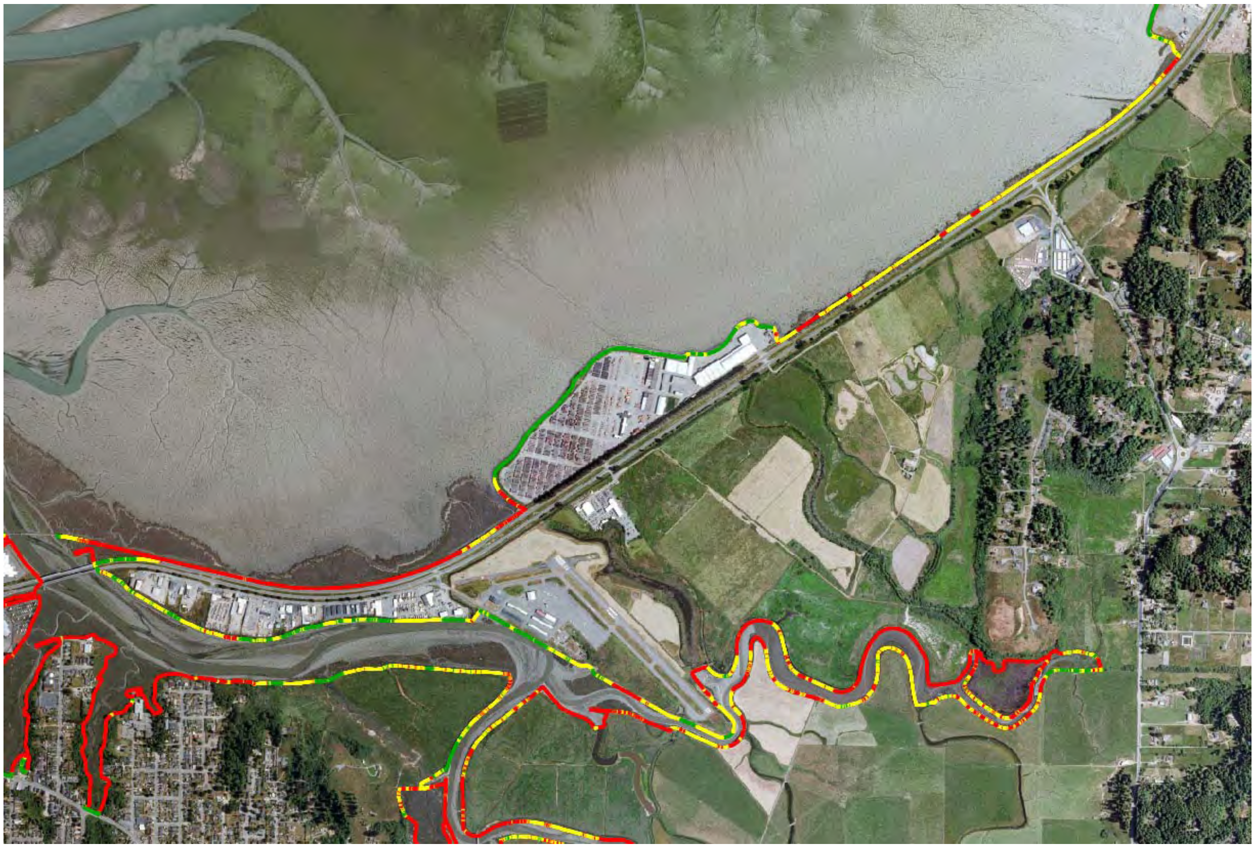


Figure 23. North segment, shoreline vulnerability rating of the lower reach of Highway 101 on Arcata Bay: high (red), moderate (yellow), and low (green) (Laird and Powell 2013).

Exhibit 32
CDP Application No. 1-18-1078
(Caltrans)
Vulnerbility of Dikes and Corridor (Laird 2013)
2 of 2

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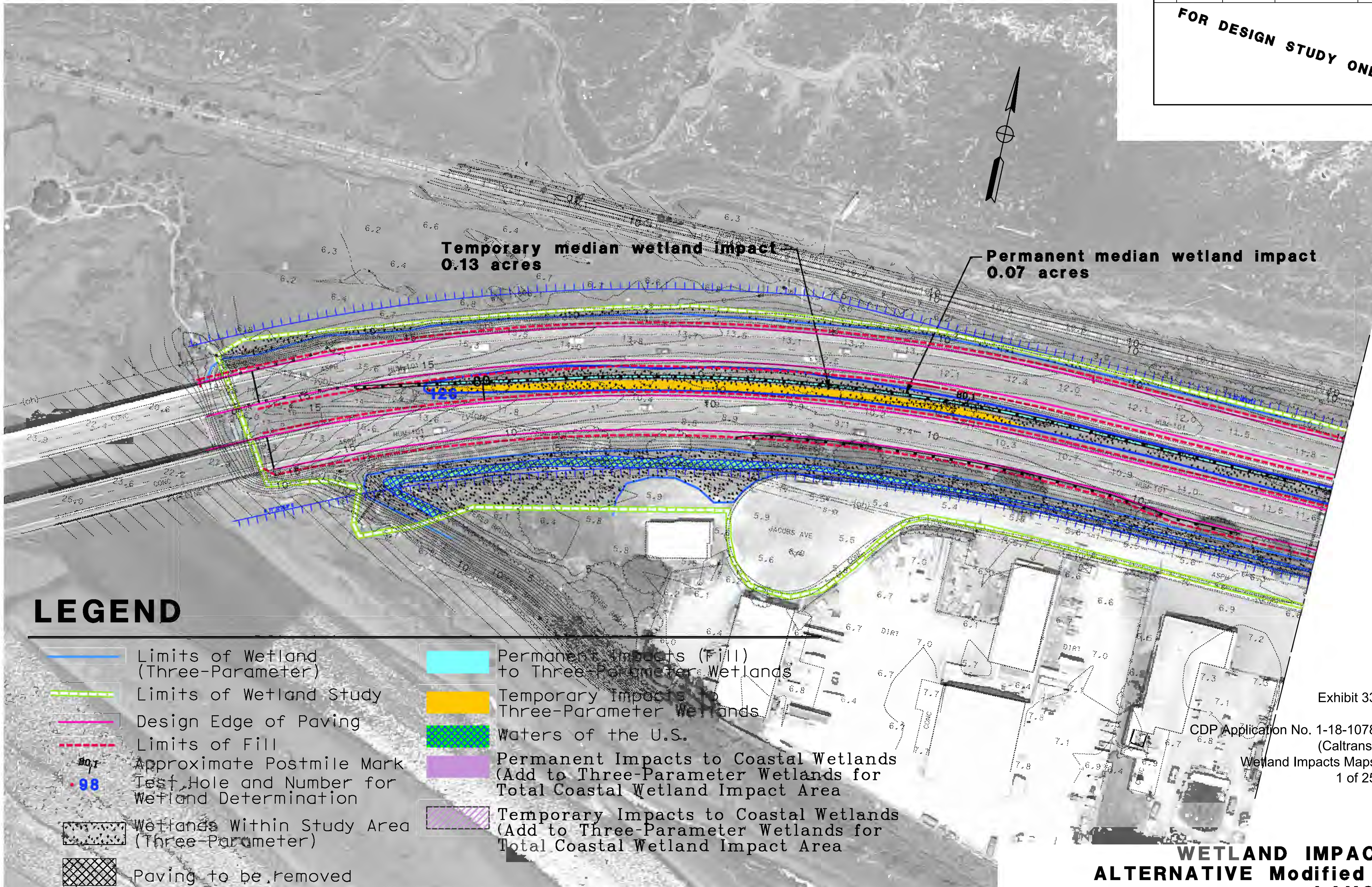

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
1 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-1

SCALE: 1"=50'

0 FEET 50 100 150 200 250
SCALE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:09
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

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CU 03232

EA 363301

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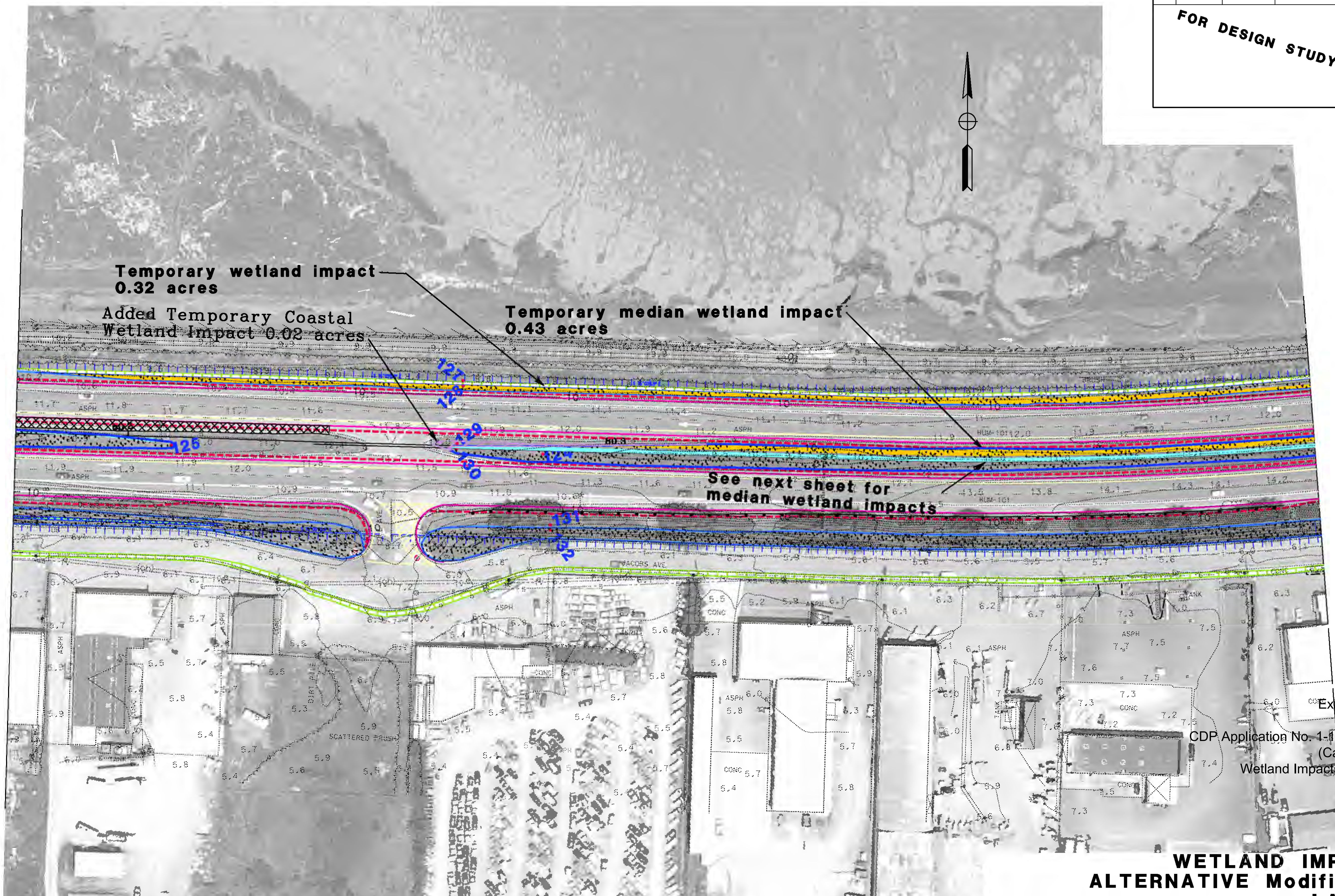

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
2 of 25

WETLAND IMPACTS ALTERNATIVE Modified 3A LAYOUT
L-2

SCALE: 1"=50'

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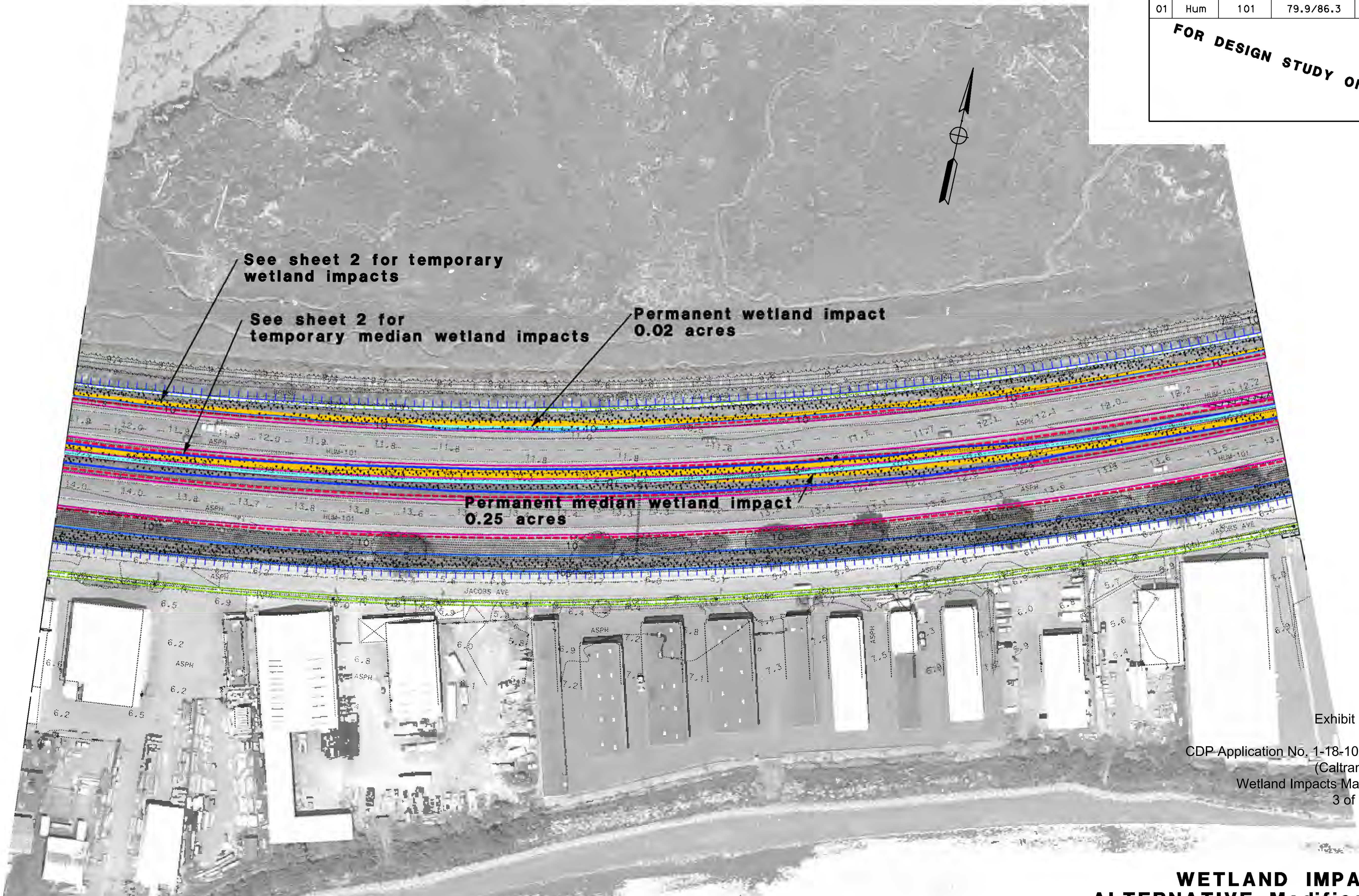

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
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WETLAND IMPACTS ALTERNATIVE Modified 3A LAYOUT

SCALE: 1"=50'

L-3

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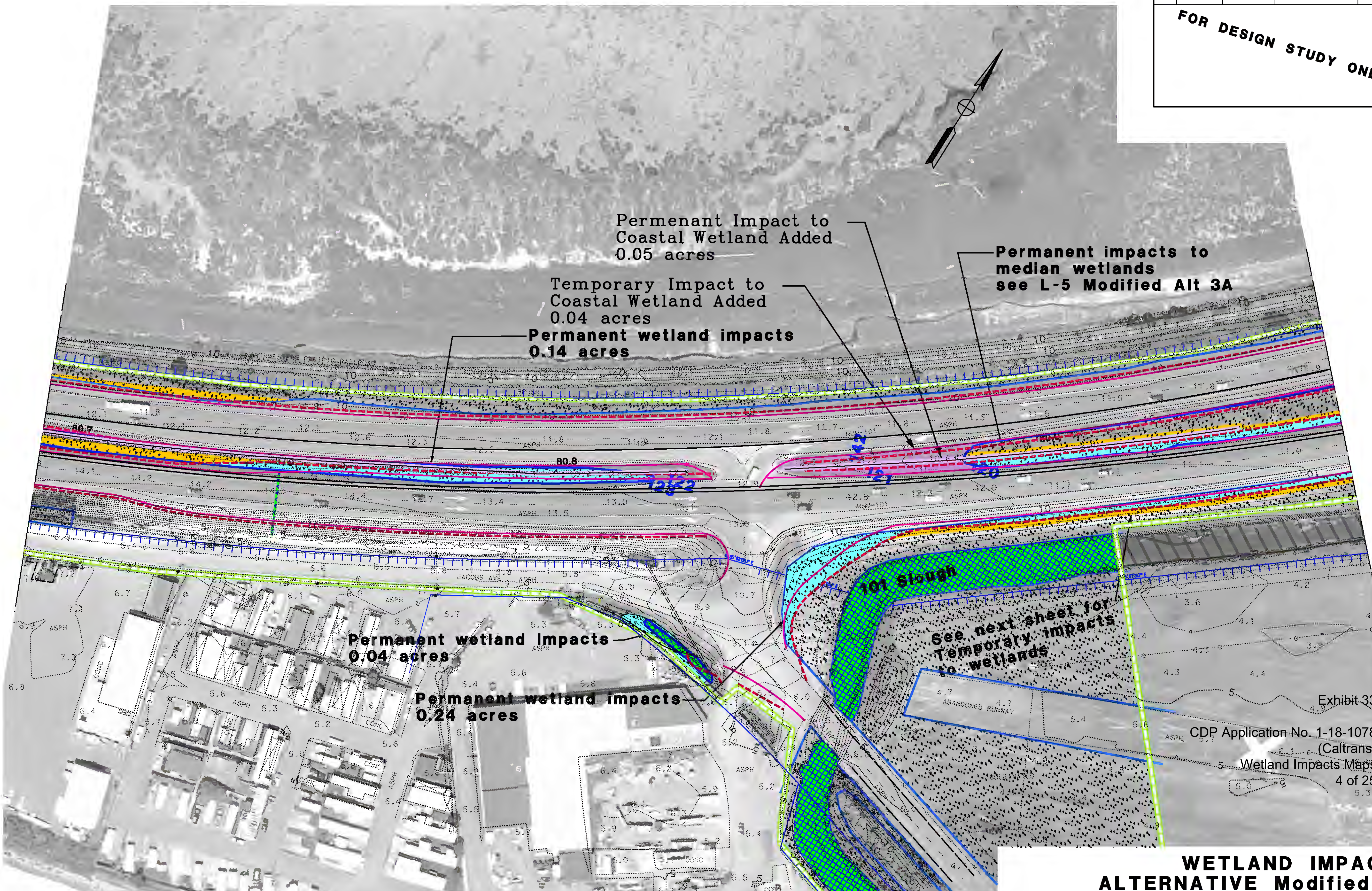

Exhibit 33
CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
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WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT

SCALE: 1"=50'

L-4

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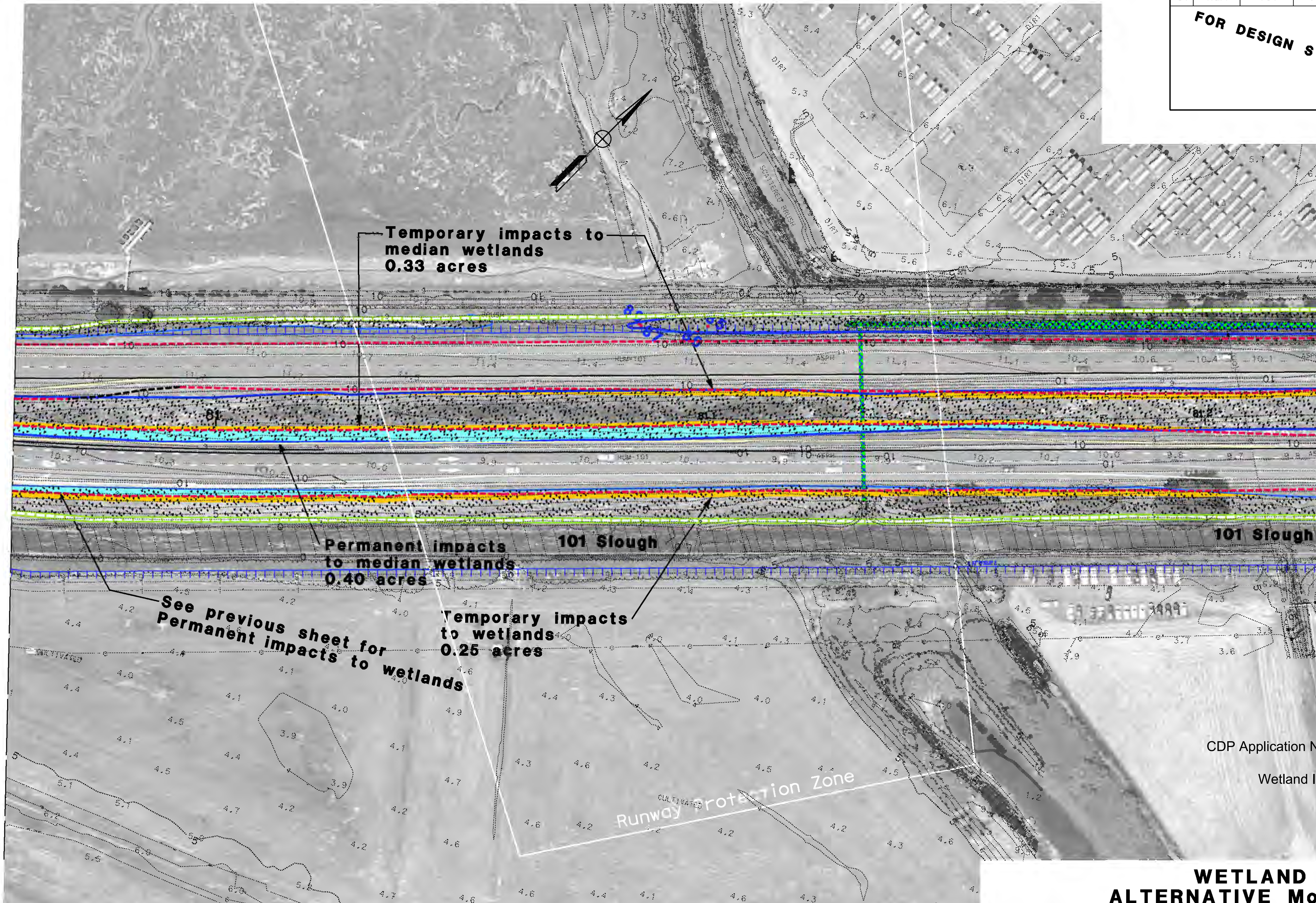

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
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WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-5

SCALE: 1"=50'

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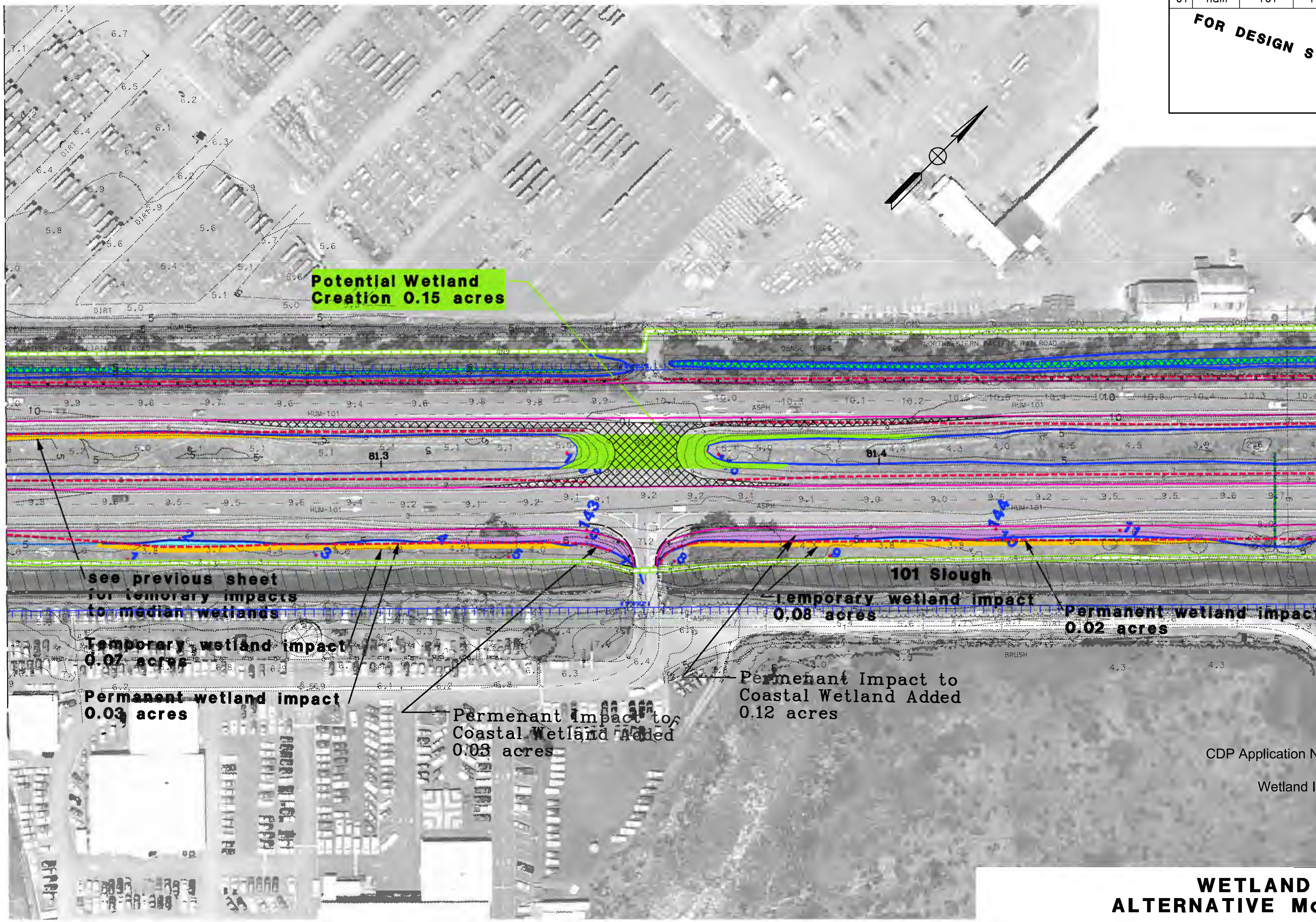

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
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WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-6

SCALE: 1"=50'

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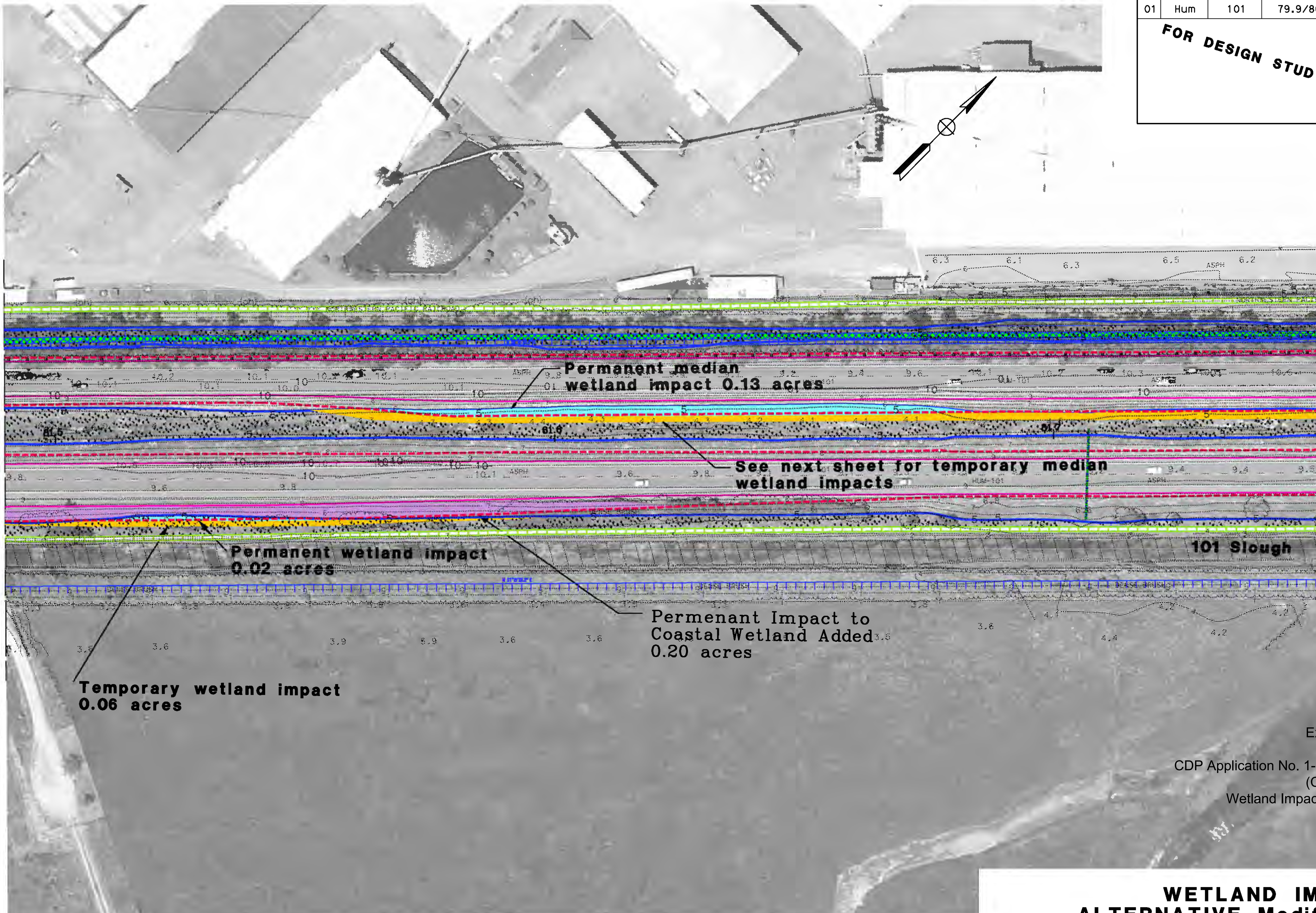

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
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WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-7

SCALE: 1"=50'

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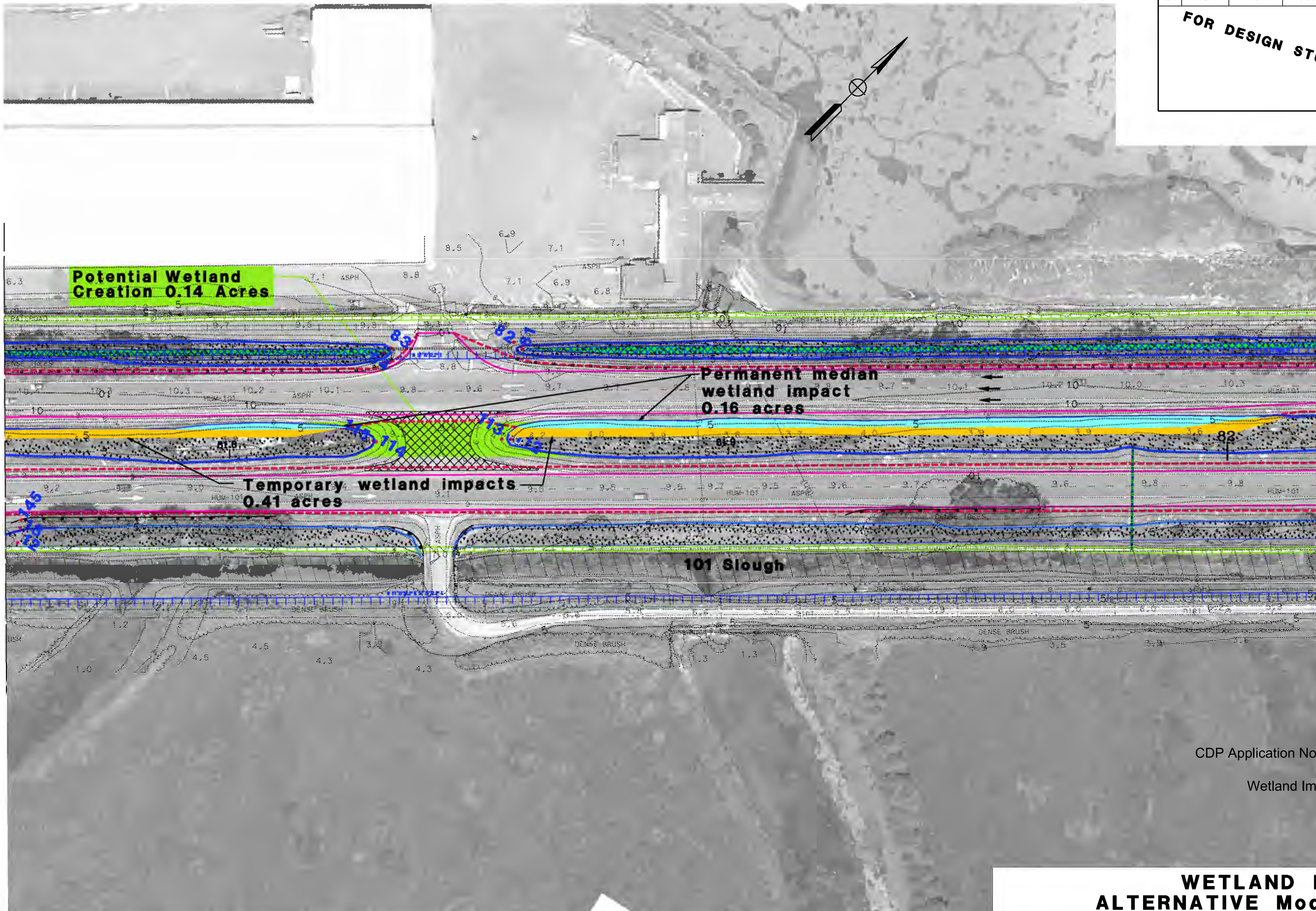

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
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WETLAND IMPACTS ALTERNATIVE Modified 3A LAYOUT L-8

SCALE: 1"=50'

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01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

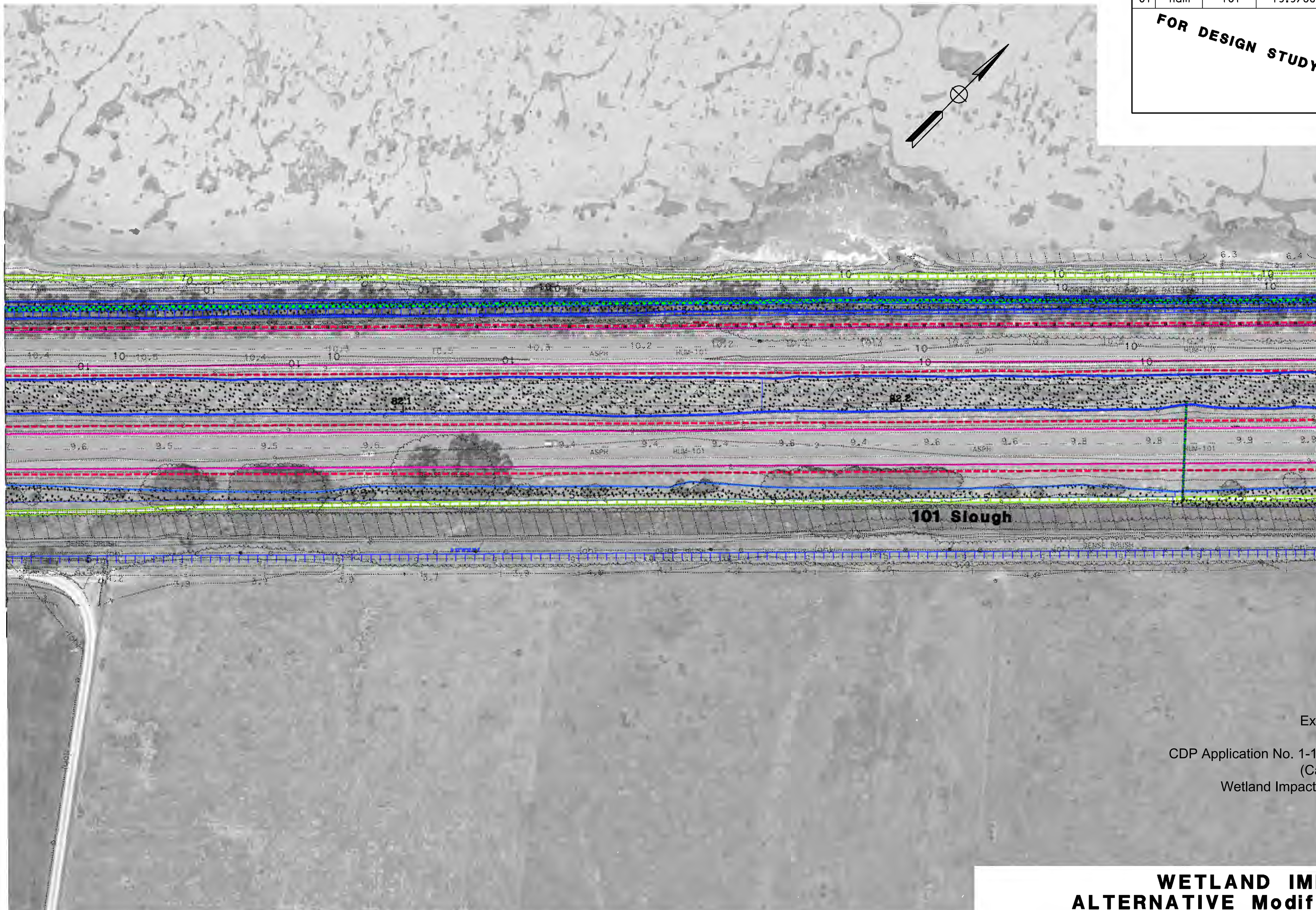

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
9 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-9

SCALE: 1"50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: L.R. ASHLEY

CALCULATED-DESIGNED BY: TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:15

LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet009.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

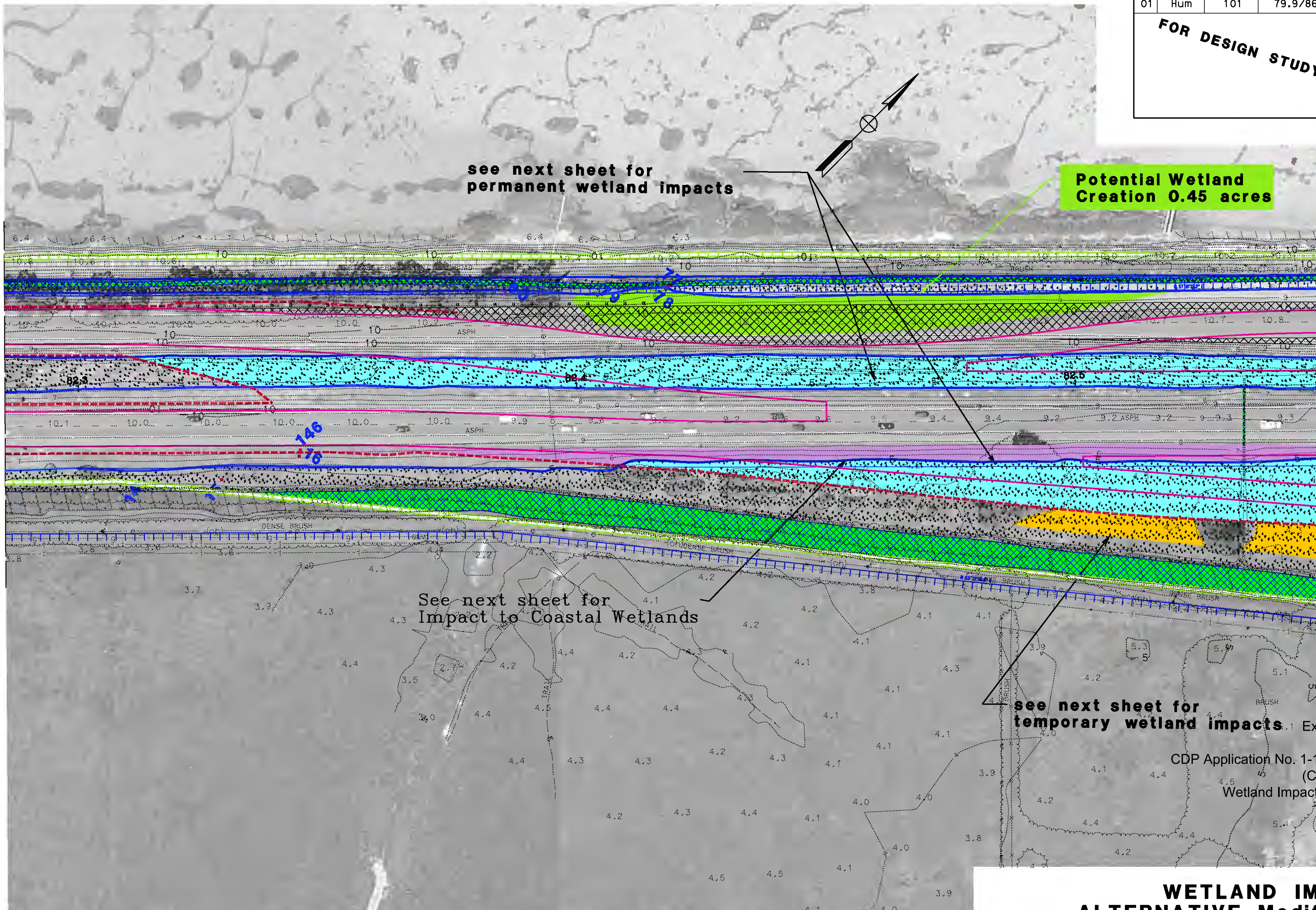

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
10 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L10

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR L.R. ASHLEY

CALCULATED-DESIGNED BY TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION 08-11-08

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:15

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet010.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

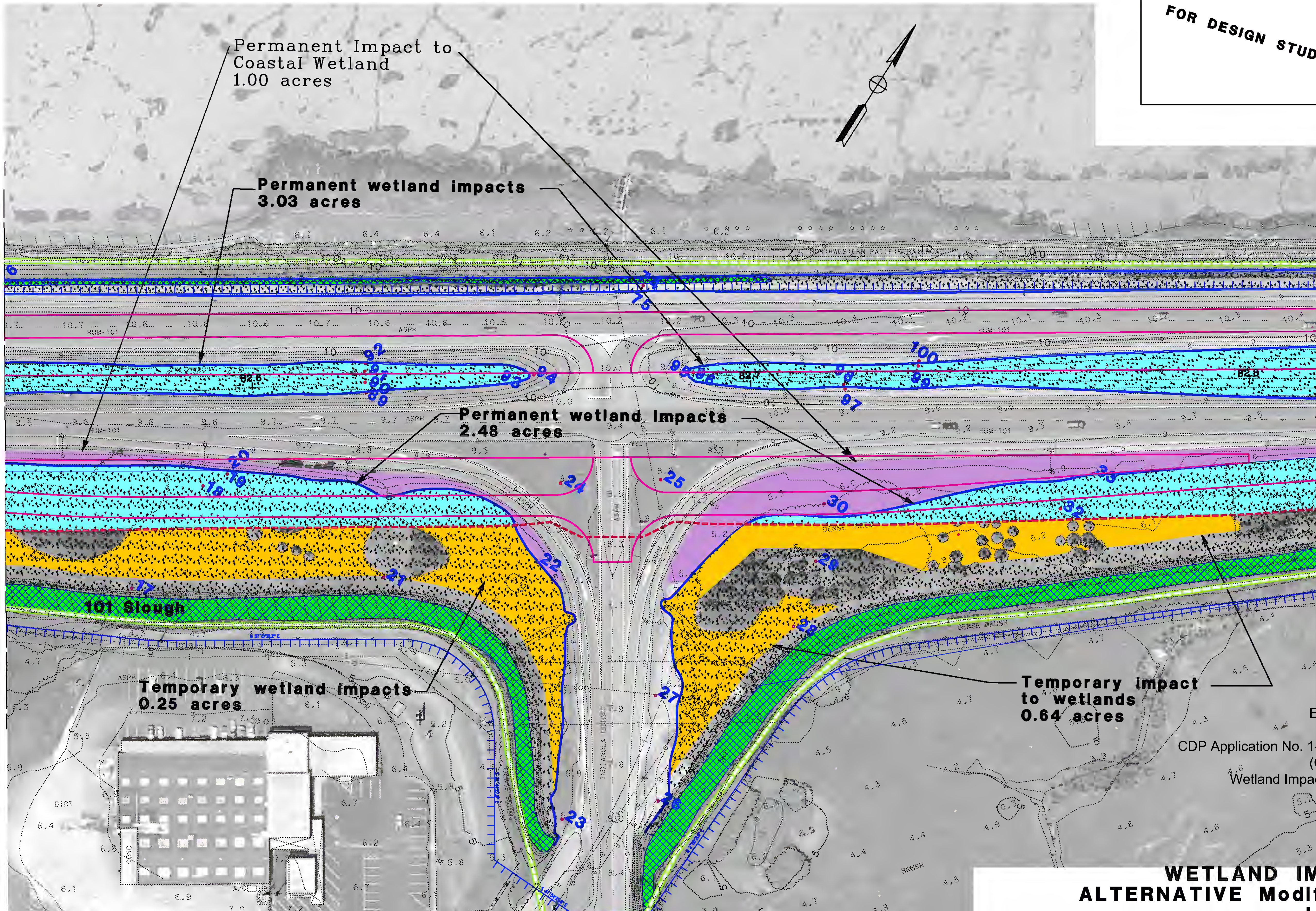

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
11 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-11

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans

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

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:16
LAST REVISION 08-11-08

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

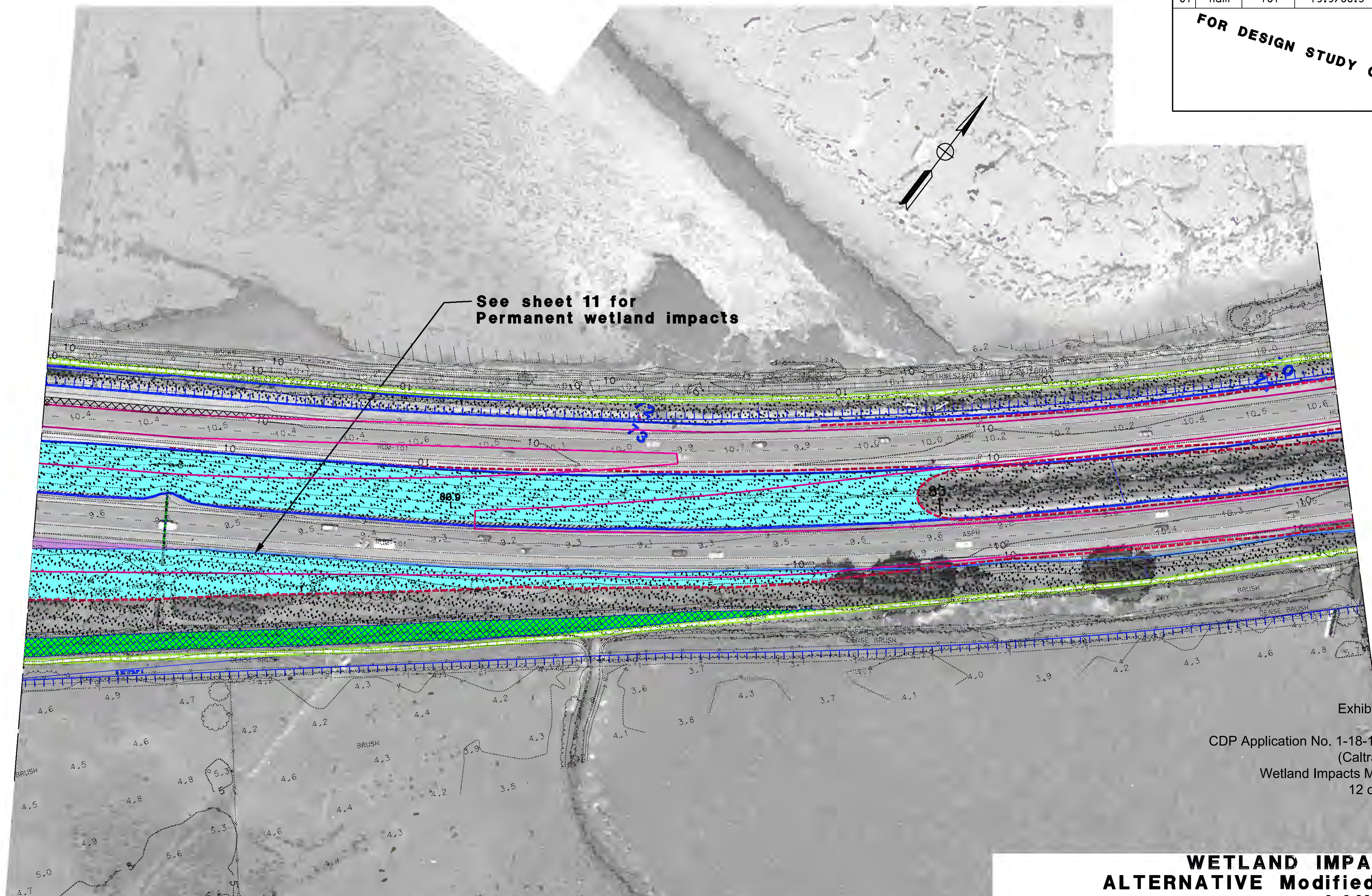

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
12 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-12

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: L.R. ASHLEY

CALCULATED-DESIGNED BY: TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION: 08-11-08

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:16

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet012.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

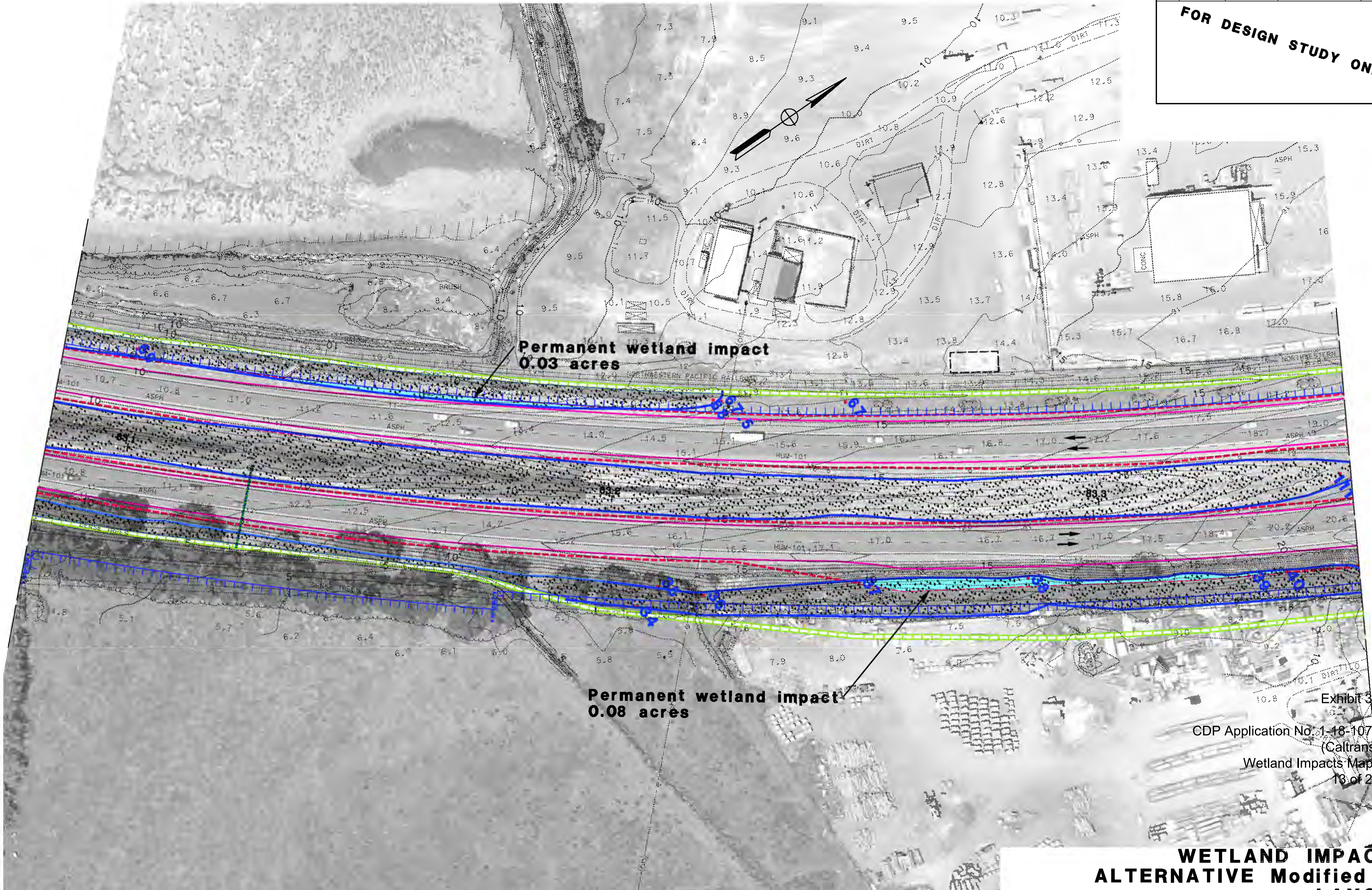

Exhibit 33
CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
13 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-13

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

LAST REVISION: 08-11-08
DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:17

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet013.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

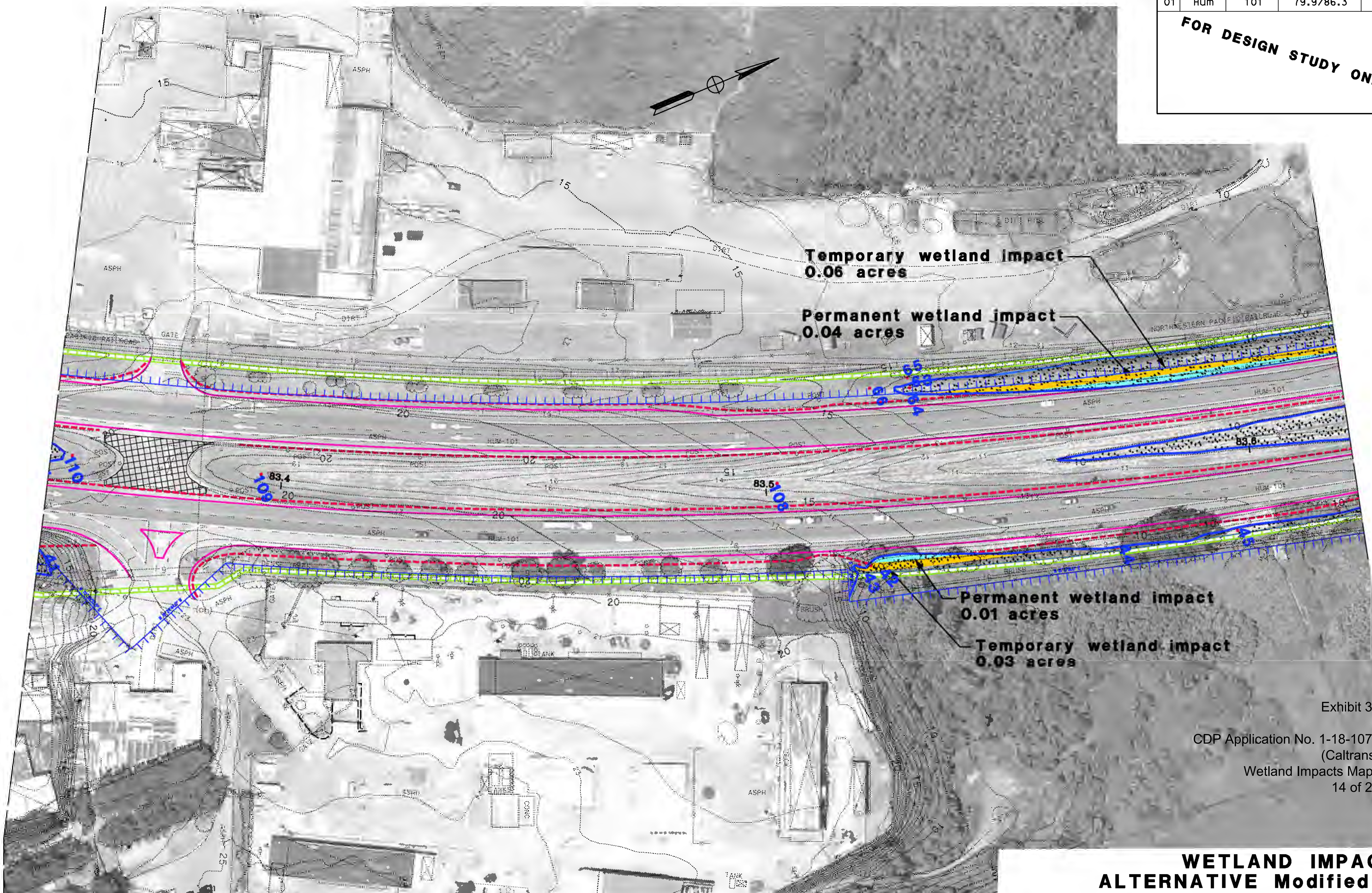

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
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WETLAND IMPACTS ALTERNATIVE Modified 3A LAYOUT L-14

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

LAST REVISION 08-11-08
DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:17

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet014.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

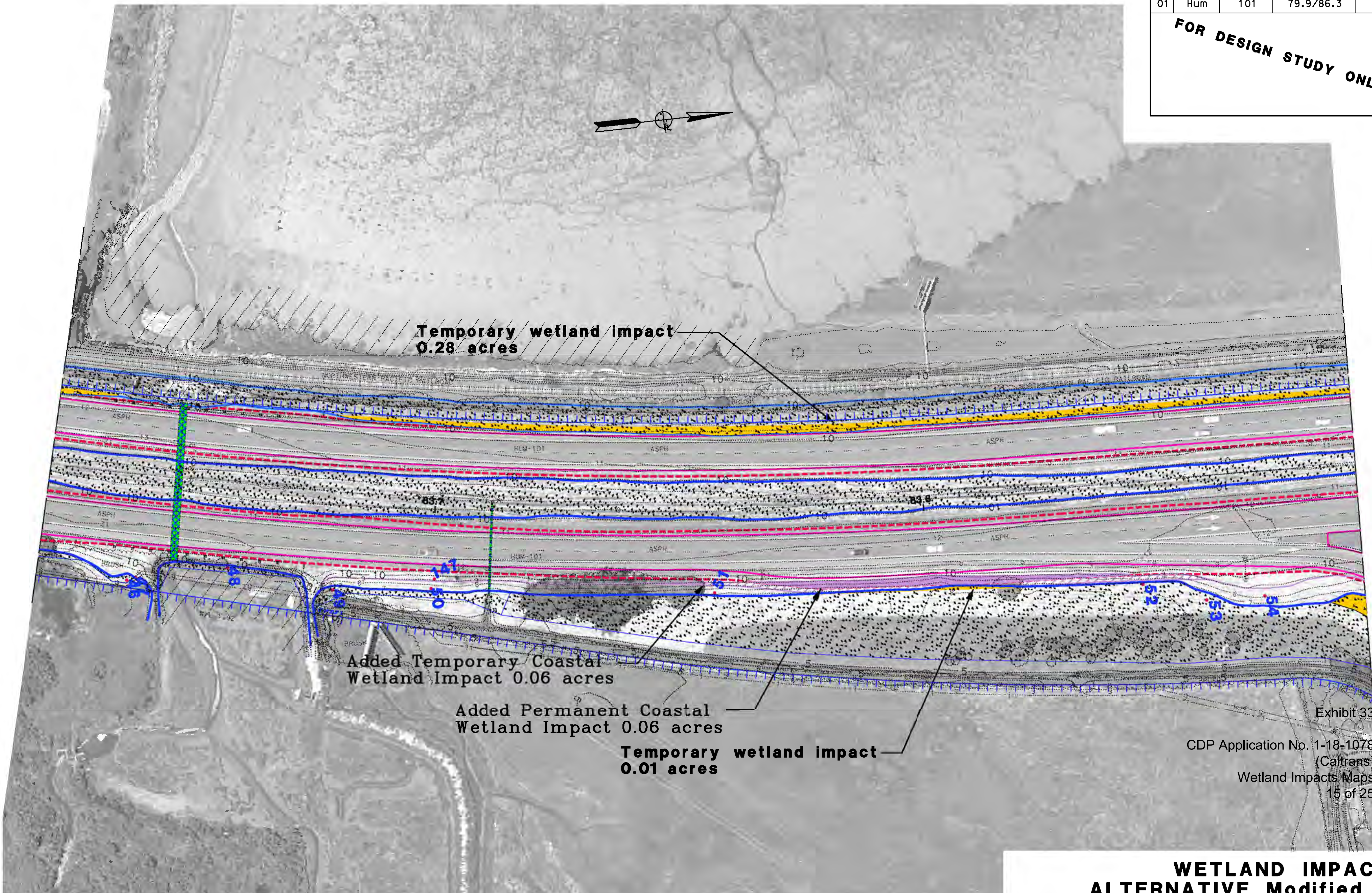

Exhibit 33
CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
15 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-15

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:17
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet015.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

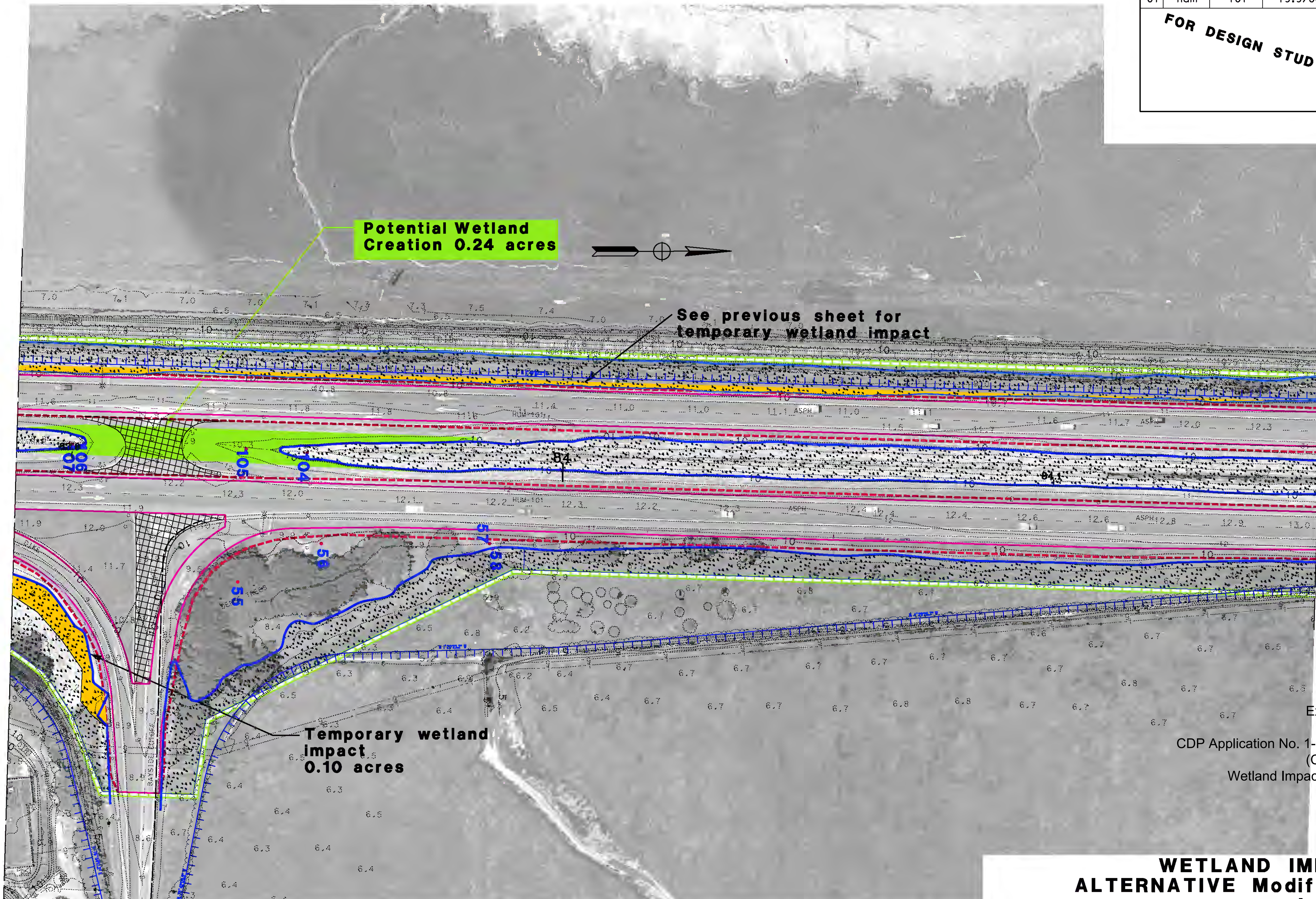

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
16 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-16

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: L.R. ASHLEY

CALCULATED-DESIGNED BY: TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:18

LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet016.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

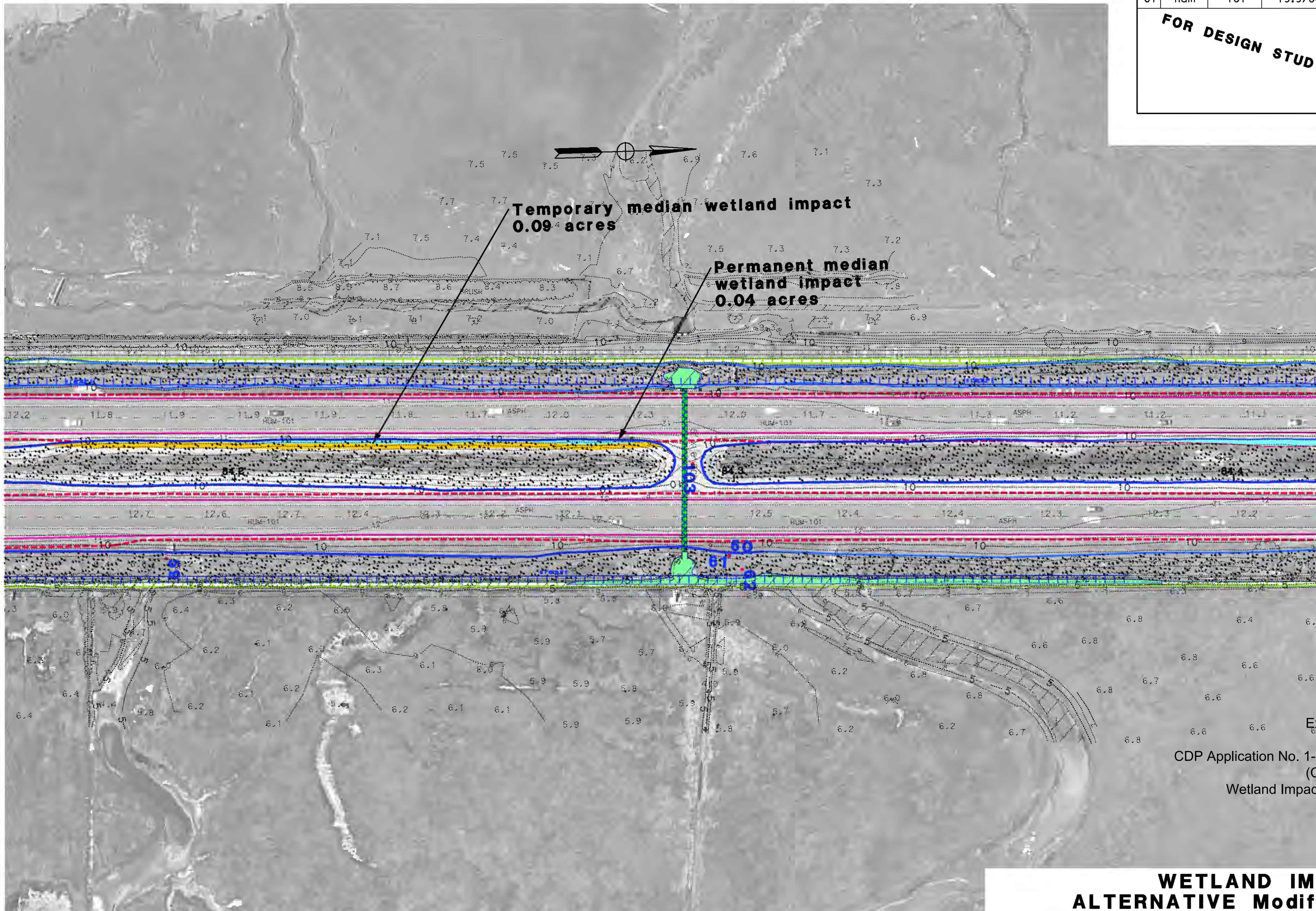

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
17 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-17

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR L.R. ASHLEY

CALCULATED-DESIGNED BY TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet017.dgn

CU 03232

EA 363301

LAST REVISION 08-11-08

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:18

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

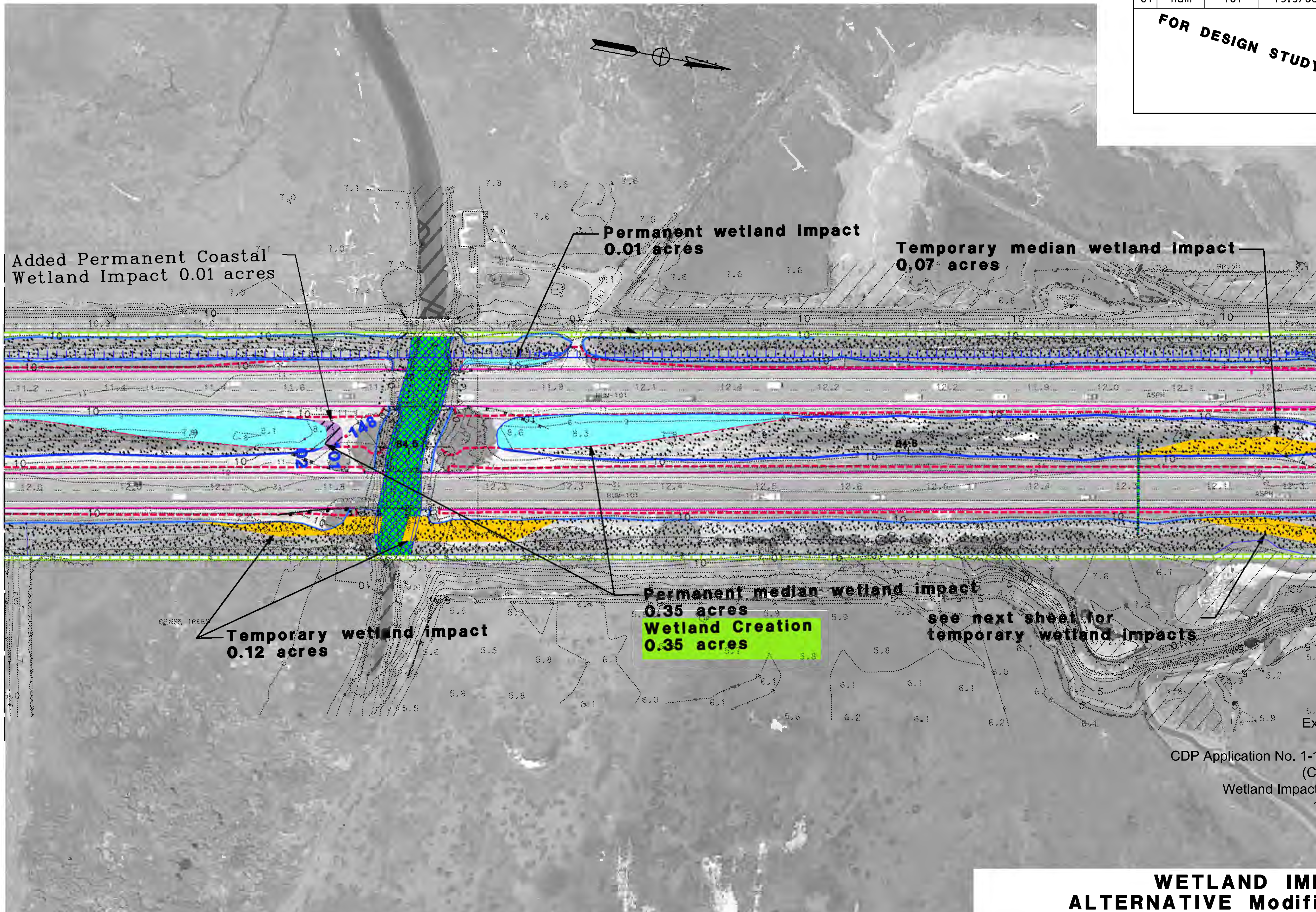

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
18 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-18

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
DESIGN
Caltrans

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

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:19
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet018.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

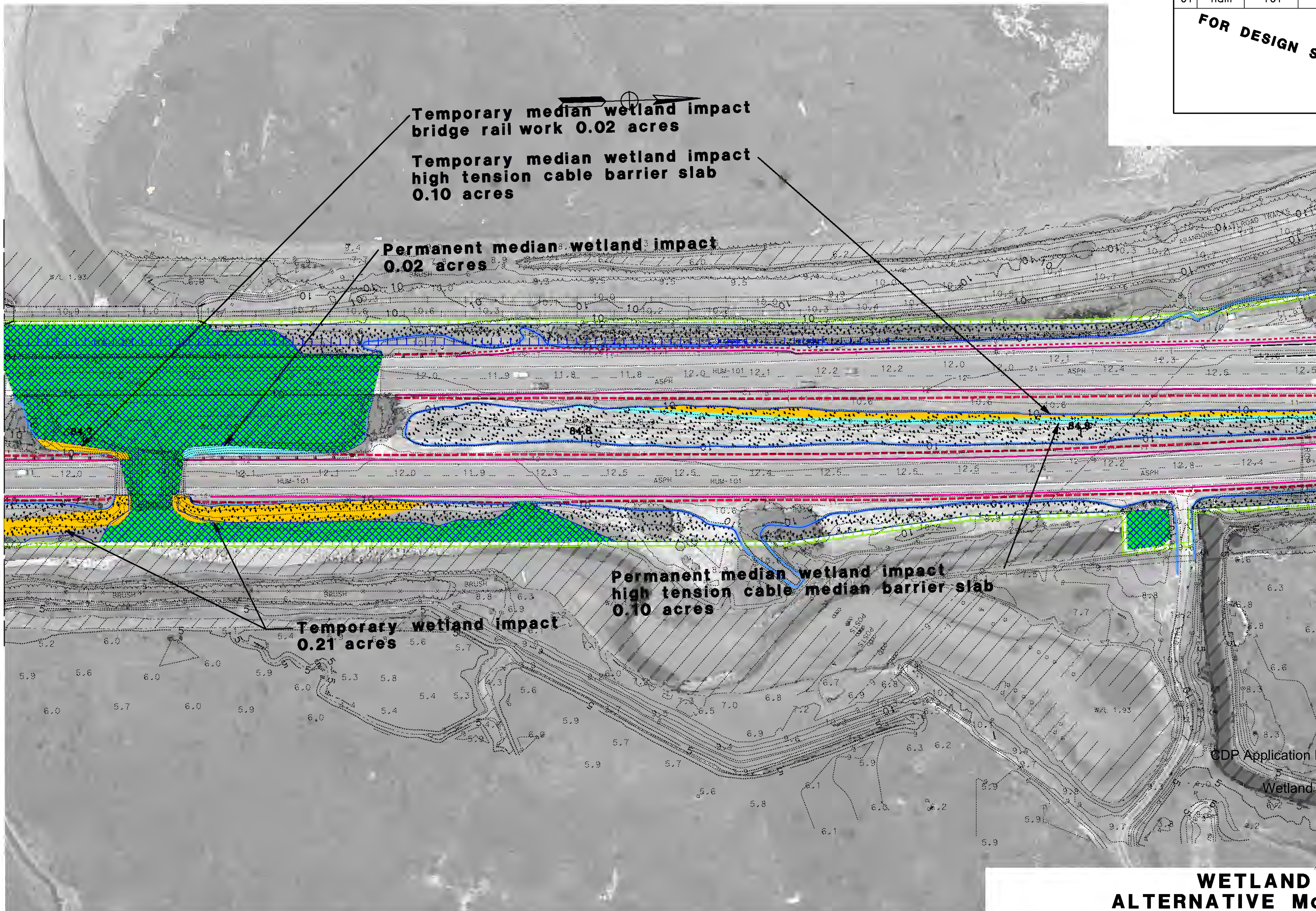

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
19 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-19

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:19
LAST REVISION 08-11-08

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

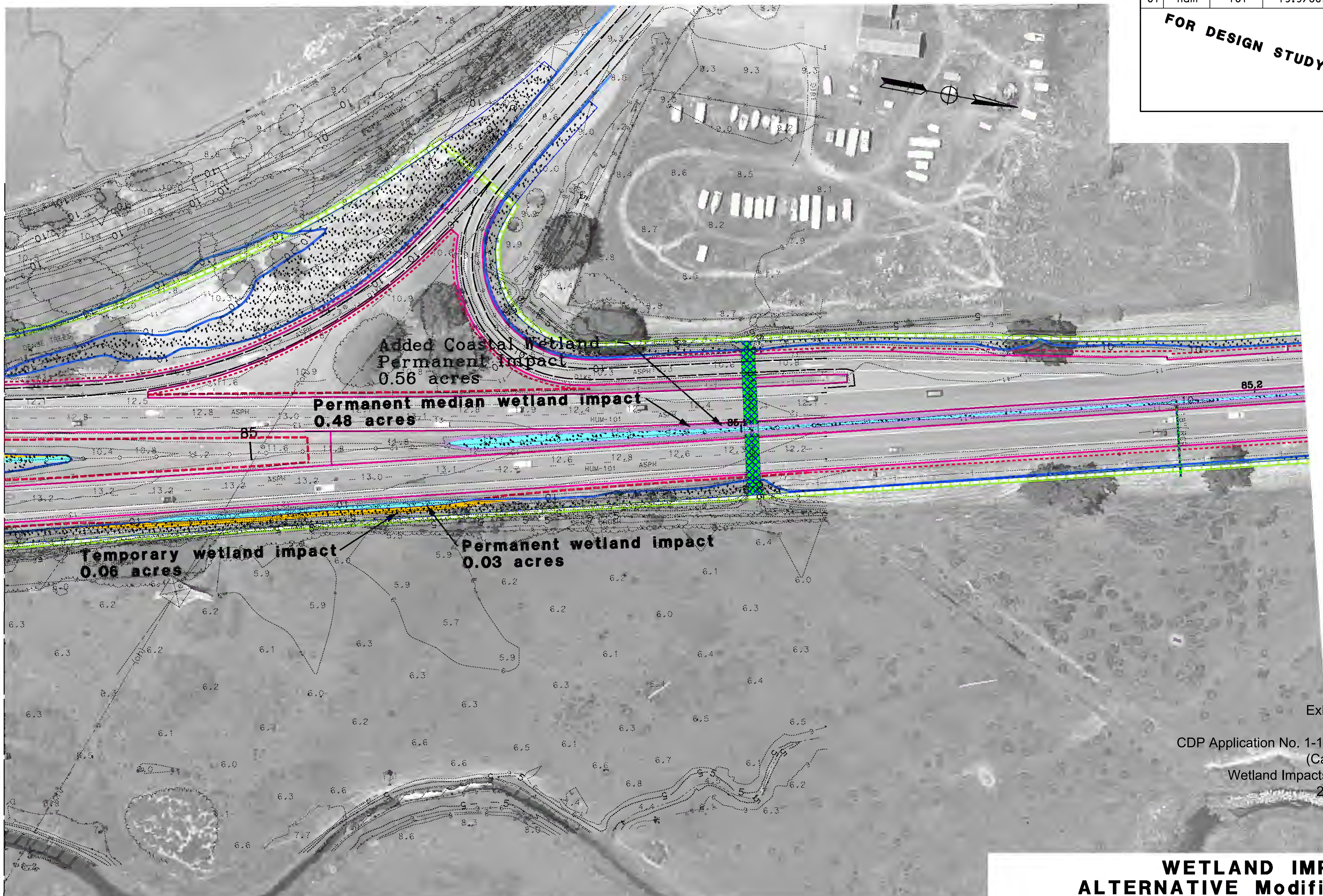

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
20 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-20

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

LAST REVISION 08-11-08
DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:22

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet020.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

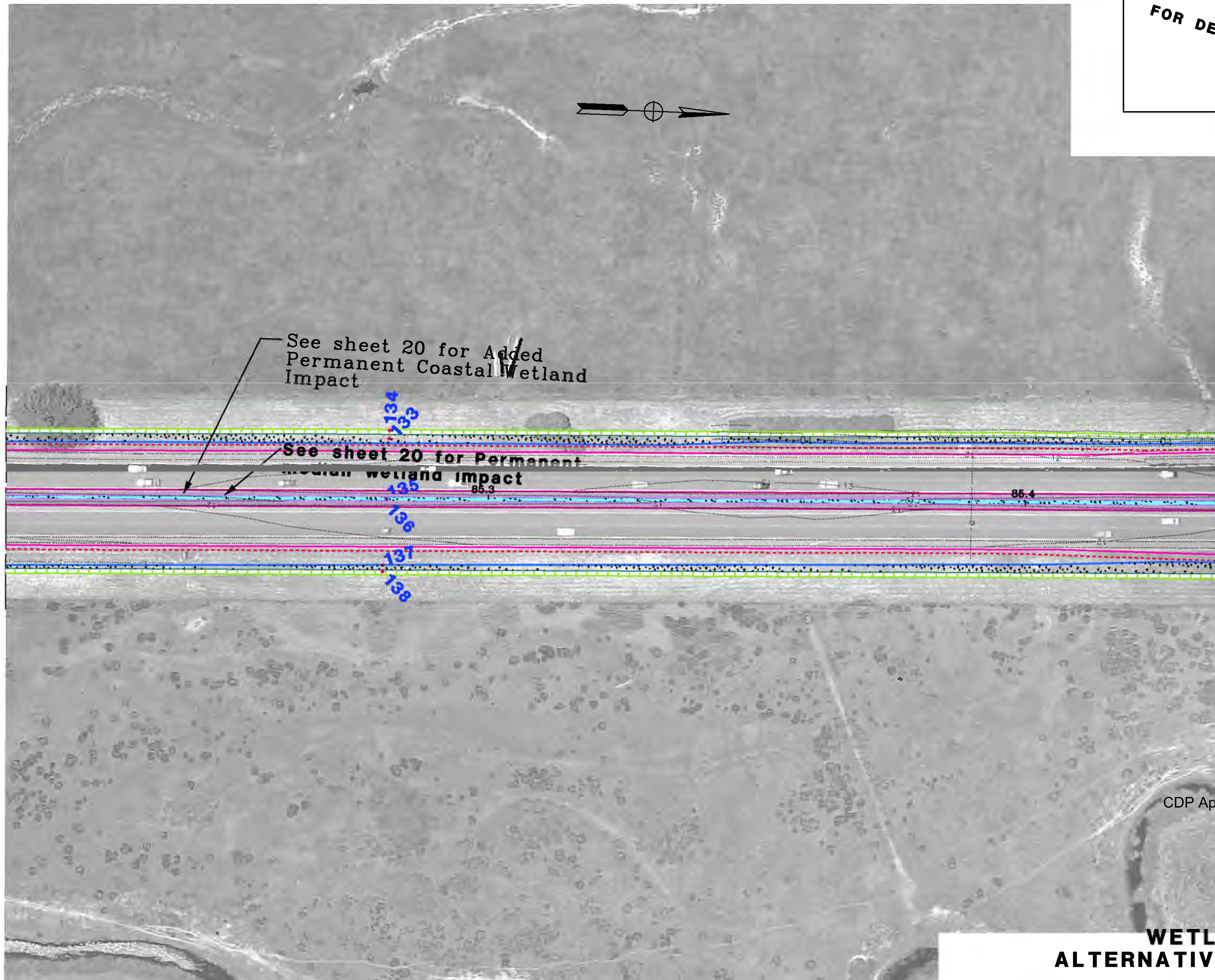

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
21 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-21

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR L.R. ASHLEY

CALCULATED-DESIGNED BY TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

LAST REVISION 08-11-08

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:23

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet021.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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FOR DESIGN STUDY ONLY

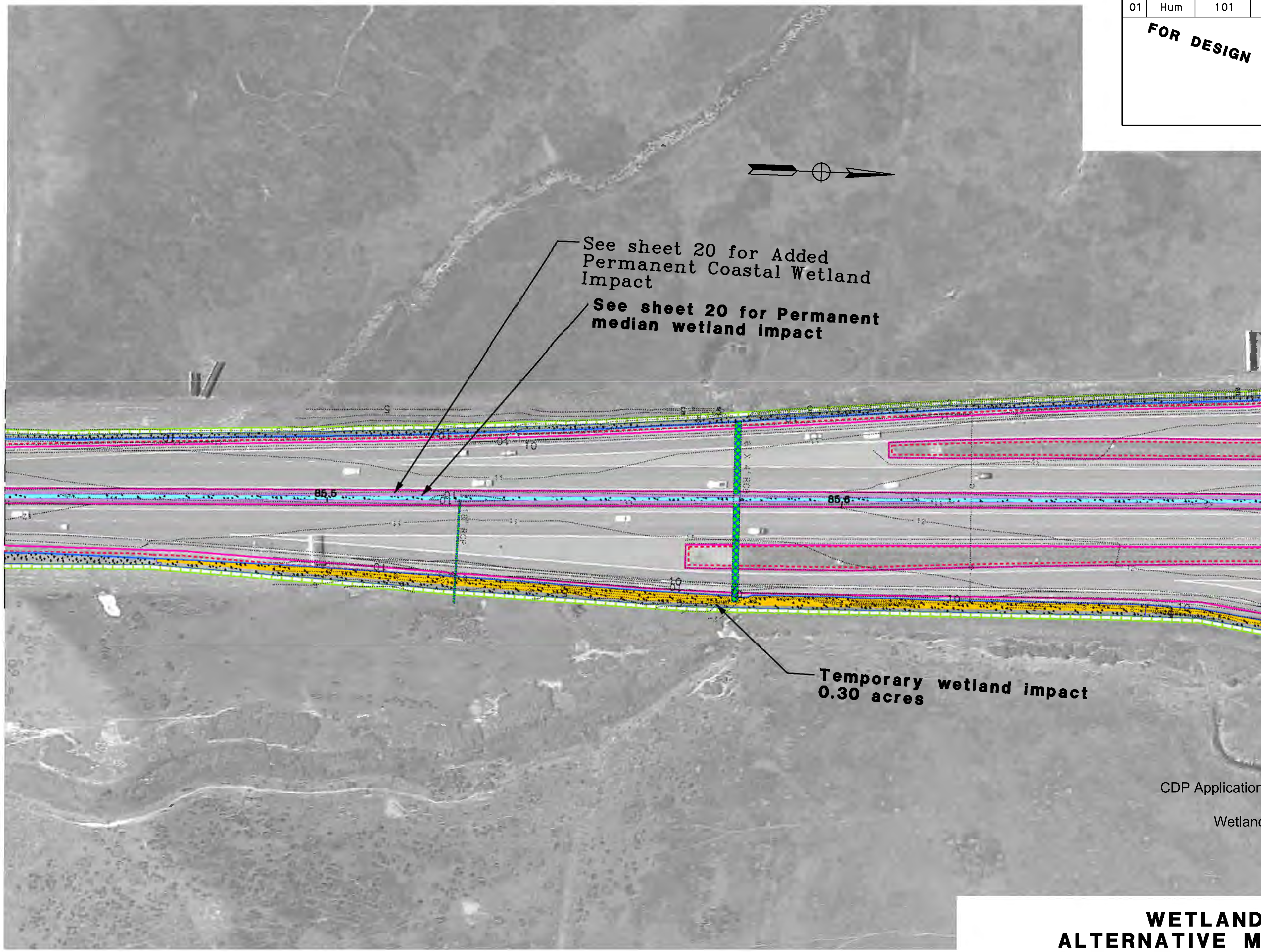

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
22 of 25

WETLAND IMPACTS ALTERNATIVE Modified 3A LAYOUT L-22

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet022.dgn

CU 03232

EA 363301

LAST REVISION 08-11-08
DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:23

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

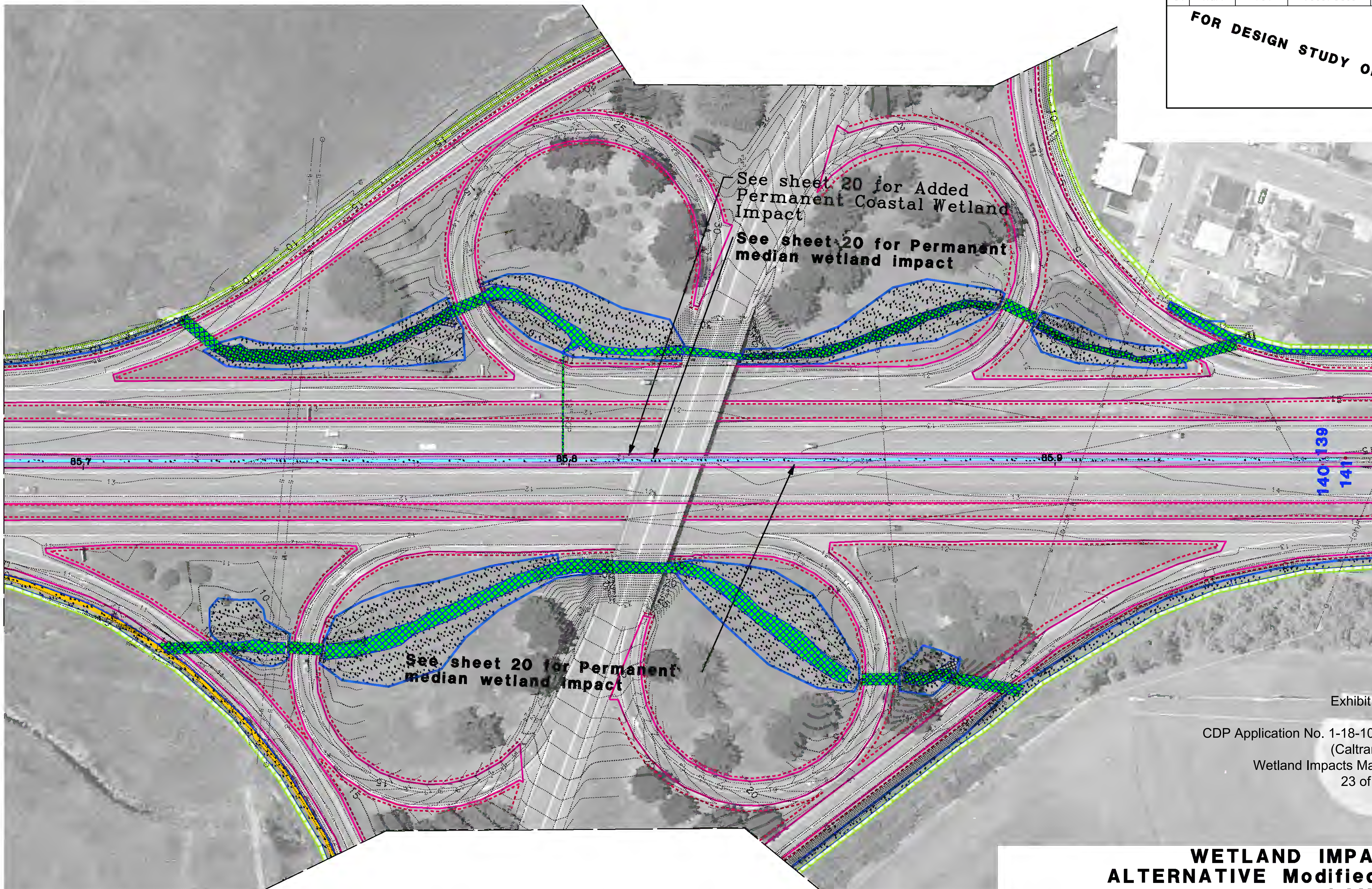

Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
23 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-23

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:23
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet023.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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FOR DESIGN STUDY ONLY

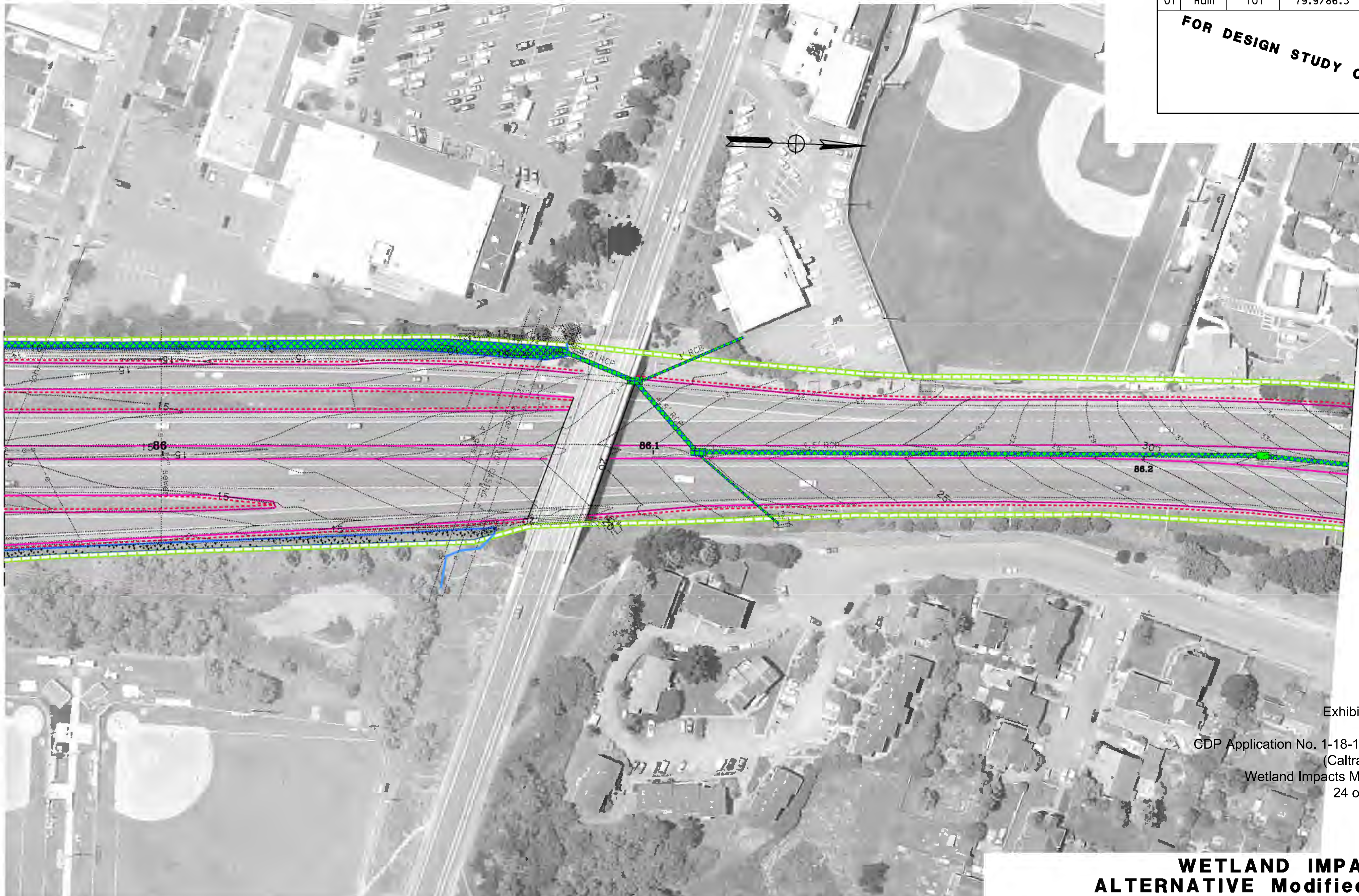


Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
24 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-24

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN

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

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:24
LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet024.dgn

CU 03232

EA 363301

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
01	Hum	101	79.9/86.3		

FOR DESIGN STUDY ONLY

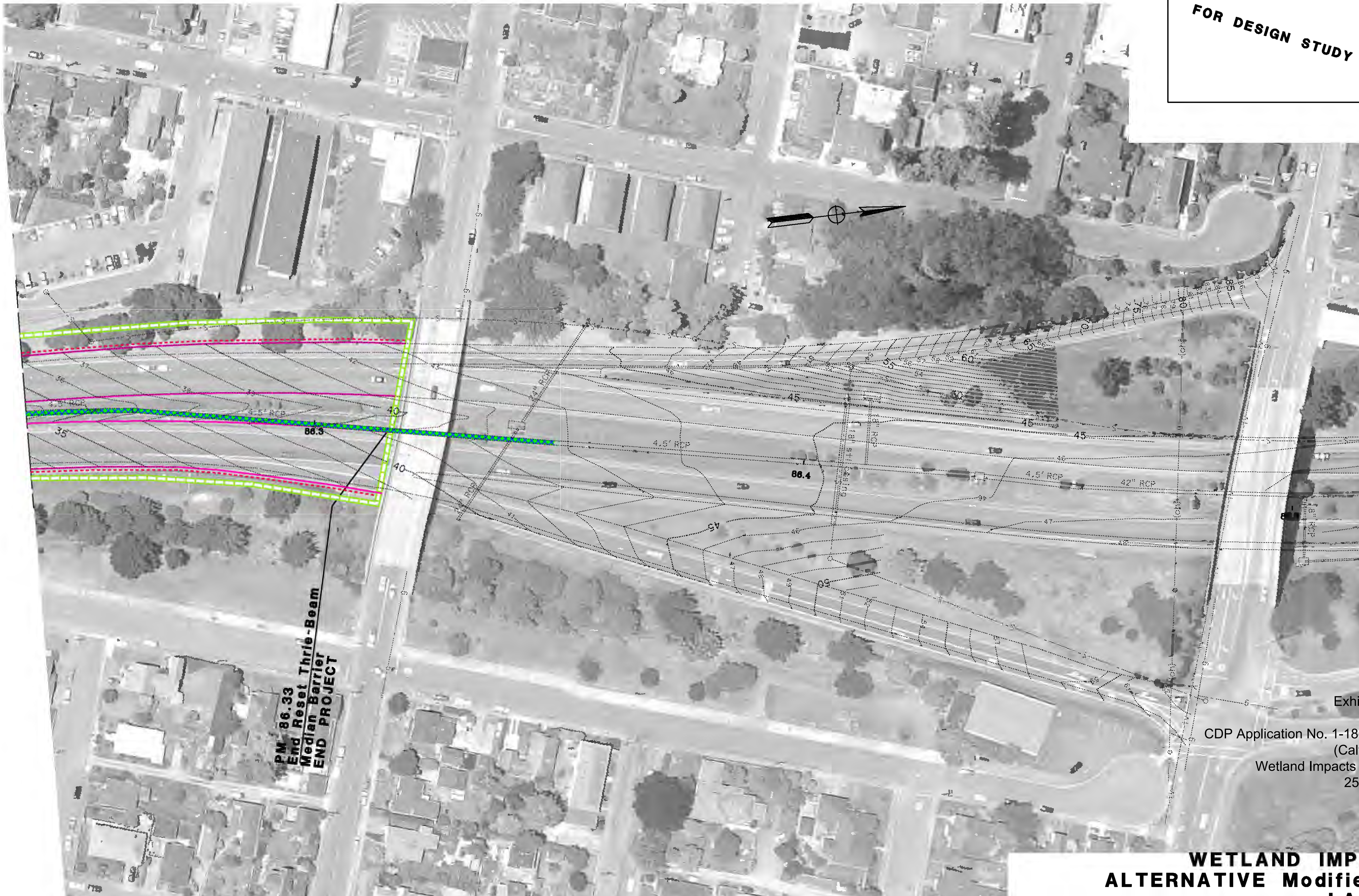


Exhibit 33

CDP Application No. 1-18-1078
(Caltrans)
Wetland Impacts Maps
25 of 25

WETLAND IMPACTS
ALTERNATIVE Modified 3A
LAYOUT
L-25

SCALE: 1"=50'

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN

FUNCTIONAL SUPERVISOR: L.R. ASHLEY

CALCULATED-DESIGNED BY: TODD LARK

CHECKED BY

REVISED BY

DATE REVISED

DATE PLOTTED => 08-SEP-2016
TIME PLOTTED => 13:24

LAST REVISION 08-11-08

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3

USERNAME => s119316
DGN FILE => 136600wet025.dgn

CU 03232

EA 363301

STATE OF CALIFORNIA— CALIFORNIA NATURAL RESOURCES AGENCY GAVIN NEWSOM, *GOVERNOR*

CALIFORNIA COASTAL COMMISSION

NORTH COAST DISTRICT OFFICE
1385 EIGHTH STREET, SUITE 130
ARCATA, CA 95521
VOICE (707) 826-8950
FAX (707) 826-8960
WWW.COASTAL.CA.GOV

MEMORANDUM

FROM: John D. Dixon, Ph.D., Ecologist

TO: Peter Allen, Senior Coastal Analyst

SUBJECT: Status of the habitats from which trees will be removed to accommodate the Eureka-Arcata Highway 101 Corridor Project

DATE: July 24, 2018

Documents reviewed:

Caltrans. 2008. Modified Alternative 3A Layout

Caltrans. 2019. On-site mitigation and monitoring plan for the Eureka-Arcata Route 101 Corridor Improvement Project. A report dated July 2019, revised and designated “Final” on July 19, 2019.

Caltrans and Federal Highway Administration. 2016. Eureka-Arcata Route 101 Corridor Improvement Project. Final Environmental Impact Report/Statement. Volume 1.

National Marine Fisheries Service. 2016. Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Eureka Arcata Route 101 Corridor Improvement Project, Humboldt County, California. A letter report from W.W. Stelle, NMFS to S. Croteau, Caltrans.

Sawyer, J.O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. Sacramento, Ca: California Native Plant Society.

U.S. Fish and Wildlife Service. 2019. Reinitiation of formal consultation on theproposed Eureka-Arcate Rout 101 Corridor Improvement Project, U.S. Highway 101, Humboldt County, California. A letter report from J.L. Norris, USFWS to J. Meyer, Caltrans.

Approximately 100 trees and shrubs of various species will be removed as part of the Highway 101 Corridor Project to construct the interchange at the Indianola Cutoff, to provide a 30-foot-wide clear recovery zone (a safety zone within which there are no large fixed objects), and to accommodate other highway improvements, such as changes in the highway layout associated with new acceleration and deceleration lanes. All these trees have been designated as “riparian” by Caltrans because they are within about 100 feet from water. This designation refers to their location but not their habitat value. Caltrans did not do a habitat analysis. Such an analysis is the subject of this memorandum.

The Commission has often found that riparian habitats meet the definition of ESHA, but this has generally been in the context of natural water bodies. Such habitats have become rare in California and are known to provide many important ecosystem services, such as improving water quality by reducing pollutants and sediments, providing necessary habitat for many species, and contributing to nutrient cycling. Riparian habitats generally occur along rivers and streams and are characteristically made up of a variety of hydrophilic or water tolerating species, such as willows, alders, wax myrtle and cottonwoods. In a natural setting, a salient characteristic of riparian areas is that their species composition is markedly different from the surrounding vegetation.

Along the 101 Corridor, the only natural stream that could suffer riparian impacts from tree removal is Jacoby Creek. A second natural-appearing area is north of the Caltrans maintenance yard at Bracut, where there is a large stand of riparian trees adjacent to Brainard Slough. The rest of the aquatic areas of concern for riparian impacts are all drainage ditches constructed to convey runoff from roadways and inland agricultural areas to Humboldt Bay. One of the ditches, designated the 101 Slough, has more stream-like characteristics in its lower reach where it is 15 to 30 feet wide and is tidally influenced. Both the lower 101 Slough and Jacoby Creek provide habitat that is appropriate for salmonids and tidewater gobies.

From south to north, the areas that may have trees removed (Caltrans 2019, Appendix D and revised Table 5) are: 1. Area between the southern end of Jacobs Avenue and Highway 101(Caltrans RP-1a,b); 2. Area next to 101 Slough north of Mid City Motor World (Caltrans RP-2a-h & RP-3); 3. Area south of Indianola Cutoff (Caltrans RP-4a-c); 4. Area north of Indianola Cutoff (Caltrans RP-4d-g); 5. Area covered by native riparian vegetation north of the Caltrans maintenance yard (Caltrans RP-5a) and cluster of *Pittosporum* trees further north (Caltrans RP-5b); 6. Area south of Bayside Cutoff (Caltrans RP-5c,d); and, 7. Area in the highway median next to Jacoby Creek Bridge (Caltrans RP-6a,b). These areas are depicted in Attachment 1 to this memorandum. According to Caltrans, each of these areas from which trees may be removed is within a coastal wetland.

On July 12, 2019 I visited each of these areas with Jeffery Barrett, Revegetation Specialist with Caltrans and Melissa Kraemer, North Coast District Supervisor for the Coastal Commission. Both Mr. Barrett and Ms. Kraemer are botanists and the following descriptions rely heavily on Ms. Kraemer's field notes.

Environmentally Sensitive Habitat Area (ESHA) is defined in Section 30107.5 of the Coastal Act as: "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments." The seven areas that Caltrans has identified for tree or shrub removal are analyzed for ESHA determination in the following paragraphs.

1. Area between Jacobs Avenue and 101 Highway (Caltrans RP-1a,b). A ditch about 5-feet wide parallels Highway 101 and Jacobs Avenue and discharges to the Eureka Slough through a nearby tide gate. The wetland adjacent to the ditch extends to about 20 feet from the highway pavement and is largely dominated by cattails (*Typha* sp.) near the ditch. Other species in the immediate wetland area include natives (e.g., water parsley (*Oenanthe sarmentosa* and common rush (*Juncus effusus*)) and nonnatives (e.g., Himalayan blackberry (*Rubus armeniacus),* Dallis grass (*Paspalum dilatatum*), and everlasting sweet pea, *Lathyrus latifolius*). The Jacobs Avenue side of the ditch is confined by a high chain-link fence. On the highway side of the ditch, there is a more-or-less linear series of clumps of Monterey Cypress (non-native to Humboldt County) with a few native wax myrtles interspersed. Two of a cluster of four wax myrtles are

scheduled for removal. The canopy of those large shrubs extends from the ditch to five or ten feet from the pavement of the highway (Figure 1). The distance between Jacobs Avenue and Highway 101 is less than 40 feet. The drainage ditch does not have high ecological value, and the strip of land around the ditch is narrow and affected by traffic disturbance on both sides. These trees are not a rare vegetation community and, in my opinion, the wax myrtle bushes do not perform a role in the ecosystem that is "especially valuable." I recommend that the Commission find that the area within which these bushes are growing does not meet the definition of ESHA in the Coastal Act.

Figure 1. Wax myrtles adjacent to a drainage ditch between Highway 101 and Jacobs Avenue.

2. Area adjacent to the 101 Slough north of Mid City Motor World (Caltrans RP-2a-h & RP-3). The 101 Slough is a wide ditch that conveys water to Eureka Slough through a tide gate. As a result of a leaky, "fish-friendly" tide gate, this section is tidal and brackish, and listed salmonids and tidewater gobies may be present (NMFS 2016, USFWS 2019). Scattered native wax myrtle (*Morella californica*) and shore pine (*Pinus contorta* var. *contorta*) trees line the banks and extend to about 10 or 15 feet from the highway (Figure 2). About five of these trees are scheduled for removal. The drainage ditch, or slough, is 15 to 30 feet wide in this area, quite open, and lined with shrubs and herbs, both native (e.g., coyote bush (*Baccharis pilularis*), twinberry (*Lonicera involucrata*), California blackberry (*Rubus ursinus*), alkali bulrush (*Bolboschoenus maritimus* ssp. *paludosus*), and tufted hairgrass (*Deschampsia cespitosa*)), and nonnative (e.g., poison hemlock (*Conium maculatum*), wild radish (*Raphanus sp.*), tall oat-grass (*Arrhenatherum elatius*), tall fescue (*Festuca arundinacea*), and bird's-foot trefoil (*Lotus corniculatus*)). The vegetation alone would not constitute ESHA in this highway setting. However, because of the high habitat value of this section of the 101 Slough for listed fish species, I think the ecosystem functions of the riparian vegetation for improving water quality by removing excess nutrients and sediments from surface runoff, providing

woody debris for aquatic habitat complexity, contributing to aquatic food webs through the litter-fall of riparian organic matter, and providing wildlife habitat can be considered "especially valuable." Therefore, I recommend that the Commission find that this riparian habitat meets the definition of ESHA.

About 50 feet to the north of the riparian area described above there is a several hundred-foot-long monospecific patch of the non-native ornamental shrub, *Escallonia rubra* (Caltrans RP-3) that has grown to fill most of the area between the slough and the highway (Figure 3). Although this non-native shrub probably provides some of the same water quality functions of the adjacent riparian area, it displaces native riparian species and does not have the habitat complexity of the native riparian vegetation and so cannot provide appropriate habitat for the diversity of wildlife associated with native riparian trees and shrubs. I recommend that the Commission find that the area covered by this discrete patch of exotic vegetation does not meet the definition of ESHA in the Coastal Act.

Figure 2. Vegetation adjacent to the 101 Slough north of Motor City World. The riparian vegetation extends nearly to the 101 Highway.

Figure 3. Monospecific patch (red outline) of the non-native ornamental shrub *Escallonia rubra*.

3. Area south of the Indianola Cutoff (Caltrans RP-4a-c). Caltrans plans to remove several nonnative (in Humboldt County) Monterey pine (*Pinus radiata*) trees for construction of the interchange lanes and infrastructure. These trees are more-or-less linearly arrayed parallel to the highway and are located about 50 to 100 feet away from a wide drainage ditch that is completely filled with cattails (Figure 4). There are no other trees or shrubs in the area and the wetland is dominated by mostly non-native grasses. These non-native trees have little or no riparian function. I recommend that the Commission find that the area within which these trees are growing does not meet the definition of ESHA in the Coastal Act.

Figure 4. Monterey pine trees south of Indianola Cutoff arrayed between the highway and drainage ditch.

4. Area north of the Indianola Cutoff (Caltrans RP-4d-g). This area is similar in configuration to the area south of Indianola Cutoff as it is located between the highway and a cattail-dominated drainage ditch (Figure 5). However, the vegetation is somewhat denser and more species diverse. In addition to the non-native Monterey cypress and Monterey pine, there are scattered individuals of native riparian tree species, including wax myrtle, shore pine, Sitka spruce (*Picea sitchensis*), red alder (*Alnus rubra*), and cottonwood (*Populus trichocarpa*) These mixed groups of trees bordering the highway do not constitute a rare vegetation community type, and although they probably provide better wildlife habitat and extend closer to the drainage ditch than the trees south of Indianola, they are unlikely to provide many of the ecosystem

services generally associated with natural riparian habitats bordering rivers and streams. This is because of disturbance from the adjacent busy highway and because the water body is an unnatural drainage ditch that is entirely filled with cattails and that does not provide valuable fish habitat. I don't think the riparian role of these trees could reasonably be characterized as "especially valuable." Therefore, I recommend that the Commission find that the area within which these trees are growing does not meet the definition of ESHA in the Coastal Act.

Figure 5. Mixed stands of native and non-native trees between a drainage ditch and Highway 101 north of the Indianola Cutoff.

5. Riparian forest north of the Caltrans maintenance yard at Bracut (Caltrans RP-5a). This site is a large riparian wetland that is adjacent to Brainard Slough (Figure 6). The forest is dominated by native willows (*Salix* sp.) and red alders (*Alnus rubra*) in the overstory.

layer. The understory is comprised of a variety of shrubs and herbs, both native (e.g., California blackberry (*Rubus ursinus*), horsetails (*Equisetum* sp.), water parsley (*Oenanthe sarmentosa*), rushes, and sedges), and nonnative (e.g., Himalaya berry (*Rubus armeniacus*), and everlasting sweet pea, *Lathyrus latifolius*). The forest probably improves the quality of runoff flowing into the bay through a culvert under Highway 101 by reducing sediments and pollutants, and it is large enough to provide significant wildlife habitat. I recommend that the Commission find that this riparian forest meets the definition of ESHA in the Coastal Act. Caltrans Area 5b is a cluster of non-native *Pittosporum* trees growing next to the highway shoulder north of the riparian forest, and is not part of the recommended ESHA.

Figure 6. Riparian forest north of the Caltrans maintenance yard at Bracut. *Pittosporum* trees further north at Caltrans Area 5b in red.

6. Area south of Bayside Cutoff (Caltrans RP-5c,d). A drainage ditch parallels the highway about 100 feet downslope from the highway. The 3-foot-wide ditch is bordered by riparian vegetation dominated by several native species, including Sitka spruce (*Picea sitchensis*), shore pine (*Pinus contorta* var. *contorta*), California blackberry (*Rubus ursinus*), twinberry (*Lonicera involucrata*), silverweed (*Potentilla anserina*), and water parsley (*Oenanthe sarmentosa*). Several clusters of *Pittosporum* sp., a non-native tree, are located about 50 to 70 feet upslope and immediately adjacent to the highway (Figure 6). These exotic plants provide no valuable ecosystem services. I recommend that the Commission find that the area within which the *Pittosporum* are growing does not meet the definition of ESHA in the Coastal Act.

Figure 6. The large clusters in the foreground and in the distance immediately adjacent to the highway are non-native trees (*Pittosporum* sp.). A drainage ditch parallels the highway about 50 to 70 feet down slope from the edge of the *Pittosporum* clusters.

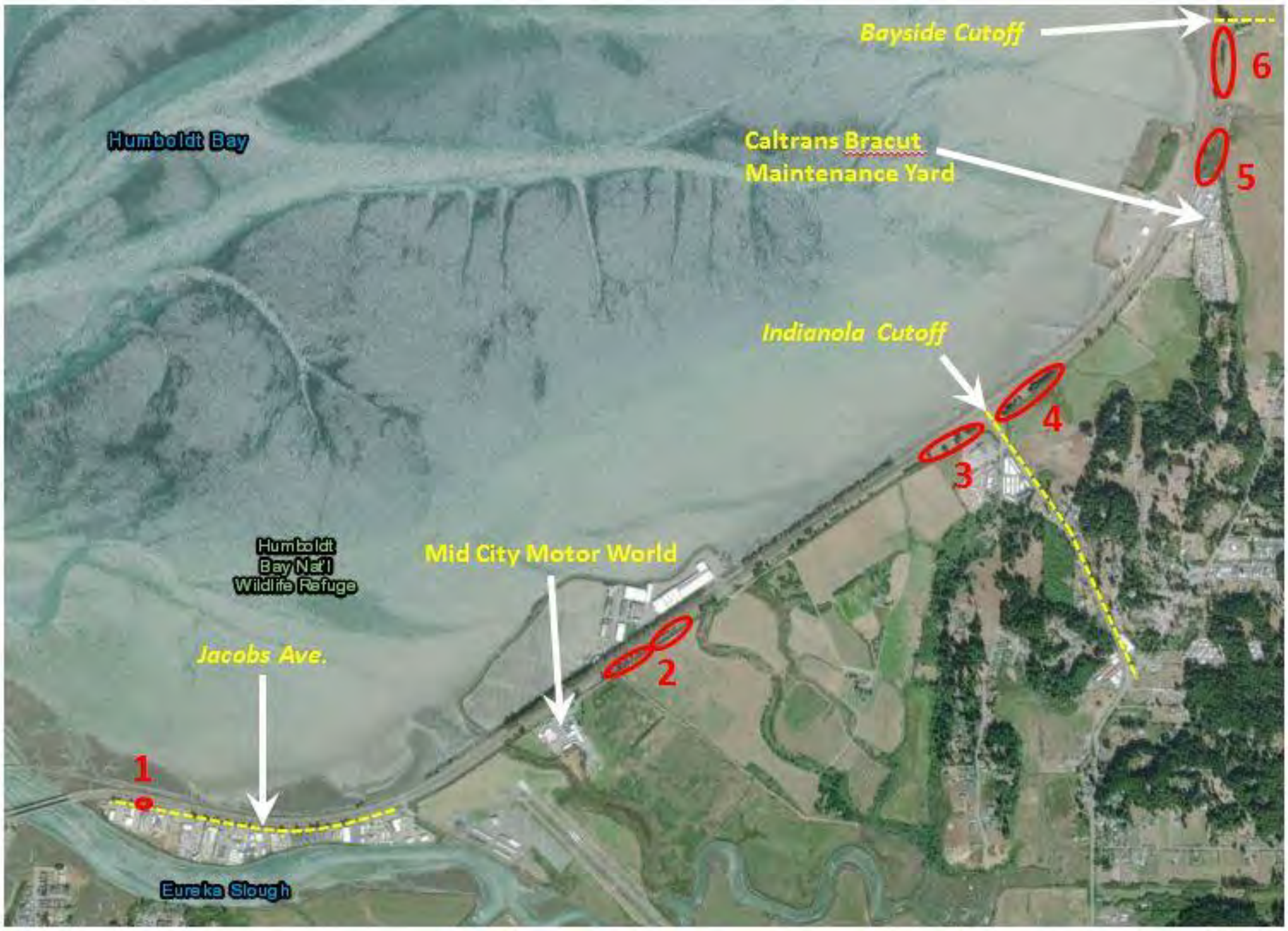
7. Highway median adjacent to Jacoby Creek (Caltrans RP-6a,b). Four individual non-native Monterey pine trees occur above the banks of Jacoby Creek, three north of the creek and one to the south (Figures 7 & 8). Caltrans proposes to remove all these trees for the construction of the temporary Jacoby Creek Bridge that will provide for traffic flow while the new Jacoby Creek Bridge is constructed. Although these isolated non-native trees are not part of a typical riparian habitat, they probably provide some ecosystem services, such as shade and input of organic litter. However, these planted trees are not rare, and the minor role they play in the riparian ecosystem is not "especially valuable." With regard to the removal of these four Monterey pines, the National Marine Fisheries Service (2016) found that "… given the scale of the impact, no measurable increase in water temperature or reduction in the amount of terrestrial food input into Jacoby Creek is anticipated and there remains ample vegetative cover of higher quality habitat immediately upstream of the project site for fish to take refuge." and "[P]otential negative effects to listed salmonids, green sturgeon and their designated critical habitat from impacts to riparian, aquatic, and emergent wetland vegetation and associated functions is insignificant…." I recommend that the Commission find that the area in which these non-native trees are growing does not meet the definition of ESHA in the Coastal Act.

Figure 7. Aerial view of Jacoby Creek where it passes under Highway 101 and enters Humboldt Bay. The natural riparian corridor inland from the bay can be seen, as well as a wetland restoration area that is connected to the creek. There is one Monterey pine in the highway median to the left and a cluster of three to the right of the Creek.

Figure 8. Ground-level view of the four non-native Monterey pine trees that are adjacent to Jacoby Creek and in the median strip between the north and south bound lanes of Highway 101.

Attachment I.

A. Areas of tree removal along the Highway 101 Eureka-Arcata Corridor from Eureka Slough to Bayside Cutoff. Numbers correspond to site numbers in text.



B. Areas of tree removal along the Highway 101 Eureka-Arcata Corridor from Bayside Cutoff to Jacoby Creek. Numbers correspond to site numbers in text. The dotted line is the City of Arcata boundary.

Chapter 1 Project Need and Purpose

1.1 Introduction

Caltrans and FHWA propose to make improvements to Route 101 between the Eureka Slough bridge in Eureka and the 11th Street overcrossing in Arcata (post miles 79.9 to 86.3) in Humboldt County. See Project Location Map Figures S-1, 2, and 3 in the preceding Summary section. After the environmental documentation process and obtaining all required public agency permits is completed, project construction is tentatively scheduled to start in year 2019 and completed in 2021.

The existing Route 101 corridor consists of a four-lane expressway north of the Eureka Slough bridge (post mile 79.8) to the Gannon Slough bridge (post mile 84.7). (An "expressway" is a high-speed divided highway for through traffic with access partially controlled. A "controlled access" facility is a roadway where the spacing and design of driveways, medians, median openings, traffic signals and intersections are strictly regulated by consideration of such factors as traffic volume and number of lanes, which gives preference to through traffic.) North of the Gannon Slough bridges, Route 101 is a four-lane freeway up to and beyond the northern project limit at the Route 101/255 interchange in the city of Arcata. (A freeway is a high-speed divided highway for through traffic with fully controlled access - i.e., only grade-separated interchanges provide access to local roads.) The current posted speed limit for the expressway segment is 50 mph, and 65 mph for the freeway segment.

The existing Route 101 roadway has the following typical dimensions:

- One 12-foot wide lane and one 11-foot wide lane in each direction within the expressway segment between the Eureka Slough bridges and Gannon Slough bridges

- Two 12-foot wide lanes in each direction within the freeway segment north of the Gannon Slough bridges

- 4 feet wide inside and 10 feet wide outside paved shoulders

- A median varying in width from 22 to 80 feet wide

There are currently seven at-grade Route 101 local street/driveway access locations within the expressway segment of Route 101 between Eureka and Arcata. (See Figure S-1 in the Summary and Plan Sheets in Appendix A.) Six of these access locations currently have Route 101 median crossings that allow for left turn on and off movements, to and from the local streets/driveways. (See Figure S-3 – Route 101 Existing Open Median Locations.) At Route 101 and Cole Avenue the Route 101 median opening was closed to traffic in 2003 at this location; only right turn off movements from northbound Route 101 and right turn on movements to Route 101 vehicle movements are permitted. Cole Avenue connects to Jacobs Avenue.

From south to north, these six access (median opening) locations are described as follows:

- Airport Road – The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. Northbound to southbound Route 101 U-turns are prohibited at this intersection. The deceleration and acceleration lanes at this intersection were extended and improved in 2003. Airport Road connects to Jacobs Avenue on the east side of Route 101.

- Mid-City Motor World – On the east side of Route 101, a private driveway connects Route 101 to this car dealership as well as a Fish and Wildlife Refuge. The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for both length and shoulder width.

- California Redwood Company (formerly Simpson) – On the west side of Route 101, a private driveway connects Route 101 and the mill. The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for length or width.

- Indianola Cutoff – The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. Indianola Cutoff connects Route 101 to Old Arcata Road to the east of Route 101. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for both length and shoulder width.

- Bracut – The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. There are businesses on both sides of Route 101 at this location. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for length or width.

- Bayside Cutoff – The Route 101 median is currently open and all turn movements to and from Route 101 at this intersection are permitted. Bayside Cutoff connects Route 101 to Old Arcata Road to the east. The deceleration and acceleration lanes at this intersection currently do not meet highway design standards for both length and shoulder width.

North of the Gannon Slough bridges, and continuing through the city of Arcata, the expressway changes to a four-lane freeway with a posted 65 mph speed limit.

The proposed project would improve safety and reduce operational conflicts and traffic delays at Route 101 intersections between Eureka and Arcata by:

- Eliminating uncontrolled left turn movements;
- Eliminating uncontrolled Route 101 median crossing movements;
- Extending or constructing right-turn acceleration and deceleration lanes.

For Modified Alternative 3A (identified as the Preferred Alternative), major project features include closing roadway median crossings, constructing a grade separation at Indianola Cutoff, replacing southbound Jacoby Creek bridge, and constructing a half signal at the Route 101/Airport Road intersection. See Figure S-4 – Overview of Alternatives in the Summary section of this document. The project Alternatives are described in detail in Chapter 2.

1.2 Project Need and Purpose

The project need consists of the transportation problems and deficiencies to which Caltrans, FHWA, and the Humboldt County Association of Governments (HCAOG) are responding. This section describes and quantifies concerns including safety, traffic operating conditions, long-term roadway maintenance, and highway design standards. The statement of project need, together with the purpose, provides focus to the identification, development, and evaluation of the project Alternatives.

Project Need: Reduce Collisions

Vehicle collision data is maintained on all state highways. For Route 101 between Eureka and Arcata, collision rates at multiple intersections exceed the statewide averages for similar highway intersections and the number of collisions was statistically significant;: thus, a traffic safety analysis was performed for this location. The analysis included studying individual California Highway Patrol collision reports and looking for possible common collision types and collision factors. The analysis indicated that safety concerns exist at intersections within the Eureka-Arcata Route 101 Corridor. The majority of collisions resulting in serious injuries or fatalities on Route 101 between Eureka and Arcata were the result of left turning vehicles attempting to cross high-speed high volume traffic at Route 101 intersections.

Reported collisions at the Route 101 intersections during the five-year period from May 19, 1997 to May 18, 2002 included five fatal collisions and 44 injury collisions out of 85 total collisions. The five-year total collision rate exceeded the statewide average (for similar intersections) at all of the public access locations (Cole Avenue, Airport Road, Indianola Cutoff, and Bayside Cutoff) and at one of three private access locations (Mid-City Motor World). See Figure 1-1. The fatal plus injury collision rate exceeded the statewide average at all four public access locations (Cole Avenue, Airport Road, Indianola Cutoff, and Bayside Cutoff) and at one of the three private access locations (Mid-City Motor World). See Figure 1-2. (*Source: Caltrans, Transportation Systems Network, District 1 Traffic Safety, no date)* To address the incidence of high rate of collisions, the State was required to evaluate and implement improvements in the interest of public safety.

In 2002, Caltrans, in cooperation with HCAOG and in partnership with state and local law enforcement agencies, implemented a Safety Corridor as an interim measure to address safety concerns on Route 101 on the five-mile expressway segment between Eureka and Arcata. The Safety Corridor included such measures as reducing the posted speed limit from 60 mph to 50 mph and a daylight use of headlights section. During the Safety Corridor's first year, there were 45 percent fewer collisions (including 80 percent fewer collisions at intersections) when compared to the Safety Corridor five-year baseline, averaged over the period from January 1, 1996 to December 31, 2000. *(Source: Eureka-Arcata Safety Corridor, 1st Annual Report. Caltrans District 1 Traffic Safety, June 18, 2003)*

Figure 1-1 compares the average collision rates of all collision types (fatal, injury, and property damage only) at the Route 101 intersections for two five-year periods before and after the establishment of the Safety Corridor. Prior to the Safety Corridor, the collision rate five-year averages were higher than the statewide average (for similar highway intersections) at four of the six intersections. After implementation of the Safety Corridor, collision rate five-year averages at Mid-City Motor World and Indianola Cutoff remain above statewide averages; in fact, the collision frequency at Mid-City Motor World and Indianola Cutoff are actually higher than prior to the Safety Corridor.

While Figure 1-1 shows the frequency of all collision types, Figure 1-2 summarizes the average rates of severe collisions for the same time periods as Figure 1-1. Collisions are considered severe if they result in injuries or fatalities. The incidence of severe collisions is similar to that of all collisions in Figure 1-1; namely, the collision rate five-year averages remain higher than statewide average rates (for similar intersections) at Mid-City Motor World and Indianola Cutoff after the Safety Corridor.

Both Figures 1-1 and 1-2 illustrate that even with a Safety Corridor in place for seven years, collision rates above statewide averages occur at two of the intersections: Mid-City Motor World and Indianola Cutoff. (Note: Figures 1-1 and 1-2 do not include the period between May 2002 and May 2004.) Even though the Safety Corridor enhances safety overall, the possibility of severe collisions from left turn movements remain. When collision history frequency and severity is highly elevated in spite of safety measures already in place (such as the Safety Corridor), the State evaluates improvements in the interest of public safety. A collision analysis from 2002 through 2008 (six full years with the Safety Corridor in place) at Indianola Cutoff shows that:

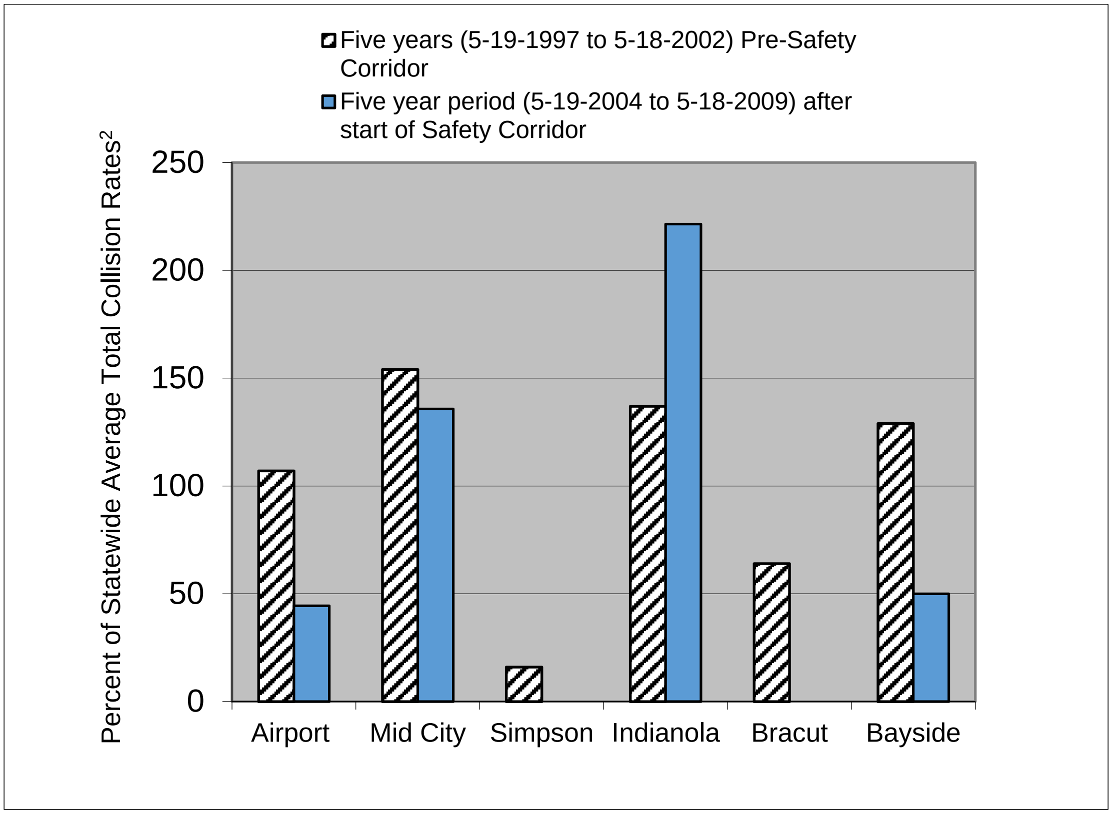
- 21 reported collisions occurred;
- 52 percent of the collisions resulted in injuries;
- Over 70 percent of the collisions involved cross-median movements.

(Source: Caltrans Eureka-Arcata Safety Corridor Fifth/Sixth-year Report (2002-2008), no date)

As the 2002-2008 collision data indicates, collisions are still occurring even after implementation of the Safety Corridor in 2002. Traffic volumes are expected to increase on Route 101 between Eureka and Arcata, which would result in shorter and fewer traffic gaps for left turn movements. The average annual daily traffic is expected to increase from 37,000 vehicles per day in 2014 to 50,000 by 2041. This traffic increase is explained in the next section.

In addition to and related to left turn movements, there are numerous factors that can contribute to higher levels of injury collisions at Route 101 intersections. During peak travel periods, vehicles can form long lines in left turn lanes on Route 101 or on crossroads waiting to make left turns across oncoming Route 101 traffic. (See Figure 1-5.) When traffic is light, most drivers can wait for suitable gaps in oncoming traffic to make left turns. However, when traffic is heavy and drivers are waiting in the left turn lane, drivers sometimes attempt to complete left turns within shorter traffic gaps than they normally would accept. In addition, impaired vision and judgment of aging drivers, as well as inexperienced drivers and reduced driver visibility during heavy rain or fog, can further hinder drivers crossing Route 101 safely at intersections. Without improvements, an increase in collision frequency could occur within one of the most heavily traveled segments of Route 101 within the North Coast counties of Mendocino, Humboldt, and Del Norte. *(Source: Caltrans 2011 Traffic Volumes on the California State Highway System, no date)*

Figure 1-1 Average Total Collision Rates at Route 101 Intersections as a Percentage of Statewide Average Rates[1, 3]



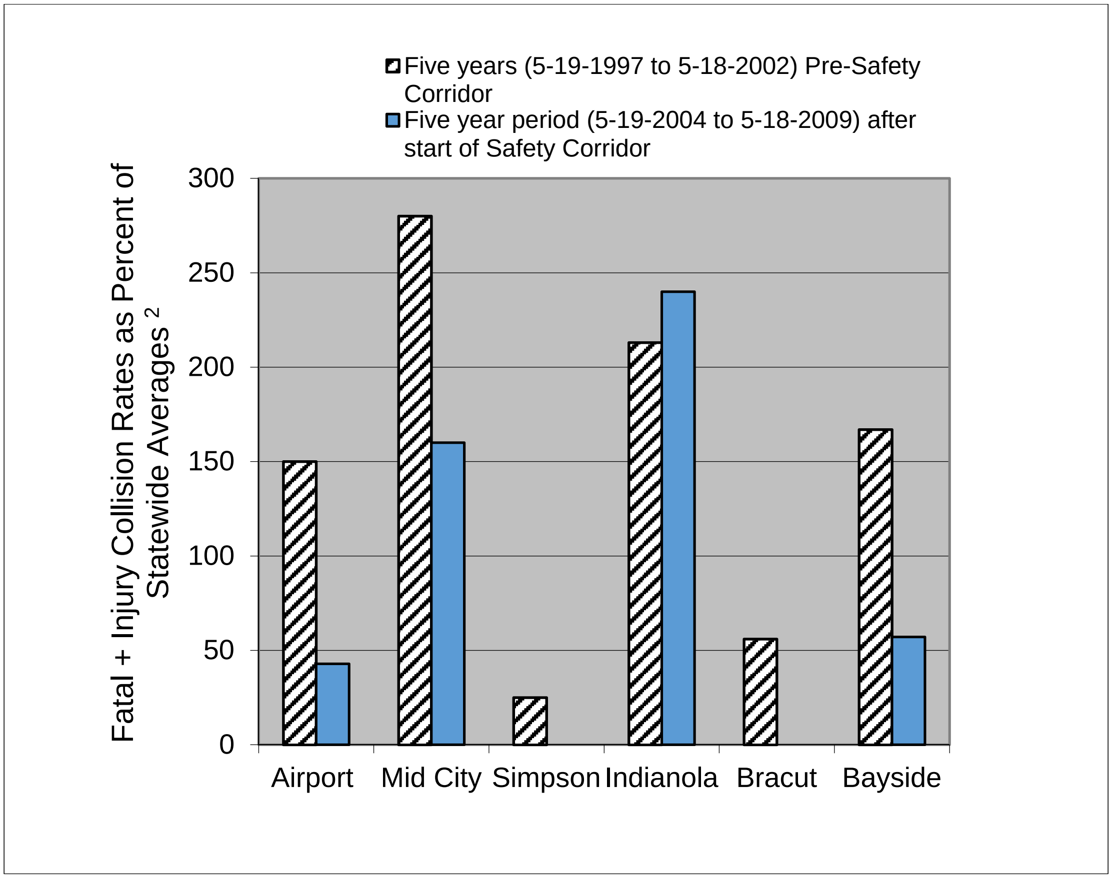
Note 1: Total collisions consist of all types of collisions: fatal, injury and property damage

Note 2: For intersections, collision rates are a measure of the number of collisions per million vehicles. One hundred represents the percentage of the statewide average collision rate for similar highway intersections.

Note 3: The Safety Corridor was started on May 19, 2002.

Source: Collision Data obtained from Caltrans Transportation System Network (TSN) by District 1 Traffic Safety

Figure 1-2 Average Severe Collision Rates at Route 101 Intersections as a Percentage of Statewide Average Rates[1, 3]



Note 1: Severe collisions consist of fatal and injury collisions.

Note 2: For intersections, collision rates are a measure of the number of collisions per million vehicles. One hundred represents the percentage of the statewide average collision rate for similar highway intersections.

Note 3: The Safety Corridor was started on May 19, 2002.

Source: Collision Data obtained from Caltrans Transportation System Network (TSN) by District 1 Traffic Safety

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Project Need: Reduce Route 101 Operational Conflicts – Left Turn Traffic Movements

Left Turns Across Route 101 to Access or Exit Private Businesses and Local Roads

One type of highway "operational conflict" occurs when vehicles at intersections turn across opposing traffic lanes. On Route 101, operational conflicts can occur as a result of uncontrolled left turn movements at six existing median crossings within the Route 101 Corridor. Left turns require motorists to monitor gaps in traffic from the Route 101 through lanes, slower moving bicyclists in the shoulders, and left turns on (or off) Route 101. These types of operational conflicts can occur within one of the most heavily traveled segments on Route 101 within Humboldt County. In addition, traffic flow along Route 101 through lanes is impeded when drivers leave left turn pockets and return to the through traffic lanes; this occurs when drivers are unable to cross Route 101 travel lanes because they perceive there are insufficient traffic gaps or because the wait to turn is too long. Commercial trucks, which comprise approximately 4.6 percent to 6.7 percent of the total traffic on Route 101, can dominate left turn pockets and require longer traffic gaps to complete left turn movements. (*Source: 2010 Annual Average Daily Truck Traffic on the California State Highway System Compiled by Caltrans Traffic and Vehicle Data Systems, no date)* See Figures 1-3 and 1-4 for photographs at intersections.

Existing conditions lead to a slowing of Route 101 traffic and an increased potential for collisions. Some improvement can be expected by extending the existing acceleration and deceleration lanes and turn pockets. Closure of the Route 101 median opening at Cole Avenue and improvement of the acceleration and deceleration lanes at Airport Road were completed in 2003. These changes improved the operation and safety of Route 101 at this location.

Higher future traffic volumes on the corridor would substantially reduce the number of suitable gaps in traffic that allow left turns across opposing traffic lanes. It should also be noted that the post World War II "baby boom" generation, the largest segment of the U.S. population, will become elderly over the next 10 to 20 years. As humans age, there is a marked decrease in their ability to accurately judge and choose an adequate gap in oncoming traffic, as when crossing or turning left on or off Route 101. Older drivers are involved in a disproportionate number of collisions when there is a higher demand on driving skills, such as making left turns across traffic, merging with high-speed traffic, crossing a high-volume intersection or stopping quickly for queued traffic (AASHTO, 2004).
For safety reasons, it is important to plan and design highways to accommodate for the inevitable scenario of the elderly population comprising a much higher proportion of drivers.

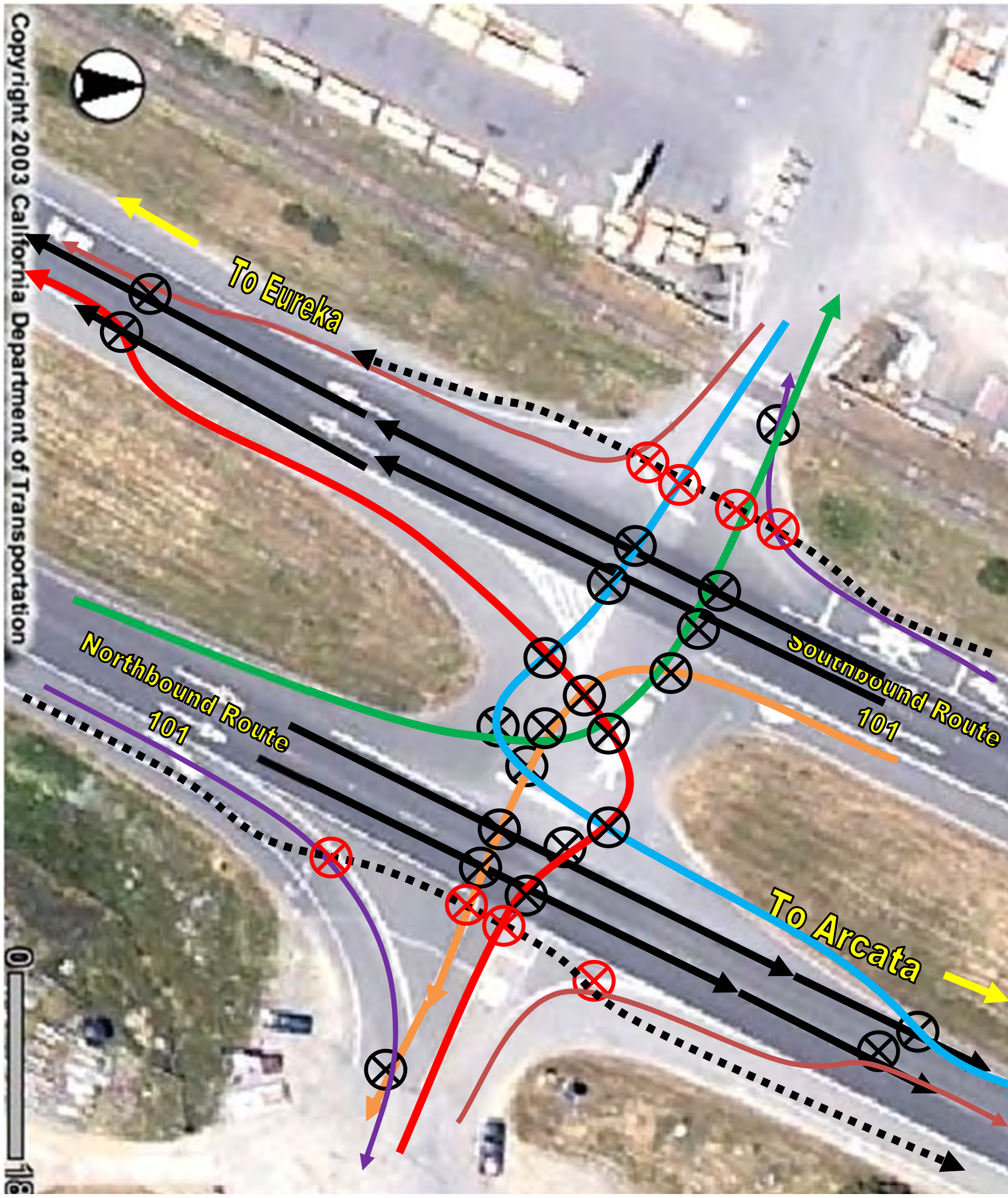

Figure 1-3 Existing Route 101 / Bracut Intersection

This aerial photograph of the existing Route 101 intersection at Bracut depicts possible vehicle turning paths (colored lines) and paths of Route 101 through traffic (black lines). The dashed lines (▪▪▪▪▪) indicate typical travel paths of bicyclists on Route 101. Potential conflicting vehicle locations can occur where the path lines cross. The ⊗ symbol indicates potential vehicle conflict locations and the ⊗ symbol indicates potential vehicle conflicts with bicyclists. This figure does not show all possible vehicle movements such as crossing or U-turn movements. The proposed project would eliminate uncontrolled (non-signalized) left turn, crossing, and U-turn movements on Route 101 between Eureka and Arcata. This would reduce the number of circled conflict points from 30 to 8 at this location.

Figure 1-4 Photograph of conflicting vehicle paths

At Route 101/Mid-City Motor World Intersection facing Humboldt Bay.
One vehicle is waiting to turn left at stop sign and in the background another vehicle is stopped in the median; both drivers are waiting for a suitable traffic gap to cross two lanes of northbound Route 101 traffic.

Project Need: Level of Service (LOS) Justification

Improving the Level of Service (LOS) is needed to reduce delays at Route 101 intersections. There is no substantial delay or capacity problem along the mainline (Route 101 through lanes) in the Eureka-Arcata Corridor; however, substantial delays associated with left turn traffic crossing Route 101 currently exist and are expected to deteriorate further if no change is made. See Figure 1-5 which is a photograph of a line of vehicles waiting to turn left from Route 101 southbound to eastbound Indianola Cutoff.

Reducing traffic congestion and implementing improvements at the at-grade intersections to improve Route 101 circulation are goals of both the Humboldt County Association of Governments (HCAOG) and Caltrans. HCAOG is a joint powers agency comprised of the seven incorporated cities (Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Rio Dell, and Trinidad), and the County of Humboldt. The agency is largely responsible for funding and programming State highway public transportation improvements in the region.

LOS is a qualitative measure for describing operational conditions within a traffic stream or at an intersection. LOS is designated by a letter from “A” to “F”, with “A” representing the least delay or congestion and “F” representing the greatest delay or most severe congestion. LOS is defined differently for mainline than it is for intersections (both non-signalized and signalized). The preferred LOS mainline is “D” or better for the Route 101 segment between Eureka and Arcata (*Source: Caltrans Transportation Concept Report - Route 101 Corridor. District 1. October 2002)*

The LOS for left turns onto Route 101 from local streets and driveways is currently LOS "F" and other turn movements are expected to degrade at every location and direction by year 2041. (See Chapter 3, Section 3.1.6—Traffic and Transportation for more information.) Degradation of intersection LOS indicates vehicles queuing, which is the result of fewer opportunities to cross high traffic volumes on Route 101. This, in turn, increases the likelihood of more frequent and more serious collisions.

Figure 1-5 Vehicles queuing up in left turn lane waiting to turn left from Route 101 southbound to eastbound Indianola Cutoff

Throughout this document, year 2041 is used as a planning horizon to predict conditions that would result compared to baseline conditions in order to characterize change. In addition, the Caltrans Highway Design Manual mandates a 20-year design life for roadway improvements.

Table 3-8 Turn Movement Level of Service (LOS) at Airport Road for Alternatives 1A, 2, and Modified 3A for the years 2013 and 2041 PM Peak Period			
	Westbound left onto Route 101	Southbound left off Route 101	Westbound right onto Route 101
Year 2041			
Alternative 1A	N/A	B	A
Alternative 3	F	F	F
Modified Alternative 3A	D	B	A

Overall, the turn movements at Airport Road for the project Build Alternatives with signals are acceptable, except for Alternative 3. Without building costly additional lanes, LOS “F” would be unavoidable. Note that the existing left turn onto Route 101 from Airport Road is currently LOS “F”.

In terms of acceptable LOS, the half signal at Airport Road would work satisfactorily (at least LOS “E”); however, between 15 and 20 years after construction of the signal, the projected increased volume of traffic on Route 101 would require that the phase for the westbound left turn movement onto southbound Route 101 be abandoned or discontinued. In 15 to 20 years, this would result in the southbound left turn from Route 101 being the only allowed left turn movement. *(Source: Caltrans Summary of Operational Analysis for Alternative 3B, Half Signal at Airport Road, 2010)*

The LOS at 4th and 5th Streets (Route 101) at V Street in Eureka was evaluated for all Build Alternatives for year 2013. The calculated LOS for the Alternatives for 4th and V Streets and 5th and V Streets was LOS “A” and LOS “B”. In year 2041, the LOS at 4th and V Streets and 5th and V Streets is projected to change to LOS “B” and LOS “C”.

The Route 101/255 interchange in Arcata includes multiple on- and off-ramps. At all ramps, the LOS was anticipated to be LOS “A” for all Alternatives for year 2013. In year 2041, the LOS would remain the same as year 2013 except for the westbound off-ramp and eastbound on-ramp transition, which would drop to LOS “B”.

Project Effects on Local Roads and Intersections

Segment Collisions On Local Roads. Segment collisions (injury and fatal) are defined as collisions that occur outside the defined area of an intersection. Statewide average collision rates for segments are calculated in terms of collisions per million vehicle miles (as compared to intersection collisions which are in terms of collisions per million vehicles). Hence, long segments of roads are more sensitive to changes in traffic volume than intersection collisions. For year 2013 and the design year 2041, Alternative 1 could result in a 60 percent increase in traffic on Old Arcata Road south of Indianola Cutoff; the predicted increase of traffic volume on Old Arcata Road for Alternative 1 could potentially increase the number of segment collisions. For year 2013 and the design year 2041, Alternatives 2, 3, and Modified Alternative 3A were not expected to increase segment collisions on Route 255 and Old Arcata Road because these alternatives would not divert traffic to these two roads.

Intersection Collisions. Intersection collisions (injury and fatal) are defined as collisions that occur within a specific area of an intersection. Intersection collisions on Route 101 outside the Eureka-Arcata Corridor limits, Route 255, and Old Arcata Road were not expected to change for any one of the Build Alternatives for both year 2013 and year 2041 since the project would not change any of the local road intersections in terms of configuration.

Even though the No-Build Alternative does not include any proposed roadway changes, traffic volumes and speeds are expected to increase in the foreseeable future, which may necessitate closing one or more Route 101 intersection median openings within the corridor. Closing one or more intersection median openings could potentially restrict access to businesses and residences and result in diverting additional traffic to local roads. Consequently, the No-Build Alternative could potentially have effects to local roads that are similar to Alternative 1.

Project Effects on Local Road Volumes. The percent change in traffic volumes for each Alternative for both year 2013 and year 2041 was calculated using an average volume weighted by the distance of each segment for Routes 101, Route 255, and Old Arcata Road (Table 3-10).

Old Arcata Road is a two-lane county road that extends from Eureka to Arcata and is approximately ten miles long. There are many access points along Old Arcata Road; public or private roads/driveways connect to Old Arcata Road, but most of the access is from driveways with housing immediately adjacent to the roadway. Old Arcata Road passes through the community of Bayside, which has a K through 8th grade public school, post office, and other businesses that are accessed immediately from Old Arcata Road (see Figure 3-6). Old Arcata Road was improved in 2009. Between Jacoby Creek Road and the Route 101/255 interchange in Arcata, there are traffic circles and speed bumps to slow traffic—potentially discouraging using this road as a Route 101 detour. The most recent available average daily traffic volume on Old Arcata Road was 7,600 vehicles.

If Alternative 1 were constructed, traffic volume is expected to increase by approximately 60 percent on Old Arcata Road between Eureka and Indianola Cutoff for both year 2013 and year 2041; this would be a substantial increase compared to the existing condition. Currently left turns to and from Route 101 are allowed; however, Alternative 1 would remove all left turn movements without a grade separation or signalization. Alternative 1 would thus divert a high proportion of traffic from Route 101 to Indianola Cutoff and Old Arcata Road. See Table 3-9.

Figure 3-6 Photograph of Old Arcata Road between Indianola Cutoff and Arcata, Facing North

Table 3-9 Projected increase in traffic volumes of weighted average by distance for all Build Alternatives as compared to the pre-Safety Corridor* (posted speed limit 60 mph) condition within the Eureka-Arcata Corridor for years 2013 and year 2041

	Alternative				
	1	**1A**	**2**	**3**	**Modified 3A**
Route 101	7%	0%	6%	1%	1%
Route 255	0%	15%	6%	1%	1%
Old Arcata Road	60%	10%	7%	-2%	-2%

*Immediately after the establishment of the Safety Corridor in 2002, a 30 percent increase occurred as a result of a portion of drivers diverting to State Route 255 to avoid the Route 101 Safety Corridor. Over the years, the traffic diversion from Route 101 to State Route 255 basically returned to pre-Safety Corridor conditions.

Traffic LOS at Local Road Intersections

Old Arcata Road. The LOS was also calculated at four intersections along Old Arcata Road (OAR) between Eureka and Arcata (Freshwater Road, Indianola Cutoff, Bayside Cutoff and Jacoby Creek Road) to assess potential effects to traffic patterns of the proposed project Alternatives on Old Arcata Road.

The predicted left turn movements to and from Old Arcata Road (OAR) at Bayside Cutoff during the AM and PM Peak Hour would be LOS "C" or better for all Alternatives.

Tables 3-10 and 3-11 show year 2013 and year 2041 left turn movements onto Old Arcata Road (OAR) from Freshwater Road during the AM and PM Peak Hour.[12] Delays currently occur during peak periods for left turn movements from Freshwater Road onto Old Arcata Road.

Table 3-10 Level of Service at Freshwater Road and Old Arcata Road for Year 2013 traffic volumes, during AM/PM Peak Hour

Alternatives	Left onto OAR	Right onto OAR	Left off OAR
1, 1A, 2, 3, Modified 3A, 7	E/E	A/A	A/A

Table 3-11 Level of Service at Freshwater Road and Old Arcata Road for Year 2041 traffic volumes, during AM/PM Peak Hour

Alternatives	Left onto OAR	Right onto OAR	Left off OAR
1, 1A, 2, 3, Modified 3A, 7	F/F	B/B	A/A

Tables 3-12 and 3-13 show the intersection LOS at Old Arcata Road and Jacoby Creek Road for years 2013 and 2041 for the Alternatives.

[12] A County of Humboldt project to construct a roundabout at the Freshwater and Old Arcata Road (Myrtle Avenue) Intersection is identified in the 2008 Regional Transportation Plan (RTP). A roundabout would be expected to substantially improve LOS at this location.

Table 3-12 Level of Service at Jacoby Creek Road and Old Arcata Road for year 2013 volumes, during AM/PM Peak Hour			
Alternative	**Left onto OAR**	**Right onto OAR**	**Left off OAR**
1	B/B	A/B	A/A
1A	B/B	A/B	A/A
2	B/B	A/B	A/A
3	B/B	A/B	A/A
Modified 3A	B/B	A/B	A/A
Alternative 7 – Existing Condition without Improvements	B/B	A/B	A/A

Table 3-13 shows the predicted LOS for turn movements at Old Arcata Road and Jacoby Creek Road. Traffic modeling indicates that none of the Build Alternatives would have an adverse effect to the LOS at Jacoby Creek Road and Old Arcata Road for left turn movements onto Old Arcata Road during the PM Peak Hour. All other turn movements during both AM and PM peak hours are at, or better than LOS "C", except for Alternative 1 which is LOS "D" for right turns from Jacoby Creek Road onto Old Arcata Road.

Table 3-13 Level of Service at Jacoby Creek Road and Old Arcata Road for year 2041 volumes, during AM/PM Peak Hour			
Alternative*	**Left onto OAR**	**Right onto OAR**	**Left off OAR**
1	C/F	B/D	A/B
2	C/F	B/C	A/B
3	C/F	B/C	A/B
Alternative 7 - Existing Condition without Improvements	C/F	B/C	A/B

*Traffic LOS predictions at this intersection were not made for Alternative 1A and Modified Alternative 3A but they would be no worse than Alternatives 1, 2, or 3.

Indianola Cutoff links Route 101 to the west with Old Arcata Road to the east. A roundabout currently exists at the intersection of Indianola Cutoff and Old Arcata Road. All Alternatives would perform LOS "A" for 2013 at the Indianola roundabout. None of the Build Alternatives would adversely affect the LOS of this roundabout for both existing and future conditions. The roundabout performs at LOS "A" currently, and under Alternative 1 was expected to perform LOS "A" in 2013 and LOS "C" for 2041. Alternative 1 is considered to have the highest impact to Old Arcata Road and this is considered to be the worst case scenario; all other Alternatives would perform LOS "C" or better in 2041.

In summary, except for Alternative 1, although LOS depends at some locations on certain turn movements, none of the Build Alternatives would adversely affect the intersections on Old Arcata Road between Eureka and Arcata. In other words, the LOS is predicted to degrade at certain locations and for certain turn movements because of the predicted increase in traffic—not as a result of the project (except for Alternative 1).

Impacts on LOS at 4th and 5th Streets at V Street in Eureka (southbound and northbound Route 101, respectively) were evaluated for all Build Alternatives for the year 2041. The calculated LOS for all Alternatives for 4th and V Streets and 5th and V Streets are "B" and "C", respectively.

Project effects on LOS for four different weave movements at the existing Route 101/255 interchange in Arcata (on- and off-ramps) for the year 2041 were evaluated for Alternatives 1, 2 and 3. For all three Alternatives, the LOS for the four traffic weave movements are "A" (northbound and southbound) and "B" (westbound and eastbound).

State Route 255. The LOS was also calculated at five intersections along State Route 255 (which included Peninsula Drive, Pacific Road, and Lupin/Victor Road [in Manila]) to assess impacts as a result of changes in traffic patterns due to the proposed Alternatives on Route 101. For all Build Alternatives, LOS "B" or better was calculated for each turning movement for year 2013 traffic volumes. The annual average daily traffic volume on State Route 255 in 2012 was 7,600 vehicles.

Project effects on LOS were calculated at State Route 255 intersections with Pacific Road and Lupin Drive (in Manila) for year 2041. For all Build Alternatives, LOS "C" or better is predicted at these intersections.

Overall, none of the project Build Alternatives would affect State Route 255 for the years 2013 or 2041.

Project Alternatives - Potential Effects on Transportation Modes

Railroad

None of the Build Alternatives would cross or require acquisition of temporary or permanent railroad easement from the North Coast Railroad Authority (NCRA): consequently, the proposed project would not temporarily or permanently impact the potential future operation of the railroad.

Public Transit

None of the Build Alternatives would temporarily or permanently impact public transit (bus) operations. There are no bus stops on Route 101 between the Eureka Slough bridge and the Route 101/255 interchange in Arcata. The feasibility of adding a bus stop on Route 101 at

Indianola Cutoff, however, would be greatly enhanced by a Route 101/Indianola Cutoff grade separation, which is included in Alternatives 2, 3, and Modified Alternative 3A.

Murray Field Airport (Humboldt County Airport)

None of the project Alternatives would affect the existing flight operations at the Murray Field Airport. For Alternative 3, the proposed additional lane would be realigned into the Route 101 roadway median to avoid a conflict with airport flight paths. Alternative 3 would likely require an encroachment permit for construction in the southwest corner of Murray Field for the realignment of Airport Road intersection with Route 101. The proposed construction work would not require taking any existing buildings within the airport complex. However, according to a September 18, 2007 letter from the Humboldt County Department of Public Works – Aviation Division, the portion of the airport needed for the intersection alignment is earmarked for airport development; consequently, the County recommended realigning the intersection outside of airport property.

Bicycle and Pedestrian Travel

As a result of the California Coastal Commission Coastal Consistency Certification process, Caltrans is committed to ensure adequate commitments are in place for a separate Class 1 bike and pedestrian trail parallel to Route 101 from Arcata to X Street in Eureka. Except for Alternative 1A, the proposed roadway project would not affect the Bay bicycle trail during or after construction. Modified Alternative 3A includes a proposed grade separation (interchange) at Indianola Cutoff, which would provide west-east connectivity (i.e., protected access across Route 101) between the bicycle trail and origins/destinations on the east side of Route 101.

While any one of the Build Alternatives would restrict or eliminate left turn movements along the Eureka-Arcata Route 101 Corridor, none of the project Alternatives propose to reduce or eliminate the number of right turn on and off movements at the Route 101 intersections (except at Cole Avenue where the right turn move onto northbound Route 101 would be eliminated). With the elimination of left turn and crossing movements, bicycle safety would be substantially enhanced for bicyclists on Route 101. In addition, all Build Alternatives include extending the existing acceleration and deceleration lanes at the Route 101 intersections, which is expected to enhance bicycle safety by providing a longer transition distance for vehicle maneuvering. Bicycle safety would also be enhanced by a barrier-separated travel way for non-motorized traffic on the proposed new southbound Jacoby Creek bridge.

After project construction, the posted speed limit of 50 mph between the Eureka Slough bridges and Gannon Slough bridges would remain at the existing posted 50 mph speed limit. However, 45 days after project construction, Caltrans would conduct an Engineering and Traffic Survey to comply with the California Vehicle Code. The California Vehicle Code requires a renewed engineering and traffic survey whenever substantial changes in roadway or traffic conditions have occurred. If the prevailing 85th percentile of traffic eventually rises above 55 mph after project construction, Caltrans would be required to address the condition: raising the posted speed limit would be considered and possibly implemented.

For bicyclists commuting to and from Eureka and Arcata, none of the project Alternatives would increase travel distances or times. For bicyclists whose destination may be one of the businesses, the mobile home park, campground or other median access points along the Route 101 corridor, travel distance could be increased by as much as ten miles under Alternative 1 (refer to Table 3-3); there would be no opportunities to cross or turnaround on Route 101 between the Eureka Slough bridge and the Route 101/255 interchange in Arcata.

Alternative 1A includes three turnarounds (U-turns) that would result in a wider roadway at the U-turn locations and would thereby reduce the opportunity to construct a new bicycle trail on either or both sides of Route 101. In addition, it is anticipated most bicyclists would choose not to use the U-turns, which would require bicyclists to merge across two traffic lanes and then share the U-turn lanes with fast moving vehicle traffic. If bicyclists chose not to use the U-turn lanes, the only other Route 101 crossing/turning option would be at the partially signalized Route 101/Airport Road intersection.

Alternative 2 would minimize out-of-direction travel by providing a turnaround opportunity at the proposed Route 101/Indianola Cutoff grade separation approximately midway between Eureka and Arcata. Alternative 3 would include a full signal at Airport Road and Route 101, in addition to a grade separation at Route 101 and Indianola Cutoff. Modified Alternative 3A includes a half signal at Route 101 and Airport Road, which would allow bicyclists to turn left to and from Route 101 and Airport Road. Alternative 1A includes partial signalization at Airport Road similar to Modified Alternative 3A—except that left turn movements would not be allowed from Airport Road to southbound Route 101.

For pedestrians, the effects of the Build Alternatives would be similar to the potential effects of bicyclists. However, the pedestrian access between businesses and residences on Jacobs Avenue would not change, regardless of the Alternative.

Alternative 7, the No-Build Alternative, does not include any proposed roadway changes, thus would not have any direct impact on bicyclists or pedestrians. However, if no safety improvements are made, traffic volumes and speeds are expected to steadily increase resulting in higher collision rates; this may necessitate closing one or more Route 101 intersection median openings within the corridor. Closing one or more intersection median openings could potentially restrict access to businesses and residences and add out-of-direction travel and delay that would be similar to Alternative 1. Finally, the No-Build Alternative could delay construction of the Humboldt Bay Trail since the California Coastal Commission conditioned their Coastal Development Permit approval of the Route 101 project on prior or concurrent construction of the Humboldt Bay Trail. (See Chapter 3, Section 3.1.1 Land Use, Community, and Businesses.)

Summary of Project Environmental Consequences

The number of injury and fatal collisions at intersections within the project limits is expected to steadily increase over time with Alternative 7, the No-Build Alternative, as the volume of traffic increases on Route 101. At most Route 101 intersections, Alternative 7 (No-Build) would result in substantial continued degradation of LOS for left turn movements at intersections for PM peak hour traffic volumes. Construction of any one of the Build Alternatives would substantially improve safety immediately and for the long term.

For both year 2013 (latest data) and year 2041, out-of-direction travel distance for local trips to businesses and residents would increase for any one of the Build Alternatives with Alternative 1 having the greatest distance added. However, any one of the Build Alternatives would eliminate uncontrolled left turn movements, thus improve both short term and long term intersection level of service at Route 101 intersections between Eureka and Arcata. Through traffic on Route 101 (drivers not making stops within the Eureka-Arcata Corridor) would not generally be affected by any of the project Alternatives (including the No-Build).It should be noted that the proposed project would not add additional through lanes that would increase the traffic carrying capacity of Route 101. With or without the project, traffic volumes are expected to increase on Route 101 and the local roads because of anticipated population and development growth. On Old Arcata Road, increase in traffic volume is expected to degrade intersection level of service (without the project).

Refer to Chapter 3, Section 3.1.4 – Community Impacts for information on how this project could affect traffic patterns for residents and businesses.

Traffic During Project Construction

Construction activities include building the Indianola Cutoff grade separation (except Alternatives 1 and 1A), replacing the southbound Jacoby Creek bridge, and various roadway improvements such as removing fixed objects within the clear recovery zone. Construction activities would cause limited temporary disruption of local access to homes and businesses along the Route 101 corridor. Construction is expected to be completed in three years.

Bicyclists and Pedestrians During Construction

During construction of any of the Build Alternatives, bicyclists would be affected by temporary lane closures or other roadway use restrictions and the presence of construction workers, vehicles and materials. Any one of the Build Alternatives would have some temporary construction-related interruptions of pedestrian and bicycle travel or access.

AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

As discussed in the Environmental Consequences section, closing the Route 101 medians would have varying adverse effects depending on which Alternative was constructed. In general, closing the medians and eliminating uncontrolled left turn movements would result in out-of-direction travel.

Intersection level of service (LOS). All Alternatives, including the No-Build Alternative, would result in LOS “D” or lower for both the existing and projected conditions at certain intersections and for certain turn movements. Avoidance, minimization, or mitigation to improve the LOS for all turn movements at all intersections would not be possible without a substantial increase in cost and impact. However, any one of the Build Alternatives would greatly improve safety compared to the No-Build Alternative.

Traffic access and out-of-direction travel. Construction of a grade separation at Route 101 and Indianola Cutoff (Alternatives 2, 3, and Modified Alternative 3A) would substantially improve out-of-direction travel for local residents and businesses along Jacobs Avenue and in Bracut. The annual vehicle hours of increased delay to local residents and businesses is reduced more than 50 percent with the construction of Alternative 2 and the annual cost associated with that delay is less than 30 percent of that associated with Alternative 1. In addition, a grade separation at Indianola Cutoff would prevent substantial traffic diversion to Old Arcata Road that would be expected to occur if Alternative 1 were constructed. Old Arcata Road is less suited to accommodate higher traffic volumes and speeds than Route 101. Alternative 3 includes construction of a fully signalized intersection at Route 101 and Airport Road, which would further minimize out-of-direction travel for businesses and residents on Jacobs Avenue if the Route 101 median openings were closed. Modified Alternative 3A, the third alternative with a grade separation, includes a half signal for traffic accessing the businesses and residents at Jacobs Avenue.

Measures to avoid and minimize traffic delay during Construction

Bridge Construction Work Sequence and Traffic Detouring

The new bridge would be erected to the east of the existing southbound Jacoby Creek bridge. The southbound Jacoby Creek bridge replacement would require both lanes to be open during peak travel periods (basically daylight hours); therefore, the bridge would need to be replaced in a manner where two lanes could be made available every day. The method proposed for the bridge replacement would involve constructing the new two lane bridge temporarily next to the existing bridge, realign traffic to the new bridge, remove the old bridge, then choose one evening to close the southbound lanes altogether to move the new bridge to the original alignment, and finally relocate traffic back to its original alignment.

A comprehensive transportation management plan (TMP) would be prepared prior to construction to maintain circulation on streets and arterials for the duration of the three year construction period. Caltrans staff would coordinate preparation of the TMP with the

California Highway Patrol, emergency services, and public agencies such as the County of Humboldt. The TMP would also consider community and special events and holidays. The TMP would be implemented during construction and would minimize disruption to travelers, business owners, customers and residents. The TMP would require, but not be limited to, standard measures such as:

- Limiting long-term lane closures; during peak travel periods, two lanes of traffic in each direction on Route 101 would be maintained. If lane and ramp closures were necessary, they would be limited to night and off-peak hours;
- Placing work hour restrictions on both the Route 101 mainline and business accesses;
- Local streets and private driveways would be kept open during the construction of any one of the Build Alternatives;
- Advanced changeable message signs and broadcast media notifications, detour plans, and other contingency plans;
- Prohibiting any road work on holidays (such as the 4th of July or Labor Day weekend) or when special events are scheduled;
- Caltrans would provide advance notification of planned highway detours and road closures to local cities and the County of Humboldt;
- Caltrans would inform businesses and the media in advance of any project work that might affect business;
- Bicycle access would be maintained through the project construction zone. There is no expectation for detours for bicycles. Project construction contract special provisions would require the construction contractor to be responsible to maintain a clean shoulder that is safely passable by bicyclists;
- The existing posted speed limits on Route 101 between Eureka and Arcata would remain the same during construction to avoid excessive traffic delays and traffic diversion to State Route 255 or Old Arcata Road.

Implementation of such measures would minimize construction impacts on any particular location along the Route 101 corridor. Since the overall traffic flow is expected to be maintained during project construction, diversion of traffic to State Route 255 and Old Arcata Road is not anticipated.

Alternative 7, the No-Build Alternative, would not cause any temporary impacts on access to local businesses or residential areas. However, if the project was not constructed and if safety and operations further degraded, the eventual closing of medians could occur under the No-Build Alternative and would be similar to the traffic conditions under Alternative 1.

- The project does not include constructing a new connection to a major highway;
- The posted speed limit on Route 101 is not planned to be changed after project construction;
- There is no planned construction of bus facilities or other facilities within the Eureka-Arcata Route 101 corridor that would generate additional diesel vehicle trips.

Particulate Matter - Regional Cumulative Impacts

Operation of the proposed project would result in regional emissions of ozone precursors (nitrogen oxides and reactive organic gases that react to form ozone), carbon monoxide, and inhalable particulate matter (PM_{10} and $PM_{2.5}$) that could have a cumulative effect with other pollutant sources in the area. These emissions are addressed and accounted for in the regional analysis performed for the proposed project's inclusion in the RTP for Humboldt County. This RTP was found to conform to the SIP. (See Chapter 3, Section 3.6 Cumulative Impacts for more discussion of cumulative impacts.)

Particulate Matter - Construction Effects

Construction is a source of dust and equipment emissions that can have temporary impacts on local air quality (i.e., exceed state or national air quality standards for PM_{10}). Construction emissions would result from earthmoving (fugitive dust) and heavy equipment use (vehicle exhaust). These emissions would be generated from land clearing, ground excavation, cut and fill operations, delivery of excavated material, and the construction of the project facilities. Dust emissions would vary from day to day depending on the level of activity, the specific operations, and the prevailing weather.

In addition to particulate emissions from earth moving, combustion emissions from fuel-powered construction equipment may create a temporary impact on local air quality. NCUAQMD CEQA Guidelines do not provide a numerical threshold of significance for these emissions. Instead, the emphasis is on minimization of this type of temporary effect. NCUAQMD Regulation 1 Rule 430 specifies measures to minimize harm for controlling fugitive dust emissions. If the project follows the practices described in Regulation 1 Rule 430, the impact is not considered adverse. Measures to minimize fugitive dust are described later in this section.

Construction activities for large development projects are estimated by the EPA to add 1.2 tons of fugitive dust per acre of soil disturbed per month of activity. In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, SO_2, NO_x, VOCs and some soot particulate (PM_{10} and $PM_{2.5}$) in exhaust emissions. Table 3-18 shows an estimate of construction emissions for the proposed project. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Table 3-18 Emissions from Road Construction*

Road Construction Emissions Model, Version 7.1.5.1 With Water Truck

Emission Estimates for -> Eureka-Arcata Corridor										
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM_{10} (lbs/day)	Exhaust PM_{10} (lbs/day)	Fugitive Dust PM_{10} (lbs/day)	Total $PM_{2.5}$ (lbs/day)	Exhaust $PM_{2.5}$ (lbs/day)	Fugitive Dust $PM_{2.5}$ (lbs/day)	CO_2 (lbs/day)
Grubbing/Land Clearing	5.3	35.3	40.5	101.9	1.9	100.0	22.5	1.7	20.8	6,654.7
Grading/Excavation	19.5	126.5	199.7	108.9	8.9	100.0	28.7	7.9	20.8	29,117.8
Drainage/Utilities/Sub-Grade	14.3	93.4	126.5	106.3	6.3	100.0	26.5	5.7	20.8	18,291.4
Paving	5.0	36.7	34.1	1.9	1.9	-	1.7	1.7	-	6,301.8
Maximum (pounds/day)	19.5	126.5	199.7	108.9	8.9	100.0	28.7	7.9	20.8	29,117.8
Total (tons/construction project)	2.8	18.3	26.4	18.1	1.2	16.8	4.6	1.1	3.5	3,892.6
Notes: Project Start Year ->	2019									
Project Length (months) ->	18									
Total Project Area (acres) ->	15									
Maximum Area Disturbed/Day (acres) ->	10									
Total Soil Imported/Exported (yd^3/day)->	625									

(Source: Sacramento Metropolitan Air Quality Management District, 2014)

*NOTE: This table summarizes approximate construction emission modeling results based on a hybrid of the Build Alternatives: three years of construction, a project area of 15 acres, 625 cubic yards of material imported per day, 10 acres of disturbance.

PM_{10} and $PM_{2.5}$ estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM_{10} emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total $PM_{2.5}$ emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

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AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

As discussed in the Environmental consequences section, post-construction project air quality impacts are not anticipated; therefore, avoidance, minimization, or mitigation measures are not proposed.

Measures to minimize particulate emissions

Although the proposed project is not expected to create or worsen particulate matter air quality violations both for the existing year and the future design year, Caltrans has adopted policies to help reduce air emissions statewide. Caltrans promotes measures, practices, and business operations to minimize GHG emissions. These can include, but are not limited to the following: advocating for efficient land use and transportation planning; Transportation Demand Management strategies; implementing operational improvements to increase the efficiency of the transportation system; incorporating climate change mitigation, adaptation, and energy efficient strategies into the design and maintenance of Caltrans facilities; and seeking new opportunities to implement clean energy alternatives when possible. *(Source: Caltrans Director's Climate Change Policy DP-30, June 22, 2012)*

The proposed project for the existing year and the future design year would not result in new or worsened $PM_{2.5}$ or PM_{10} violations for the reasons summarized in Table 3-19.

Table 3-19 $PM_{2.5}$ or PM_{10} Conclusion Summary		
Particulate Matter Analysis Criteria	**Analysis Summary**	**Analysis Result/Finding**
EPA 2006 final rule of an example of a project that would ***likely*** be covered by 40 CFR 93.123(b)(1) (i.e., considered a project of air quality concern)	A project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 Annual Average Daily Traffic (AADT) and 8% or more of such AADT is diesel truck traffic. Year 2011 AADT on Route 101 is 36,000* and it is not expected to exceed the EPA's Project of Air Quality Control threshold of 125,000 AADT within the 20-year planning horizon. Also, the proposed project is not a new highway.	The proposed project is clearly not an example of a project that the EPA would consider to be a project of air quality concern.
FHWA and EPA's Project of Air Quality Concern diesel truck percentage threshold is 8% of overall vehicle fleet composition.	The current diesel truck percentage of overall traffic is approximately 4% to 7% on Route 101 between Eureka and Arcata. Also the proposed project would not substantially affect diesel truck volumes and percentages between Build and No-Build Alternatives since the project does not include a new connection to a major highway and the project would not increase the carrying capacity of Route 101.	In terms of diesel truck percentage, the proposed project is below the FHWA and EPA threshold of air quality concern.
Project related $PM_{2.5}$ and PM_{10} emission	$PM_{2.5}$ and PM_{10} emissions are expected to slightly increase from this project because of minor increases in vehicle miles traveled (VMT) compared to the No-Build Alternative. The access restrictions would increase out-of-direction travel, but the proposed interchange and half or full signalization would minimize the out-of-direction travel for Alternatives 3 and Modified 3A. Alternatives 1, 1A, and 2 would have more $PM_{2.5}$ and PM_{10} emissions resulting from higher out-of-direction travel.	The additional VMT varies by alternative; however any additional VMT would be offset by improved intersection level of service (i.e., reduced delay at intersections) and other factors such as continuing improvements in engine technology and retirement of older, higher-emitting vehicles.
Local $PM_{2.5}$ and PM_{10} emission trends	Based on representative monitoring data, ambient $PM_{2.5}$ concentrations are remaining relatively constant (24-hour $PM_{2.5}$ standard) or declining (annual $PM_{2.5}$ standard). Based on representative monitoring data, monitored annual average $PM_{2.5}$ concentrations have not exceeded both the state and national standards in the past five years (see Table 3-13).	The project would not worsen local $PM_{2.5}$ and PM_{10} emission trends.

*AADT source: Caltrans Traffic Volumes Annual Average Daily Traffic (AADT) for all vehicles on California State Highways

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For these reasons, for both the existing and future design year, the proposed project is not expected to worsen $PM_{2.5}$ or PM_{10} violations of standards. Therefore, the proposed project meets the conformity hot spot requirements in 40 CFR 93.116 and 93.126 for $PM_{2.5}$ and PM_{10}.

Construction

As discussed previously, impacts from dust generation by excavation and construction activities would be localized and of a temporary nature. Dust control practices, as described in NCUAQMD Rule 1-4-430 and below, would be employed to minimize or avoid potential exceedances (violations) of the PM_{10} air quality standard during construction.

(a) The handling, transporting, or open storage of materials in such a manner which allows or may allow unnecessary amounts of particulate matter to become airborne shall not be permitted.

(b) Reasonable precautions shall be taken to prevent particulate matter from becoming airborne, including, but not limited to, the following provisions:

(1) Covering open bodied trucks when used for transporting materials likely to give rise to airborne dust.

(2) Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials. Containment methods can be employed during sandblasting and other similar operations.

(3) Conduct agricultural practices in such a manner as to minimize the creation of airborne dust.

(4) The use of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land.

(5) The application of asphalt, oil, water or suitable chemicals on dirt roads, materials stockpiles, and other surfaces which can give rise to airborne dusts.

(6) The paving of roadways and their maintenance in a clean condition.

(7) The prompt removal of earth or other material from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water, or other means.

In addition, employing the following measures to minimize pollutant emissions from construction equipment exhaust would be employed as appropriate and reasonable:

- Keeping engines properly tuned;
- Limiting idling;
- Avoiding unnecessary concurrent use of equipment.

If emission levels are exceeded during construction, consider using Enhanced Fugitive PM Dust Control Practices as an option to reduce pollutant emissions.

After construction, none of the Build Alternatives would have an adverse impact on air quality; consequently, no project-specific air quality-related mitigation measures are required.

Climate Change

The Council on Environmental Quality (CEQ) released Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Reviews (August 1, 2016). This final guidance provides a framework for federal agencies to consider both the effects of a proposed action on climate change, as indicated by its estimated greenhouse gas emissions, and the effects of climate change on a proposed action. Climate change is discussed in Chapter 4 of this document. As the CEQ guidance aligns with the analysis required by the state of California under CEQA, the analysis in Chapter 4 will be used to inform the NEPA decision for the project. However, the CEQ guidance does not apply to this project, as this project was initiated prior to the guidance being adopted.

Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gases (GHGs), particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization's in 1988, has led to increased efforts devoted to greenhouse gas (GHG) emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs related to human activity that include carbon dioxide (CO_2), methane, nitrous oxide, tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23 (fluoroform), HFC-134a (s, s, s, 2 – tetrafluoroethane), and HFC-152a (difluoroethane).

There are typically two terms used when discussing the impacts of climate change. "Greenhouse Gas (GHG) Mitigation" is a term for reducing GHG emissions in order to reduce or "mitigate" the impacts of climate change. "Adaptation" refers to the effort of planning for and adapting to impacts due to climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels)[29].

Transportation sources (passenger cars, light duty trucks, other trucks, buses and motorcycles) in the state of California make up the largest source (second to electricity generation) of greenhouse gas emitting sources. Conversely, the main source of GHG emissions in the United States (U.S.) is electricity generation followed by transportation. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

There are four primary strategies for reducing GHG emissions from transportation sources: 1) improve system and operation efficiencies, 2) reduce growth of vehicle miles traveled (VMT) 3) transition to lower GHG fuels and 4) improve vehicle technologies. To be most effective, all four should be pursued collectively. The following Regulatory Setting section outlines state and federal efforts to comprehensively reduce GHG emissions from transportation sources.

Regulatory Setting

State

With the passage of several pieces of legislation, including State Senate and Assembly Bills and Executive Orders, California launched an innovative and proactive approach to dealing with GHG emissions and climate.

[29] http://climatechange.transportation.org/ghg_mitigation/

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Assembly Bill 1493 (AB 1493), Pavley, Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the California Air Resources Board (CARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year.

Executive Order (EO) S-3-05 (June 1, 2005): The goal of this EO is to reduce California's GHG emissions to 1) year 2000 levels by 2010, 2) year 1990 levels by 2020, and 3) 80 percent below the year 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32.

Assembly Bill 32 (AB 32), Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases."

Executive Order S-20-06 (October 18, 2006): This order establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency (Cal/EPA) and state agencies with regard to climate change.

Executive Order S-01-07 (January 18, 2007): This order sets forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least ten percent by 2020.

Senate Bill 97 (SB 97), Chapter 185, 2007, Greenhouse Gas Emissions: required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to the California Environmental Quality Act (CEQA) Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

Senate Bill 375 (SB 375), Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires the California Air Resources Board (CARB) to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land-use, and housing policies to plan for achievement of the emissions target for their region.

Senate Bill 391 (SB 391) Chapter 585, 2009 California Transportation Plan: This bill requires the State's long-range transportation plan to meet California's climate change goals under AB 32.

Federal

Although climate change and GHG reduction are a concern at the federal level, currently no regulations or legislation have been enacted specifically addressing GHG emissions reductions and climate change at the project level. Neither the United States Environmental Protection Agency (USEPA) nor the Federal Highway Administration (FHWA) has issued explicit guidance or methods to conduct project-level GHG analysis.[30] FHWA supports the approach that climate change considerations should be integrated throughout the transportation decision-making process—from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will assist in decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project-level decision-making. Climate change considerations can be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

The four strategies outlined by FHWA to lessen climate change impacts correlate with efforts that the state is undertaking to deal with transportation and climate change. These strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and a reduction in travel activity.

Climate change and its associated effects are being addressed through various efforts at the federal level to improve fuel economy and energy efficiency, such as the “National Clean Car Program” and EO 13514 - *Federal Leadership in Environmental, Energy and Economic Performance*.

Executive Order 13514 (October 5, 2009): This order is focused on reducing greenhouse gases internally in federal agency missions, programs and operations, but also directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

USEPA’s authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court’s ruling, USEPA finalized an endangerment finding in December 2009. Based on scientific evidence, it found that six greenhouse gases constitute a threat to public health and welfare. It is the Supreme Court’s interpretation of the existing Act and EPA’s assessment of the scientific evidence that form the basis for EPA’s regulatory actions.

[30] To date, no national standards have been established regarding mobile source GHGs, nor has USEPA established any ambient standards, criteria or thresholds for GHGs resulting from mobile sources.

USEPA, in conjunction with NHTSA, issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010.[31] The USEPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations.

The final combined standards that made up the first phase of this national program applied to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce GHG emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

On August 28, 2012, USEPA and NHTSA issued a joint Final Rulemaking to extend the National Program for fuel economy standards to model years 2017 through 2025 passenger vehicles. Over the lifetime of model years 2017-2025 standards, this program is projected to save approximately four billion barrels of oil and two billion metric tons of GHG emissions.

The complementary USEPA and NHTSA standards that make up the Heavy-Duty National Program apply to combination tractors (semi-trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards will cut greenhouse gas emissions and domestic oil use significantly. This program responds to President Barack Obama's 2010 request to jointly establish greenhouse gas emissions and fuel efficiency standards for the medium- and heavy-duty highway vehicle sector. The agencies estimate that the combined standards will reduce CO_2 emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model years 2014 to 2018 heavy duty vehicles.

Project Analysis

An individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may participate in a potential impact through its incremental contribution combined with the contributions of all other sources of GHG.[32] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable." See CEQA Guidelines sections 15064(h)(1) and 15130.

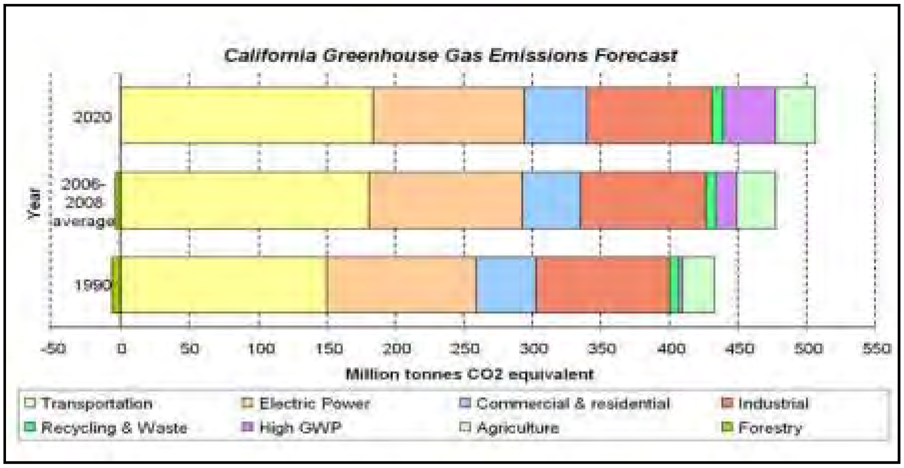
[31] http://www.c2es.org/federal/executive/epa/greenhouse-gas-regulation-faq

[32] This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the SCAQMD (Chapter 6: : The CEQA Guide, April 2011) and the US Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. Gathering sufficient information on a global scale of all past, current, and future projects to make this determination is a difficult, if not impossible task.

The AB 32 Scoping Plan contains the main strategies California will use to reduce GHG. As part of its supporting documentation for the Draft Scoping Plan, CARB released the GHG inventory for California (forecast last updated in October 2010). The forecast is an estimate of the emissions expected to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. The base year used for forecasting emissions is the average of statewide emissions in the GHG inventory for 2006, 2007, and 2008.

Figure 4-1 California Greenhouse Gas Forecast



(Source: CARB, 2014)

Caltrans, and its parent agency, the California State Transportation Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation, Caltrans has created and is implementing the Climate Action Program published in December 2006.[33]

The purpose of the proposed project is to improve safety and to improve the operation of the intersections by reducing delay at those intersections. The project will not increase the vehicle capacity of the existing roadway, therefore a qualitative analysis of greenhouse gas emissions has been completed per Section 15064.4 of the CEQA guidelines.

[33] Caltrans Climate Action Program is located at the following web address: http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf

In order to improve safety on this route, the proposed Build Alternatives would eliminate uncontrolled left turn movements across the median. This modification is expected to increase out-of-direction travel for local trips to businesses and residents. However, intersection level of service would be improved between Eureka and Arcata. Through traffic on Route 101 is not expected to be affected.

Although the project would not add additional through lanes that would increase the traffic carrying capacity of Route 101, traffic volumes on Route 101 and local roads are anticipated to increase due to anticipated population and development growth of the region. Consequently, VMT would increase over time as a result of the projected increase in traffic volumes independent of the proposed project. The increase in traffic volumes and miles traveled could potentially result in an increase in operational GHG emissions; however, because of State legislative bills and Executive Orders mandating greater fuel efficiency, stricter emission standards for motor vehicles, and measures to minimize VMT, GHG emissions are expected to decrease by 2041.

Project-specific measures to minimize harm were developed to avoid or offset out-of-direction travel, which would also minimize operational GHG emissions. The most effective and feasible of these measures involved modifying Alternatives 1 and 3 by signalizing or adding turnarounds which resulted in Alternative 1A (partial signalization and turnarounds) and Modified Alternative 3A (includes a half signal with a new grade separation at Route 101 and Indianola Cutoff).

In addition, all Build Alternatives would improve intersection Level of Service (LOS) compared to the existing condition where traffic queues often form at the local street and driveway intersections on Route 101. This would reduce idling vehicle engines and variable motor vehicle speeds at intersections which could result in higher GHG emissions compared to motor vehicles traveling at constant speeds.

Caltrans, along with other agencies, is planning and implementing statewide measures to reduce GHG; these measures are discussed in the following sections.

Construction Emissions

Greenhouse gas emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction GHG emissions include emissions produced as a result of material processing, emissions produced by on-site construction equipment, and emissions arising from traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase. Their frequency and occurrence could be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. Construction emissions would be a one-time unavoidable consequence.

In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be mitigated, to some degree, by longer intervals between maintenance and rehabilitation events.

Refer to Chapter 3, Section 3.2.6—Air Quality for a discussion of construction related emission effects and measures to address construction emissions that may have a benefit of reducing greenhouse gas emissions and improving energy efficiency.

Greenhouse Gas Reduction Strategies

AB 32 Compliance

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement Executive Orders S-3-05 and S-01-07 and to help achieve the targets set forth in AB 32. Many of the strategies Caltrans is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Former Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a $222 billion infrastructure improvement program to fortify the state's transportation system, education, housing, and waterways, including $100.7 billion in transportation funding during the next decade. The Strategic Growth Plan targets a significant decrease in traffic congestion below today's level and a corresponding reduction in GHG emissions. The Strategic Growth Plan proposes to do this while accommodating growth in population and the economy. A suite of investment options has been created that combined together are expected to reduce congestion. The Strategic Growth Plan relies on a complete systems approach to attain CO_2 reduction goals: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements as depicted in Figure 4-2, Mobility Pyramid.

Figure 4-2 Mobility Pyramid

Caltrans supports efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. Caltrans works closely with local jurisdictions on planning activities but does not have local land use planning authority. Caltrans also assists efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks. Caltrans is doing this by supporting ongoing research efforts at universities, by supporting legislative efforts to increase fuel economy, and by its participation on the Climate Action Team. It is important to note, however, that the control of the fuel economy standards is held by USEPA and ARB.

Caltrans also works towards enhancing the State's transportation planning process to respond to future challenges. Similar to requirements for regional transportation plans under Senate Bill (SB) 375 (Steinberg 2008), SB 391(Liu 2009) requires the State's long-range transportation plan to meet California's climate change goals under Assembly Bill (AB) 32.

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce greenhouse gas (GHG) emissions. The CTP defines performance-based goals, policies, and strategies to achieve our collective vision for California's future, statewide, integrated, multimodal transportation system.

The purpose of the CTP is to provide a common policy framework that will guide transportation investments and decisions by all levels of government, the private sector, and other transportation stakeholders. Through this policy framework, the CTP 2040 will identify the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the State's transportation needs.

Table 4-1 summarizes Caltrans and statewide efforts implemented to reduce GHG emissions. Additional information about each strategy is included in the Climate Action Program at Caltrans (December 2006).

Table 4-1 Climate Change/CO_2 Reduction Strategies

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings (MMT)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies and other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	.975	7.8
Operational Improvements & Intelligent Trans. System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	.07	2.17
Mainstream Energy & GHG into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, CalEPA, CARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	.0045	.0065 .045 .0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	.117	.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5 % limestone cement mix 25% fly ash cement mix > 50% fly ash/slag mix	1.2 .36	4.2 3.6
Goods Movement	Office of Goods Movement	Cal EPA, CARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					**2.72**	**18.18**

Caltrans Director's Policy 30 (DP-30) Climate Change (June 22, 2012) is intended to establish a Department policy that will ensure coordinated efforts to incorporate climate change into Departmental decisions and activities.

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Caltrans Activities to Address Climate Change (April 2013)[34] provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce greenhouse gas emissions resulting from agency operations.

To the extent that it is applicable or feasible for the project, and through coordination with the project development team, the following measures would be included to reduce GHG emissions and potential climate change impacts resulting from the project:

1. Landscaping reduces surface warming and, through photosynthesis, decreases CO_2. The project proposes planting in the intersection slopes, drainage channels, and seeding in areas adjacent to frontage roads and planting a variety of different-sized plant material and scattered skyline trees where appropriate, but not to obstruct the view of the mountains. Revegetation efforts would help offset a potential increase in CO_2 emissions resulting from the project.

2. The project would incorporate the use of energy efficient lighting, such as LED traffic signals. LED bulbs cost $60 to $70 each, but last five to six years, compared to the one-year average lifespan of the incandescent bulbs previously used. LED bulbs consume 10 percent of the electricity of traditional lights, which would also help reduce CO_2 emissions.[35]

3. According to Caltrans Standard Specifications, the contractor must comply with all local Air Pollution Control District's rules, ordinances, and regulations regarding air quality restrictions.

In addition to the proposed project, Caltrans and the California Highway Patrol are working with regional agencies to implement Intelligent Transportation Systems (ITS) to help manage the efficiency of the existing Route 101 highway system at other locations outside the project limits. ITS is commonly referred to as electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

Caltrans also coordinates with the Humboldt County Association of Governments, County of Humboldt, and local public transit agencies to promote and provide ridesharing services, park-and-ride facilities, and non-motorized transit improvements to help manage the growth in demand for highway capacity.

[34] http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/projects_and_studies.shtml

[35] Knoxville Business Journal, “LED Lights Pay for Themselves,” May 19, 2008 at http://www.knoxnews.com/news/2008/may/19/led-traffic-lights-pay-themselves/.

Statewide Adaptation Strategies

"Adaptation strategies" refer to how Caltrans and others can plan for the effects of climate change on the state's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damage to roadbeds from longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA), released its interagency task force progress report on October 28, 2011[36]. This report outlines the federal government's progress in expanding and strengthening the nation's capacity to better understand, prepare for, and respond to extreme events and other climate change impacts. The report provides an update on actions in key areas of federal adaptation, including building resilience in local communities, safeguarding critical natural resources such as freshwater, and providing accessible climate information and tools to help decision-makers manage climate risks.

Climate change adaptation must also involve the natural environment as well. Efforts are underway on a statewide-level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. Results of these efforts would help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, then-Governor Arnold Schwarzenegger signed EO S-13-08 which directed a number of state agencies to address California's vulnerability to sea level rise (SLR) caused by climate change. This EO set in motion several agencies and actions to address the concern of sea level rise.

In addition to addressing projected sea level rise, the California Natural Resources Agency (Resources Agency) was directed to coordinate with local, regional, state and federal public and private entities to develop The California Climate Adaptation Strategy (Dec 2009)[37], which summarizes the best-known science on climate change impacts to California, assesses California's vulnerability to the identified impacts, and then outlines solutions that can be implemented within and across state agencies to promote resiliency.

[36] http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation

[37] http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF

The strategy outline is in direct response to EO S-13-08 that specifically asked the Resources Agency to identify how state agencies can respond to rising temperatures, changing precipitation patterns, sea level rise, and extreme natural events. Numerous other state agencies were involved in the creation of the Adaptation Strategy document, including the California Environmental Protection Agency; Business, Transportation and Housing; Health and Human Services; and the Department of Agriculture. The document is broken down into strategies for different sectors that include: Public Health; Biodiversity and Habitat; Ocean and Coastal Resources; Water Management; Agriculture; Forestry; and Transportation and Energy Infrastructure. As data continues to be developed and collected, the state's adaptation strategy will be updated to reflect current findings.

The National Academy of Science was directed to prepare a Sea Level Rise Assessment Report[38] to recommend how California should plan for future sea level rise. The report was released in June 2012 and included:

- Relative sea level rise projections for California, Oregon, and Washington taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge and land subsidence rates.
- The range of uncertainty in selected sea level rise projections.
- A synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems.
- A discussion of future research needs regarding sea level rise.

In 2010, interim guidance was released by The Coastal Ocean Climate Action Team (CO-CAT), as well as Caltrans, as a method to initiate action and discussion of potential risks to the infrastructure of the state due to projected sea level rise. Subsequently, CO-CAT updated the Sea Level Rise guidance to include information presented in the National Academies Study.

All state agencies that are planning to construct projects in areas vulnerable to future sea level rise are directed to consider a range of sea level rise scenarios for the years 2050 and 2100 to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. Sea level rise estimates should also be used in conjunction with information on local uplift and subsidence, coastal erosion rates, predicted higher high water levels, storm surge and storm wave data.

All projects that have filed a Notice of Preparation (NOP) as of the date of the EO S-13-08, and/or are programmed for construction funding through 2013, or are routine maintenance projects may, but are not required to, consider these planning guidelines.

[38] *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (2012) is available at: http://www.nap.edu/catalog.php?record_id=13389.

The Notice of Preparation for the Eureka-Arcata Route 101 Corridor Improvement project was filed in 2001.

Executive Order S-13-08 also directed the Business, Transportation, and Housing Agency to prepare a report to assess vulnerability of transportation systems to sea level rise affecting safety, maintenance and operational improvements of the system, and economy of the state. Caltrans continues to work on assessing the transportation system vulnerability to climate change, including the effect of sea level rise.

Currently, Caltrans is working to assess which transportation facilities are at greatest risk from climate change effects. However, without statewide planning scenarios for relative sea level rise and other climate change effects, Caltrans has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once statewide planning scenarios become available, Caltrans will be able review its current design standards to determine what changes, if any, may be needed to protect the transportation system from sea level rise.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is an active participant in the efforts being conducted in response to EO S-13-08 and is mobilizing to be able to respond to the National Academy of Science Sea Level Rise Assessment Report.

Eureka-Arcata Route 101 Corridor Improvement Project Sea Level Rise Adaptation

While this project is not subject to the planning guidelines in the Executive Order S-13-08 because its Notice of Preparation was published (in 2001) prior to the Executive Order, the proposed project is within both the Coastal Zone and the 100-year floodplain. For this reason, this section includes a discussion of potential sea level rise effects.

AFFECTED ENVIRONMENT

The California Ocean Protection Council established the Sea Level Rise Task Force of the Coastal and Ocean Working Group, which released the Sea-Level Rise for Coasts of California, Oregon and Washington (National Research Council, 2012), and an update in 2013 (National Research Council, 2013). The California Coastal Commission Sea Level Rise Policy Guidance (Draft 2013 and Final 2015) reiterated the above studies and recommended adjusting for local variance based on geologic uplift or subsidence. Table 4-2 represents estimates of Sea Level Rise following the above approach from Northern Hydrology and Engineering (2015) using the estimates for Mad River Slough. Rates of subsidence vary throughout the Humboldt Bay area and may be lowest along the east and south portions of Arcata Bay where the 101 Corridor is located (Patton 2014).

M E M O R A N D U M

FROM: John D. Dixon, Ph.D., Ecologist

TO: Melissa Kraemer, North Coast District Supervisor

SUBJECT: Mitigation for Wetland Impacts along the Eureka-Arcata Highway 101 Corridor

DATE: December 10, 2018

Documents reviewed:

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As a result of recent wetland delineations and other biological surveys, the size and location of wetlands and other habitat types at the Lanphere parcel have been revised. The most accurate depictions of habitats and the current recommendations for mitigation by Caltrans are contained in Wall (2018), as modified by Mayor (2018), which supersedes all previous discussions. Caltrans has identified 9.32 acres of permanent impacts to wetlands falling under the jurisdiction of the California Coastal Commission. These wetland losses are unavoidable impacts from the Eureka to Arcata 101 Corridor Improvement Project. Caltrans also seeks to provide mitigation for 1.78 acres of permanent impacts from completed construction of the Humboldt Bay Trail North[1] and the estimated 6.10 acres of permanent impacts from the proposed construction of the Humboldt Bay Trail South for a total estimated wetland loss of 17.20 acres for all three projects[2]. In Table 2 of Wall (2018), Caltrans proposed 49.19 ac[3] of mitigation for these impacts. The proposed mitigation is shown in Table 1.

Table 1. Compensatory mitigation proposed by Caltrans (Wall 2018) for unavoidable wetland impacts from the Eureka to Arcata Highway 101 Corridor Improvement Project and the North and South portions of the Humboldt Bay Trail. Mitigation types accepted by the Coastal Commission in past actions are in bold.

Mitigation Type	Area (ac)
Creation of palustrine and estuarine wetlands from uplands	**2.76**
Preservation of palustrine wetlands	11.33
Enhancement of palustrine wetlands through weeding and planting	7.04
Conversion of palustrine wetlands to open water	0.33
Substantial restoration (reestablishment) of tidal wetlands from palustrine	**26.79**
Enhancement of adjacent uplands	3.70
Subtotal	51.95
Wetland fill from the creation of levees or dikes	2.66
Net proposed mitigation credit	49.29[3]

In past actions, the Coastal Commission has provided mitigation credits for wetland creation from uplands and for substantial restoration of existing wetlands. The latter generally includes significant improvements to hydrology and often has involved reestablishing a marine connection to former tidelands. The Commission has not granted mitigation credits for upland enhancement, for wetland enhancement, or wetland preservation, except in a few special circumstances.[4] Therefore, of the mitigation proposed, 2.76 ac of wetland creation and 26.79

[1] Mitigation for the City of Arcata's construction of the Humboldt Bay Trail North was approved by the Coastal Commission (application 1-16-0122 approved on 10/05/16). The trail has been constructed and the approved compensatory mitigation has been partially completed. There remain 2.26 ac of required mitigation that Caltrans intends to provide at the Lanphere parcel.

[2] Wall (2018) shows 17.68 ac of wetland loss, but this includes a mitigation requirement for the north bay trail. Wall's Table 2 shows actual wetland loss for all projects except for the north trail. The actual impact of the latter was 1.78 ac, for which 2.26 ac of mitigation are outstanding. The latter figure was included in the net impact table.

[3] This should be 49.29 ac; 0.10 ac of net increase in wetlands (2.76 creation minus 2.66 ac wetland fill) was not included in Table 2 of Wall (2018).

[4] One of the few examples is the Caltrans and San Diego Area Governments Public Works Plan and Transportation and Resource Enhancement Program for the I5 Highway expansion in San Diego County (Items W17a, W18a-d, W19a July 24, 2014 Commission Hearing) where, in addition to substantial wetland restoration, habitat preservation was part of a complex mix of compensatory actions for advance mitigation for project impacts. Another example concerns mitigation for wetland impacts from the Del Norte Regional Airport Improvement Project (CDP 1-13-009 approved 9/12/13). Wetland creation at a 1:1 ratio was required, but the

ac of substantial restoration (reestablishment of tidal wetlands) would no doubt be accepted for mitigation credit by the Commission, for a total mitigation credit of 29.55 ac.[5] In cases of mitigation for habitat impacts due to development projects, the Commission has considered the conversion of one wetland type to a higher functioning, generally historically present type as self-mitigating, i.e., a mitigation ratio of 1:1. However, where wetland fill is required to implement the mitigation, the Commission has required its standard 4:1 (mitigation:impact) mitigation ratio for wetland loss[6]. This was the case for the San Dieguito wetland restoration conducted by Southern California Edison where levees were required to prevent deleterious impacts to coastal processes.[7] This would also be the case for the proposed restoration at the Lanphere parcel where there is planned to be 2.66 ac of wetland fill for construction of "eco-levees" that are necessary to protect adjacent sensitive habitat. At a 4:1 mitigation ratio, this would require 10.64 ac of mitigation. If the needed 2.26 ac of mitigation for the north Bay trail were accommodated at Lanphere, there would remain 16.65 ac of mitigation credit for the remaining 15.42 ac of project impacts. At the Commission's usual requirement of 4:1 mitigation for wetland impacts[8], there is a shortfall of 45.03 ac of mitigation. These calculations are summarized in Table 2.

additional 3:1 required mitigation included preservation of appropriate habitat at the Pacific Shores Subdivision where mitigation credit was proportional to the quality of the native habitat.

[5] If the 0.33 ac of conversion to open water is part of the creation or substantial restoration of wetlands, it could also be credited.

[6] This has not been a requirement for non-compensatory, voluntary habitat restoration projects.

[7] Application 6-04-88 approved on 10/12/05.

[8] Compensatory mitigation is generally required at a greater than 1:1 ratio because of temporal losses of ecosystem functions and because of the significant uncertainty of created or restored habitats providing the functions of undisturbed natural systems. Temporal losses occur because mitigation projects are generally constructed months or years after the environmental impacts being mitigated and because created or restored habitats generally do not provide all the desired ecosystem functions for many years. In addition, many mitigation projects never successfully mimic the natural systems they are intended to replace. Whether a project will eventually be successful in this context is subject to great uncertainty because monitoring requirements are usually quite short, typically three to five years, and the final "success" criteria are usually designed to assess whether the project appears to be on a trajectory to function naturally in the fullness of time rather than an indication that natural functioning has been achieved. There have been many studies of mitigation success over the last twenty years. Many of the frequent failures were because the projects were never started or never completed and so are not germane to a discussion of mitigation ratios. However, of those projects completed, many were not successful in the sense that they did not achieve the criteria in the regulatory permit. In an Orange County study, 55% of projects met all the permit requirements and an addition 35% met some requirements; however an evaluation of the habitat quality found that 16% of sites were successful and 58% were partially successful (Sudol & Ambrose 2002). In Indiana, it was found that a mitigation ratio of 2.5:1 was generally sufficient to compensate for a lack of success in habitat establishment, but the habitat quality and ecosystem functions were not considered (Robb 2002). Also, the necessary mitigation ratio varied depending on the difficulty of habitat establishment: 7.6:1 for wet meadow, 3.5:1 for forested wetland, and 1.2:1 for shallow freshwater marsh. These mitigation ratios did not take into account temporal losses. The National Resource Council (NRC 2001) evaluated compensatory mitigation in a subset of cases where sufficient information was available. They found that, overall, of 134 ha of constructed mitigation, 77-104 ha would be in compliance of permit conditions, but only 19 ha would be functionally equivalent to reference sites (Zedler 2004). It is because of these various considerations that Commission staff has consistently recommended and the Commission has concurred that a minimum ratio of 4:1 (mitigation acreage:lost acreage) be applied to mitigation for wetland impacts. It is generally the case that compliance success does not equate to ecosystem functional success and the available evidence indicates that most mitigation projects do not replace all important functions for many years. The assumptions underlying the establishment of mitigation ratios greater than 1:1 are that ecosystem functions over a larger area compensate for a lower level of function and that functions will increase over time, providing additional compensation.

Table 2. Project impacts, mitigation requirements, and mitigation credits.

Source of Impacts or Mitigation	Area (ac)	Mitigation Requirement or Credits (ac)*
Eureka-Arcata 101 Corridor Improvements	9.32	37.28
Humboldt Bay Trail South	6.10	24.40
Humboldt Bay Trail North	1.78	2.26
Eco-Levees at the Lanphere Restoration	2.66	10.64
Total Impacts:	19.86	74.58
Mitigation at Lanphere	29.55	29.55
Mitigation Shortfall:		45.03

* Calculated at a 4:1 ratio, except for the of the City of Arcata's Humboldt Bay Trail North project which has a 2.26 ac residual mitigation requirement at the Lanphere parcel per the Coastal Commission's 10-05-16 project approval.

Although Caltrans may identify additional areas around Humboldt Bay for wetland creation or substantial restoration using traditional methods, it is clear that such opportunities are in short supply. A non-traditional restoration approach that is worth exploring involves the removal of invasive *Spartina densiflora*.

<u>Saltmarsh restoration through removal of *Spartina densiflora* within the Humboldt Bay Region as possible mitigation for wetland impacts</u>

The Humboldt Bay Region is defined as the area from the Mad River in the north to the Eel River delta in the south (Grazul and Rowland 2011). In 1854, the Bay (not including the Eel River delta) occupied about 25,800 ac, including 15,300 acres of open water and inter-tidal mudflats and 10,500 acres of intertidal saltmarsh (Laird 2018). The great majority of intertidal habitats have been lost due to diking and conversion to agriculture. It is generally estimated that about 90% of the historical saltmarsh has been lost (H.T. Harvey 2012). Today the remaining saltmarsh acreage in the Humboldt Bay Region is something on the order of 1,545 ac (Laird 2018) to 1,677 ac (Schlosser and Eicher 2012). Grazul and Rowland (2011) don't provide an estimate of existing saltmarsh acreage, but estimate that 1,671 ac of saltmarsh are infested with *Spartina densiflora*. In short, *Spartina* is present in essentially all remaining occurrences of saltmarsh within the Humboldt Bay Region. In 2001, it was estimated that 94% of saltmarsh areas in Humboldt Bay and the Mad River Estuary were occupied by cordgrass, with dense (>70% cover) infestations in 68% of the area; and, further increases in its distribution and abundance were considered likely (Pickart 2001). Grazul and Rowland (2011) estimated the abundance of Spartina in three cover classes: 1-25%, 26-60%, and 61-100%. Within the Humboldt Bay Region, the proportions of saltmarsh with low, medium, and high density *Spartina* infestations are 35%, 28%, and 37%, respectively.

Generally, the Commission has regarded the removal of non-native species as simply weeding and falling under enhancement rather than substantial restoration and has not provided mitigation credit. However, *Spartina densiflora* profoundly alters estuarine habitats by replacing native plant species (Pickart 2012), reducing algal cover and diversity (Augyte and Pickart 2014), reducing net primary productivity (Lagarde 2012), increasing detritus and sedimentation (H.T. Harvey 2012), altering invertebrate species composition (Mitchell 2012) and invading mudflats (Grazul and Rowland 2010). Where *Spartina* is abundant, the native estuarine habitat is essentially gone and where *Spartina* is present, it usually increases over time. Therefore, *Spartina* removal can reasonably be considered “substantial restoration.” However, the amount of mitigation credit given for *Spartina* removal should generally be proportional to its abundance since dense infestations have more serious ecological consequences than infestations with low cover. The only estimates of cover are from Grazul and Rowland (2011). The best estimate of the average cover within each cover class is the midpoint. If one assumes that the impact of the *Spartina* infestation is a linear function of cover, then the average cover within a restoration area is a reasonable basis for mitigation credit (Table 3).

Table 3. Area of *Spartina* removal necessary to mitigate for one acre of wetland loss, assuming the ecological benefits of removal are proportional to *Spartina* cover.

Spartina Cover Class (%)	Midpoint Estimate of Average Cover (%)	Area (ac) of *Spartina* Removal Required to Mitigate for 1 Acre of Wetland Loss
1-25	13.0	7.69
26-60	43.0	2.33
61-100	80.5	1.24

There may be circumstances that would warrant granting of higher credits for the removal of low-cover infestations. For example, the Mad River Slough has a relatively high amount of saltmarsh and a relatively low level of infestation compared to other areas in the region. It also supports relatively high abundances of rare saltmarsh plant species. If a mitigation project were to complete the removal of *Spartina* from the entire sub-region, providing credits at the next higher cover classes might be reasonable. I have not found a study that assigns priority to the various saltmarsh, brackish marsh, and mudflat areas infested with *Spartina*. Proposals for *Spartina* removal for mitigation credit should provide a justification for the location proposed and the latter should be a discrete area where complete removal is possible. *Spartina* removal should not be proposed for plots that would be closely surrounded by untreated areas that would provide a constant source for reinvasion.

For *Spartina* removal to be meaningful, it must be long-lasting. Unless *Spartina densiflora* is completely eradicated from the Humboldt Bay Region, this means monitoring and maintenance removal in perpetuity. Therefore, in order for mitigation credit to be given, there must be a non-wasting endowment to fund those activities. *Spartina* removal generally requires intensive activity for about two years (H.T. Harvey 2012). By the third year, the native saltmarsh community generally will have substantially recovered, and treatment intensity will drop to one or two treatments per year to address *Spartina* that reinvades the site. When native species approach 100% cover the need for maintenance can be expected to decline further, but periodic monitoring will be required in perpetuity. Estimates of the necessary frequency of monitoring and the probable level of maintenance activities are needed in order to determine the size of the monitoring and maintenance endowment. Some of this cost information is contained in H.T. Harvey (2012). The U.S. Fish and Wildlife Service is spending about $40,000 per year for the long-term maintenance of a 300-acre restoration where *Spartina densiflora* of a mix of densities was removed (A. Pickart personal communication December 6, 2018). This is about $133 per acre for long-term monitoring and maintenance, which, in this case, takes the form of visiting and treating subareas every two years. An issue that would have to be resolved is identification of the entity that would be responsible for monitoring and maintenance under the endowment. Although the actual work might be undertaken by private individuals or organizations, the contracting and oversight should probably be the responsibility of a public institution.

Prior to the initiation of monitoring and maintenance under the endowment, the entity requiring mitigation will be responsible for restoration success. Pickart (2012 and personal communication December 6, 2018) found that after *Spartina* removal the native saltmarsh community recovered rapidly with canopy closure (c. 100% cover) after two to four years. The cover of *Spartina* was then generally less than 1%, which is considered the maintenance level of cover in restoration areas (Pickart 2018). However, the native plant cover varies with elevation and is generally lower in lower intertidal areas. Proposals should include success criteria with a scientific rationale appropriate to the area undergoing restoration. I suggest as possible success criteria for saltmarsh and brackish marsh the following: < 1% cover of *Spartina* and ≥ 80% native cover after 5 years. The actual native cover appropriate for such a criterion will be a function of location within the Bay and position within the intertidal zone. Where there are nearby areas of marsh with low cover of *Spartina*, the success criterion may take the form of a statistical comparison to a reference area.

Another issue that must be addressed is permission from the various public and private landowners of tide lands. Landowners that would like invasive *Spartina* removed would have to enter into a Memorandum of Understanding that would provide access for both the initial removal activities, and for long-term monitoring and maintenance.

Finally, staff and the Commission will have to determine on a case-by-case basis the location and types of wetland impacts that can appropriately be mitigated by the removal of *Spartina densiflora*. In the case of wetland impacts associated with improvements to the Eureka-Arcata Highway 101 corridor and construction of the Bay trail, the wetlands all occur on former tidelands, are close or adjacent to existing tidelands, and are estuarine or palustrine wetlands that are constrained by existing infrastructure. Even some of the wetlands categorized as palustrine may experience saltwater intrusion with high tides or storm surge. Although saltmarsh restoration may be somewhat out-of-kind, I think it is appropriate in this instance. In prior actions, the Commission has granted mitigation credit for saltmarsh restoration through *Spartina* removal for wetland impacts associated with construction of the Bay Trail North (City of Arcata application 1-16-0122 approved 10-05-16) and for the impacts to marine resources through the impingement and entrainment of marine organisms by a hatchery seawater intake (Coast Seafoods application 9-16-0033 approved 06-08-16).